



Shire of Campaspe  
 Greater Shepparton City Council  
 Shire of Moira

# Campaspe, Greater Shepparton and Moira Regional Rural Land Use Strategy



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**FINAL REPORT**    **OCTOBER 2008**



GREATER SHEPPARTON



MOIRASHIRE  
 ON THE MURRAY



in association with



Supported by  
 the Victorian  
 Government



# Campaspe, Greater Shepparton and Moira

## Regional Rural Land Use Strategy

October 2008

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Greater Shepparton City Council  
Shire of Campaspe  
Shire of Moira


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# 1. Introduction

Parsons Brinckerhoff, in conjunction with RM Consulting Group, have been engaged by the Shires of Campaspe and Moira and the Greater Shepparton City Council to prepare a rural land use strategy for the three municipalities that provides a consistent regional response to the management of rural land.

The key objective of this rural strategy is to secure and promote the future of agriculture across the region through the respective Council planning schemes. This strategy will ensure that the planning schemes of the three municipalities are responsive to rural issues, and in particular support agricultural growth and change.

Currently the three planning schemes recognise the value, significance and challenges facing agriculture and rural land. The planning schemes also consistently recognise the general directions required to support ongoing agricultural viability. Inconsistencies presently exist in terms of specific controls for subdivision and dwellings. This strategy will provide a consistent basis to a revised approach.

Further, the strategy will review the ongoing role of agriculture in the region. It is considered pertinent to review the direction and value of agriculture in light of recent changes and challenges such as drought and the opportunity for a new approach to managing the irrigation system on which the region is dependant.

The study area includes the three municipalities of Campaspe, Greater Shepparton City Council and Moira. As well as being Victoria's key agricultural area in terms of productivity and diversity, the region produces a significant proportion of the country's dairy and horticulture product. Incorporating the Goulburn Valley, known as the Foodbowl of Victoria, the study area also includes a diverse landscape that is predominantly agricultural land including large dryland agricultural areas. The study area is dissected by both the Campaspe and Goulburn Rivers that support riparian vegetation and provide opportunities for irrigation. Significant areas of remnant vegetation are also located within the study area including both the Box Iron bark forests of Rushworth, the Pathos Plains north west of Echuca and the Red Gum forests of Barmah. The study area is framed along its northern boundary by the Murray River that runs the length of Moira Shire and the northern extent of the Shire of Campaspe. In addition to on-farm production, processing and packing of agricultural produce is the core of the regional economy. Recent years have also seen some rural land placed under pressure for conversion to rural residential and tourism uses.

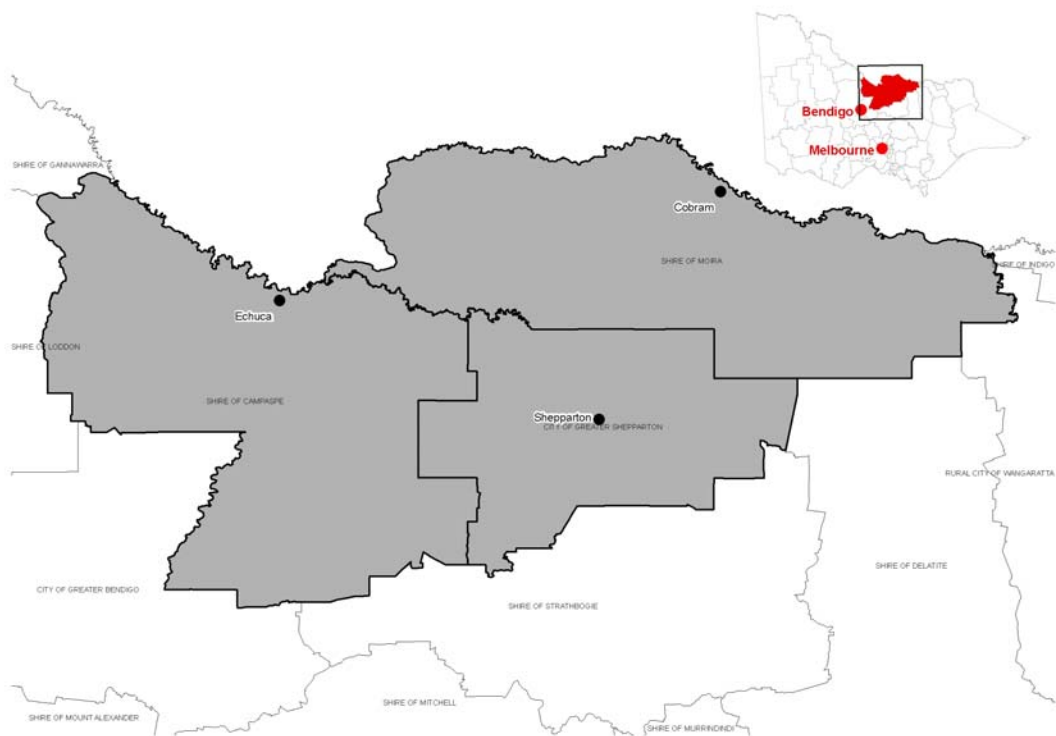
This plan needs to determine the appropriate location and balance between these rural land uses, and contribute to managing the social, economic and environmental implications of landscape change.



## 2. Developing a vision for managing the rural landscape in this region

The Campaspe, Greater Shepparton and Moira Regional Rural Land Use Strategy (RRLUS) is a unique and bold **initiative** by three Councils to provide a framework to manage the land use and development of their rural areas and to facilitate future investment. Working in concert, the three Councils are using a strategic approach implemented through consistent supporting planning scheme provisions to assist in securing and sustaining the productive capacity and employment base of their region (Figure 2-1).

This strategy seeks to advance this initiative by grounding proposed planning provisions with a clear objective of supporting and maintaining the region's strengths. This also means ensuring the adaptability and flexibility of rural land resources and production infrastructure into the future.



**Figure 2-1: The Region including City of Greater Shepparton and Shires of Campaspe and Moira**

### 2.1 Strong productive region

Irrigated primary production and the processing of that product underpin the Region's economy. The level of production is nationally important; for instance the region is responsible for

- 25% of the nation's milk production
- 90% of the national deciduous canned fruit production
- 45% of Australia's stone fruit crop
- 90% of the national tomato processing production.

The annual total value of agricultural production at the farm gate is in the order of \$1.2 billion. The food-processing sector produces an additional \$1.7 billion in income for the regional economy (Goulburn Broken Catchment Management Authority 2006). This sector alone invested around \$1 billion during the 1990s in processing and handling equipment, infrastructure and refitting.

The region's workforce is heavily dependent on the whole agricultural sector with about 8,500 people directly involved in agricultural production on farms, and an estimated similar number involved directly and indirectly in the processing of that product. An example of a service industry indirectly related to the production and processing of agricultural product is the transport sector that has grown in the region to become the nation's greatest concentration of employment and equipment in the trucking industry accounting for 4% of employment in the Goulburn Murray region (Department of Victorian Communities 2006).

### **2.1.1 The Irrigation base**

Despite the economic prominence of the whole agricultural production and processing sector the region's irrigation infrastructure, upon which much of this production is dependent, is ageing and inefficient. But that infrastructure must continue to be competitive with other regions, such as areas downstream along the River Murray and interstate, or it will become unviable for those remaining businesses and the economic base of the region will diminish. In order to address this situation a package of modernisation, known as the *Northern Victorian Irrigation Renewal Project (NVIRP)*, will encompass reforms and initiatives relating to land use, resource management and further investment in water infrastructure that are designed to ensure the long term future of the region.

Fundamentally this modernisation is proposed to involve a massive transformation of an irrigation system, essentially designed for agriculture in the early 1900s, to a system that will support an automated, low energy and regionally competitive system. This new system will supply large volumes of water to strategic areas and at service levels that match the customer's needs, particularly those that drive the economic engine of the region and thereby facilitate continued growth and major new investment in agribusiness. Dairy and horticultural activity based on irrigation are likely to continue to be the foundation industries in the regional economy, and grazing and cropping on dryland are, and will remain, very important elements.

In terms of irrigation, the region's economic performance, scale and value of production is generated by around 20% of water users who use over 80% of the water. Others on the irrigation supply system rely on these larger volumes of water to be delivered into the system to retain their own cost competitiveness.

In both irrigation and dryland production the drivers of future successful agribusinesses, regardless of the scale of enterprise, are likely to be:

- Continuing current trends for significantly increased scale of production (to spread increased overhead costs and to justify investment in technology). Increased scale is achieved by expanding the land area of production and/or by increasing the intensity of the production system
- A shift to individual management of their own business risks (e.g. consolidation into contiguous properties to manage all their own water supply).
- Agribusinesses that seek to minimize the number of neighbours (to reduce negotiation over land management and production processes and health and safety restrictions).

- Agribusinesses that expand into land that is priced competitively because it is used for agriculture rather than having inflated land values because it has been subdivided for hobby farms.

Successful agribusinesses of the future will need lower production costs than currently prevail; this will be achieved through further increases in the scale of operation. Increased scale will help businesses meet requirements for enhanced reporting on duty of care, as well as greater needs to manage their own marketing and risks, including financial risk. In addition, agribusinesses of the future will need to become even more globally competitive and operate in a demonstrated environmentally sustainable manner. In order to meet these future requirements, agribusinesses will need to maintain an adequate water supply and will be likely to construct and manage their own water distribution. They will require an irrigation supply system that increases the efficiency of supply and provides the flexibility needed for changes to scale of operation and land use. These initiatives, while specifically relating to the land use and management of the region's rural areas, directly impact on the future profile and prosperity of the whole region.

The RRLUS is predicated on five key elements

1. The region is Australia's productive food bowl based primarily on dairy products and fruit production.
2. The scale of production has resulted in Australia's greatest regional concentration of food processing industries and workforce.
3. The economy and the liveability of the region are integrated with and dependent on agriculture and its continuation.
4. The series of water reforms and the potential for new areas to be opened up for intensive production provide opportunity for expansion in the level of agricultural production.
5. The region natural assets and ecosystem services provide significant contribution to the productivity and sustainability of the region.

In order to maintain the region's pre-eminent position and to provide the climate under which future investment will take place various economic, resource and development factors need to be in place. One is obviously securing the region's long term water resources (that, in itself, relies on securing the agricultural base), another is providing the conditions under which new privately led water infrastructure investment to service the expansion of agricultural production can take place. It is increasingly evident that such prospective agricultural investment is jeopardized, deterred, or completely lost by land uses and developments that have the potential to compromise the scale and location of such investment. Large-scale multi million-dollar investment in agricultural investment is far less likely if prospective investors are confronted with land that is already fragmented in ownership with housing dispersed throughout or adjoining it.

### **2.1.2 Dryland farming**

A substantial proportion of the land area supports dryland farming enterprises. These are mostly mixed farm businesses producing livestock and growing cereals (usually wheat, oats or barley) and some legumes and oil seeds. Sheep raising for wool or fat lamb production and cattle for beef production, are the main dryland livestock enterprises.

Regional data on output and gross value of agricultural production (by commodity) does not differentiate between dryland and irrigation production which means that it is difficult to report on the significance of the dryland contribution to the region as a whole. Dryland farming is,

however, substantial and it should be noted that much of the commentary and discussion in this strategy is applicable to both irrigation and dryland businesses because they are similarly impacted by planning and land use pressures occurring throughout the region.

### **Farm Business Structures**

In common with other agricultural regions, farm business within the three Shires comprise a mix of single family, multi family and corporate owned businesses producing a single commodity or a variety of commodities that may or may not have some level of on-farm processing. This diversity of business structures is a reality of modern agriculture and demonstrates that there are many different models for running a profitable agricultural business. The RRLUS does not suggest that there is any one preferred model but is based on land use planning principles that will accommodate a variety of businesses models and ensure that from a land use perspective businesses can adapt to change such as new markets, new technology and emerging risks.

## **2.2 Decision time for the region**

Essentially the region finds itself early in the twenty first century at a fork in the road in relation to the future rural landscape, its productivity and its capacity to drive and deliver substantial investment in agriculture and in turn in local processing and production. One path secures the future by strengthening the existing agricultural and economic base; the other path will lead to the erosion of that base and an increasing reliance on new but uncertain sources of prosperity. In essence, to a significant degree, the long-term prosperity of the region is directly linked to the choices made in respect to the key elements of the RRLUS, because the RRLUS has the capacity to considerably strengthen the chances of the expected agricultural investment occurring. Conversely if the strategy is not pursued, particularly in respect to managing proposals for the subdivision of agricultural areas, the building and location of new dwellings and other non-agricultural uses and developments, the future could be quite different.

### **2.2.1 Steady as it goes**

The least contentious path may appear to be a continuation of current arrangements and past practices. Generally it involves supporting the continued fragmentation of agricultural land in many localities and the development of housing and other non agricultural uses with little or no regard as to whether it will impact on current farming and horticulture and the likelihood of future investment, adaptability and flexibility. That decision-making regime is largely driven by short-term horizons, local activism and parochialism. Its outcome is the cumulative impact of small-scale decisions. Each individual decision will not alter the destiny of the region. However over time the collective impact of these decisions will continue to reshape the region because of the increasing likelihood that large-scale investors in food production will look to other regions where they can find much greater certainty and situations that are more conducive to risking large amounts of capital. This will, in time, reduce the level of production from the region, reduce the importance of the region compared to other areas and reduce the level of investment in processing and services with consequent impacts across the whole economy and social fabric.

### **2.2.2 Bold future**

The alternative path is tougher. It means being much more decisive when options for development are advocated. Choices are about long-term and region-wide gains against short-term individual concerns and individual financial outcomes. It means looking beyond

individual speculative expectations and supporting a large-scale investment climate, which will produce flow-on impacts with wider beneficial regional outcomes. It means recognizing that the RRLUS is a core component of a wider set of measures and initiatives that collectively can much better secure the economic future of the region. The political will needed to carry this out now and into the future should not be underestimated.

The RRLUS and the planning scheme provisions that assist its implementation cannot, alone, bring about this substantial regional change and the anticipated level of continued and new investment in agriculture. But the whole package of reforms associated with the *NVIRP* has a much greater chance of failing to come to fruition and deliver its projected benefits if the RRLUS is not effectively adopted and then appropriately implemented through planning scheme provisions and, finally, administered in a way that is consistent with the objectives of the strategy. Without the RRLUS and its implementation through a new planning scheme regime, particularly in respect to certain key decisions on land use and development in various areas, it will be practically impossible to realise the benefits of the modernisation project.

### 2.2.3 Growth areas

The core of the RRLUS is to ensure that those large-scale areas where major future agricultural investment is likely to occur are not compromised by ad hoc land uses and developments including the subdivision of land and its fragmentation in ownership. For the purposes of the RRLUS this area has been termed **Growth**. Future investors do not want operations that may be limited or compromised by countless neighbours and residential amenity issues. Therefore the RRLUS has at its central piece the identification and zoning of areas that are and should remain essentially exclusive farming areas and have the capacity and potential for significant further agricultural development. These are areas where substantial future investment in horticulture and large scale agriculture both irrigation based and dry is likely because it is attractive to both existing and new major agricultural producers and business consortiums. In addition these areas include land previously identified as **Prime Development Zones**<sup>1</sup> for agriculture either with access to irrigation or operated as dryland properties.

The level of planning control required to be delivered in these areas by the respective Councils will be to effectively prevent any further fragmentation of this land, to not provide for inappropriate dwellings to be constructed and to prevent any other uses and developments that are not consistent with agriculture. In terms of the planning scheme provisions this will in essence mean that there will be no basis for the further subdivision of any more lots, no new dwellings will be required and uses that are not related to or support agricultural production will not be required. This may be seen as a restrictive regime but it reflects the outcomes of the strategy and the importance of the regional goals. In terms of the manner in which the provisions of planning schemes are expressed this will mean statements in the Municipal Strategic Statement (MSS) to this effect, a Local Planning Policy encapsulating this in terms of decision making guidelines and relating the provisions in the Schedule to the Farming Zone to this policy, in order to complement expanded minimum lot provision. The experience in the exercise of planning scheme provisions has been that minimum requirements become the standard. To address this, the RRLUS intends to prescribe larger minimum lot sizes and

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<sup>1</sup> Prime Development Zones are detailed in Section 4.4.2 of the report. These areas are land that have been identified as capable of accommodating new investment into high-value irrigation development. To ensure clarity with reference to other land use zones (in accordance with the Victorian Planning Provisions) these areas are referred to as Agricultural Development Areas.

promote development standards that ensure the development proposals must be justified against strategy and the policy – that is implementing a full performance based approach to the implementation of a planning scheme.

#### 2.2.4 Remaining areas

At the second tier level the regional RRLUS encompass areas where agriculture is significant but where large-scale major investment in agriculture and water infrastructure is far less likely. These are productive areas both irrigated and dryland. But these areas comprise one or more and usually many of the following characteristics; comparatively smaller agricultural holdings, fragmented ownerships, dispersed residential properties with limited relationship to agricultural use, non agricultural uses and developments, outmoded or inefficient water infrastructure, highly productive land parcels amidst non agricultural uses, conflicts between competing and non-compatible land uses, rural holdings primarily used for lifestyle reasons, and some areas where land values considerably exceed the productive value of the land.

While these areas are often complex in their range and mixture of land uses and development and display significant variation in productivity they can be broadly divided into four areas based on the dominant land uses and relationships to agricultural land uses.

1. Areas where productive agriculture is the predominant land use. Further investment in agriculture is likely in these areas, but the relatively smaller size of most of the holdings, the fragmented pattern of land ownership and the older irrigation infrastructure is likely to make these areas far less attractive for large scale agricultural investment. For the purposes of the RRLUS this area has been termed the ***Consolidation*** area. Under the Victorian planning system these areas should be zoned Farming and include necessary minimum lot size provisions in the accompanying Schedule to the Farming Zone.
2. Areas where productive agriculture is a significant land use but there are many properties that do not rely on a productive agricultural return and they are often increasingly hosting a range of urban related uses. While there may be some further investment in productive agriculture it is increasingly unlikely as the cost of purchasing land far exceeds a productive return from the area and the amenity impacts of further agricultural uses limit opportunities. Investment in agriculture will be largely based on the existing lot configuration and is likely to increasingly involve niche and specialist products. They are farming areas but they are being transformed by demand into areas where the dominant household basis is a form of rural living. For the purposes of the RRLUS this area has been termed the ***Niche*** Area. The most appropriate zone for these areas is Farming but the detailed provisions of the zone should recognise the reality of the current land uses and the transition in role and function that is occurring in these areas and therefore to provide for flexibility in terms of further development of an appropriate scale and intensity.
3. Areas in rural settings where ownership is heavily fragmented, properties are small – often too small to support independently viable agricultural use other than at a hobby scale. Essentially these areas have become rural living or rural residential areas regardless of their formal zoning under the current planning schemes. The most appropriate zone for these areas is ***Rural Living***.
4. Areas where there is agricultural land use but it is essentially providing a setting or background land use and landscape for a variety of tourist and recreational developments that have located in the area. These areas are generally relatively small in area against the total area of the region and are often nearby to urban areas and major

tourist and recreation areas like rivers and forests. Under the provisions of the Victorian planning system these areas would be generally zoned **Rural Activity**.

5. The region's biodiversity values have been placed under considerable pressure through land clearance and fragmentation of vegetation as a result of land use and development. A number of areas contain significant conservation values on private land. These areas also provide opportunities for limited residential activity and some low intensity agriculture activity. Principally these areas long term future is concerned with maintaining and enhancing areas of biodiversity. These areas have been recommended to be zoned for **Rural Conservation**.

## 2.3 Planning Scheme provisions

The specific planning scheme provisions that would derive from the RRLUS relate to the Rural type zones. These are expressed through three proposed schedules to the Farming Zone; *Growth*; *Consolidation*; and, *Niche*, they include:

- Subdivision minimum sizes are recommended for enlargement and would be supported by a performance based approach. Each subdivision proposal would have to provide the justification and demonstrated need for the further creation of lots. The current situation is generally that an arbitrary subdivision size is set in the planning scheme provisions, Councils receive applications to subdivide land into lots of that size and because it complies with the provisions the application is granted. The lot size often bears no relationship to the intended land use and development of the land and its only virtue is that it complies with an arbitrary size based on a long forgotten historical rationale. It would be preferred to specify no minimum lot and rely on applications that justify their proposal against the strategy. However, the prescription of a minimum lot requirement is required to ensure the trigger for a planning permit. Proposals will be required to provide the justification for the subdivision against the Strategy and then Councils apply the decision making criteria consistent with the Strategy the result will be that there will be few if any subdivisions in the Growth and Consolidation areas and only a modest number in the Niche area.
- Excision<sup>2</sup> of existing houses from agricultural properties will not be necessary in the Growth area. There may be some situations in the Consolidation area where an excision will assist in the development of farming enterprises and far less likely in the Niche area because these areas are already extensively fragmented with supporting houses. In all three proposed farming zones, applications for excisions will be required to demonstrate how an excision will positively contribute to the strategic agricultural future of the subject property.
- New dwellings in the Farming Zone that do not meet the 'as of right' minimum lot requirement would require a planning permit and would need to be assessed against the purpose of the zone. In the Growth area there is no need or justification for additional dwellings, there are unlikely to be situations in the Consolidation area where a new dwelling will assist in the development of farming enterprises, but in the Niche area further dwellings may be needed to support the productive use of land.
- Tourism and recreation based development including accommodation and hospitality enterprises would need planning permits but there would be no basis for such uses in

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<sup>2</sup> Subdivisions, excisions, and re-subdivisions can often be misinterpreted, particularly as all planning tools may achieve the same outcome of an 'excised' dwelling from a farming operation. However, statutory planning instruments do clearly delineate the three. A plain English discussion outlining the difference in these statutory tools, and visual examples are included in Appendix G.

either the Growth area nor the Consolidation area but they may be justified in the Niche area where they do not compromise agricultural operations and production. Land where tourism and recreational based activities are the primary activity are more suitably located within the Rural Activity Zone.

Ultimately, the RRLUS is a core element among a suite of other policy and process that will impact across a wide range of issues that affect the whole region. That range of issues includes; the use of land, the allocation of water, the prospects for significant agribusiness investment, the long term future of industries that process local product, the jobs of the region's largest employment sector and all the businesses that depend on them. The scale of these issues and their relationships with the regional economy are at such a level that they are beyond regional significance and they impact at a state and national level.



### **3. The strategy development process**

This study was undertaken by Parsons Brinckerhoff (PB) in collaboration with RM Consulting Group. The project team included expertise in strategic and statutory planning, agriculture and land capability.

#### **3.1 Key project team members**

Key project team members were:

Trevor Budge – Project Director, PB

Carolyn Stephenson – Principal Planner, PB

Nick Byrne – Planner, PB

Andrew Butt – Senior Planner, PB

Felicity Brown – Senior Planner, PB

Jessie Keating – Planner, PB

Roger Standen - Agricultural Consultant, RM Consulting Group

Shelley McGuinness – Agricultural Consultant, RM Consulting Group

Greg Hughes – Greater Shepparton City Council

Colin Kalms - Greater Shepparton City Council

David Becroft – Shire of Moira

Richard Whiting – Shire of Campaspe/Moira

Andrew Cowin – Shire of Campaspe

#### **3.2 Study brief**

According to the Study Brief, the aims of this project are to:

- Provide each Council with a “Rural Land Use Strategy” that will, when taken with the “Rural Land Use Strategy” of the other Councils, secure and promote the future of agriculture across the Region.
- Provide the data, strategic justification and analytical basis for planning scheme amendments to give effect to the strategy.
- Implement the “Rural Land Use Strategy” as part of each Council’s Planning Scheme.

The objectives of the project are to:

- Develop a common vision, role and purpose for rural land to apply to each Council and Municipality.
- Investigate opportunities, constraints and options for diversifying land uses in the rural areas in suitable locations to support high value rural industries, intensive agricultural production, accommodate tourism demands and other appropriate uses which are compatible with the primary purpose of the rural areas.
- Investigate and identify sub-regions in each of the three Municipalities that require different strategies to support and promote appropriate and sustainable agricultural enterprises.

- Investigate options and develop strategies for those areas where water is no longer available.
- Develop a common set of policies and zone provisions that prevent the fragmentation of agricultural land as appropriate to the sub-regions.
- Develop policies and zone provisions, including the revision of existing schedules, to implement each Council's "Rural Land Use Strategy".
- Accurately map the outcome of each Council's "Rural Land Use Strategy" and provide justification for any Planning Scheme mapping modification.
- Investigate opportunities, constraints and options during the application of rural zones, in particular the Rural Conservation, for the protection of significant environmental areas or assets from inappropriate development or use.

### 3.3 Project stages

The methodology for this project involved review of existing material, primary data collection and consultation. One of the unique approaches adopted for this project was the significant involvement of the Councillors of the three Councils in the development of the direction for the strategy and the involvement of Council Officers of the three municipalities in the development of the implementation initiatives for the strategy.

The project methodology is outlined below.

#### 1. Research and Investigation of Issues

This stage of the project involved:

- Document review
- Investigations – Agriculture and Settlement
- Application of Investigations
- Councillor Workshop 1
- Planners Workshop 1

The purpose of this stage of the project was to gain an understanding of the issues facing the study area.

#### 2. Community Consultation

The community consultation consisted of a series of open days, where members of community could drop in and view initial research findings and discuss their issues and concerns one on one with a member of the consultancy team and Council representative.

As well as these general community sessions, a number of targeted sessions were also conducted on particular issues including water and the environment and economic development. Relevant agency staff were invited to these sessions as well heads of industry groups.

#### 3. 1<sup>st</sup> Joint Councillor Workshop – Regional Vision

The key aim of this project is to secure and promote the future of agriculture across the region through the development of consistent strategies and Objective 3.4 of the Project Brief required that the study develop a common vision, role and purpose for rural land to apply to each Council and Municipality. The study team recognised the significant challenge in bringing together the three groups of Councillors to develop a common position for the region.

A workshop was conducted on 4th September, 2007 at which the Councillors were presented with information about the challenges and values of rural land use across the region. At this workshop they developed some agreed principles for the region which enabled the project to proceed to the next stage.

#### **4. Joint Planners Workshop – Implementation**

Following on from the Councillors workshop a workshop was held with the Council Planning Staff to discuss and develop options to implement the direction set by the Councillors.

This workshop provided information to planning staff about the challenges and values of rural land use across the region, the role of strategy, the direction and principles adopted by Councillors and implementation initiatives to enable identification of suitable options to deliver the strategy. In conducting this workshop it was recognised that an understanding of the issues and the strategic regional context was a significant element of effective implementation of the strategy, along with the development of statutory planning tools.

#### **5. 2nd Joint Councillor Workshop – In principle approval**

The Councillors met for a third time in late February 2008 to confirm their commitment to the adopted vision and provide in principle approval for the Draft Strategy.

#### **6. Agency Workshop/Briefing**

A targeted workshop took place in March 2008 to discuss the proposed implementation of the strategy and outline the broad findings of the research that is encompassed in the RRLUS. This workshop included representatives from DSE, the Department of Primary Industries (DPI), Goulburn Murray Water and the DPCD with elected representatives and staff members from each of the partner Councils.

#### **7. Preparation of the Strategy document**

This stage of the project involved preparing the draft strategy including supporting documentation to justify the recommendations. This strategy document is to be initially prepared as a draft which was placed on public display for community feedback.

This strategy document includes sections addressing; agricultural issues and trends, processes of change in housing and population in the region, a discussion of environmental issues for consideration and an overview of the existing planning process with reference to limitations and alternatives and the process of community consultation. The final section of the report provides a strategic direction and recommendations based on the analysis and the context introduced in Chapter One above. A series of appendices provides further material for consideration.

#### **8. Public Display and Consultation**

The Draft RRLUS was placed on display for a 28 day period. During this time a series of information sessions were undertaken throughout the region. These sessions targeted consultant surveyors and planners, Council Officers; land management agencies and the regions community. During this period a total of 72 submissions were received. A summary of these submissions and responses are located in Appendix I.

#### **9. Finalisation of Strategy document**

A number of issues were raised during the public display period. These included clarification regarding the consultation program; ABS commodities data update and analysis; information regarding the alignment of agricultural principles that form the basis

for the RRLUS and the application to agricultural enterprise of all scales and whether it is dryland or irrigation.

## 4. Agriculture in the region

This chapter provides an analysis and discussion of the importance of agriculture across the region and within each municipality. It will also document trends and issues relevant to agricultural production such as irrigation infrastructure modernisation, water reform and agricultural development areas.

Sections 4.1 - 4.6 of the chapter provide an overview of the study area. Sections 4.7 - 4.9 provide a more detailed analysis and discussion of agriculture in each municipality. The 'region' or 'the study area' is used to describe the three municipalities as a single entity. The 'Shepparton Irrigation Region' refers to the combined irrigation districts across the three municipalities.

Throughout this report, data from the Australian Bureau of Statistics has been used to provide a picture of the current status and trends in agriculture across the region.

### 4.1 The region in a national context

Agricultural production and food processing is an important segment of the local economies in the Shires of Moira and Campaspe and the City of Greater Shepparton but are also significant nationally. For example, Victoria produces 65% of the national milk production. Twenty five percent of national milk production comes from the northern irrigated area of the state much of which is located in the study area (Dairy Australia 2006);

The region grows:

- 90% of the national deciduous canned fruit production;
- 85% of the national pear crop;
- 45% of the national stone fruit crop;
- 14% of the national fresh stone fruit crop;
- 16% of the national apple crop;
- 90% of the national kiwifruit crop (Department of Primary Industry 2006)
- 90% of Australia's tomato processing capacity is located in the study area (Department of Sustainability and Environment and Department of Innovation, Industry and Regional Development 2007).

Agricultural produce is consumed and processed locally as well as being exported. Food processing and manufacturing in the study area<sup>3</sup> is estimated to generate \$1.7 billion annually (Goulburn Broken Catchment Management Authority 2006) as well as providing a significant amount of employment across the region.

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<sup>3</sup> Figures are based on data generated from the GBCMA that commissioned a study into the food processing and manufacturing across the Goulburn Broken Catchment area and the entire area of the Shire of Campaspe.

The study area has the necessary combination of natural attributes for high-value agriculture:

- Excellent soil types.
- Mediterranean climate.
- Access to a secure supply of high quality water.



#### 4.1.1 Soil types

The soils of the irrigation areas, which represent the majority of the study area, have been extensively mapped and classified according to their suitability for irrigation. Appendix D shows that most of the land within the irrigation areas has attributes that make it highly suitable or suitable for irrigation such as good drainage and low salinity.

Land outside of the irrigation areas has been assessed as to its suitability for new irrigation development. A number of agricultural development areas<sup>4</sup> have been identified across the region that present an opportunity for further expansion of irrigated agriculture. The Agricultural development areas are discussed in further detail in Section 4.4.2 of this report.

#### 4.1.2 Land capability

Most of the land in the region is capable of being irrigated provided farm management practices address issues such as excessive leaching through highly permeable soil and waterlogging from low lying and impermeable soils.

Erosion is virtually non-existent in the irrigation region due to relatively flat topography (little water erosion) and generally heavier soils (little wind erosion).

Land deterioration hazards relevant to the irrigation area are less than for much of the dryland. Generally, on-site deterioration can take the form of; nutrient decline, waterlogging, soil salting, landslips, erosion (sheet and gully), soil structure decline. The first three are relevant to the irrigation region. Soil salting has been the subject of substantial changes to practice and management over the past two decades with improved water application methods and drainage and is now a manageable issue.

Most of the region has potential for waterlogging if water is not well managed and nutrient decline is addressed through the productive application of fertilisers and soil ameliorants.

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<sup>4</sup> Agricultural Development Areas (Prime Development Zones) have been identified (Loddon Murray 2000 Plus, 1998; SKM, 2000) as those areas capable of accommodating new investment into high-value irrigation development. Further detail regarding Prime Development Zones is outlined in Section 4.4.2.

There is limited land capability data for areas outside of the Agricultural Development Areas and the irrigation districts. There is, however, broad scale land capability information available for parts of the dryland region<sup>5</sup>. Basic information on landform, soil type, climate and susceptibility to degradation risk (erosion and soil compaction) provide an overall assessment of the land's capability in supporting agricultural and other land uses. More detailed land capability data is not required to verify the suitability of various dryland farming activities in the farming zones specified in this land use strategy.

### 4.1.3 Climate

The region has a Mediterranean climate with generally hot dry summers with an average temperature of 30°C between December and February (Bureau of Meteorology, <http://www.bom.gov.au/>). In winter, June to August, the average temperature is 14°C with sufficient cold days to achieve the necessary chilling requirement for bud initiation in fruit crops. The average rainfall is around 450mm, just over half of which falls between May and October.

The Department of Sustainability and Environment (2004) assessed the likely impacts of climate change on the Goulburn Broken Region. The report summarized the projected climate change for Goulburn Broken as follows:

- Annual warming of 0.3 to 1.6°C by 2030 and 0.8 to 5.0°C by 2070 - Day time maximum temperatures and night time minimum temperatures to rise at similar rate, with warming to be similar throughout the seasons.
- A 10 to 50% increase in the number of hot summer days (over 35°C) by 2030 and 20 to 400% by 2070.
- A 10 to 70% reduction in the number of frost days by 2030 and a 35 to 100% decrease in frost days by 2070.
- Annual precipitation decreases likely (changes of +3 to -15% by 2030 and +10 to -40% by 2070). Decreases likely in all seasons, but less so in summer and extreme heavy rainfall events may become more intense.
- Runoff in the Goulburn is estimated to decrease by 0 to 25% and 0 to 35% in the Broken by 2030. By 2070 the decreases in both river systems is estimated to be 5% to more than 35%.
- Droughts are likely to become more frequent and longer with dry conditions that currently occur on average on in every five years may increase to up to one in three years by 2030. Due to hotter conditions, droughts are also likely to be become more intense.
- Increased evaporation rates and drier soil likely, even if precipitation increases, with decreased average run-off in streams.
- Hotter, drier conditions likely to increase bushfire risk.

The report also assessed the potential impacts on farming systems and irrigation:

- Warmer temperatures, changing rainfall patterns, the fertilizing effect of increased atmospheric carbon dioxide levels, increased demand for water and fewer frosts will impact on productivity and the types of crops that can be grown.
- Farmers may be faced with more weeds and other invasive species as well as changing domestic and international markets.

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<sup>5</sup> Refer to *A Study of the Land in the Campaspe River Catchment* (1987) published by Department of Conservations, Forests and Lands, Land Protection Division, Victoria

- Dryland grazing and broad acre cropping in the Goulburn-Broken region are likely to benefit from higher CO<sub>2</sub> concentrations, but this may be offset by the effect of higher temperatures. An overall negative impact on production is more likely if substantial rainfall decreases accompany the warming.

Irrigated agriculture is very significant in the region and includes cropping, dairy and horticulture (fruit, vegetables, wine grapes). Likely reductions in overall water resources will reduce the volumes available for irrigation. In addition, crop water requirements will increase as temperatures and evaporation rates rise. These impacts will increase the need for more efficient use of water. Higher temperatures will also reduce winter chilling which is important for some fruit trees for setting fruit, and it may become necessary to consider low chill varieties and alternative management options. Viticulture in the region will be affected by possible reductions in grape quality due to higher temperatures. However, in some cases there will be opportunities to shift production to varieties that are better adapted to warmer climates. Warmer temperatures will also increase heat stress in dairy cattle, reducing milk production, unless management measures such as shade sheds and sprinklers are adopted.

All surface water resources north of the Great Divide are fully allocated, and water for new development must be transferred (traded) from existing entitlements. Any reduction in resource availability as a result of climate change has the potential to change the balance between consumptive uses and environmental entitlements and adjustments to entitlements may be required to restore this balance.

Based on the projected range of regional rainfall and potential evaporation changes, run-off has been estimated to decrease by up to 25% in the Goulburn and up to 35% in the Broken by 2030. By 2070 the decreases in both river systems are estimated to range from 5% to more than 35% by 2070. Climate change modelling indicates that the actual reduction in stream flows experienced over the last 10 years are (for most systems) similar to or greater than the reductions expected by 2055 as a result of medium to high climate change scenarios (Sustainable Water Strategy Northern Region, 2008).

While demand for water can be expected to increase as a result of increases in temperature and evaporation, this does not take into account possible offsetting impacts of changes in the seasonal patterns of rainfall. For example, if summer rainfall were to increase, it would help offset potential increases in irrigation demand as a result of increased summer temperatures.

It will be important that agribusiness has the flexibility to respond to the opportunities and threats brought about by climate change.

#### **4.1.4 Water supply**

Goulburn Murray Water (GMW) manages the water storages and irrigation supply and drainage system across the region. The Goulburn and Murray River systems, which supply the water to the study area, have historically had a very secure water supply with 100% or more of water right and licensed volume supplied in 97 years out of 100. This is due to the relative conservative approach taken to management of water allocation via application of the seasonal allocation principles (<http://g-mwater.dds.com>).

Over recent years, increased awareness about the river environment has seen several programs introduced to enable more water to remain in the river system. This impacts on water available for extraction for productive use, but is generally being accessed through the introduction of greater efficiency measures.



Ultimately, less sales water will be available for agriculture than historically was available. The recent extended dry period has seen inflows fall to record lows leaving allocations well below full entitlement.

There are two important groundwater resource areas in the region. These are the Campaspe Deep Lead Water Supply Protection Area, which covers 950 km<sup>2</sup> and includes parts of the floodplains of the Campaspe and Murray Rivers in the Rochester and Echuca areas (GMW 2007a). Secondly, the Katunga Water Supply Protection Area comprises 2100 km<sup>2</sup> and is located in the Murray and Goulburn Valleys extending from Yarrawonga in the east to Barmah in the west (GMW 2007b).

In the Campaspe groundwater resource area, the annual metered use increased from 23,112 ML in 2005/06 to 34,762 ML in 2006/07, which represented 87% of total allocation (GMW 2007a), while in the Katunga resource area, annual metered use increased from 21,614 ML in 2005/06 to 30,801 ML in 2006/07, which represented 74% of total allocation (GMW 2007b).

Groundwater resources within these protection areas are managed by Goulburn Murray Water in an equitable manner to ensure the long-term sustainability of those resources. Each Water Supply Protection Area is divided into allocation zones for management purposes (five in Campaspe and three in Katunga). Demand in many zones has been consistently high over the last four seasons due to prolonged drought.

## **4.2 Agriculture overview**

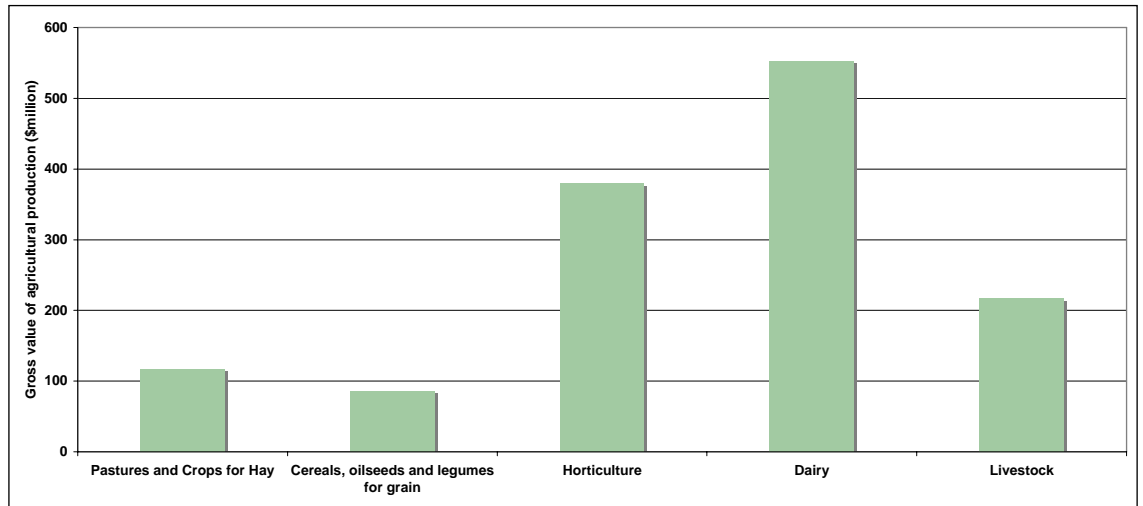
Agriculture across the three municipalities includes both dryland and irrigated enterprises. The study area covers about 500,000 ha, of which approximately 317,000 ha is irrigated and around 1.5 million megalitres of water is used for irrigation annually, depending on seasonal allocations.

The irrigated area of the study area is known as the Shepparton Irrigation Region (SIR). Appendix D (Figure AD-2) shows the land use across the SIR (note that this does not include all dryland agriculture in the study area). Irrigation is clustered in two main areas in the northern and central parts of the study area. The SIR comprises the Central Goulburn, Shepparton and Rochester-Campaspe Irrigation Areas which are supplied from Lake Eildon, and the Murray Valley irrigation area which is supplied with irrigation water from the Murray River. There are extensive areas of dryland farming to the east, west and south of the irrigation districts in the study area.

The major agricultural industries across the three municipalities are dairy, horticulture, particularly pome (apple and pears) and stone fruit production and sheep and cattle grazing for meat production (Figure 4-1). The total farm gate value of production for the three municipalities was \$1.4 billion in 2006 up from \$1.2 billion dollars in 2001. Forty one percent of this came from milk production, 16% from livestock and 28% from fruit and vegetables (ABS 2006).

In addition to the gross value of farm production, it is estimated that the food processing sector, particularly dairy, fruit and vegetables in the SIR produces an additional \$1.7 billion gross value of production and processing (Goulburn Broken Catchment Management Authority 2006). The major food processing sector and food manufacturers in the SIR invested over \$1billion in processing and handling infrastructure between 1990 and 2000 (Young 2001). There are also meat processing facilities and winemaking businesses across the study area.

Around 7,772 people in the three municipalities were employed directly on farm in 2006 (Table 4-2) mostly within the SIR. In addition to on farm employment, a significant proportion of the employment in manufacturing is associated with processing of local produce (Department of Primary Industry 2006). A trend analysis of employment in the three municipalities (Table 4-3) shows that contrary to other major employment sectors, employment in agriculture is declining. Manufacturing has also replaced agriculture as the major employer in the region. It should be noted that a large proportion of manufacturing would be associated with the processing of agricultural produce and servicing of the agricultural industries, particularly dairy and horticulture. Service providers include accountants, lawyers, real estate agents, and surveyors.



**Figure 4-1: Gross value of agricultural production (\$million) from major agricultural industries across the three municipalities (ABS 2006)**

**Table 4-1: Total farm gate gross value of production, by industry and municipality, 2001 (Department of Primary Industry 2006) and 2006 (Australian Bureau of Statistics, 2008) (\$000)**

LGA	Pasture and crops cut for hay		Cereals for grain		Oilseeds	
	2001	2006	2001	2006	2001	2006
Campaspe	\$25,309	\$40,640	\$24,038	\$20,711	\$2,100	\$1,721
Greater Shepparton	\$18,882	\$35,457	\$10,868	\$10,796	\$2,078	\$2,175
Moira	\$24,039	\$41,072	\$40,631	\$41,750	\$7,927	\$6,487
<b>Total</b>	<b>\$68,230</b>	<b>\$117,169</b>	<b>\$75,537</b>	<b>\$73,256</b>	<b>\$12,105</b>	<b>\$10,383</b>
<b>% of total FGVP</b>	<b>5.6%</b>	<b>8.6%</b>	<b>6.1%</b>	<b>5.4%</b>	<b>1.0%</b>	<b>0.8</b>

LGA	Legumes for grain		Vegetables		Fruit	
	2001	2006	2001	2006	2001	2006
Campaspe	\$1,349	\$1,237	\$30,017	\$23,452	\$8,153	\$25,875
Greater Shepparton	\$335	\$357	\$33,918	\$35,732	\$138,693	\$193,048
Moira	\$583	\$613	\$11,083	\$3,324	\$69,426	\$97,420
<b>Total</b>	<b>\$2,267</b>	<b>\$2,208</b>	<b>\$75,018</b>	<b>\$62,508</b>	<b>\$216,272</b>	<b>\$316,344</b>
<b>% of total FGVP</b>	<b>0.2%</b>	<b>0.2%</b>	<b>6.1%</b>	<b>4.6%</b>	<b>17.5%</b>	<b>23%</b>

LGA	Milk		Egg	
	2001	2006	2001	2006
Campaspe	\$222,743	\$236,637	\$13	\$435
Greater Shepparton	\$142,751	\$138,945	\$267	\$2,246
Moira	\$159,740	\$177,091	\$496	\$268
<b>Total</b>	<b>\$525,234</b>	<b>\$552,674</b>	<b>\$776</b>	<b>\$2,949</b>
<b>%of total FGVP</b>	<b>42.7%</b>	<b>41%</b>	<b>0.1%</b>	<b>0.2%</b>

LGA	Livestock and poultry slaughtered		Total value of agriculture	
	2001	2006	2001	2006
Campaspe	\$98,673	\$92,873	\$420,468	\$443,581
Greater Shepparton	\$57,314	\$62,019	\$411,943	\$480,777
Moira	\$74,804	\$62,305	\$395,205	\$430,330
<b>Total</b>	<b>\$230,791</b>	<b>\$217,197</b>	<b>\$1,230,616</b>	<b>\$1,354,688</b>
<b>%of total FGVP</b>	<b>18.8%</b>	<b>16%</b>	<b>100%</b>	<b>100%</b>

**Table 4-2: Employment in agriculture, forestry and fishing by local government areas 2006 (Australian Bureau of Statistics 2007, <http://www.abs.gov.au/>)**

LGA	Employment in Agriculture, Forestry and Fishing	Total Employment	Primary industries (%)
Campaspe	2,584	15,958	16%
Gr Shepparton	2,555	25,517	10%
Moira	2,385	11,575	21%

**Table 4-3: Employment in the study area: 1996-2006(Australian Bureau of Statistics 2007, <http://www.abs.gov.au/>)**

Employment Sector	1996	2001	2006
Manufacturing	6431	7906	7662
Agriculture, forestry & fishing	9118	8769	7524
Retail trade	4914	5739	6488
Health care & social assistance	3851	4676	5784
Construction	2394	2711	3875
Education & training	3018	3167	3498
Accommodation & food services	2698	2826	3064
Transport, postal & warehousing	1733	1966	2125
Wholesale trade	2194	2446	1902
Public administration & safety	1447	1220	1877
Other services	1802	1727	1827
Professional, scientific & technical services	1393	1648	1680
Administrative & support services	561	974	1188
Inadequately described/Not stated	1379	1089	1188
Financial & insurance services	958	904	1009
Electricity, gas, water & waste services	694	648	804
Rental, hiring & real estate services	339	433	530
Information media & telecommunications	611	552	512
Arts & recreation services	263	369	437
Mining	74	55	76
<b>Total</b>	<b>45,872</b>	<b>49,825</b>	<b>53,050</b>

## 4.2.1 Dairy industry

### Dairy Industry Overview

The dairy industry is the most significant agricultural industry across the region with 41% (\$0.55 billion) of the gross value of production coming from milk production. Around 43% of this is produced in the Campaspe Shire with Moira Shire contributing around 32% and Greater Shepparton around 25% of milk production.

The access to a secure and reliable water supply underpins the dairy industry. The dominant form of irrigation is border-check, or flood, irrigation. Whole farm planning, laser grading, recycling systems and automation have improved the efficiency of this traditional irrigation system. On lighter soils and in undulating areas, sprinkler irrigation such as centre pivot irrigators is becoming more common. The majority of feed grown for dairy production is perennial pastures.



### Dairy farm businesses

Owner-operated farms dominate the Australian dairy industry. Nationally, the number of dairy farms has halved over the last twenty years, from 22,000 in 1980 to less than 9,000 in 2006. This reflects a general trend in agriculture but has been given further impetus by the deregulation of the dairy industry in 2000 and the drought in 2003 (Dairy Australia 2006). The trends in farm number have meant that the average herd size has increased from 85 cows in 1980 to 224 in 2005/06. For example, across the Murray Dairy ([www.murraydairy.com.au](http://www.murraydairy.com.au)) area (from the Alps to Swan Hill and straddling the Murray River) farms with more than 200 cows represent 40% of the farm numbers, but produce more than 70% of the milk.

The trend towards larger dairy farms may be further accelerated by the current drought. A report prepared by RM Consulting Group (2006) for Murray Dairy found that as a result of the current drought, milk production from the Murray Dairy area would drop by 25% compared to the 2005/06 season with flow on impacts predicted on seasonal work in factories and farms and the wider economy. The report also noted that:

*“From a land use planning perspective, it is likely that there will be a continuing trend to larger dairying properties, which can be supported by minimising the risks of conflicting adjoining land uses.”*

As dairy farms grow in size, the herd structure may change and in the future a dairy farm may comprise 4 to 6 herds of 500 cows based around a single rotary dairy. For farms to expand, they will require access to land that is unencumbered by unnecessary infrastructure such as housing. Farming should also be well buffered from urban areas, as future production systems are likely to see an increased level of mechanisation and shift to 24 hour operations.

### **Dairy processing and manufacturing**

The value of dairy processing in the SIR was estimated at \$1.6 billion in 2005 (Department of Primary Industry 2006). Milk processing is undertaken at a number of milk factories including Fonterra Foods (Stanhope), Murray Goulburn (Cobram and Rochester) and Tatura Milk Industries. These milk factories also supply Nestle in Tongala and Echuca, Meiji-MGC Dairy Company in Cobram, Kraft in Strathmerton and Snow Brand Tatura Dairies for further processing, producing a range of products including yoghurt and infant milk formula. Dairy Farmers Cooperative also undertakes milk product packaging and distribution in this region.

Since 1995 milk processing factories have expanded capacity in response to the annual growth in milk production of between 5% and 7% and the long-term positive outlook for dairy product exports (Department of Primary Industry 2006).

### **4.2.2 Horticulture**

Across the study area, there are approximately 800 horticultural properties covering an area of almost 16,000 hectares. Pome and stone fruits (including apples, pears, apricots, peaches, nectarines and plums) are the most significant, with smaller areas of citrus, nuts vegetables and grapes.

The horticultural industry (fruit and vegetables) accounts for 28% of the gross value of agricultural production of the region but takes place on less than 5% of the total irrigated area. Many of the horticultural businesses are located close to the urban centres of Shepparton, Mooroopna and Cobram. Urban encroachment into these areas should be prevented to ensure that farm businesses can continue to grow and expand and to minimise urban –rural conflict as farm businesses become more mechanised, 24 hour operations.

#### **Perennial horticulture**

Perennial horticulture is centred in the Goulburn Valley with the combination of suitable climate and soil types and a reliable water supply. The major orchard crops are pears, apples, nectarines, apricots, plums, kiwifruit and cherries for the fresh market and processing.

The region grows:

- 90% of the national deciduous canned fruit production
- 85% of the national pear crop

- 45% of the national stone fruit crop
- 14% of the national fresh stone fruit crop
- 16% of the national apple crop
- 90% of the national kiwifruit crop (DPI 2006).

Approximately half the produce is sold in the fresh markets and the remainder is processed (Table 4-4). From 1997 to the 2002/03 drought, there was significant new development, particularly stone fruit, representing an investment of between \$9million and \$16million depending on the trellis and irrigation system installed (Department of Primary Industry 2006).



While the average orchard property size is estimated at 25ha anecdotally it has been reported that there is a trend towards larger properties and that this is occurring through farm amalgamation.

A major limitation to expansion of horticulture outside existing irrigation areas is access to a reliable water supply. Accessing irrigation water outside the existing irrigation area is negotiated on a case-by-case basis and is subject to New Irrigation Development Controls, with a water entitlement purchased through the usual water trading facilities and the entitlement transferred to the development site. This will be of particular significance to the future land use options in the dryland areas of the three municipalities.

**Table 4-4: Fruit type by area and volume of production across the region in 2001 and 2006 (ABS 2006)**

	2001			2006		
	Trees planted ('000s)	Properties	Production (t)	Trees planted	Properties	Production (t)
Apples	1,581	228	54,123	1,870	210	58,721
Pears	1,202	258	144,327	1,336	297	119,117
Apricots	253	157	10,443	271	178	7,903
Cherries	113	23	880	230	31	1,173
Nectarines	312	81	8,282	481	100	12,067
Peaches	1,006	173	45,281	1,500	184	62,468
Nashi	359	50	3,301	289	32	2,921
Citrus	148	47	9,868	121	47	8,379
	<b>Area Planted (Ha)</b>			<b>Area Planted (ha)</b>		
Kiwifruit	140	5	1,144	107	5	3,297
Tomatoes	3.6	52	254	2.8	43	216
Grapes	218	10	1,147	1,348	22	9,913

### Tomatoes

Tomatoes are grown for fresh fruit and processing with most processing production occurring around Corop, Colbinabbin and Rochester. Most fresh tomato production occurs around Shepparton.

There has been significant structural adjustment within the processing industry with less than half the number of growers in 2005 (16) compared to 1990 (40). Overall production increased from 76 tonnes/ha in 2000/01 to 86 tonnes/ha in 2003/04 (Department of Primary Industry 2006).

### Horticultural processing

There are a number of processors of horticultural produce providing significant employment opportunities in the study area including; SPC Ardmona in Shepparton, Henry Jones Foods in Kyabram, Campbells Soups in Shepparton, Lemnos, Girgarre Country Foods, Unifoods in Tatura, Cedenco Australia and Simplot both in Echuca. These remain significant local employers in terms of processing, transport and other flow-on services.



### 4.2.3 Livestock production and processing

Livestock slaughtering represents 16% of the farm gate value of production from the study area (ABS2006). Cattle and sheep are grazed on both irrigated and dryland properties. Increasing cost associated with irrigation along with competition for water from other industries has seen a reduction in livestock on irrigated properties over the past decade. Low wool prices and fluctuating meat prices have also seen a shift to cropping in recent times. There will continue to be a role for grazing as in mixed farming businesses as a risk management strategy and it plays a role in management of cropping rotations and utilising areas of less arable land.

There are a number of abattoirs in the study area that provide significant employment opportunities, such as JBS Swift in Cobram, HW Greenhams in Tongala, Riverside Meats in Echuca, Ryans Wholesale Meat in Nathalia, Auld's Knackery in Stanhope and Numurkah Knackery.

### 4.2.4 Fodder and crop production

Hay, pasture, grain, oilseed and legume production represents approximately 14% of the farm gate value of production from the three municipalities. Most of this is produced under irrigation. Irrigated fodder cropping plays an important role in providing supplementary feed to the dairy industry as well as supplying the lucrative export market.

## 4.3 Irrigation

### 4.3.1 Surface water

Irrigation underpins agriculture in the study area. The Shepparton Irrigation Region comprises the Central Goulburn, Shepparton and Rochester-Campaspe Irrigation Areas which are supplied from the Goulburn River via Lake Eildon, and the Murray Valley Irrigation Area which is supplied with irrigation water from the Murray River.

- The **Central Goulburn Irrigation Area** covers 173,053 hectares (113,106 hectares irrigated) and is one of the largest irrigated areas in northern Victoria. Approximately 2,800 irrigated holdings are serviced in this area and the water right totals 385,000 megalitres.
- The **Shepparton Irrigation Area** covers 81,750 hectares (51,000 hectares irrigated). Approximately 1,500 irrigated holdings are serviced in this area and the water right totals 181,500 megalitres.
- Approximately 1,300 customers in the **Rochester-Campaspe** area are serviced in this area and the major sources of water supply are Lake Eildon and Lake Eppalock (Campaspe River) with supplementary supplies taken from Greens Lake. Water rights in the area total 187,396 megalitres in the Rochester Area and 20,202 megalitres in the Campaspe Irrigation District. The Rochester Irrigation Area has a total area of 107,750 (61,700 Ha irrigated) and the Campaspe Irrigation Area has a total Area of 9,300 Ha (5,010 Ha irrigated).
- The **Murray Valley Irrigation Area** covers 128,372 hectares (88,969 hectares irrigated).



Approximately 1,500 irrigated holdings are serviced in this area and the water entitlements in the Area total 273,656 megalitres of high reliability Water Right with supplies released into the River Murray at Hume Dam. Water from Dartmouth Dam on the Mitta Mitta River provides supplementary storage for Lake Hume.

#### **4.3.2 Groundwater**

Significant groundwater for irrigation is sourced from two main aquifers, the Katunga (in the Murray Valley) and Campaspe (around Rochester) Deep Leads. Longer term extractable volumes are around 30,000ML for Katunga (up to 42,000ML most years) and around 30-35,000ML in the Campaspe Deep Lead, that has its management plan currently under review. The groundwater provides significant underpinning of the dairy industry, in particularly in times of reduced surface allocation.

The Katunga Groundwater Supply Protection Area (Katunga GSPA) is located around Cobram and covers an area of 2,100 km<sup>2</sup>. The Katunga Groundwater Management Plan (Goulburn Murray Water 2006a) that covers this GSPA has established an ongoing allocation policy that provides for flexibility of use between years based on an agreed sustainable yield. There are 195 groundwater licenses in the management areas that authorise a total of up to 59,780 ML/year to be taken and used each year according to the management plan rates. The actual annual use is somewhat less than this as indicated in Table 4-5.

**Table 4-5 Metered groundwater use in the Katunga Groundwater Supply Area (GMW 2006a)**

Season	ML/year used
1999/00	28,645
2000/01	22,795
2001/02	28,873
2002/03	40,470
2003/04	24,285
2004/05	25,660
2005/06	21,614
2006/07	30,801

The Campaspe Groundwater Management Area is located around Rochester and covers an area of 950 km<sup>2</sup> and 109 licences have been authorised. In 1998, technical work commissioned by the Department of Natural Resources and Environment estimated that the volume of water that could be taken out of the area sustainably was 19,850 ML/yr. However, this is also under review.

## 4.4 Challenges and opportunities for agriculture

### 4.4.1 Challenges

#### Water reform

The Victorian Government White Paper set out a range of reforms to improve the management of water. A key feature of the paper is unbundling of water entitlements into three components – a water share, a water-use license and a delivery share.

Irrigation businesses, like Goulburn-Murray Water, have imposed limits on the amount of water permanently traded out of an area (e.g. Central Goulburn, or Murray Valley) since water trading was introduced. The National Water Initiative has at its core the objective of increasing trade to capture what it sees as benefits from water moving to higher value use. As a consequence, in the future any limits to trade will decline. The ability of an area to remain viable in a water supply sense will depend on its capacity to remain competitive.

Understanding the needs of future irrigation businesses will be vital to helping this competitiveness. From local government's perspective, this will mean minimising the risk of fragmentation of good agricultural land and intrusion by residential development.

#### Reconfiguration of irrigation networks

All three municipalities have irrigation supply systems that have the opportunity for modernisation over the next eight years through the Foodbowl Modernisation project. Analysis undertaken for the project demonstrated that there are significant opportunities for improving system efficiency that will generate water savings. The upgrades will include replacement of some of the smaller open, unlined channels with lined or piped delivery systems, channel automation, water metering and rationalising the number of channel structures and delivery points to each property that will enable more efficient, automated on-farm irrigation systems. Potential outcomes of the project include:

- Increased efficiency of the supply system while still being able to deliver all the water.
- Businesses supplied in a way that complements their current and future needs (e.g. new supply point, changed service to match modern irrigation needs).

- A state-of-the-art competitive supply system that facilitates business growth and attracts new investment.
- Accommodation of future changes in demand.
- Better customer service based around different customer groups, with tariff changes that reflect the different services.

Integration of the planning process (e.g. effective use of the Farming Zone) with the modernisation process will be important. Work will begin on modernisation of the system in 2008 and is expected to take up to eight years.

From the figures in green in Table 4-6, it can be seen that about 20% of customers in the Goulburn Murray Irrigation District use around 80% of the water and produce 98% of the gross value of agricultural production. The figures in orange show that about 80% of customers, mainly small users and stock and domestic users use around 20% of the water and produce just 2% of the gross value of agricultural production.

**Table 4-6: Customers, water use and agricultural production in the Goulburn Murray Irrigation District (compiled by RMCG from Goulburn Murray Water data)**

Industry	Number of customers	% of customers	Water use (ML)	% Water use	Gross value of agricultural production (\$mill)	%Gross value of agricultural production
Dairy	1,820	17%	1,081,398	55%	811	65%
Horticulture	482	4%	106,382	5%	303	24%
Mixed farming	550	5%	476,968	24%	110	9%
Small users	3,094	28%	285,383	14%	20	2%
Domestic and stock	4,933	45%	30,128	2%		
<b>Total</b>	<b>10,879</b>	<b>100%</b>	<b>1,980,258</b>	<b>100%</b>	<b>1,244</b>	<b>100%</b>

### Water Trade

Under the COAG agreement, water has been able to be traded separately to land with a view to allowing the water to move to its best use. Over the past 5-10 years, increasingly dry seasons have resulted in more competition for water and water has been traded out of this region to downstream on the Murray River where large horticultural developments have been established. To compete with this, the irrigation supply system must be improved to provide people with a source of water they can manage, at a cost-competitive rate. The *Foodbowl Modernisation* project was instigated with a view to responding to this process.

While there has been much internal trade around the district, this area has experienced a net loss of water. In 2007/08, the trade of high reliable water has been (G-MW website):

- Murray Valley 5,438ML (limit 10,906ML)
- Campaspe / Rochester 8,021ML (limit 8,021)
- Shepparton 4,446ML (limit 6,982ML)
- Central Goulburn 14,859ML (limit 14,859ML)

This means 80% of the limit of water to be traded was reached by 10 October 2007. This is in a year of most extreme low allocations.

It is expected that considerable numbers of people will not be returning to the levels of irrigation prior to the drought, but many of the 20% of farm businesses that already use 80% of the water will be expected to continue in irrigation.

Providing a cost competitive supply system in areas where business can grow will be critical to the long-term future of irrigation in the region.

### **Native Vegetation**

The implications of Victoria's Native Vegetation Management Framework, provides the strategic approach to protecting, enhancing and vegetating Victoria's native vegetation. The key priority of the framework includes a policy of net gain in native vegetation.

As outlined in Section 6, there are significant areas of native vegetation within the region and the impacts of previous agricultural and urban activity have resulted in a severe reduction of native vegetation. Agricultural activities have the potential to impact on existing areas of high value remnant vegetation. This is particularly the case within the northern grassland regions of the study area.

## **4.4.2 Opportunities**

### **Prime development zones**

Within the irrigation areas, resources are being moved from lower value grazing enterprises to higher value enterprises such as dairy and horticulture. Prime Development Zones have been identified (Loddon Murray 2000 Plus, 1998; SKM, 2000) as those areas capable of accommodating new investment into high-value irrigation development. Delivery of water will be a key to the development of the prime development zones (Appendix E – Map 1). For the purposes of this report and to ensure no confusion with Land Use Zones in accordance the Victorian Planning Provisions, prime development zones will be referred to as Agricultural Development Areas.

However, a number of areas where good land exists in sufficient scale to warrant new development have already been identified around the edge of the irrigation area. What many new businesses are looking for is a site that is unencumbered by existing infrastructure (e.g. old dairies, homes), where they can get a single water supply point and manage all their own water supply/application system as well as confidence that they can continue to run their businesses without undue interference from boundary interaction with non-agricultural residents.

### **Irrigation futures project**

An extensive consultative project looking at future scenarios for irrigation in the Goulburn Broken region was conducted over several years. It has been valuable in alerting the region to potential futures and challenged thinking about the capacity of organisations to deal with these scenarios. Essentially, the future scenarios include:

1. Dairy being the mainstay for irrigation land and water use under all scenarios.
2. Horticulture remaining a strong user of water
3. Cropping to vary but generally hold its own
4. Livestock to generally diminish under all scenarios (except the drying up scenario)
5. Continued uncertainty over where and when water would be needed across the region.

Under the 'drying up' scenario, livestock increased as other industries left. Dairy and horticulture were seen to be the main economic engine for the area.

### Niche industries

It has been reported anecdotally that the equine industry is emerging as a significant industry in the region. Table 4-7 outlines the ABS data available on the equine industry across the three municipalities. While 480 farms indicated that they kept horses as part of the farming business, only 48 of these indicated the major source of farm income was derived from horse management. Of these 48 businesses, seven are generating more than \$500,000 per annum. No ABS data is available of the farm gate value of production generated from the equine industry. The data suggests that the industry is relatively small with a number of hobby based operators in the industry and a very small group operating as genuine equine businesses.

The industry is supported by the National Centre for Equine Education with a Cluster Coordinator based in Euroa, the North East Thoroughbred Industry Alliance based in Wangaratta and the Goulburn Valley Equine Hospital in Shepparton.

The Shire of Strathbogie has invested significant resources to market and position itself as a hub for the equine industry based on its natural attributes and accessibility to the Melbourne racing venues.

**Table 4-7 Number of horse properties and horse numbers in the region (Australian Bureau Statistics Agricultural Census Data 2001 and 2006)**

Municipality	Number of farms*		Horse number (excluding stud horses)	Stud horse numbers		Number of farms businesses generating the majority of their income from horses		Income >\$500,000	
	2001	2006		2001	2006	2001	2006	2001	2006
Campaspe	171		397	978	14	23	1	2	
Greater Shepparton	149		321	833	26	30	3	1	
Moira	160		544	944	8	17	3	0	
<b>Totals</b>	<b>480</b>		<b>1,262</b>	<b>2,755</b>	<b>48</b>	<b>70</b>	<b>7</b>		

#### 4.4.3 Outlook for agriculture in the region

Recent trends and outlook suggest that dairy and horticulture will remain strong and competitive industries. Strong global economic growth is keeping demand for commodities (wheat, wool, corn, dairy products) sound.

Increased interest in alternative fuels, including biofuel could see changes in cropping due to competition for plant products. At the 2007 ABARE Outlook Conference, Peter Anderton (Agri Energy Ltd) noted that while the ethanol market was immature, it was poised for growth, (e.g. production company projected to go from 216ML/ann in 2007 to 1,288ML/annum in 2010), while biodiesel was salvageable from a faltering position (e.g. production 623ML/annum 2007 to 1,043ML/annum in 2010).

#### 4.4.4 Implications for land use planning

Land use planning can support existing agricultural industries and ensure that there will be opportunity for new and emerging industries by: retaining allotments in larger parcels and preventing subdivision so that the farms can continue to grow and expand as required; limiting land from being encumbered with unwanted infrastructure, particularly housing,

which can drive up land values beyond productive value and render it unavailable for farm expansion; restricting urban expansion into high value agricultural areas; and preventing cross-boundary conflicts by ensuring that there are buffers between urban (and urban-type) development and agricultural areas particularly irrigation development where farm operations occur 24 hours a day, seven days a week and may produce noise and odours. Careful management is also required throughout the region to ensure land use and development does not impact on biodiversity and is managed in an environmentally sustainable manner.

In productive agricultural areas, the prevention of ad hoc rural living development by managing dwelling development on small allotments is critical. Equally, planning has a role in the integrated modernisation and reconfiguration of the irrigation network and the expansion of irrigated agriculture into the Agricultural development areas.

## 4.5 Local profiles

This section of the report provides a more detailed analysis and discussion of agriculture in each of the local governments. The following sections outline the methodology used to assess farm businesses and productive agricultural land in the municipalities. These are common to the discussion on each municipality and presented here to prevent duplication.

### 4.5.1 Farm business analysis

Analysing farm business income provides information on the types of farm businesses, for example whether a farm businesses is fulltime, part time or for lifestyle purposes. This can be useful to understand issues, such as right to farm and the needs of agriculture such as minimum lot size and infrastructure.

Benchmarking of farm businesses over the last fifteen years has established a guideline for the minimum gross turnover at average cost control that enables sufficient profit to support a family and provide sufficient funds for redevelopment and growth for establishing the next generation. At 2006 values, the minimum gross turnover required, over the long term, is approximately \$300,000 per business.

Those with a gross turnover below \$300,000 and wanting to run *full time* farming business will need to consider increasing farm scale or profitability to increase farm turnover. Opportunities for increasing production efficiency come mainly through increasing scale to allow capital costs to be spread over more units of production. For example, all dairy businesses require a milking shed but greater production efficiency will come from spreading the capital cost of the milking shed across a larger dairy herd compared to a smaller herd.

In this rural strategy, an analysis of turnover of farm business assists in understanding current farming models and the land use planning requirements to underpin these industries into the future. It is important that the strategy reflects the diversity of farm businesses - small scale, large scale, family run, corporate owned, single commodity, multiple commodity – and notes that there are different approaches to running a profitable farm business. It is essential that land use and development in the long term does not impede the capacity of farm business to respond to market signals and remain profitable in the future, regardless of business structure.

From a land use planning perspective it is important to ensure that land is retained in allotments that will facilitate farm expansion. It also important that land does not become compromised with unwanted infrastructure (e.g. dwellings) that can inflate land prices above its productive value. This is a particular issue for farming land close to urban centres where the primary use is shifting to farming for lifestyle purposes.

## 4.6 Land capability and productive agricultural land

The State Planning Policy Framework Objective for Agriculture (Clause 17.05) states that “productive farmland of strategic significance in the local or regional context should be protected.” The VPP Planning Practice Note: Applying the rural zones (DSE 2007) provides the following definition of productive agricultural land:

*Productive agricultural land generally has one or more of the following characteristics:*

- *Suitable soil type;*
- *Suitable climatic conditions;*
- *Suitable agricultural infrastructure, in particular irrigation and drainage systems;*
- *A present pattern of subdivision favourable for sustainable agricultural production.*

Soils in the irrigation areas have been extensively surveyed, classified and mapped in a number of studies undertaken between 1942 and 1975. These studies have been compiled into a single map by Goulburn Murray Water (2006) and reproduced in Appendix E – Map 1 of this report.

In 2000, the Department of Natural Resources and Environment undertook an assessment of land to identify suitable sites for development of sustainable irrigated agriculture and horticulture. These Agricultural development areas (GMW 2006) included areas that are currently not irrigated and indicate how the future irrigation area may look.

With the soil suitability mapping, identification of Agricultural development areas, identification of the irrigation areas and understanding of the climatic conditions, we have an excellent picture of the attributes of the land for agriculture. This will be combined with an assessment of the subdivision pattern, undertaken by others for this study, to identify land to be retained for farming.

In the dryland parts of the study area, there is very little documentation or mapping of soil types. However, for these areas, land use can be used as an indicator of soil type that is more than satisfactory for strategic planning purposes. Generally speaking, land used for dryland cropping with some grazing tends to have better soil or land characteristics such as slope, than land that is used for grazing only. In this report, land use in combination with climatic conditions is used to assess agricultural land outside the irrigation areas.

## 4.7 Moira Shire

### 4.7.1 Overview of agriculture

Agriculture in Moira is centred on the Murray Valley irrigation district and the northern reaches of the Shepparton irrigation district. Agricultural production is worth approximately \$431 million in gross value of agricultural production per annum (Figure 4-2) Dairy is the most significant industry and is worth approximately \$177 million in gross value of agricultural production per annum. About 21% of all employment in Moira is associated with agriculture in on farm jobs.

### 4.7.2 Agricultural industries

Dairy is the most significant agricultural industry in Moira generating \$177million per annum or over 40% of the gross value of agricultural production in the Shire and also the most significant in terms of land area. Figure AD-5 (Appendix D) shows that dairying in Moira occurs in a band through the middle of the irrigation area between Strathmerton and Nathalia



mainly on the Group 2 soils. There are processors in the municipality producing a range of milk-based products including Meiji-MGC, Murray Goulburn at Cobram and Kraft at Strathmerton.

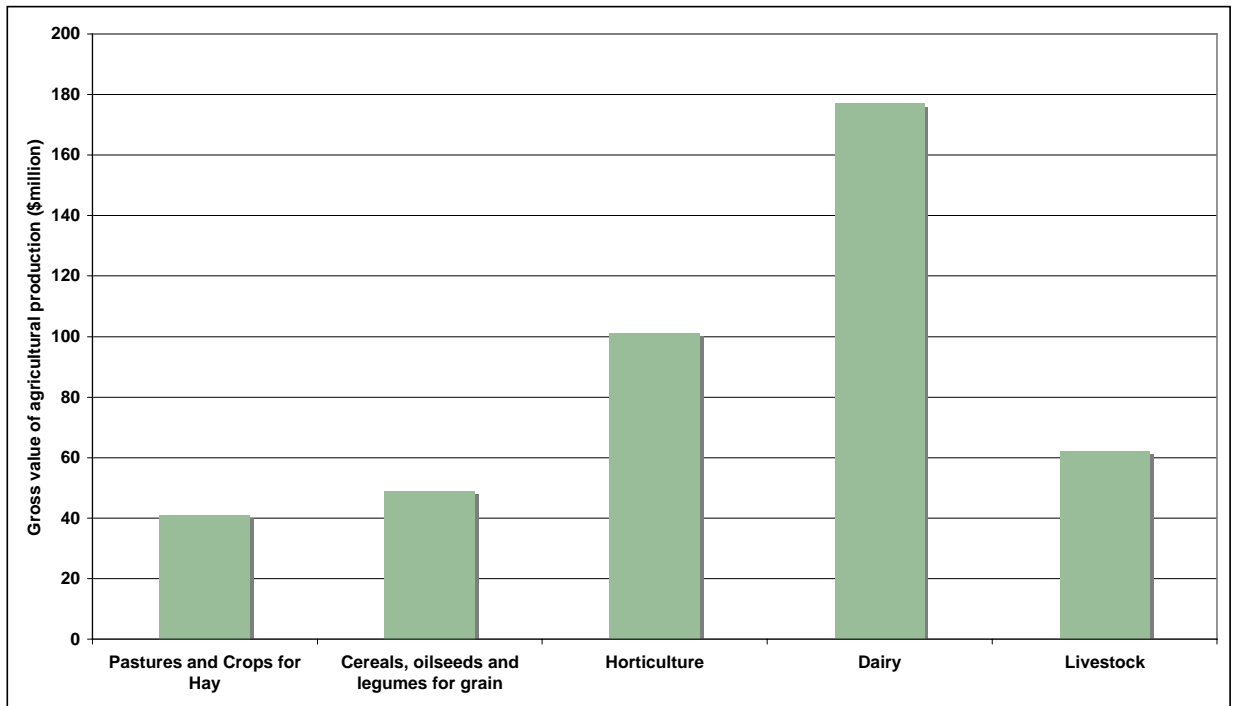
Horticulture generates approximately \$101 million in gross value of agricultural production and accounts for 3% of the land use in the irrigated areas of the Shire. Horticultural products include apples, pears, peaches, plums for the fresh market and processing. Other horticultural products include citrus, potatoes, carrots and other vegetables. Horticulture is clustered around Cobram on Group 1 soils that are suitable for high-value irrigated horticulture.

There are a large number of mixed farms in both the dryland and irrigation areas running beef cattle, sheep for wool and lambs as well as dairy young stock. Irrigated mixed farming occurs on the fringes of the irrigation area where the soils are more variable with Group 2 soils mixed with Group 5 and 6 soils. There are a number of abattoirs in the Shire including at Cobram and Numurkah.

Commodity trend data from 2001 to 2006 show that the drought and reduced water allocations impacted on production, particularly in the dairy and grain sectors.

**Table 4-8 Commodity Trends in Moira (Australian Bureau of Statistics Agricultural Census Data 2006)**

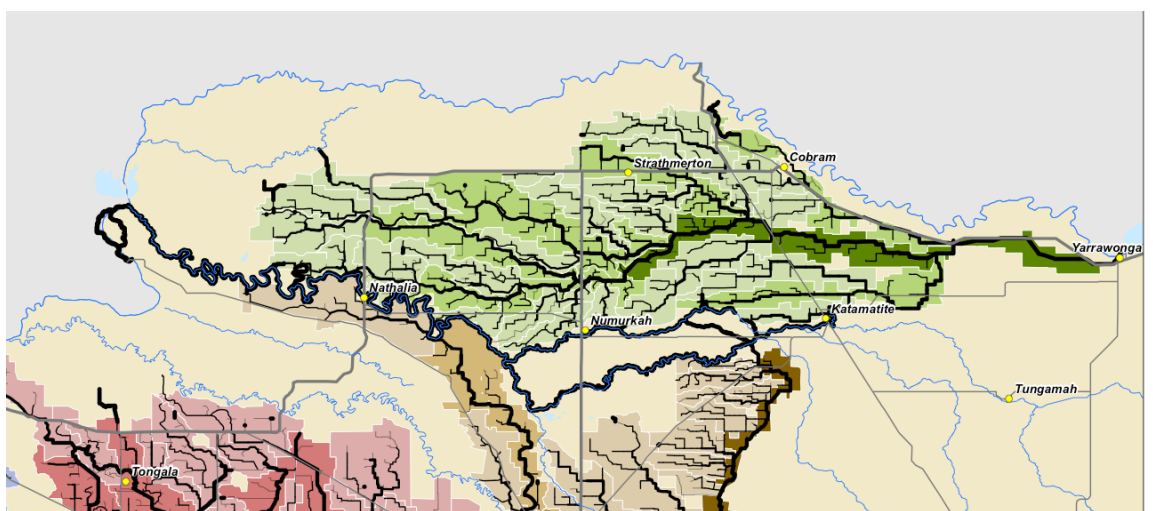
Commodity		2001	2002	2003	2004	2005	2006
Dairy	Cows ('000s)	111	110	101	90	108	98
	Farms	547	439	438	447	437	439
	Milk (million L)	553	634	493	439	530	481
Horticulture	Trees ('000s)	1385	-	-	-	-	1840
	Farms	290	-	-	-	-	328
	Fruit (million T)	72	-	-	-	-	82
Grains	Hectares (000's)	71	81	91	91	97	84
	Farms	813	738	804	862	928	760
	Grain (000's T)	196	212	78	876	224	235
Livestock	Animals (000's)	384	329	332	320	339	300
	Farms	811	686	688	659	650	756



**Figure 4-2: Gross value of horticultural production from major industries in the Moira Shire (Australian Bureau of Statistics Agricultural Census Data 2006)**

### 4.7.3 Irrigation infrastructure and efficiency

Approximately 2,000 properties covering 90,000 hectares (ABS 2001) are irrigated in Moira. The Murray Valley Irrigation Area lies entirely within Moira and water is sourced from the Murray River. The northern reaches of the Shepparton irrigation district are also within Moira where irrigation water is sourced from Lake Eildon, via the Goulburn River, and the Broken River.



**Figure 4-3: Irrigation districts in Moira Shire (Goulburn Murray Water 2006b)**

Table 4-9 provides a breakdown by water of irrigation customers in the Murray Valley Irrigation Area. Nearly 50% of customers use less than 20 ML per annum. This suggests that

about a quarter of the customers use about 90% of the water. This is a stark illustration of the need to protect and service the needs of this source of growing businesses.

**Table 4-9: Distribution of water use in the Murray Valley**  
(<http://www.g-mwater.com.au/>)

	Distribution of water use in the Murray Valley				
	<20ML	20-100ML	100-300ML	300-1000ML	>1,000ML
Number of customers	662	90	316	303	29
Proportion of customers %	47	6	23	22	2

#### 4.7.4 Farm businesses

The breakdown by farm incomes in 2006 (Table 4-16) reveals that 33% of farms are generating less than \$100,000 gross farm income. Over half of these are livestock businesses and are likely to be part time businesses with other income coming off-farm.

Those generating between \$100,000 and \$200,000 per annum (22% of farm businesses) will be under significant economic pressure (if relying on the farm business alone) and in the near future may need to consider increasing farm scale, introducing a more intensive production system or increasing the off farm income. A large proportion of these are dairy businesses and for those looking to increase farm scale they will need access to land in larger allotments and unencumbered by unnecessary infrastructure such as housing.

Horticultural businesses close to the urban fringe of Cobram looking to expand may be constrained by access to affordable land. There is a tendency for small blocks close to the town and river to be purchased for lifestyle purposes which drives land values above productive value.

A comparison of farm incomes in 2001 and 2006 indicates that the total number of farm business has declined by around 200 businesses. Most of these were from businesses generating less than \$500,000 per annum. There has also been a small increase in the number of businesses generating over \$500,000. This suggests that some businesses have left farming and that there has been increased productivity, possibly by farm expansion amongst other farm businesses.

**Table 4-10: Distribution of farm incomes (estimated value of agricultural operations) in Moira (ABS 2006)**

Farm businesses type	Farm income range						Total number of properties
	< \$100k	\$100k to \$200k	\$200 to \$500k	\$500 to \$1mill	\$1mill to \$2mill	>2mill	
Horticulture	31	23	29	17	12	9	121
Dairy	48	121	231	65	8	1	474
Livestock	195	46	13	-	3	-	257
Cropping	38	13	28	18	1	-	98
Mixed cropping/grazing	50	39	29	9	1	-	128
<b>Total</b>	<b>362</b>	<b>242</b>	<b>330</b>	<b>109</b>	<b>25</b>	<b>10</b>	<b>1,078</b>

**Table 4-11: Distribution of farm incomes (estimated value of agricultural operations) in Moira (ABS 2001)**

Farm businesses type	Farm Income Range						Total number of properties
	< \$100k	\$100k to \$200k	\$200 to \$500k	\$500 to \$1mill	\$1mill to \$2mill	>2mill	
Horticulture	69	25	43	16	10	6	169
Dairy	58	218	270	41	8	-	595
Livestock	167	30	9	2	1	1	210
Dryland cropping	39	24	29	8	1	1	102
Mixed cropping/grazing	84	45	34	4	-	-	167
<b>Total</b>	<b>417</b>	<b>342</b>	<b>385</b>	<b>71</b>	<b>20</b>	<b>8</b>	<b>1,243</b>

#### 4.7.5 Productive agricultural land

Productive agricultural land is established based on an evaluation of the soil types, subdivision pattern, climate and irrigation infrastructure.

##### Soil types

Group 1 and Group 2 soils are found south and east of Cobram and north of Katamatite and around Invergordon North. These soils have few disabilities for irrigation and suitable for horticultural crops, vegetables, perennial and annual pastures and summer fodder crops.

Elsewhere, especially towards the fringes of the irrigation areas, the soils are more variable with Group 1 and Group 2 soils interspersed with Group 5 and Group 6 soils. This variability limits the agricultural options and these areas are commonly used for mixed farming.

The Agricultural development areas (Appendix E – Map 1) in Moira are located north of Nathalia around Picola, south of Nathalia along the irrigation channel between the Goulburn River and Broken Creek and west and south west of Yarrawonga.

There is no soils data for the dryland areas of the Shire, however, the agricultural industry data shows that dryland cropping of winter cereals and grains is significant as is dryland livestock production. This suggests that dryland areas have soils suited to agricultural production.

### Subdivision patterns

The pattern of property sizes in the area (shown in Appendix E – Map 2) indicates that within the irrigation areas a most properties are between the 40 ha and 100 ha in area and consist of a number of separate allotments. Around Cobram along the Murray River, there are a number of small properties comprised of a number of quite small allotments. As noted previously, these properties are at risk of becoming lifestyle properties due to their small size and proximity to the river and town. Properties in the dryland areas of the Shire are generally larger than 100ha in size and comprised of a number allotments. The subdivision pattern in the rural areas is considered to be suited for continuing agriculture.

### Climate

Moira has a Mediterranean climate with hot dry summers and cool winters with most rainfall falling between May and October. The winters also have cold nights with sufficient hours when temperatures fall below 2°C to meet the chilling requirement for bud initiation in fruit crops. This climate is suited to production of a range of agricultural commodities.

**Table 4-12: Temperature and rainfall data from Yarrawonga (<http://www.bom.gov.au>)**

	J	F	M	A	M	J	J	A	S	O	N	D	Annual
Mean max temp °C	32.1	31.6	27.6	22.9	18.2	14.5	13.5	15.3	18.2	21.8	26.5	29.9	22.7
Mean Min temp °C	15.5	15.5	12.2	8.7	6.2	4.0	3.4	3.6	5.3	7.1	10.6	12.8	8.7
Mean days < 2°C	0	0	0	0.6	5.2	9.5	10.7	10.4	7.2	2.8	0.4	1	46.8
Mean rainfall mm	28.4	39.4	24.5	27.9	35.5	43.7	49.0	38.3	50.4	37.9	41.2	32.5	449.1

### Irrigation Infrastructure

Land that has access to the irrigation network has a wider range of agricultural options than dryland. Without access to the irrigation network dairying and horticulture could not be undertaken in Moira. A process is underway to develop a modernised irrigation supply that is critical to the Shire for the next 50 years and beyond.

### Productive agricultural land conclusions

Based on the assessment of soil types, subdivision patterns, irrigation infrastructure and climate, land in the rural areas is generally considered to be productive agricultural land that is of strategic importance to Shire economy. It is important that planning controls reflect this value and they encourage protection and retention of land for agriculture both now and in the future, particularly Group 1 and 2 soils around urban centres.

It is recognised that to secure some parts of the shire for agriculture, other parts, even though they may have good soils, will need to be available to lifestyle living. Existing constraints to furthering agricultural objectives in these areas may include the arrangement

of adjacent property, access to infrastructure and conservation values. However, this will be determined by further analysis of rural living needs.

#### **4.7.6 Summary of agriculture in Moira**

Agriculture is a significant land use in the Shire and underpins the local economy directly through on farm employment and through the associated manufacturing and food processing and industries servicing agriculture.

Dairy is the most significant agricultural industry in terms of land use and gross value of agricultural production. Along with horticulture, the dairy industry is dependant on access to a secure water supply via the irrigation network. Land use planning controls need to protect the irrigation areas to secure their future for farming but also integrate with the modernisation and reconfiguration of the systems and expansion into the agricultural development areas.

Farm businesses generally need to grow and expand over time. Access to affordable land unencumbered by unnecessary infrastructure is essential to provide the opportunity for farm growth of both irrigated and dryland businesses.

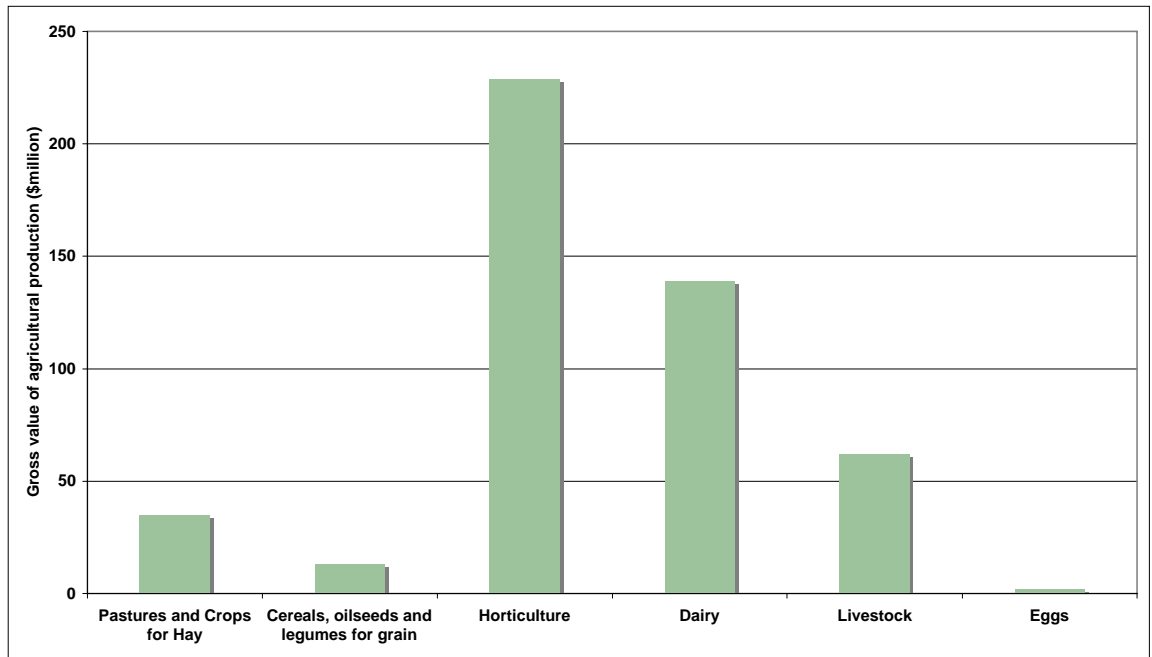
Horticultural production, and to a lesser extent dairy, requires soils with high suitability for irrigation. Moira has substantial areas of Class 1 soil (highly suitable for irrigation), some of which is in close proximity to Cobram. Land use planning controls need to ensure that sufficient areas of these soils are protected from urban expansion and are available to agriculture in the long term.

Land in the rural areas of the Shire is productive agricultural land based on the soil types, subdivision pattern and climate and the significant level of irrigation infrastructure, protection and retention of this land for agriculture is of primary strategic importance to the Shire and it is recommended that it should be included in the Farming Zone.

The boundaries of the farming zone will be modified based on subsequent strategic work in relation to town boundaries and rural living.

### **4.8 City of Greater Shepparton**

Agriculture in Greater Shepparton is a mix of dryland and irrigation production systems. Agricultural production was worth approximately \$481 million in 2006 up from \$410 million in 2001. Most production comes from perennial horticulture and dairy associated with the Shepparton and Central Goulburn Irrigation Areas (Figure 4-4). Approximately 10% of all employment in Greater Shepparton is associated with agriculture in the form of on-farm jobs. There is also significant employment associated with the manufacturing and processing of locally produced food.



**Figure 4-4: Gross \$ value of agricultural production from major industries in the City of Greater Shepparton (Australian Bureau of Statistics Agricultural Census Data 2006)**

#### 4.8.1 Agricultural industries

Horticulture is the most significant industry in the municipality and is worth approximately \$229 million (Figure 4-4). Most of this is associated with fruit production such as apples, pears, peaches, plums as well as vegetables for the fresh and processing markets. Horticulture is focussed on the better soils in the municipality around Shepparton and Ardmona. While horticulture is the most economically significant industry, it takes place on just 12% of the total irrigated area on the municipality (Table 4-13). A number of food processing businesses in the municipality use local horticultural produce such as SPC Ardmona, Campbells Soups and Unifoods in Tatura.

Dairy is the second most significant industry and is worth approximately \$139 million per annum. Dairying is focussed in the western side of the Shire and to the north along the Shepparton-Katamatite Road towards Invergordon. There are milk processors producing a range of milk-based products in the municipality including Snow Brand Tatura Dairies.

An analysis of trends in commodities between 2001 and 2007 shows that the drought and low water allocations had a significant impact on production levels in some industries particularly dairy and grain production. Over the same period, horticulture, particularly orchards, expanded the area of production.

**Table 4-13: Irrigated Agriculture in Greater Shepparton (Australian Bureau of Statistics Agricultural Census Data 2001)**

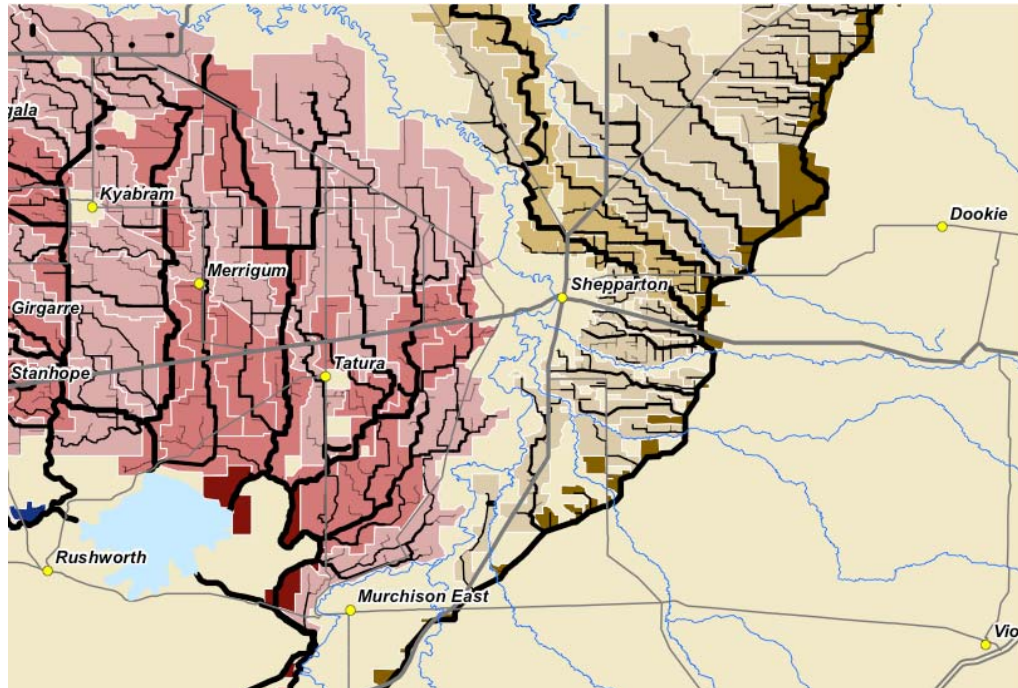
Commodity	Hectares
	2001
Cereal	1,362
Fruit	9,582
Grapes	363
Pasture	65,163
<b>Total</b>	<b>76,470</b>

Commodity		2001	2002	2003	2004	2005	2006
Dairy	Cows ('000s)	99	92	85	76	91	77
	Farms	532	408	407	416	407	385
	Milk (million L)	463	530	415	370	446	378
Horticulture	Trees ('000s)	3513					4153
	Farms	697					726
	Fruit (million T)	196					185
Grains	Hectares (000's)	17	20	21	22	23	20
	Farms	273	253	261	285	309	261
	Grain (000's T)	47	51	20	60	52	58
Livestock	Animals (000's)	256	217	218	211	224	196
	Farms	699	603	304	581	577	696

#### 4.8.2 Irrigation infrastructure and irrigation efficiency

Irrigation in Greater Shepparton takes place within the Shepparton and Central Goulburn Irrigation Areas (Figure 4-5). Both irrigation areas source water from Lake Eildon.





**Figure 4-5: Irrigation in Greater Shepparton (Goulburn Murray Water 2006b)**

A breakdown by industry of water use confirms that horticulture is a major economic contributor, using relatively low levels of the natural resources of land and water, while dairy uses much more resources to produce similar gross dollar value (Table 4-14)

**Table 4-14 Production, business size and water use by major industries in the Shepparton Irrigation Region (compiled by RMCG from Goulburn Murray Water data)**

Commodity	Value of production \$million	Number of businesses	Average businesses size Ha	Area irrigated Ha	Water use MI
Dairy	94	369	70	25,823	124,928
Horticulture	89	184	25	4,557	31,232
Mixed	7	74	463	34,178	29,001

### 4.8.3 Farm businesses

The breakdown of farm businesses by farm income indicates that 33% of farm businesses are generating less than \$100,000 per annum. About one half of these are livestock businesses generating less than \$100,000 per annum suggesting that they are part time businesses and relying to some extent on off farm income (Table 4-15).

Around 22% of businesses are earning between less than \$200,000 per annum with a large proportion of these dairy farms. These businesses may need to consider increasing farm scale or off farm income in the near future and will require access to large allotments to increase farm scale.

About 32% of the horticultural properties are generating between \$100,000 and \$200,000 per annum and some of these businesses may be looking to expand in the future. Horticulture is focussed around the urban centres of Shepparton and west of Mooroopna and

it is important that urban growth does not encroach on these production areas and limit opportunities for farm expansion and create right-to-farm issues.

Between 2001 and 2006, the total number of farm business declined by around 200 properties, particularly from dairy and horticulture. There was also an increase in the number of businesses generating more than \$500K in the dairy and horticulture industries suggesting that some of this increase may have come from farm expansion and consolidation.

**Table 4-15: Distribution of farm incomes (estimated value of agricultural operations) in Greater Shepparton (ABS 2001)**

Farm businesses type	Farm Income Range						Total number of properties
	< \$100k	\$100k to \$200k	\$200 to \$500k	\$500 to \$1mill	\$1mill to \$2mill	>2mill	
Horticulture	74	64	73	55	22	15	303
Dairy	94	204	253	28	6	-	585
Livestock	201	22	13	4	1	1	242
Cropping	19	10	8	1	-	-	38
<b>Mixed cropping &amp; grazing</b>	<b>48</b>	<b>24</b>	<b>10</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>82</b>
<b>Total</b>	<b>436</b>	<b>324</b>	<b>357</b>	<b>88</b>	<b>29</b>	<b>16</b>	<b>1,250</b>

**Table 4-16: Distribution of farm incomes (estimated value of agricultural operations) in Greater Shepparton (ABS 2006)**

Farm businesses type	Farm income range						Total number of properties
	< \$k	\$50k to \$100k	\$100 to \$200k	\$200 to \$500k	\$500k to \$1million	>1mill	
Horticulture	69	43	73	27	11	24	247
Dairy	57	125	197	37	9	1	426
Livestock	230	27	9	2	-	-	268
Cropping	27	9	8	2	1	-	47
<b>Mixed cropping and grazing</b>	<b>23</b>	<b>18</b>	<b>18</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>60</b>
<b>Total</b>	<b>406</b>	<b>222</b>	<b>305</b>	<b>69</b>	<b>21</b>	<b>25</b>	<b>1,048</b>

#### 4.8.4 Productive agricultural land

##### Soil types

There are areas of land with Group 1 and Group 2 soil suitability for irrigation in Greater Shepparton, particularly around Tatura, Ardmona. These soils have few disabilities for irrigation and suitable for horticultural crops, vegetables, perennial and annual pastures and summer fodder crops.

Elsewhere the soils are generally Group 3 and Group 4 which are more suited to irrigated pasture and crop production and are generally used for dairy and irrigated mixed farming (Appendix E – Map 1).

The Agricultural development areas in Greater Shepparton (Appendix D – Figure AD-10) are located around Bunbartha in the north and east of the main channel of the Shepparton Irrigation Area.

There is no soils data for the dryland areas of the Shire, however, the agricultural industry data shows that dryland cropping of winter cereals and grains is significant as is dryland livestock production. This suggests that dryland areas have soils suited to agricultural production.

### Subdivision patterns

Analysis indicates that in the irrigation areas east of Shepparton and around the towns, properties are generally 8 to 20 ha. This is associated with the horticultural development in Shepparton East. These properties will be at risk of becoming lifestyle properties due to their small size and proximity to the town (See Appendix E – Map 2).

Elsewhere in the irrigation areas properties are generally 20 to 40 ha or 40 to 100 ha and larger properties would be comprised of a number of allotments. Dryland properties tend to be mainly over 100 ha in size and would be comprised of a number of allotments. This subdivision pattern is considered favourable for agriculture.

### Climate

Greater Shepparton has a Mediterranean climate with a hot dry Table 4-17). The winters have cold nights with sufficient hours when temperatures fall below 2°C to meet the chilling requirement for bud initiation in fruit crops. This climate is suited to production of a range of agricultural commodities.

**Table 4-17: Temperature and rainfall data from Tatura (<http://www.bom.gov.au>)**

	J	F	M	A	M	J	J	A	S	O	N	D	Annual
Mean max temp °C	29.3	29.5	26.2	21.6	17.2	13.9	13.0	14.7	17.3	20.8	24.4	27.3	21.3
Mean Min temp °C	14.0	14.4	11.7	8.2	5.8	3.6	2.9	3.8	5.5	7.6	10.0	12.1	8.3
Mean days < 2°C	0	0	0	1.0	5.9	10.6	13.0	10.0	5.8	1.6	0.2	0	48.1
Mean rainfall mm	32.5	32.5	32.2	34.6	46.6	44.4	48.3	47.1	44.2	48.4	39.0	32.9	482.8

### Irrigation infrastructure

Land that has access to the irrigation network has a wider range of agricultural options than dryland. Without access to the irrigation network dairying and horticulture could not be undertaken in Shepparton. A modernised supply system is planned and about to be designed and implemented.

### Productive agricultural land conclusions

Based on the assessment of soil types, subdivision patterns, irrigation infrastructure and climate, land in the rural areas is generally considered to be productive agricultural land that is of strategic importance to Shire economy. It is important that planning controls reflect this value and they encourage protection and retention for agriculture both now and in the future, particularly the Group 1 and 2 soils close to urban centres.

#### **4.8.5 Summary of agriculture in Greater Shepparton**

Agriculture is a significant land use in the Greater City and underpins the local economy directly through on farm employment and through the associated manufacturing and food processing and industries servicing agriculture.

Horticulture is the most significant agricultural industry in terms of gross value of agricultural production. Horticulture and the dairy industry is dependant on access to a secure water supply via the irrigation network. Land use planning control needs to protect the main production irrigated areas to secure their future for farming but also integrate with the planned modernisation and reconfiguration of the systems and potential expansion into the agricultural development areas.

Farm businesses generally need to grow and expand over time. Access to affordable land unencumbered by unnecessary infrastructure is essential to provide the opportunity for farm growth.

Horticultural production, and to a lesser extent dairy, requires soils with high suitability for irrigation, particularly excellent drainage and low salinity. Greater Shepparton has areas of Class 1 soil and Class 2 soil (highly suitable for irrigation), some of which is in close proximity to urban development around Shepparton, Ardmona and Mooroopna. Land use planning controls need to ensure that these soils are protected from urban expansion and are available to agriculture in the long term and that urban development is buffered from mechanised 24 hour farm activities.

The rural areas of the Greater City are considered to be productive agricultural land based on the soil types, subdivision pattern and climate and the significant level of irrigation infrastructure. Protection and retention of this land for agriculture is of primary strategic importance to the Greater City and it is recommended that it should be included in the Farming Zone.

The boundaries of the farming zone will be modified based on subsequent strategic work in relation to town boundaries and rural living.

### **4.9 Campaspe Shire**

Agriculture is a significant industry in the Campaspe Shire and generated approximately \$440 million in gross value of agriculture production per annum in 2006 up from \$420 million in 2001. Dairy is the most significant industry and is worth approximately \$237 million per annum. Approximately 21% of employment in Campaspe is associated with on farm jobs.

#### **4.9.1 Agricultural industries**

Dairy is the most significant agricultural industry in Campaspe generating approximately \$237 million per annum or more than half the farm gate value of agricultural production in the Shire. Dairy is focused around Rochester, Lockington and between Stanhope and Tongala.

Livestock production generates approximately \$62 million including sheep and cattle production on mixed irrigation farms and dryland farms. The mixed irrigation farms are located between the dairy districts and tend to be on land less suited to irrigation. Dairy and mixed farming account for most of the land use in the irrigated areas of the Shire.

An analysis of trend data for major commodities demonstrates the impact of the recent drought and water allocations on farm production with a decline in the areas of production and overall production levels particularly livestock and tomato production.

**Table 4-18: Irrigated agriculture in Campaspe Shire (ABS 2001 and 2006)**

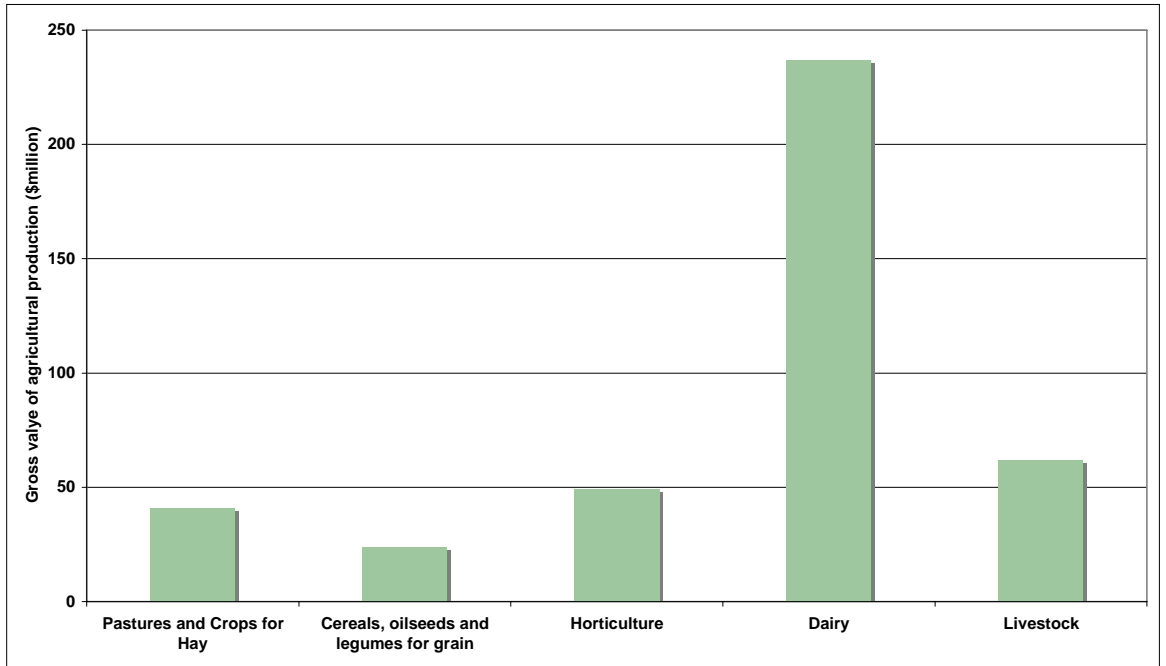
Commodity	Hectares
	2001
Cereal	4,033
Fruit	438
Pasture	109,134
<b>Total</b>	<b>113,605</b>

Commodity		2001	2002	2003	2004	2005	2006
Dairy	Cows ('000s)	154	150	138	123	148	132
	Farms	798	626	625	638	623	608
	Milk (million L)	775	888	674	601	724	643
Horticulture	Trees ('000s)	77					106
	Farms	42					48
	Fruit (million T)	9					6
Grains	Hectares ('000's)	45	52	60	59	61	57
	Farms	585	561	617	642	677	604
	Grain ('000's T)	118	116	43	154	122	121
Livestock	Animals ('000's)	347	319	321	309	326	317
	Farms	904	835	823	791	776	980
Tomatoes	Hectares	2782	2457	2075	1873	1968	1921
	Properties	29	29	22	19	18	23
	Tonnes ('000's)	215	172	149	170	149	176

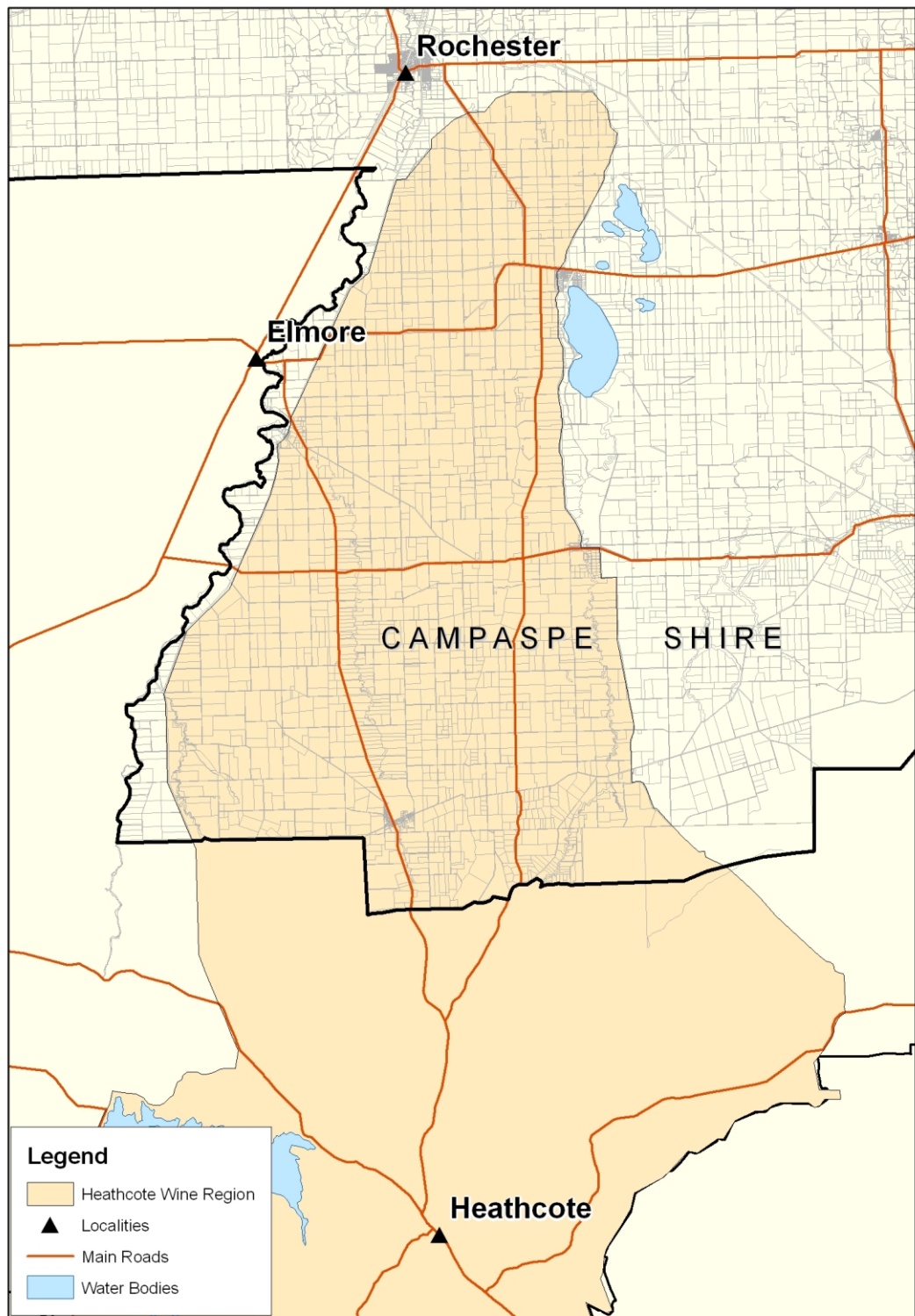
Horticulture generates approximately \$49 million per annum and a large proportion of this comes from tomato production for the fresh and processing markets around Corop and Colbinabbin. Horticulture accounts for just 0.4% of the land use in the Shire (Table 4-18). Cedenco have a tomato processing plant and Riverside Meats has an abattoir in Echuca to service the local industries.

Viticulture is an expanding industry around Corop and Colbinabbin and the boundaries of the Heathcote Wine Region (Figure 4-7) have been recently declared by the Geographical Indications Committee ([www.heathcotewinegrowers.com.au](http://www.heathcotewinegrowers.com.au)).

This rapid growth and capital investment in viticulture, is estimated to be in the order of \$70m over the past decade with over 300 vineyards now supporting 2900 ha of vines within the Heathcote GI (Department of Primary Industries 2008).



**Figure 4-6: Gross \$ value of agricultural production from major industries in Campaspe Shire (Australian Bureau of Statistics Agricultural Census Data 2006)**



**Figure 4-7: Heathcote Wine Region (Based on data from [www.heathcotewinegrowers.com.au](http://www.heathcotewinegrowers.com.au))**

#### 4.9.2 Farm businesses

The breakdown of farm businesses shows that 41% of farms are generating less than \$100,000 farm income and a large proportion of these are livestock businesses suggesting that they are part time businesses supported by off farm income (Table 4-19).

About 42% of dairy businesses are generating less than \$200,000 per annum. Without off farm income these businesses will be under some financial pressure and will be looking to expand, intensify or increase off farm income in the short term. From a land use planning perspective, growth of these businesses can be assisted by ensuring land is retained in larger allotments, is not encumbered with unnecessary infrastructure and that land values reflect the agricultural value and not inflated by the existence of or potential for a dwelling.

**Table 4-19: Distribution of farm incomes (estimated value of agricultural operations) in Campaspe (ABS 2006)**

Farm businesses type	Farm income range						Total number of properties
	< \$100k	\$100k to \$200k	\$200 to \$500k	\$500 to \$1mill	\$1mill to \$2mill	>2mill	
Horticulture	87	20	12	8	8	4	139
Dairy	102	177	299	74	12	3	667
Livestock	296	41	21	7	5	6	376
Cropping	43	12	15	5	2	-	77
<b>Mixed cropping and grazing</b>	<b>36</b>	<b>24</b>	<b>23</b>	<b>4</b>	<b>-</b>	<b>-</b>	<b>27</b>
<b>Total</b>	<b>564</b>	<b>274</b>	<b>370</b>	<b>98</b>	<b>27</b>	<b>13</b>	<b>1,346</b>

**Table 4-20: Distribution of farm incomes (estimated value of agricultural operations) in Campaspe (ABS 2001)**

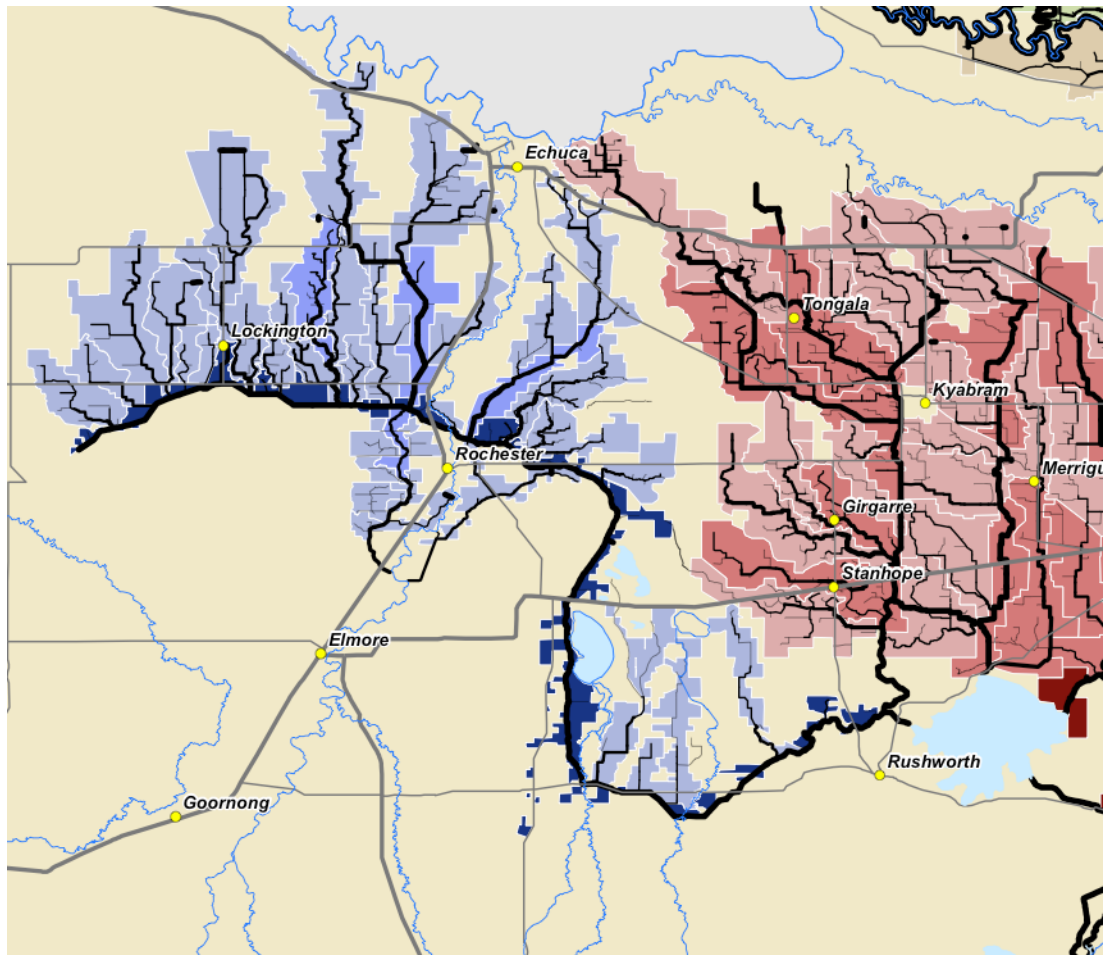
Farm businesses type	Farm income range						Total number of properties
	< \$100k	\$100k to \$200k	\$200 to \$500k	\$500 to \$1mill	\$1mill to \$2mill	>2mill	
Horticulture	64	9	16	15	12	2	118
Dairy	139	285	373	65	12	-	874
Livestock	245	25	9	5	2	4	290
Cropping	43	12	15	2	2	-	77
<b>Mixed cropping &amp; grazing</b>	<b>36</b>	<b>24</b>	<b>23</b>	<b>4</b>	<b>-</b>	<b>-</b>	<b>87</b>
<b>Total</b>	<b>527</b>	<b>355</b>	<b>436</b>	<b>94</b>	<b>28</b>	<b>6</b>	<b>1,446</b>

#### 4.9.3 Irrigation infrastructure and irrigation efficiency

Irrigation in Campaspe takes place in the Campaspe Rochester Irrigation Area, the western side of the Central Goulburn Irrigation Area and the far eastern end of the Torrumbarry



Irrigation District (Figure 4-8). Approximately 1,230 properties covering 113,605 ha are irrigated in Campaspe Shire. A number of farms outside the irrigation districts access water from the Waranga Basin via individual licenses from Goulburn Murray Water.



**Figure 4-8: Irrigation districts in Campaspe (Goulburn Murray Water 2006b)**

A breakdown of water customers by water use for the Rochester Campaspe Irrigation Area indicates that nearly 50% of customers use less than 20ML per annum (Table 4-21). This suggests that substantial lifestyle occupation of rural properties has already occurred. The remaining productive businesses need to be ‘protected’ from further encroachment from subdivision and extra houses.

**Table 4-21: Distribution of water use in the Rochester-Campaspe irrigation district (compiled by RMCG from Goulburn Murray Water data)**

	Distribution of water use in Rochester - Campaspe				
	<20ML	20-100ML	100-300ML	300-1000ML	>1,000ML
Number of customers	713	218	369	172	16
Proportion of customers	48%	15%	25%	12%	1%

#### 4.9.4 Productive agricultural land

##### Soil types

Appendix D (Figure AD-12) shows the suitability of soils for irrigated crops in Campaspe. There are extensive areas of Group 1 and Group 2 soils in the Central Goulburn irrigation areas between Stanhope, Tongala and less extensive areas around Rochester and Lockington.

Agricultural development areas, areas suited but not yet developed for irrigation have been identified south of Lockington and south and west of the main channel near Rushworth.

There is limited land capability data for areas outside of the Agricultural Development Areas and the irrigation districts, however, the industry data indicates that dryland cropping and livestock production is significant in the Shire. This suggests that the dryland areas have soils suited to agricultural production.

It is important from a land use perspective that planning controls seek to protect particularly the soils most suitable for irrigation (where there is not excessive subdivision already) and agricultural development areas for agriculture.

##### Subdivision pattern

Properties in the irrigation areas are commonly 20 to 40 ha and 40 to 100 ha. In the dryland areas properties are generally larger and over 100 ha in size and would most likely be comprised of a number of allotments (Appendix E – Map 2). This pattern of subdivision is favourable for agriculture.

##### Climate

Campaspe has a Mediterranean climate (Table 4-22) with a hot dry summers and cool winters with most rainfall falling between May and October. The winters also have cold nights with sufficient hours when temperatures fall below 2°C to meet the chilling requirement for bud initiation in fruit crops. This climate is suited to production of a range of agricultural commodities.

**Table 4-22: Temperature and rainfall data from Echuca (<http://www.bom.gov.au>)**

	J	F	M	A	M	J	J	A	S	O	N	D	Annual
Mean max temp °C	30.8	30.6	27.2	22.2	17.6	14.2	13.4	15.2	18.3	22.2	26.0	29.0	22.2
Mean Min temp °C	15.1	15.2	12.9	9.4	6.6	4.7	3.9	4.8	6.4	8.7	11.1	13.4	9.4
Mean days < 2°C	0	0	0	0.3	3.2	8.3	10.6	7.6	3.8	0.7	0.1	0	34.6
Mean rainfall mm	26.9	26.5	30.4	32.7	41.3	42.9	41.0	42.1	39.5	43.1	32.0	28.4	426.7

##### Irrigation infrastructure

Land that has access to the irrigation network has a wider range of agricultural options than dryland. Without access to the irrigation network dairying and horticulture could not be undertaken in Campaspe. A reconfiguration process has commenced and is likely to be incorporated with the modernisation of the irrigation supply.

#### **4.9.5 Productive agricultural land conclusions**

Based on the assessment of soil types, subdivision patterns, irrigation infrastructure and climate, land in the rural areas is generally considered to be productive agricultural land that is of strategic importance to Shire economy. It is important that planning controls reflect this value and they encourage protection and retention for agriculture both now and in the future.

#### **4.9.6 Summary of agriculture in Campaspe**

Agriculture is a significant land use in the Shire and underpins the local economy directly through on farm employment and through the associated manufacturing and food processing and industries servicing agriculture.

Dairy is the most significant agricultural industry in terms of land use and gross value of agricultural production. The dairy industry is dependant on access to a secure water supply via the irrigation network. Land use planning controls needs to protect the irrigation areas to secure their future for farming but also integrate with the modernisation and reconfiguration of the systems and expansion into the agricultural development areas.

Farm businesses generally need to grow and expand over time. Access to affordable land unencumbered by unnecessary infrastructure is essential to provide the opportunity for farm growth.

The rural areas of the Shire are considered to be productive agricultural land based on the soil types, subdivision pattern and climate and the significant level of irrigation infrastructure. Protection and retention of this land for agriculture is of primary strategic importance to the Shire and it is recommended that it should be included in the Farming Zone.

Increasing development of intensive agricultural industries within areas of Campaspe have also occurred. These are commonly in locations that are associated with large areas of native grasslands. Strategic policy instruments are required to ensure that existing and future intensive industries can coexist in a sustainable way with the protection of significant native grassland ecosystems.

## 5. Population and settlement

The study region encompasses a number of distinct landscapes and communities, each following varied trajectories in land use modification, population change and economic transition. These trends present the core challenges for future planning as they indicate new pressures and motivations for development in both urban and rural areas.

Given that the study area includes productive irrigation areas, valuable riverine and forest environments and areas where rural landscapes have attracted new and emerging forms of (often urban-generated) living, it is important to consider social and economic trends as they are reflected in each of these location types. Land use and population trends in the area should also be seen in a broader context of change in the region and beyond. In general the following broad trends can be identified across rural Australia, including in the study area:

- Declining rural and small-town populations, particularly in dryland agricultural areas, but also in many established irrigation regions.
- A centralisation of services (a 'sponge city' effect) in most agricultural regions.
- Rapid growth within the expanding commuter field of larger urban centres, this is evident in both rural landscapes and in established settlements.
- Growth of population and housing in valued localities where leisure landscapes, comparative housing affordability and lifestyle perceptions combine. This appears to be driven by both local population movement and more general 'tree change' trends.
- Concurrent and divergent pathways of large and expanding commercial agricultural holdings and increasing small, niche and sub-commercial farming – and effective, but long term, trend of the 'hollowing-out' of mid-range farm businesses, leaving only large and small (or sub-commercial) farms as predominant in the landscape.

In the case of the study region each of these processes can be identified in various localities, presenting an often contradictory set of dynamics at the regional level: larger urban centres such as Shepparton and Echuca continue to grow, a number of small towns are characterised by population decline, towns and rural areas on the River Murray and its broader environs show strong population and development growth, while the character of farming landscapes show a mixed process of change relating to farm business size, transition to non-commercial land uses and the continued emergence of newer forms of agricultural activity.

Exploring these issues, and offering strategic approaches to future land management, requires consideration of the existing context of policy and land use planning, a review of trends in population at a regional and local level, and an appraisal of land use trends, especially trends in housing and subdivision. This chapter outlines each of these elements and offers a strategic basis for directing broad land use objectives in the regions rural landscapes.

### 5.1 Strategic elements for consideration

Various existing elements of strategy and policy guide the direction for development in the study area. They include the Moira Rural Living Strategy (2004), Echuca Low Density Residential and Rural Living Review (2003), as well as elements of broader strategy such as the Greater Shepparton 2030 Strategy Plan which have been prepared at a local government level, as well as the Local and State Planning Policy contained within each of the three planning schemes.

In general, there is recognition that many rural localities are experiencing land use change, whether within a context of agricultural restructure, or through a transition to residential development in a rural setting. Even within these different processes of change, existing policy offers a framework for the form and management of new development and land use change.

The Echuca Low Density Residential and Rural Living Strategy (2003) are concerned directly with land on the fringes of urban Echuca. The strategy sought to determine the appropriate distribution and form of rural residential opportunities in areas including Wharparilla Drive and sites on the immediate fringe of the existing urban area such as the racecourse precinct. In general this strategy, which was largely supported with the eventual approval of Amendments C34, C35 and C36 to the Campaspe Planning Scheme, recognised the need to provide for rural lifestyle development as a genuine market segment, but to do this within a framework that supported locations where development was strategically desirable, and in forms that met a range of market opportunities. The study also ensured that the supply of such land was suited to anticipated levels of demand.

The Moira Rural Living Strategy (2004) assesses capacity and demonstrated demand for residential development in rural areas, specifically within the environs of six areas of Moira: Cobram, Numurkah, Nathalia, Yarrowonga, Barmah and Bundalong. This resulted in specific analysis of opportunities for such development in localities near Yarrowonga and Numurkah, although the proposed changes at Numurkah were not supported by the Panel<sup>6</sup> reviewing the subsequent amendment proposal. In the case of Moira, the strategy and subsequent amendment recognised the role of rural residential (low density and rural living) development, especially near the River Murray towns, but the existing levels of supply were also assessed and the need to ensure that any land use transition was managed to meet location constraints, risks to existing rural activities, and anticipated levels of demand was recognised in the strategy and in the subsequent assessment of the proposed amendment to the Moira Planning Scheme.

In Shepparton, while no specific rural land strategy has been prepared in recent years, the Greater Shepparton 2030 Strategy Plan (2006) provides a framework for some lifestyle development in rural landscapes close to existing urban centres. The strategy focussed strongly on the role of rural living development within the spectrum of urban-generated housing choices, especially where servicing and environmental constraints limit the development at urban residential densities. In general, this policy framework considers rural residential housing as a component of the broader urban and urban-generated settlement process, rather than as a distinct land use in the rural landscape. This reflects the productive nature of rural landscapes in Greater Shepparton, and that population growth is not necessarily linked to specific landscape features.

At the 2006 Census the study area recorded a population of 118,105 – this represents a net population growth of 2,109 since 2001 (Table 5-1). At the local level, the pattern of population change was varied, with some areas and urban centres recording significant levels of growth and others in decline. Generally, it is apparent that levels of growth since 2001 have not been as high as the experience of the 1990s, with some areas recording population decline subsequent to increases during the period between 1996 and 2001.

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<sup>6</sup> The Panel, or The Planning and Environment List is part of the Victorian Civil and Administrative Tribunal (VCAT), an independent tribunal, which hears and decides applications by permit applicants, objectors and others.

**Table 5-1: Population – Statistical local areas 1996-2006. Source: ABS Census**

	1996	2001	2006	Av. Annual Change 1996-2006
Campaspe - Echuca	10,014	10,955	12,401	2.16
Campaspe - Kyabram	11,750	11,981	11,646	-0.09
Campaspe - Rochester	7,865	7,990	7,791	-0.09
Campaspe - South	3,691	3,685	3,619	-0.20
Gr. Shepparton - Pt A	39,694	42,749	43,999	1.03
Gr. Shepparton - Pt B East	3,832	3,846	3,590	-0.65
Gr. Shepparton - Pt B West	8,376	8,615	8,525	0.18
Moira - East	7,374	7,870	8,558	1.50
Moira - West	17,339	17,605	17,976	0.36
<b>Total</b>	<b>109,935</b>	<b>115,296</b>	<b>118,105</b>	<b>0.72</b>

The highest levels of population growth were recorded in Echuca, Shepparton and Moira – East (which includes localities such as Yarrawonga and its environs), while agricultural areas of the study region experienced low growth or population decline. Areas such as Shepparton Part B East and Campaspe – Rochester had experienced moderate growth in the later 1990s prior to a decline in population.

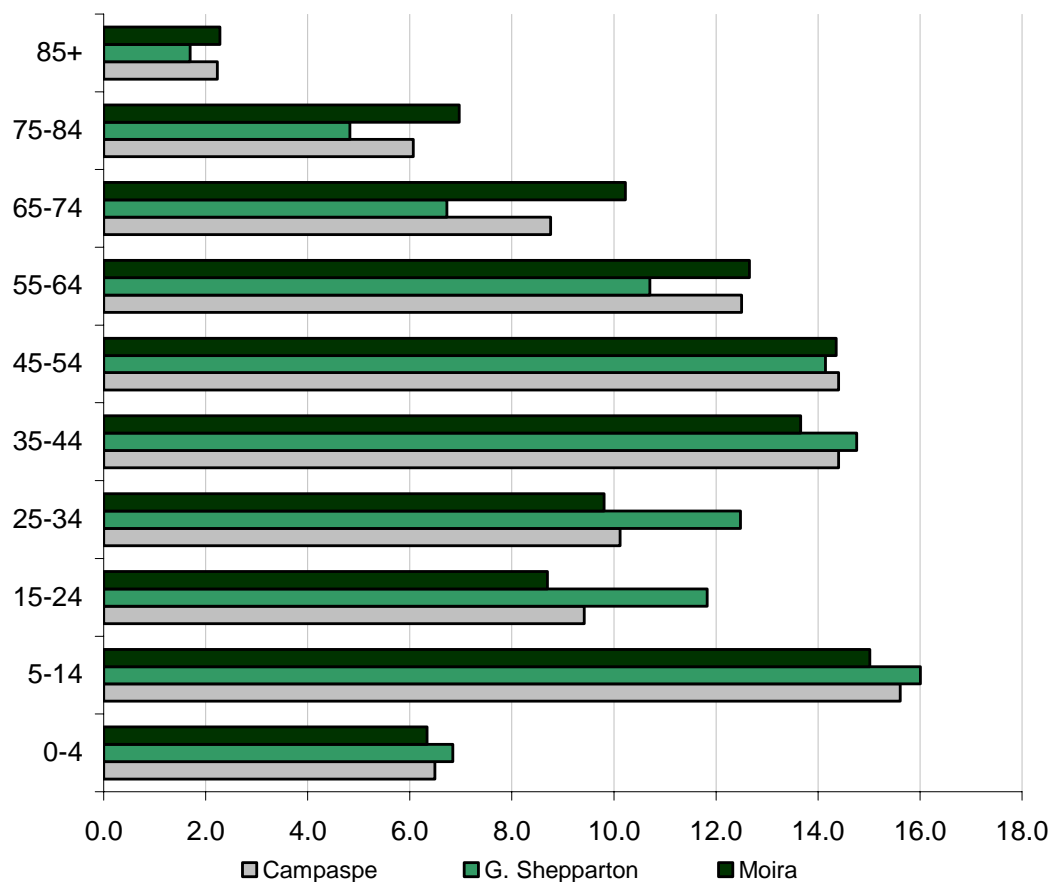
The divergent trends in population are more evident in the urban centres in the region. Centres including Echuca, Shepparton and Yarrawonga have experienced considerable growth (at level above averages for Victoria and Regional Victoria), while some smaller centres have declined in population (Table 5-2).

**Table 5-2: Population – Urban Centres 1996-2006. Source: ABS Census**

	1996	2001	2006	Av. Annual Change 1996-2001
Shepparton-Mooroopna	31,945	35,828	38,797	1.96
Echuca	10,014	10,955	12,401	2.16
Yarrawonga	3,435	4,025	5,731	5.25
Kyabram	5,738	5,534	5,615	-0.22
Cobram	3,865	4,554	5,066	2.74
Numurkah	3,128	3,382	3,683	1.65
Tatura	2,826	2,931	3,534	2.26
Rochester	2,553	2,624	2,832	1.04
Nathalia	1,455	1,416	1,425	-0.21
Tongala	1,164	1,179	1,257	0.77
Rushworth	976	1,001	1,039	0.63
Murchison	633	672	787	2.20
Stanhope	565	514	520	-0.83

Consistent with most regions in Victoria the population is ageing and the trends of smaller household sizes, especially in urban centres, has resulted in household growth continuing at rates above population growth. In a land use planning context, this pattern of change is significant – in some instances declining populations have occurred along with increasing household numbers. Increases in lifestyle developments within the study area, such as locations in the River Murray corridor, also mean that housing growth can be independent of permanent population change.

The age profile of the study area reveals an older profile in Moira and Campaspe than in Shepparton. The geography of the age profile reflects younger populations in and around centres such as Echuca, and older populations in areas such as Yarrawonga. In rural areas, the pattern of the age profile is mixed, with irrigation areas exhibiting a younger median age, and areas, such as around Rushworth, Yarrawonga and Barmah - where lifestyle development has been more evident – displaying an older age profile (Figure 5-1).



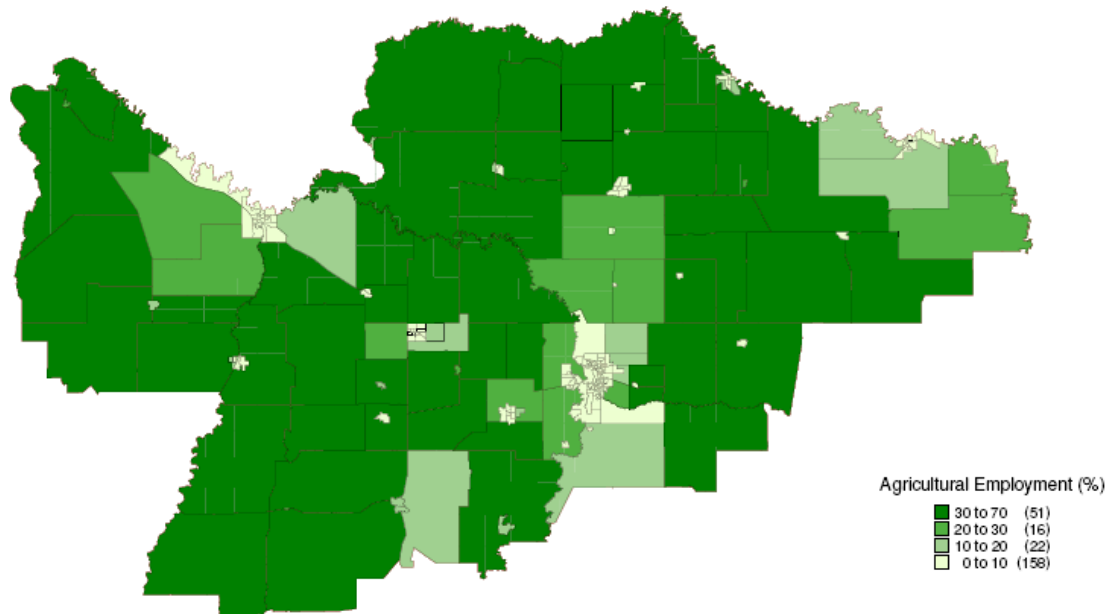
**Figure 5-1: Age Profile (%) - 2006. Source: ABS Census**

Between 1996 and 2006 all Statistical Local Areas within the study region experienced an increase in household numbers. This included those areas where populations declined. Housing growth in a variety of forms continues to occur throughout the region.

**Table 5-3: Households – Statistical Local Areas 1996-2006. Source: ABS Census**

	1996	2001	2006	Av. Annual Change 1996-2006
Campaspe - Echuca	3752	4165	4686	2.25
Campaspe - Kyabram	4168	4396	4437	0.63
Campaspe - Rochester	2796	2849	2910	0.40
Campaspe - South	1324	1333	1437	0.82
Gr. Shepparton - Pt A	14262	15419	16112	1.23
Gr. Shepparton - Pt B East	1215	1254	1240	0.20
Gr. Shepparton - Pt B West	2843	3006	3007	0.56
Moira - East	2733	2971	3277	1.83
Moira - West	6213	6502	6847	0.98
<b>Total</b>	<b>39,306</b>	<b>41,895</b>	<b>43,953</b>	<b>1.12</b>

The patterns of change reveal some distinct characteristics for regions within the study area; those areas where lifestyle attractions have driven growth, those where linkages to traditional agricultural activities have not supported population growth and larger urban areas that have experienced population increases as small centres and rural areas around them have not. These differences offer insight to the transitions that are occurring in terms of production, farm business restructure and development across the landscapes of the study region, and provide a means for considering strategic approaches to rural land use management into the future.

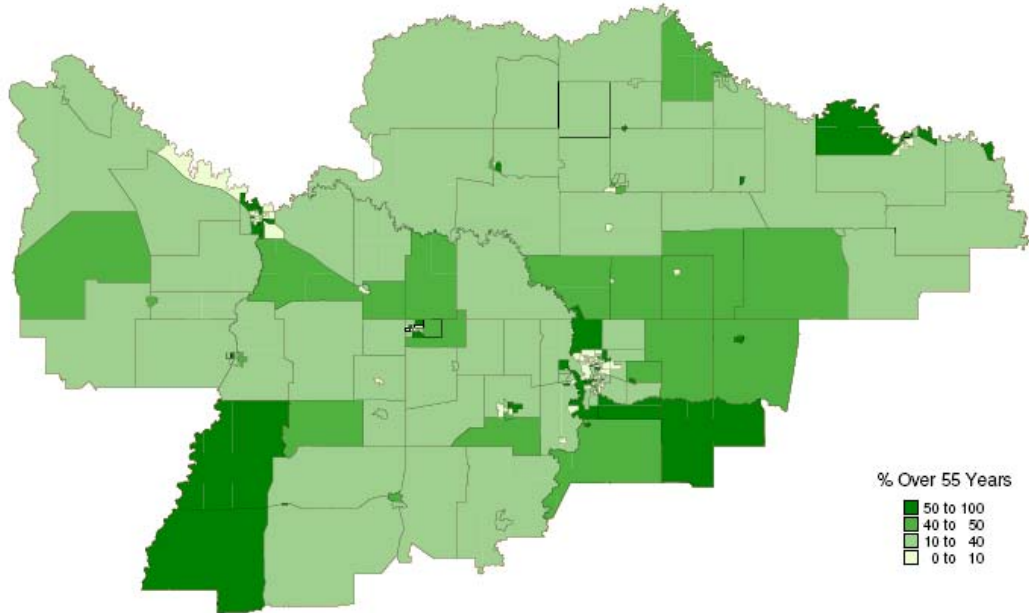


**Figure 5-2: Employment in Agriculture (% of all employment), 2006. Source: ABS Census**

The distribution of agricultural activity in the study region reflects patterns of population and housing growth. Areas surrounding larger centres such as Echuca and Shepparton, as well as areas along the River Murray corridor have lower levels of agricultural employment than the core agricultural areas that have not experienced high levels of housing growth (Figure 5-2). The age structure of farmers in the study area is also reflective of

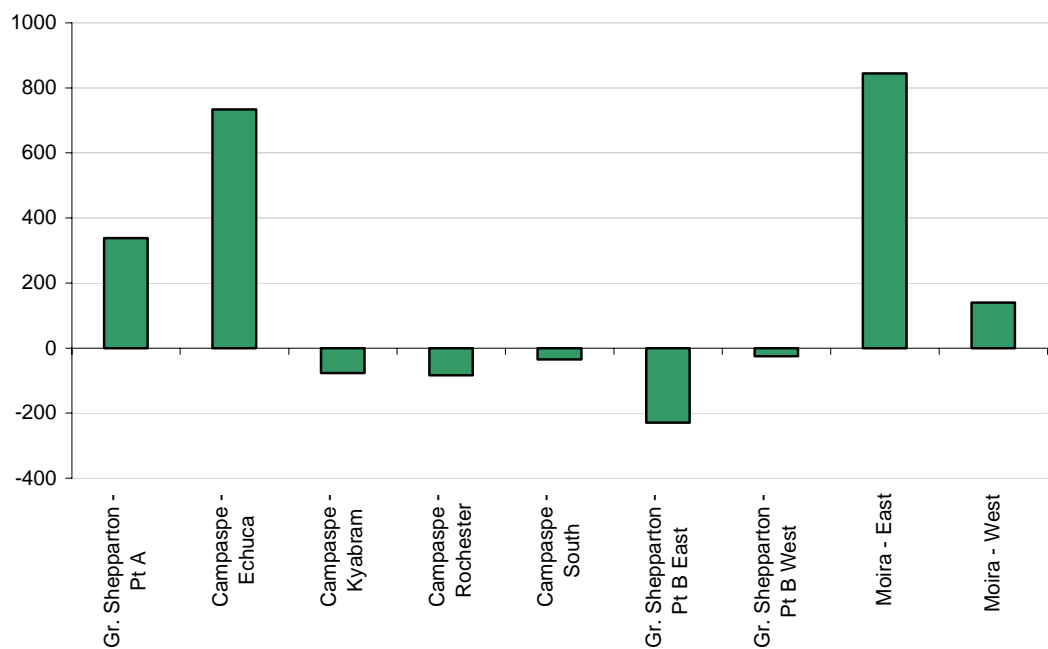


localities that appear to be experiencing transition from agricultural activity with older farmers predominant in areas where farming activity is less (Figure 5-3).



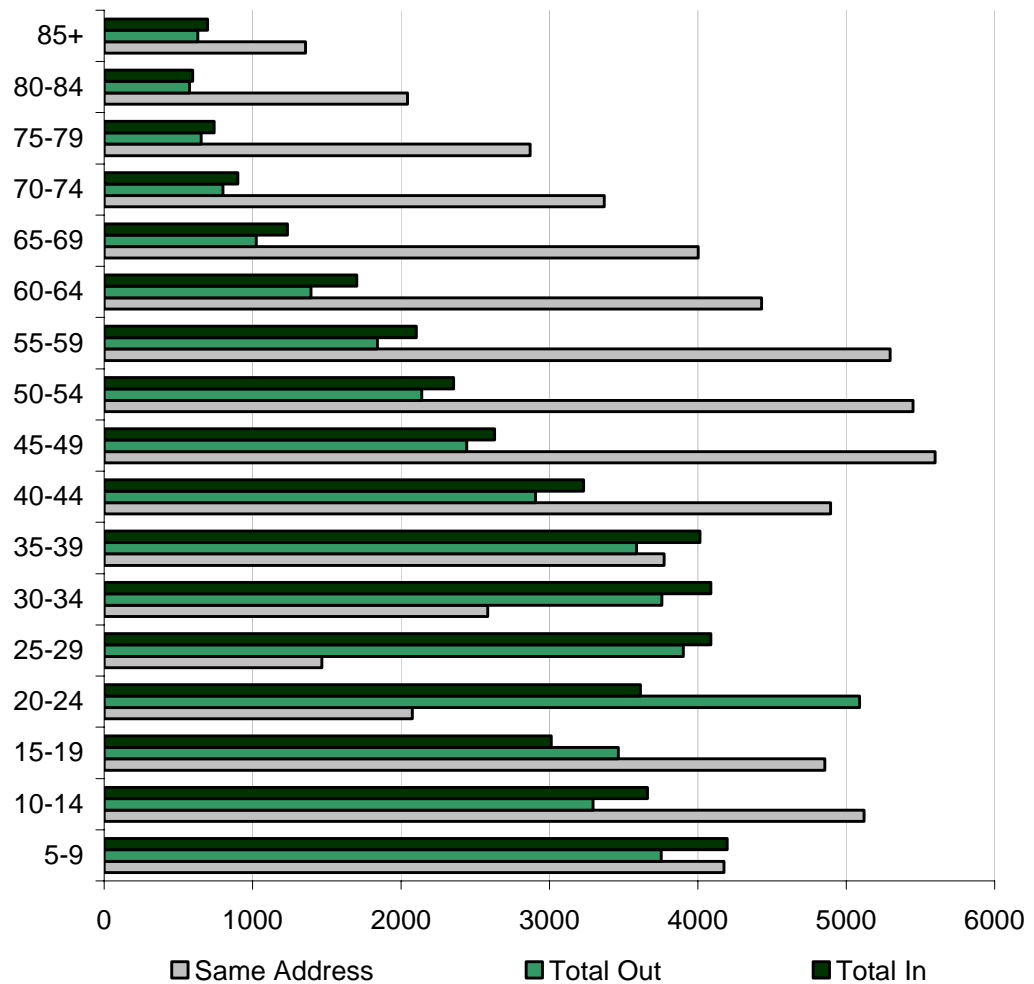
**Figure 5-3: Employment in Agriculture (% over 55 years), 2006. Source: ABS Census**

Likewise, patterns of population mobility reflect areas that appear to be undergoing change, corresponding to locations experiencing housing and other development activity, mostly on the fringes of larger centres and 'lifestyle' towns such as Yarrowonga. The profile and characteristics of the 'new' community generally confirms the process of centralisation in the larger centres of Echuca and Shepparton, as well as in the Cobram/Yarrowonga region (Figure 5-4).

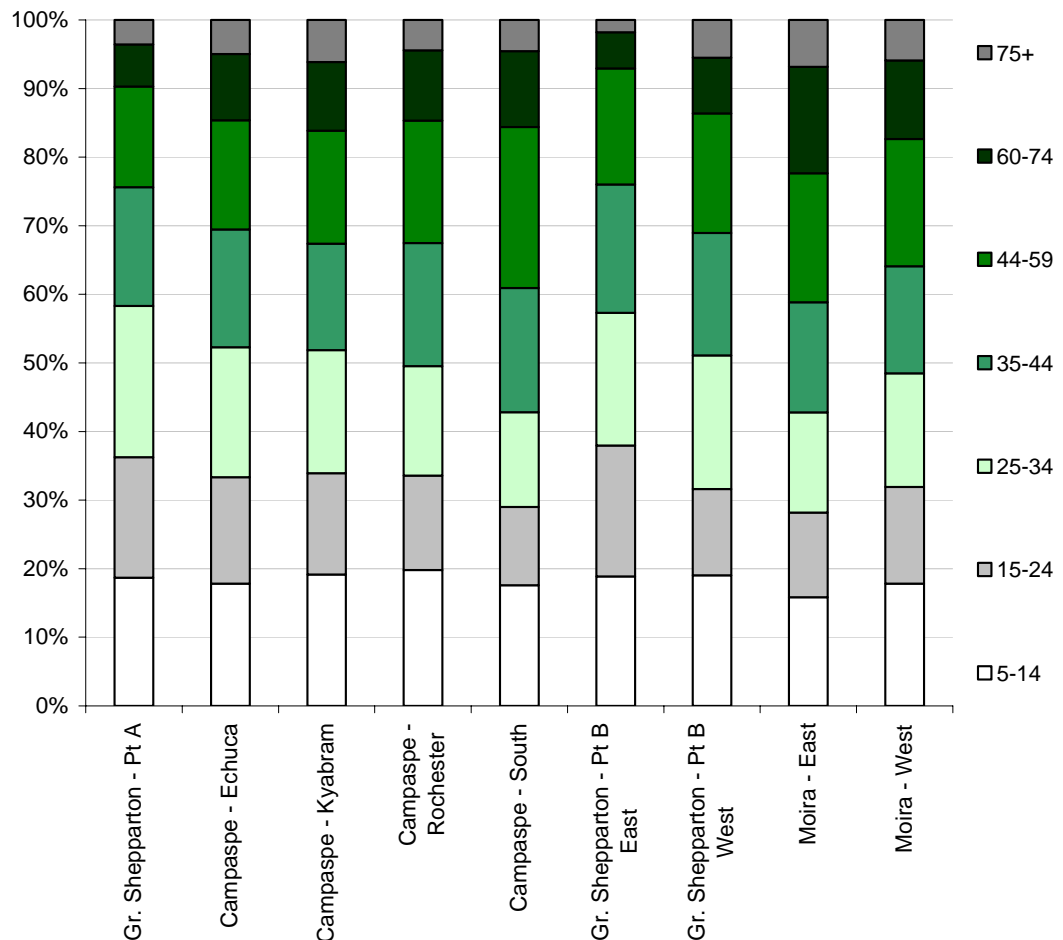


**Figure 5-4: Net Population Movement: 2001-2006. Source: ABS Census**

More specific characteristics of the new, old and existing population reveal considerable differences in age profile. Younger people, as might be expected, tend to leave the region, however considerable numbers also move into the region. In all age groups, except young adults aged 15-24, inward movements between 2001 and 2006 were greater than outward movements for the total study area (Figure 5-5).



**Figure 5-5: Age Profile and Population Movement (Study Region) - 2001-2006.**  
Source: ABS Census



**Figure 5-6: Age Profile - Inward Population Movement (Region SLAs): 2001-2006.**  
Source: ABS Census

At a more local level, new residents are typically older in Moira Shire and Campaspe – South (Rushworth/Waranga) and younger in Shepparton (urban and rural), Echuca and Kyabram.

Within the specific context of the rural areas, it is evident that population growth remains centred on the larger urban areas of the study region. The forms and levels of landscape-scale population and housing growth in rural areas that are evident in peri-metropolitan areas, coastal areas and some rural locations (such as Victoria’s north east) are not being experienced in this region. While perception of a ‘tree-change’ process may be apparent in some localities, population processes appear to indicate that the centralisation of population and the growth of larger centres (or localities immediately within their influence) is a greater driver of change. Notwithstanding this, some locations appear to be undergoing functional and structural change with new forms of rural lifestyle occurring.

The following section provides some detail of the spatial processes of development and change, as well as an analysis of trends in supply and demand for the existing provision of rural lifestyle land.

## 5.2 Rural property and trends in housing

Patterns of rural land use and housing development reflect the differentiated rural changes occurring in the study region. Existing patterns of landholdings reflect a range of historical drivers of development; larger dryland holdings, irrigation holdings developed at various phases and reflecting horticulture and dairying and smaller rural residential holdings on urban fringes and in desirable landscapes.

The distribution of smaller properties (Appendix E – Map 2) reflects an historical pattern of land settlement in irrigated farming areas, such as close to Shepparton, along a band from Cobram to Nathalia and around Bamawm and Lockington. The riverine corridors within the study are also characterised by smaller holdings. There are implications for future planning resulting from this property size distribution; while in some localities productive farming continues on single holdings in others multi-property farm businesses are a more typical response to pressures for increased scale, while in other places these properties have become an opportunity for non-farm rural development.

Patterns of existing housing, as reflected through rural address data indicate a predominance of housing on smaller holdings (Table 5-5). The capacity for these smaller properties to be operated and traded as an element of larger agricultural holdings is potentially limited by the existing residential nature of them.

**Table 5-4 Property Size Ranges (Rural Zones) – Based on Council Maintained Cadastral Data**

	Campaspe	Moira	Gr. Shepparton	Total
0-4ha	3,135	1,796	1,925	6,856
4-8ha	668	354	495	1,517
8-20ha	1,103	528	836	2,467
20-40ha	987	557	849	2,393
40-100ha	1,609	1,270	1,146	4,025
>100ha	1,239	1,206	590	3,035
<b>Total</b>	<b>8,741</b>	<b>5,711</b>	<b>5,841</b>	<b>20,293</b>

Recent trends in housing development (reflected through building permits) and subdivision reflects trends towards the generation of smaller land units and their development (Appendix E – Map 3). This would appear to imply development pressures not related to commercial agriculture. Higher levels of new rural housing on smaller properties in localities including Strathmerton, Katamatite and along the River Murray near Cobram suggest that these areas are undergoing change at a landscape scale, presenting risks for land markets based on agricultural values, and creating development patterns that are not fully reflective of existing planning objectives in the area. Overall, however, the area is typified by larger holdings and lower levels of development in genuine rural landscapes (Table 5-4).

**Table 5-5: Property Size Ranges (ha) – Rural Addresses. Based on Council Maintained Cadastral Data**

	Campaspe	Moira	Gr. Shepparton	Total
0-4ha	1,329	1,671	1,975	4,975
4-8ha	317	286	4,146	4,749
8-20ha	667	482	852	2,001
20-40ha	623	507	937	2,067
40-100ha	969	1,327	1,280	3,576
>100ha	757	1,903	674	3,334
<b>Total</b>	<b>4,662</b>	<b>6,176</b>	<b>9,864</b>	<b>20,702</b>

*Note: Rural Addresses are the most consistent and reliable indication of existing dwellings available. The associated maps do not indicate the exact location of a dwelling, but rather the location of properties with an address point.*

### 5.3 Land supply in specific rural living precincts

The Rural Living Zone has been applied in six precincts within the study area: areas adjoining Echuca, a small area adjoining Kyabram, areas the south-east of Shepparton, land near Rushworth, and small sites near Yarrowonga and Barmah. An assessment of the trends in land supply across the region within specific localities suggest that in general there is not clear and identifiable evidence of demand for expansion of the existing Rural Living zoning in any area. It is noted that this analysis is focussed at the regional level and other studies concentrated on given localities or at the township level could indicate demand for the application of Rural Living zoning.

Each of the areas has been analysed using existing housing data, recent building permits and subdivision activity data (Appendix E – Map 3). The following summaries indicate the status of each:

#### 5.3.1 Echuca

A considerable area of land to the south-east of Echuca is zoned Rural Living. This includes an area of over 800ha either side of the Echuca-Kerang railway corridor. This rural living land was subject to an assessment of supply and demand in 2002. At that time it was evident that land supply was adequate for likely future demand in this area. Most new development in and around Echuca was assessed as being focussed on fringe urban sites, including low density residential areas closer to the River Murray.

At present 153 developed sites on small (up to 1ha) blocks area evident. These area generally in linear subdivisions on Mary Ann Rd, Lady Augusta Rd, Simmie Rd and the Murray Valley Hwy. A further 42 lots in this size range are not developed. Additionally, a further 15 large blocks (between 20ha and 120ha) remain within this zoned area. This would suggest potential for at least 50 additional lots at the existing subdivision minimum of 8ha, and substantially more at densities similar to those in the locality.

Building data shows that 45 new building permits for houses were issued in this area between 2001 and 2007. These would indicate that, at these trends, over 10 years supply is available in the area.

### **5.3.2 Kyabram**

Three areas totalling 250 ha are zoned Rural Living on the fringes of Kyabram. At present these comprise 53 properties ranging in size from under 0.5ha to 26ha. At present, 17 of these properties do not have a dwelling on them, representing 32% of all properties. Additionally, at least three properties have potential for further subdivision at the existing 8ha minimum. Building data since 2001 shows 6 new permits issued, suggesting over 20 years supply at current trends.

### **5.3.3 Shepparton**

Around 1000ha of land on the south-eastern fringes of Shepparton is zoned Rural Living. This comprises 130 properties ranging in size from under 1ha to over 80ha with 120 houses on them. A number of larger blocks have significant development constraints resulting from identified flood risks on some of the property. At present the 8ha subdivision minimum could result in application for subdivision on approximately 7 lots where land is not subject to Flood Overlay. In recent years there has been 8 building permits approved for new dwellings in the area, and one approved subdivision created three lots (each over 20ha).

### **5.3.4 Barmah**

Two small areas of Rural Living land exist in Moira Shire; at Barmah and at Yarrawonga. Both have an 8ha subdivision minimum.

The Barmah site includes 15 houses on 20 properties at the edge of the existing urban area. In recent years two building permits have been granted in this area. In total five properties have potential for further subdivision within the existing planning provisions.

### **5.3.5 Yarrawonga**

The Yarrawonga site includes 19 houses on 29 properties immediately adjoining the urban area. In recent years only one building permit has been approved in the area. There is limited scope for further subdivision in this area.

### **5.3.6 Rushworth Region**

A considerable area (over 6000 ha) of land to the south east and south west of Rushworth is zoned Rural Living. This zoning applies to five separate areas, mostly adjoining public land near the Tait & Hamilton Rd, the Heathcote-Rochester Rd and in the Waranga Basin environs. These areas do commonly contain natural and cultural values that can inhibit development potential. These sites mostly comprise properties of about 20ha, although a number of smaller 'formal' subdivisions are evident to the east of Rushworth. The areas include 286 properties with 152 houses. Within these areas 83 properties are large enough for further subdivision at the existing 8ha minimum. A total of 49 building permits were issued for the various localities in this area between 2001 and 2007.

### **5.3.7 Nathalia and Numurkah Environs**

At present, no land has been zoned for Rural Living in the environs of Nathalia or Numurkah. In the environs of each town a small area of Low Density Residential land and some areas of small lots within the Farming Zone exist.

East of Numurkah an area zoned LDRZ (Brooke Crt and Ashley Crt) includes 38 lots of approximately 0.5ha. Based on building permit data, in this area 22 houses have recently been approved and 4 lots remain vacant. South of the golf course a cluster of small lots, of

around 1ha, are within the Farming Zone. These are also largely developed for housing with a number of recent building approvals. No distinct areas of development are evident at the typical scale of Rural Living development (4-8ha).

An area to the west of the Broken Creek at Nathalia is zoned LDRZ. This includes lots ranging from 0.5ha to 7ha. While many of the smaller lots are developed, a significant area remains in larger holdings. Land form constraints, including land subject to flooding present some limitations for further development here. Some smaller lots in the Farming Zone, such as land north-west of Scott Lane, have also developed on small lots. Again, no distinct areas of development at the Rural Living scale are evident

Previous planning consideration resulting from the Moira Rural Living Strategy (2004) did not consider there to be a demonstrated level of demand for rural living development in either town. The preparation of the Numurkah Strategy and Nathalia Strategy has commenced and will inform the appropriateness of developing town fringe areas at suitable densities for urban settlement in both towns.

### **5.3.8 Summary of rural living zone trends**

Considerable scope exists for further rural living development in each of the existing precincts. In many cases this includes considerable scope for additional subdivision within the existing provisions. Recent trends do not indicate that any area requires additional provision of rural living to meet current trends in development and development demand.

Trends in development in some areas however suggest the de facto creation of rural living areas, with the corridor between Cobram and Yarrawonga being the most evident example.

## **5.4 Strategic directions**

Population change and development trend in the region suggest likely continued growth in larger centres and in riverine environments. Trends in this growth to date do not indicate any considerable pressure for significant provision of locations for rural lifestyle development in a broader context.

It is evident that the rural landscapes in the region will have varied prospects and futures resulting from past patterns of development, access to water, patterns of land holdings and the risk and opportunities resulting from land use change. The drivers of population change (and consequent development pressures) are also varied. Planning for these processes requires the development of a desired land use future that recognises these drivers, but which also manages the flexibility and scope to meet future land use and production needs.

Essentially, the trends described suggest that population and housing change in rural areas is most strongly associated with land on the fringe of the larger urban centres in the study area and development in a few, highly valued, rural landscapes. Consequently, an exploration of past trends in population and settlement suggests that managing scope for appropriate agricultural futures is the central need of this strategy. Clarity in planning strategy and controls should be seen as a mechanism to ensure that competing land use trends and property markets do not distort the policy intent in the rural areas of this region, especially given the existing comparative low intensity of new small lot development beyond the influence of larger centres in this region.

## 6. Environmental values and threats

The environmental agenda of the region is primarily set by the following regional policy documents:

- North Central Regional Catchment Strategy, (NCRCS)
- Goulburn Broken Regional Catchment Strategy, 2003 (GBRCS)
- Moira Planning Scheme
- Campaspe Planning Scheme
- Greater Shepparton Planning Scheme.

In addition to these documents there are numerous other land, water and vegetation strategy documents that build upon the above regional strategies. The following section does not provide an exhaustive review of existing regional strategies. Rather, alignment at a policy level and with respect to planning scheme implementation is the focus of the RRLUS.

The five documents reviewed have been selected as they identify the environmental values and challenges of the region and the strategic response to them. In terms of planning for rural land use, they provide guidance about constraints and limitations. The GBRCS highlights the ongoing importance of agriculture in the region's economy and the role of farmers in enhancing the environmental condition of the region in pursuit of agricultural viability.

The following section of the report outlines the key drivers across the region with respect to environmental values and threats including remnant vegetation, fauna, water, flooding, salinity, soil health and climate change. Following a broad outline of these key factors, policy implications and recommendations are provided.

### 6.1 Environmental considerations

The key environmental considerations of the region include:

#### 6.1.1 Remnant vegetation

Most of the region has been heavily modified for settlement and agriculture, and as a result minimal native vegetation remains. Significant remnant vegetation has been preserved along roadsides and along adjacent riparian areas. Policy dictates that this should be preserved.

In addition to areas of remnant vegetation on public land, pockets of remnant vegetation exist on private land (Appendix E – Map 4, 5 & 6). Of particular note in this region are areas of remnant grasslands in the west of the region around Patho Plains and Gunbower<sup>7</sup>. The vegetation communities of the Victorian Northern Plains have been severely degraded since European settlement and now only small remnant areas remain. As a result, all vegetation communities on the Northern Plains are of considerable conservation significance. Northern Plains Grasslands are recognised as one of the most endangered vegetation communities in Victoria with less than 1% of their original extent remaining. Northern Plains Grasslands are listed under the *Victorian Flora and Fauna Guarantee Act 1988*, and have been nominated under the *Commonwealth's Environmental Protection and Biodiversity Conservation Act 1999*. These are highly significant due to their minimal representation across the region and

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<sup>7</sup> Designated by Australia to the List of Wetlands of International Importance - The Convention on Wetlands (Ramsar, Iran, 1971)



the locally indigenous nature of the species within this area. In addition, the native grasslands within these areas are also highly threatened as they are not as obvious as larger species such as trees and can be lost without being recognised. In particular, cropping and inappropriate levels of grazing are significant threats to grasslands.

Box Ironbark forest is also a significant vegetation type present in the region. The Whroo-Rushworth State Forest is part of the largest block of Box Ironbark habitat remaining in Victoria.

The region also includes Barmah Forest, the largest River Red Gum forest in Australia that is located adjacent the Murray river between Echuca, in Victoria and Tocumwal in New South Wales. While significant areas of this forest is located within reserved land managed by Parks Victoria, the Ecological Vegetation Class that includes River Red Gum extends into private land and it is on this land that is poorly represented.

The State Government has adopted a policy of net gain for native vegetation across the landscape. Any proposal to clear remnant vegetation is subject to a strict assessment to determine the appropriateness of the clearance proposal, with avoidance of the need to clear the preferred position especially in the case of significant, rare or threatened species, or high quality remnants. Any clearance approved is subject to an offset requirement to compensate for the vegetation lost and contribute to net gain. This offset may take the form of protection and enhancement of another area of remnant vegetation, or replanting of an area.

While the region seeks to promote and protect opportunities for agriculture, legislation and policy also requires remnant vegetation, in particular significant remnant vegetation, should be protected.

Where significant areas of remnant vegetation are zoned Farming Zone, it is recommended that these areas are reviewed with consideration of application of the Rural Conservation Zone. The extent of these proposed Rural Conservation Zones extend beyond identified values to incorporate a contiguous area incorporating existing private parcels that also contain ecological significant values. This is particularly the case in the Dookie Hills, Box-Ironbark forests within the Shire of Campaspe and City of Greater Shepparton that are to the east of Rushworth and adjacent the township to its west and south. In addition there are significant tracts of remnant River Red Gum forests adjacent the Murray River.

In addition to the application of RCZ, it is recommended that the application of a Vegetation Protection Overlay (VPO) is consistently applied throughout the region based on assessment of both priority Ecological Vegetation Community (EVC) Mapping<sup>8</sup> and existing mapping developed through the Biodiversity Action Planning partnership process developed between the Catchment Management Authorities, Department of Sustainability & Environment, Trust for Nature, Local Government and Parks Victoria. Appendix E – Map 4, 5 & 6 demonstrates these priority areas throughout the region and it is recommended that the application of these mapping as a basis for across the region will ensure future planning decisions are made in accordance with the requirements of Victoria's Native Vegetation Framework.

The Northern Grasslands within the Shire of Campaspe present a different rural land use challenge. There is recognition within this area that intensive agricultural industries have the potential to pursue sustainable agricultural practices if well managed and contained without impact on significant tracts of native grasslands. Therefore it is recommended that this area remain within the Growth Farming Zone and that the application of a Environmental Significance Overlay (ESO) across the region will ensure decision making is based on

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<sup>8</sup> EVC Mapping has been prepared by Department of Sustainability & Environment, 2008.

protecting the priority areas of significant native grasslands from the impacts of agriculture. Requirements to ensure that adequate waste management and associated development and use within this area does not impact on grassland areas should be incorporated into the associated schedule to the ESO.

### 6.1.2 Significant Flora and Fauna

The region supports a diversity of flora and fauna species of National and State significance. Threatening processes associated with historic land use changes have placed risk on the long term viability, maintenance and expansion of native flora and fauna. The recognition of biodiversity and associated habitat value provided through protecting native vegetation, grasslands and associated riparian areas and wetlands through application of the Rural Conservation Zone and Vegetation Protection Overlay's is the key planning tool for biodiversity management. The protection, maintenance and enhancement of habitat throughout the region will ensure the long term viability of native species.

#### Flora

A search of the Environment Protection and Biodiversity Conservation (EPBC) Act protected matters search tool indicates that 13 threatened flora species of national significance occur, or have the potential to occur, within the region. Refer to Table 6-1 for further details.

**Table 6-1: State significant species of plant with potential habitat within the region**

Scientific Name	Common Name	EPBC Act <sup>1</sup>	Shires Applicable	Notes
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass	V	Campaspe, Shepparton and Moira	Species or species habitat may occur within Campaspe, Shepparton and Moira Shire.
<i>Brachyscome muelleroides</i>	Mueller Daisy	V	Campaspe, Shepparton and Moira	Species or species habitat likely to occur within Campaspe, Shepparton and Moira Shire.
<i>Callitriche cyclocarpa</i>	Western Water-starwort	V	Campaspe, Shepparton and Moira	Species or species habitat likely to occur within Campaspe, Shepparton and Moira Shire.
<i>Calochilus richiae</i>	Bald-tip Beard-orchid	E	Campaspe	Species or species habitat likely to occur within Campaspe Shire.
<i>Diuris sheaffiana</i>	Tricolour Diuris	V	Campaspe, Shepparton and Moira	Species or species habitat may occur within Campaspe and Shepparton Shire. Likely to occur in Moira Shire.
<i>Lepidium monoplocoides</i>	Winged Pepper-cress	E	Campaspe	Species or species habitat likely to occur within Campaspe Shire.
<i>Maireana cheelii</i>	Chariot Wheels	V	Campaspe	Species or species habitat likely to occur within Campaspe Shire.
<i>Myriophyllum porcatum</i>	Ridged Water-milfoil	V	Campaspe, Shepparton and Moira	Species or species habitat likely to occur within Campaspe, Shepparton and Moira Shire.
<i>Pimelea spinescens subsp. spinescens</i>	Plains Rice-flower	CE	Campaspe	Species or species habitat likely to occur within Campaspe Shire.
<i>Sclerolaena napiformis</i>	Turnip Copperbur	E	Campaspe, Shepparton and Moira	Species or species habitat likely to occur within Campaspe, Shepparton and Moira Shire.

Scientific Name	Common Name	EPBC Act <sup>1</sup>	Shires Applicable	Notes
<i>Senecio behrianus</i>	Stiff Groundsel	E	Campaspe	Species or species habitat likely to occur within Campaspe Shire.
<i>Swainsona murrayana</i>	Slender Darling-pea	V	Campaspe, Shepparton and Moira	Species or species habitat likely to occur within Campaspe, Shepparton and Moira Shire.
<i>Swainsona plagiotropis</i>	Red Darling-pea	V	Campaspe	Species or species habitat Shire.

Key 1) Listed as critically endangered (CE); endangered (E) or vulnerable (V) under the Environment Protection and Biodiversity Conservation Act 1999.

The region supports numerous flora species of state significance. The majority of threatened flora species are associated with habitats that have been impacted by land clearing and disturbance associated with European settlement. Notable species of state significance within the North Central and Goulburn Broken CMA boundaries include:

- Crimson Spider Orchid (*Caladenia concolor*)
- Whipstick Westringia (*Westringia crassifolia*)
- Slender Sunray (*Rhodanthe stricta*)
- Grey Billy-buttons (*Craspedia canens*)
- Weeping Myall (*Acacia pendula*)

### Fauna

Native fauna within the region is largely associated with existing tracts of remnant vegetation, waterways and wetlands that provide habitat for faunal species. A search of the EPBC Act protected matters search tool indicates that 16 threatened flora species of national significance occur, or have the potential to occur, within the region. Refer to Table 6-2 for further details.

**Table 6-2: State significant species of plant with potential habitat within the region**

Scientific Name	Common Name	EPBC Act <sup>1</sup>	Shires Applicable	Notes
<b>Birds</b>				
<i>Lathamus discolor</i>	Swift Parrot	E	Campaspe, Shepparton and Moira	Species or species habitat may occur within Campaspe, Shepparton and Moira Shire.
<i>Pedionomus torquatus</i>	Plains-wanderer	V	Campaspe, Shepparton and Moira	Species or species habitat may occur within Shepparton and Moira Shire. Likely to occur within Campaspe Shire.
<i>Polytelis swainsonii</i>	Superb Parrot	V	Campaspe, Shepparton and Moira	Species or species habitat likely to occur within Campaspe and Moira Shire. May occur within Shepparton Shire.
<i>Rostratula australis</i>	Australian Painted Snipe	V	Campaspe, Shepparton and Moira	Species or species habitat may occur within Campaspe, Shepparton and Moira Shire.
<i>Xanthomyza phrygia</i>	Regent Honeyeater	E	Campaspe, Shepparton and Moira	Species or species habitat likely to occur within Shepparton and Moira Shire. May occur within Campaspe Shire.

Scientific Name	Common Name	EPBC Act <sup>1</sup>	Shires Applicable	Notes
<b>Amphibians</b>				
<i>Litoria raniformis</i>	Growling Grass Frog	V	Campaspe, Shepparton and Moira	Species or species habitat may occur within Campaspe, Shepparton and Moira Shire.
<b>Insects</b>				
<i>Synemon plana</i>	Golden Sun Moth	CE	Campaspe, Shepparton and Moira	Species or species habitat may occur within Campaspe, Shepparton and Moira Shire.
<b>Mammals</b>				
<i>Dasyurus maculatus maculatus</i>	Spot-tailed Quoll	E	Campaspe, Shepparton and Moira	Species or species habitat may occur within Campaspe, Shepparton and Moira Shire.
<i>Nyctophilus timoriensis</i>	Eastern Long-eared Bat	V	Campaspe and Moira	Species or species habitat may occur within Campaspe and Moira Shire.
<b>Ray-finned Fish</b>				
<i>Craterocephalus fluviatilis</i>	Murray Hardyhead	V	Campaspe, Shepparton and Moira	Species or species habitat likely to occur within Campaspe and Moira Shire. May occur within Shepparton Shire.
<i>Maccullochella peelii peelii</i>	Murray Cod	V	Campaspe, Shepparton and Moira	Species or species habitat may occur within Campaspe, Shepparton and Moira Shire.
<i>Macquaria australasica</i>	Macquarie Perch	E	Campaspe, Shepparton and Moira	Species or species habitat may occur within Campaspe, Shepparton and Moira Shire.
<i>Maccullochella macquariensis</i>	Trout Cod	E	Moira	Species or species habitat likely to occur within Moira Shire.
<b>Reptiles</b>				
<i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard	V	Campaspe, Shepparton and Moira	Species or species habitat likely to occur within Campaspe, Shepparton and Moira Shire.
<i>Delma impar</i>	Striped Legless Lizard	V	Campaspe, Shepparton and Moira	Species or species habitat likely to occur within Campaspe, Shepparton and Moira Shire.

Notable fauna species of state significance include:

- Bush Stone Curlew (*Burhinus grallarius*)
- Brush Tailed Phascogale (*Phascogale tapoatafa*)
- Silver Perch (*Bidyanus bidyanus*)
- Eastern Wallaroo (*Macropus robustus robustus*)

### 6.1.3 Water

The Goulburn Broken Catchment produces 11 per cent of the Murray Darling Basin stream flow (GBCMA 2003).

The region is also an importer of water for irrigation and urban water use. Key water assets in the region include the Murray River, Campaspe River, Broken River and the Goulburn River. These rivers are significant in terms of their contribution to the local economy through

provision of water for agriculture. They are also significant tourism and recreation assets. They obviously also play a significant role in the biodiversity of the region.

Groundwater from the Murray Basin is also a water source for the region.

A number of significant wetlands exist in the region associated with the significant rivers, these include the Barmah-Millewa Forest<sup>9</sup> and Kow Swamp.

The quality of water in the region has been compromised by run off from urban and rural areas, increasing nutrient loads, salinity levels, turbidity and allocation levels. Given the region's dependence on water for agriculture it is fundamental that water quality be protected. Initiatives to protect water quality include maintaining remnant vegetation (particularly riparian vegetation), effective effluent management (urban areas and that from rural areas including animal waste), managing salinity, maintaining natural flood processes and protecting environmental flows.

The application of VPO throughout the region is key to ensuring management of remnant vegetation and maintenance of water quality throughout waterways and wetlands.

#### **6.1.4 Flooding**

Associated with the region's values based on water assets, a significant proportion of the region is subject to flooding.

Flooding can limit land use prospects for agriculture and more specifically development within an urban context. However, flooding is an important process in terms enhancing the environmental health of the river system. Where possible, natural flooding processes should be protected. In some areas drainage has been enhanced to promote movement of floodwaters and minimise risk of water table recharge and increase of soil salinity. Drainage systems are a significant part of the infrastructure of the region to enhance agricultural productivity.

Flooding is managed in the region by a number of localised floodplain management plans and planning controls that seek to minimise development in the floodplain.

Campaspe have highlighted the environmental significance of their main flood paths through application of the Rural Conservation Zone (RCZ) to these areas, as well as the Floodway Overlay (FO). Moira and Shepparton have relied on the Floodway Overlay. All three Councils use the Land Subject to Inundation Overlay for the balance of the floodplain. The different approach that Campaspe has adopted indicates that farming is not their intended land use for these flood paths, and the environmental role should take precedence. In Moira and Shepparton, although the area is flood prone and development should respond to this, farming still remains the preferred land use. The application of the RCZ within Campaspe therefore requires review to ensure a consistent approach across the region, particularly where agricultural activity is the primary objective across the land. The use of FO in areas subject to flooding is considered a more appropriate planning instrument as it will ensure that building, works and development are considered through the planning process.

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<sup>9</sup> Designated by Australia to the List of Wetlands of International Importance - The Convention on Wetlands (Ramsar, Iran, 1971)

### 6.1.5 Salinity

Salinity presents the biggest threat to the Catchment's natural assets<sup>10</sup>. Salinity continues to affect the productive value of the soil, detrimentally affects water quality and threatens the health of native vegetation, even as process of farm practice and land management are addressing this issue.

Soil salinity is caused through the water table rising to the surface and bringing with it dissolved salts which then contaminate the soil. Due to changes in vegetation cover, drainage and irrigation practices water tables in the region have risen over the period of settlement. Programs over the last 10-20 years have improved the situation significantly, but it is an ever present threat. In 2001, 23.5 per cent of the Shepparton Irrigation Region was underlain by a water table within two metres of the surface (this varies from year to year depending on seasonal conditions).

The ongoing productivity of the region is dependant on managing water table levels.

Detailed assessment of the implications of salinity are required to ensure that the application of the Salinity Management Overlay across the region is adequate. A detailed assessment of salinity levels, associated impacts and implications for planning policy is outside the scope of this regional strategy.

### 6.1.6 Soil health

Farming land across the region has suffered from inappropriate past practices. Soil issues in the region include compaction, water logging, sodicity and salinity. These issues affect productivity and current farming practice generally seek to avoid these problems. These problems are managed by appropriate cultivation and grazing practices, drainage management and protection of vegetation.

### 6.1.7 Climate change

The climate of the region is expected to change as a result of increased concentrations of greenhouse gases in the atmosphere. Climate change may affect the growing conditions for agriculture through increased average temperatures and changes in rainfall patterns (further information in relation to climate is located at Section **Error! Reference source not found.**). In particular it is considered likely that climate change will affect the amount of water available to the region for agriculture. The ongoing agricultural viability of the region is dependant on the improved efficiency of water delivery and use. As discussed above, this presents significant challenges and some opportunity for agriculture in the region.

City of Greater Shepparton joined the *Cities for Climate Protection Program* in 2000 and has committed to evaluate and set targets for greenhouse gas emissions for Council and community and promote energy efficient subdivision and house design.

Although the effect of climate change is relatively unknown, is it considered prudent to be planning for farming in a dryer climate, with a less reliable rainfall and more limited water supply. The potential negative impacts on horticulture and dairying from diminishing water supplies provides further catalyst for aligning land use policy with significant investment around water security across the region. Importantly, the uncertainty associated with changes in climatic conditions require land use policy to provide flexibility throughout the

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<sup>10</sup> GBRCs (2003) Summary, page 11.

rural zoned land to respond to different opportunities and constraints associated with Climate Change.

## 6.2 Implications for Planning Policy and Practice

The management and enhancement of the condition of the environment is significant in terms of supporting agricultural growth and development. In particular:

- Native vegetation is required to be preserved to maintain biodiversity and manage water tables.
- Floodplains and flood events are required to flush waterways and enhance water quality.
- Fauna is required to maintain biodiversity and manage pest plants and animals.

Presently, the application of environmental controls in the region varies with a limited use of available overlays, specifically to manage significant vegetation, landscape and habitat. The range of remnant vegetation, from riverine to significant Box-Ironbark forests is indicated in the map of Ecological Vegetation Classes in Appendix E (Map 4). Importantly, the application of appropriate zoning to reflect important landscapes, amenity values and habitat is limited to small forest inliers (except in the case of Campaspe, where area of river corridor and landscape features have the Rural Conservation Zone applied). Consideration of Biodiversity Action Planning processes being completed by Catchment Management Authorities are key to this decision making (See Appendix E – Map 5). The BAP<sup>11</sup> reporting and associated mapping outlines priority ecological areas.

From the perspective of this study, the crucial issues for consideration are:

1. The need to create a consistent application of overlays (Vegetation Protection Overlay, Environmental Significance Overlay, Significant Landscape Overlay) across each of the three planning scheme areas based on EVC and BAP prioritisation;
2. The need to adopt a consistent approach to planning in floodways and floodplains. In this respect, the application of either the FO or LSIO is considered the most appropriate mechanism to limit the impact of agricultural development on the natural operation of floodways or floodplains. This approach should be applied consistently across the region as a whole;
3. The need to apply the Rural Conservation Zone widely to those areas where environmental features and landscape/amenity values suggest the need to manage development type, scale and intensity so as to support these values.

Where significant values are identified the choice of selecting an appropriate overlay, or the use of the RCZ (perhaps with overlays) should be guided by the following principles:

- If the identified value can be considered to exist at a landscape scale, the RCZ should be applied.
- Specific features, habitat areas and flood related landscapes should be subject to an appropriate overlay.

Consequently, this study recommends that the RCZ is applied more widely across the region including areas around Rushworth in Campaspe and Greater Shepparton, and particularly in parts of Moira. Examples include the River Murray corridor area where fragmentation of land ownership and trends in housing limit opportunity for agricultural expansion, but significant

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Biodiversity Action Planning is a coordinated program between DSE, CMA's, Trust for Nature, Local Government and Parks Victoria to ensure priority areas of native biodiversity are identified, mapped and managed at bioregional scales (Source: [http://www.dpi.vic.gov.au/DPI/Vro/vrosite.nsf/pages/biodiversity\\_bap](http://www.dpi.vic.gov.au/DPI/Vro/vrosite.nsf/pages/biodiversity_bap) .

landscape and amenity values can be identified. In these areas, the objective of environmental enhancement should have primacy, but may well be delivered through conditions on planning approvals that allow housing and other development at appropriate intensities, while improving vegetation and habitat linkages across the landscape.

In addition to the application of RCZ, it is recommended that the application of a Vegetation Protection Overlay (VPO) is consistently applied throughout the region based on existing mapping developed through the Biodiversity Action Planning partnership and relevant EVC Mapping.

The exception to this approach is the Northern Grasslands located within Campaspe. Recent strategic work completed by the Shire of Campaspe has highlighted the increasing importance of intensive agricultural industries within this region. It is recommended that the application of an ESO across the native grasslands of the Pathos Plains is applied. The ESO should reflect the most recent EVC Mapping undertaken by the Department of Sustainability and Environment. This is recommended to ensure protection of the high value non-forest vegetation that has been identified and to enable the long term sustainable agricultural development of both existing and future farms within the region.

And finally, the consistent approach of a Flood Overlay (FO) is recommended throughout the region. This entails removal of the broad application of the Rural Conservation Zone from areas identified with flood risk within the Shire of Campaspe. This recommendation should not be considered to diminish the significance of areas of high value vegetation where the ESO should be applied. However, the application of the FO recognises that often the primary purpose of these areas is agriculture and that the use of this land for agriculture would be preferable to some non agricultural uses that could be considered within the Rural Conservation Zone.