Community impacts of the Guide to the proposed Murray-Darling Basin Plan

Volume 8. Regional Analysis – Victoria

May 2011

Report prepared for the Murray-Darling Basin Authority

A consortium of EBC, RMCG, MJA, EconSearch, Geoff McLeod, Tim Cummins, Guy Roth and David Cornish
with special advice from Chris Miller

Key contact details:
Dr Mark Fenton, Director EBC, mark@ebc.net.au
Rozi Boyle, Associate Partner RMCG, rozib@rmcg.com.au
Matthew Toulmin, Partner and Principal Consultant RMCG, matthewt@rmcg.com.au
Dr John Marsden, Director, Marsden Jacob Associates (MJA), john.marsden@marsdenjacob.com.au

Disclaimer:
This document has been prepared for the Murray-Darling Basin Authority and is made available for general use and to assist public knowledge and discussion regarding the integrated and sustainable management of the Basin’s natural water resources. The opinions, comments and analysis (including those of third parties) expressed in this document are for information purposes only. This document does not indicate the Murray-Darling Basin Authority’s commitment to undertake or implement a particular course of action, and should not be relied upon in relation to any particular action or decision taken. Users should note that developments in Commonwealth policy, input from consultation and other circumstances may result in changes to the approaches set out in this document.

Disclaimer:
This report has been prepared in accordance with the scope of services described in the contract or agreement between the EBC Consortium and the Client. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client and the EBC Consortium accepts no responsibility for its use by other parties.
# Table of Contents

## 1 INTRODUCTION

1.1 About this study .......................................................... 10
1.2 About these regional reports .......................................... 14
1.3 ‘Bridging the Gap in the Murray-Darling Basin’ .................. 15

## 2 THE VICTORIAN MURRAY

## 3 SUNRAYSIA

3.1 Overview ............................................................................. 19
  3.1.1 Social Catchments ......................................................... 20
  3.1.2 Irrigated production ..................................................... 20
  3.1.3 Drought ...................................................................... 21
  3.1.4 Baseline ...................................................................... 22
  3.1.5 Impact of reduced water availability ............................. 23
  3.1.6 Minimising Impacts ..................................................... 24

3.2 Background ........................................................................ 24
  3.2.1 Introduction to region and social catchments ................. 24
  3.2.2 Irrigation in the region ................................................ 27
  3.2.3 Key agricultural industries ........................................... 29
  3.2.4 Other key industries .................................................... 31

3.3 Water Management, Government Purchases and Drought .... 34
  3.3.1 Water Management Arrangements ............................... 34
  3.3.2 Water Procurement ...................................................... 35
  3.3.3 Modernisation ............................................................ 35
  3.3.4 Drought ..................................................................... 36

3.4 Baseline – the future without policy change ...................... 36
  3.4.1 Farm Systems ............................................................. 37
  3.4.2 Almonds ..................................................................... 37
  3.4.3 Olives, Avocados, Pistachios ....................................... 38
  3.4.4 Table Grapes .............................................................. 38
  3.4.5 Dried Fruit .................................................................. 38
  3.4.6 Wine Grapes .............................................................. 38
  3.4.7 Citrus .......................................................................... 38
  3.4.8 Business Sector .......................................................... 38

3.5 Initial responses to the Guide ............................................. 39
  3.5.1 Mental fatigue of communities in the region ................. 39
  3.5.2 Misunderstanding of implementation of the Plan .......... 40
3.5.3 Lack of learning from regional experience ........................................ 40
3.5.4 Credibility and rigour of science and environmental allocations .......... 40
3.5.5 Many unanswered questions .......................................................... 40
3.5.6 Disappointment at pitting agriculture against the environment ........... 41

3.6 Impacts of Reduced Water Availability .............................................. 41
3.6.1 Current Diversions, and Guide proposals ......................................... 41
3.6.2 Farm Level Response .................................................................. 43
3.6.3 Impacts to the local economy ......................................................... 46
3.6.4 Social impacts .............................................................................. 48

3.7 Community Resilience and Adaptive Capacity .................................... 50
3.7.1 Overall ......................................................................................... 50
3.7.2 Mildura Social Catchment ............................................................ 51
3.7.3 Robinvale Social Catchment ......................................................... 51

3.8 Minimising impacts .......................................................................... 51

4 GOUldbURN AND vICTORIaN MURRAY - GMID ................................. 52
4.1 Overview .......................................................................................... 52
4.1.1 Social Catchments ....................................................................... 53
4.1.2 Drought ......................................................................................... 53
4.1.3 Baseline ......................................................................................... 55
4.1.4 Impact of reduced water availability ............................................. 56
4.1.5 Minimising impacts ..................................................................... 59

4.2 Background ....................................................................................... 59
4.2.1 Introduction to region and social catchments .................................. 59
4.2.2 Irrigation in the region ................................................................. 66
4.2.3 Key agricultural industries ............................................................ 68
4.2.4 Other key industries ..................................................................... 70

4.3 Water management, Government purchases and drought .................... 71
4.3.1 Water management arrangements ............................................... 71
4.3.2 Water procurement ..................................................................... 72
4.3.3 Drought ......................................................................................... 73

4.4 Baseline – the future without policy change ...................................... 75
4.4.1 Permanent horticulture ............................................................... 76
4.4.2 Annual horticulture ..................................................................... 76
4.4.3 Dairy ............................................................................................ 76
4.4.4 Mixed farming ............................................................................. 77
4.4.5 Business sector ........................................................................... 77
4.4.6 Community services .................................................................... 78
5 LODDON

5.1 Overview ................................................................. 98
  5.1.1 Social Catchments ............................................... 98
  5.1.2 Primary Irrigated production .................................. 98
  5.1.3 Drought ............................................................. 99
  5.1.4 Baseline ............................................................. 99
  5.1.5 Impact of reduced water availability .......................... 99
  5.1.6 Minimising Impacts .............................................. 99

5.2 Background .............................................................. 99
  5.2.1 Introduction to region and social catchments ............... 99
  5.2.2 Irrigation in the region ........................................ 102
  5.2.3 Key agricultural industries ................................... 102
  5.2.4 Service Industries .............................................. 103
  5.2.5 Tourism ........................................................... 103

5.3 Water Management and Drought .................................... 103
  5.3.1 Water Management Arrangements .............................. 103
  5.3.2 Drought ........................................................... 103

5.4 Baseline – the future without policy change .................... 103
  5.4.1 Loddon diverters ................................................ 103

5.5 Response to Basin Plan process .................................... 104

5.6 Impacts of Reduced Water Availability ........................... 104
  5.6.1 Water Procurement by Government ............................ 104
  5.6.2 Farm Level Response ........................................... 105
  5.6.3 Impacts to the local economy ................................ 106
  5.6.4 Social impacts ................................................... 106

5.7 Community Resilience and Adaptive Capacity .................. 107
  5.7.1 Bendigo Social Catchment ....................................... 107

4.5 Response to Basin Plan process .................................... 78

4.6 Impacts of Reduced Water Availability ........................... 79
  4.6.1 Current diversions, and Guide proposals ...................... 79
  4.6.2 Water sales to Government ..................................... 80
  4.6.3 Farm level response ............................................. 81
  4.6.4 Impacts to the local economy .................................. 87
  4.6.5 Different impacts across the region ........................... 90
  4.6.6 Social impacts ................................................... 94

4.7 Community resilience and adaptive capacity .................... 96

4.8 Minimisation of impacts ............................................ 97
5.8 Minimisation of Impacts ................................................................. 107

6 CAMPASPE ........................................................................................................ 108
6.1 Overview ................................................................................................. 108
  6.1.1 Social Catchment .............................................................................. 108
  6.1.2 Irrigated primary production ........................................................... 108
  6.1.3 Drought ............................................................................................ 109
  6.1.4 Baseline ............................................................................................ 109
  6.1.5 Impact of reduced water availability .................................................. 109
  6.1.6 Minimising Impacts ......................................................................... 109
6.2 Background .............................................................................................. 110
  6.2.1 Introduction to region and social catchments .................................... 110
  6.2.2 Irrigation in the region ...................................................................... 113
  6.2.3 Key agricultural and other industries ................................................ 116
6.3 Water Management, Government Purchases and Drought ....................... 117
  6.3.1 Water Management Arrangements .................................................. 117
  6.3.2 Water Procurement ......................................................................... 118
  6.3.3 Drought ............................................................................................ 118
6.4 Baseline – the future without policy change ............................................. 118
  6.4.1 Campaspe diverters .......................................................................... 118
  6.4.2 Coliban rural .................................................................................... 119
  6.4.3 Coliban urban ................................................................................... 119
6.5 Response to Basin Plan process ............................................................... 119
6.6 Impacts of Reduced Water Availability .................................................. 119
  6.6.1 Water Procurement by Government .................................................. 119
  6.6.2 Farm Level Response ....................................................................... 121
  6.6.3 Changes to agricultural production and third party impacts ............... 123
  6.6.4 Impacts to the local economy ............................................................. 123
  6.6.5 Social impacts .................................................................................. 124
6.7 Community Resilience and Adaptive Capacity ........................................ 124
  6.7.1 Bendigo Social Catchment ................................................................ 124
6.8 Minimisation of Impacts .......................................................................... 125

7 OVENS ........................................................................................................... 126
7.1 Overview .................................................................................................... 126
  7.1.1 Social Catchments ............................................................................ 126
  7.1.2 Irrigated primary production ............................................................. 126
  7.1.3 Drought ............................................................................................ 127
  7.1.4 Baseline ............................................................................................ 127
7.1.5 Impact of reduced water availability .................................................. 127
7.1.6 Minimising Impacts ......................................................................... 128
7.2 Background ....................................................................................... 128
  7.2.1 Introduction to the region and social catchments ............................. 128
  7.2.2 Irrigation in the region .................................................................. 131
  7.2.3 Key agricultural industries ............................................................ 131
  7.2.4 Key other industries ..................................................................... 132
7.3 Water Management, Government Purchases and Drought .................. 132
  7.3.1 Water Management Arrangements ................................................. 132
  7.3.2 Water Procurement ..................................................................... 133
  7.3.3 Agricultural production .................................................................. 133
  7.3.4 Drought ....................................................................................... 133
7.4 Response to Basin Plan process .......................................................... 133
7.5 Baseline – the future without policy change ....................................... 133
  7.5.1 Dairy ............................................................................................. 134
  7.5.2 Horticulture .................................................................................. 134
  7.5.3 Tourism ....................................................................................... 134
7.6 Impacts of Reduced Water Availability ............................................. 134
  7.6.1 Water Procurement by Government ............................................... 134
  7.6.2 Farm Level Response .................................................................... 135
  7.6.3 Impacts to the local economy ....................................................... 138
  7.6.4 Social impacts .............................................................................. 139
7.7 Community Resilience and Adaptive Capacity .................................... 139
  7.7.1 Overall .......................................................................................... 139
  7.7.2 Wangaratta social catchment ....................................................... 139
  7.7.3 Myrtleford social catchment ........................................................ 140
7.8 Minimisation of Impacts ................................................................. 140

8 KIEWA ................................................................................................. 141
  8.1 Overview .......................................................................................... 141
    8.1.1 Social Catchments ...................................................................... 141
    8.1.2 Primary Irrigated production ...................................................... 141
    8.1.3 Drought ..................................................................................... 141
    8.1.4 Baseline ...................................................................................... 141
    8.1.5 Impact of reduced water availability ........................................... 142
    8.1.6 Minimising Impacts ................................................................... 142
  8.2 Background ....................................................................................... 142
    8.2.1 Introduction to region and social catchments ............................... 142
8.2.2 Irrigation in the region .................................................. 146
8.2.3 Key agricultural industries ............................................. 146
8.2.4 Key other industries .................................................... 147

8.3 Water Management, Government Purchases and Drought .......... 147
8.3.1 Water Management Arrangements ................................ 147
8.3.2 Water Procurement ....................................................... 148
8.3.3 Drought ................................................................. 148

8.4 Response to Basin Plan process ........................................... 148

8.5 Baseline – the future without policy change .......................... 148
8.5.1 Dairy ................................................................. 149
8.5.2 Horticulture ............................................................ 149
8.5.3 Business Sector ....................................................... 149
8.5.4 Rural Communities ................................................. 149

8.6 Impacts of Reduced Water Availability ................................. 149
8.6.1 Water Procurement by Government ............................... 149
8.6.2 Farm Level Response ................................................. 151
8.6.3 Impacts to the local economy ....................................... 152
8.6.4 Social impacts ......................................................... 152

8.7 Community Resilience and Adaptive Capacity ....................... 153

8.8 Minimisation of Impacts ................................................... 153
List of Figures

Figure 1-1. How impacts were traced into communities. 10
Figure 1-2. Vulnerability matrix. 11
Figure 1-3. Social catchments in the Murray-Darling Basin, showing relative vulnerability of towns to reduced irrigation. 13
Figure 2-1 Map of the Victorian Murray social catchments, showing state borders and categories of towns 18
Figure 3-1. Current diversion limits. 28
Figure 3-2. Gross regional product of key industries. 31
Figure 4-1 Map of the Goulburn-Broken social catchments, showing categories of towns 62
Figure 4-2 Current diversion limits. The Victorian Murray is the third largest, and the Goulburn the fourth largest diverter in the Basin 66
Figure 4-3 Diagrammatic representation of the GMID 67
Figure 5-1. Social catchments in the Loddon, showing relative vulnerability of towns to reduced irrigation. 101
Figure 5-2. Current diversion limits. The Loddon is the seventh smallest irrigation region diverter in the Basin. 102
Figure 6-1. Social catchments in the Campaspe, showing relative vulnerability of towns to reduced irrigation. 112
Figure 6-2. Current diversion limits. The Campaspe is the eighth smallest irrigation region diverter in the Basin. 113
Figure 6-3. Coliban Water - Projected increase in demand to 2055 116
Figure 7-1. Social catchments in the Ovens, showing relative vulnerability of towns to reduced irrigation. 129
Figure 7-2. Current diversion limits. The Ovens is the third smallest irrigation region diverter in the Basin. 131
Figure 8-1. Social catchments in the Kiewa (adjacent to the Ovens), showing relative vulnerability of towns to reduced irrigation. 144
Figure 8-2. Current diversion limits. The Kiewa is the smallest irrigation region diverter in the Basin. 146

List of Tables

Table 1-1. Budgeted expenditure for Australian Government buyback and modernisation (at 2010). 16
Table 3-1 Communities within the study region 20
Table 3-2. Agriculture production in the Mildura Region 30
Table 3-3 Summary of Surface water entitlements 35
Table 3-4. Current diversion limit and ‘Guide’ proposals. 42
Table 4-1 Communities within the study region 60
Table 4-2 GMID Gross Value of Production in 2005-06 ($'000) 68
Table 4-3 Summary of surface water entitlements 72
Table 4-4 Current diversion limit and ‘Guide’ proposals 80
Table 5-1 Communities within the study region 98
Table 5-2. Current diversion limit and ‘Guide’ proposals. 104
Table 6-1 Communities within the study region 111
Table 6-2. Profile of Coliban rural users 114
Table 6-3 Projected population growth by Local Government Area (LGA) 115
Table 6-4. Impact of drought, Campaspe. 118
Table 6-5. Current diversion limit and ‘Guide’ proposals. 120
Table 7-1 Communities within the study region 126
Table 7-2. Summary of Surface water entitlements 133
Table 7-3. Current diversion limit and ‘Guide’ proposals. 134
Table 8-1 Communities within the study region 141
Table 8-2. Current diversion limit and ‘Guide’ proposals. 150
Preface

This report is Volume 8 in a suite of documents that has been prepared by the EBC consortium on the potential community impacts of the proposals in the Guide to the Murray-Darling Basin Plan.

The MDBA commissioned the consortium to assess the potential community impacts of the proposals in the Guide. The primary objective was to understand the impacts on local, small-scale, human issues and costs during the short and medium term. A key aim was to consult with communities to understand how they would be impacted by proposals in the Guide.

A round of key informant interviews was completed early in 2011, covering 48 social catchments, 80 local government areas and 119 towns and regional centres. The discussions involved nearly 700 people from across the full range of sectors and employment groups. Additional economic analysis was undertaken to supplement and inform the outcomes of the community interviews.

The outcome of the project is reported in nine volumes:

- Volume 1: An Executive Summary - provides an overview and condensed report on the core outcomes of the project;
- Volume 2: Methodology - sets out the framework and analytical methodology for the study;
- Volume 3: Community Impact - provides a comprehensive report on the breadth of the issues raised in the Community Impact program. This includes the identification of a number of significant issues which are material for the roll-out of the draft Basin Plan;
- Volume 4: Informing Choices - takes the key issues from Volume 3 and provides further analysis and assessment of the issues to help provide information to optimise decisions on the development and implementation of the draft plan at least cost to the community;
- Volume 5: Regional analysis: Southern Connected Basin Overview;
- Volume 6: Regional analysis Queensland - provides detailed reports on the key findings from the community engagement process at a regional scale. They focus on the short to medium term impacts of the proposals in the Guide on industries and communities at the local level;
- Volume 7: Regional analysis New South Wales;
- Volume 8: Regional analysis Victoria; and
- Volume 9: Regional analysis South Australia.
1  Introduction

1.1  About this study

This study was commissioned by the Murray-Darling Basin Authority to assess the potential impacts of the proposals in the Guide to the proposed Basin Plan on local, small-scale, human issues and costs during the short and medium term.

The project was delivered using a suite of tools including community interviews, data analysis and economic modelling. These complementary approaches provided a robust basis for the assessment.

The community impact assessment was targeted at ‘social catchments’. This is a level of social grouping that reflects community identity and local economic interaction and enabled the study to capture impacts that occurred at a small scale. Around 50 such social catchments were selected across the Basin, mostly centred on towns that are at the heart of regional communities.

A comprehensive interview program was undertaken throughout the Basin early in 2011, with almost 700 interviews with key informants in nearly 50 social catchments. These semi-structured interviews obtained and assessed the potential impact of the Guide on farmers, businesses and communities within each social catchment. The impact assessment was structured to take account of the wider factors impacting on regional communities to identify the additional impacts that the Guide would have, over and above an agreed baseline.

The interviews used lines of enquiry that explored the current context, responses to the Guide, the baseline (a dynamic baseline, if there were no Basin Plan), the impacts of buyback and irrigation modernisation to date, and the impacts of future buyback and/or modernisation to meet the scenarios set out in the Guide. There were four groups of interviewees, with four tailored lines of enquiry, so that impacts could be traced from farmers, through the farm value chain (including processors), and into the community with a focus on businesses and services (Figure 1-1).

![Diagram](image)

**Figure 1-1.** How impacts were traced into communities.
The relative impact of the Guide at a local level depended on the scale of the proposed change, the mechanisms by which compensated environmental water recovery occurred, and the inherent capacity of the communities in social catchment to adjust. The capacity of communities to adapt to compensated environmental water recovery depended on two attributes: ‘size’, with a threshold at a figure around 10,000 people; and ‘dependency on irrigated agriculture’, with a threshold at around 15% of total employment in agricultural related sectors.

Using these two criteria allows the multiple social catchments across the Basin to be analysed within four major categories (Figure 1-2):

- **Category 1**: Small to medium towns that are highly dependent on irrigated agriculture and are often geographically isolated. These smaller communities are often subject to larger forces that are driving a decline in their size and vitality. In many of these communities the Basin Plan could increase the speed and extent of these changes;

- **Category 2**: Small to medium sized, diverse locations that combine high-value irrigation with tourism and other sectors. They are generally less exposed to impacts;

- **Category 3**: Medium to large towns that are highly dependent on irrigated agriculture. These centres are robust with current diversion limits but would be highly exposed to any proposed changes in irrigated agriculture in the region; and

- **Category 4**: Large, diverse growing regional centres that have a breadth of activity and employment. These are generally relatively insulated from changes in irrigated agriculture in the region.
The relative vulnerability of towns across the Basin as a whole is shown in Figure 1-3.

It is very important to recognise that relative vulnerability does not necessarily mean that towns will be more negatively impacted by the forthcoming Basin Plan. Other factors are also important; in particular, the relative exposure of towns to the proposed changes is critical. Not all vulnerable towns will necessarily face significant reductions in irrigation activity under the Basin Plan. A number of factors, in turn, affect exposure – these include the extent of the change from the current to the proposed sustainable diversion limit; the types of water entitlement sought by the Commonwealth; the mode of procurement (e.g. buy-back vs. modernisation); etc. Some of these key policy settings that affect exposure are discussed in Volume 4 of this study.
Figure 1-3. Social catchments in the Murray-Darling Basin, showing relative vulnerability of towns to reduced irrigation.
1.2 About these regional reports

These regional reports set out in detail the analysis and findings of this study for each Basin region, by State.

This report presents the EBC consortium’s findings for the Victorian regions – Sunraysia (which also includes part of NSW), Loddon, Campaspe, Goulburn, Vic Murray, Broken, Ovens and Kiewa.¹ The findings set out in this report should be construed as the consortium’s professional judgment, except for where the context makes it clear that it is not our judgment (e.g. in some cases, anecdote that could not be substantiated is clearly expressed as being the opinion of those who communicated it). Our judgment is based upon interviews with community members, economic modelling, published literature and our professional experience.

The days allocated to regional interviews, and to analysis and report preparation, for each region differed depending on the expected exposure of each region to potential irrigation impacts of the Basin Plan. Accordingly, the number of people interviewed and the time spent in report writing was greater for Sunraysia and Goulburn-Murray than the other regions.

These regional reports do not present the results, or our detailed analysis of, the additional ABARES modelling commissioned for this study; for that material the interested reader is referred to Volume 4. The Volumes of this study are listed on page 9.

The interview program and analysis for each region in this study was undertaken by a two-person team that comprised a Team Leader and Number Two. The Team Leaders (and, in many cases, the Number Twos) have many years’ experience working and, for some, living in their regions. This expertise was combined with extensive professional experience in water and/or agriculture and meant that the Team Leaders were able to test and thoroughly analyse the material gained through our program. The consortium’s findings across the Basin as a whole then were collectively analysed and synthesised.

The Team Leaders were the lead authors of these regional profiles, which were then reviewed by the consortium and MDBA.

The Team Leader for Sunraysia was Anne-Maree Boland of RMCG, assisted by Kym Whiteoak of MJA. The Team Leader for the Goulburn-Murray was Daryl Poole of RMCG, assisted by Nigel McGuckian of RMCG and, in part, Jeremy Cheesman of MJA. The Team Leader for the remaining regions was Nigel McGuckian, supported by Leo Carroll of MJA, and in some cases Daryl Poole.

¹ A report was not undertaken for the Wimmera because the Guide proposed no changes in that region.
1.3 ‘Bridging the Gap in the Murray-Darling Basin’

The Australian Government has made a commitment that farmers' water rights will not be affected by the Basin Plan. It will ensure this by "bridging the gap" between current diversions and any final sustainable diversion limits in the Murray-Darling Basin Plan through water savings generated by infrastructure investments and voluntary water purchase. An annual average of over 700 GL of water had already been recovered for the environment through these measures.2

The major elements of the Commonwealth's ten-year Water for the Future program commence in 2008 are:3

- $3.1 billion for purchase of water entitlements for the environment (Restoring the Balance in the Murray-Darling Basin Program); and

- $5.8 billion for infrastructure improvements to improve water use efficiency (Sustainable Rural Water Use and Infrastructure Program), some of which is not within the Basin.

Under the Sustainable Rural Water Use and Infrastructure program, the Australian Government has agreed in principle to provide close to $3.2 billion for significant state-based water infrastructure and reform projects in South Australia, New South Wales, Victoria, Queensland and the ACT, subject to a due diligence assessment of the social, economic, environmental, financial and technical aspects of the projects.4

Other elements of the Sustainable Rural Water Use and Infrastructure program include investment in the Menindee Lakes, and the Private Irrigation Infrastructure Operators Program (PIIOP) in New South Wales. The PIIOP aims to acquire water entitlements resulting from water savings generated by the implementation of eligible projects to improve the efficiency and productivity of water use and management, both off and on-farm, by private irrigation infrastructure operators, and which also secure a sustainable future for irrigation communities.

As regards water buyback, the $3.1 billion Restoring the Balance in the Basin program aims to acquire water entitlements from willing sellers that represents value for money, and use the water allocated to them for the environment. This water will be used to improve the health of the Basin's rivers, wetlands and floodplains.

Up to February 2010, expenditure on the buyback component was $1,079 million, and expenditure on water infrastructure for irrigation and other primary industry

---

purposes was $465 million.\(^5\) This means that significant investment remains to be made under these two programs, contributing towards the ‘bridging the gap’ commitment. Budgeted expenditure is set out in Table 1-1.

The extent of any additional necessary investment in these or other programs to meet the requirements of the Basin Plan is not yet clear.

**Table 1-1. Budgeted expenditure for Australian Government buyback and modernisation (at 2010).\(^6\)**

<table>
<thead>
<tr>
<th>Financial year</th>
<th>Buyback (Restoring the Balance budgeted expenditure revised ($ million))</th>
<th>Modernisation (SRWUI, as shown in 2010–11 Budget ($ million))</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-08</td>
<td>45.5</td>
<td>-</td>
</tr>
<tr>
<td>2008-09</td>
<td>432.5</td>
<td>-</td>
</tr>
<tr>
<td>2009-10</td>
<td>1,237.8</td>
<td>230</td>
</tr>
<tr>
<td>2010-11</td>
<td>254.4</td>
<td>706</td>
</tr>
<tr>
<td>2011-12</td>
<td>249.5</td>
<td>868</td>
</tr>
<tr>
<td>2012-13</td>
<td>510.5</td>
<td>900</td>
</tr>
<tr>
<td>2013-14</td>
<td>n/a</td>
<td>732</td>
</tr>
<tr>
<td>2013-14 to 2016-17</td>
<td>369.8</td>
<td>-</td>
</tr>
</tbody>
</table>

---

\(^5\) Source: Chapter 3 in Senate Environment and Communications References Committee, 2010. *Sustainable management by the Commonwealth of water resources.*

\(^6\) Source: Chapter 3 in Senate Environment and Communications References Committee, 2010. *Sustainable management by the Commonwealth of water resources.*
2 The Victorian Murray

The Victorian Murray spans northern Victoria. It runs from the Sunraysia area (including Robinvale), through Swan Hill to Echuca, and east to the Kiewa.

The Victorian Murray includes a diverse range of social catchments and irrigation sectors. In this report, they are addressed separately in chapter 3 (Sunraysia), chapter 4 (Goulburn and Victorian Murray - GMID), and chapter 8 (Kiewa). Please note that for local communities, Sunraysia straddles the border and includes part of New South Wales; accordingly, part of NSW is also addressed in the Sunraysia chapter.
Figure 2-1. Map of the Victorian Murray social catchments, showing state borders and categories of towns.\(^7\)

\(^7\) Source: EBC consortium

EBC, RMCG, Marsden Jacob Associates, EconSearch, Geoff McLeod, Tim Cummins, Guy Roth and David Cornish
3 Sunraysia

3.1 Overview

This section summarises the subsequent sections of this report. For explanation of conclusions summarised in this overview, please refer to the appropriate subsequent section of this report. Please note that this report is not a regional profile, but rather, is a report on the base case and potential impacts of proposed reductions in irrigation water availability. It draws on previously-published regional profiles to which the interested reader is referred.\(^8\)

The Sunraysia region described herein contains the social catchments of Mildura and Robinvale, consisting of these centres as well as smaller satellite towns such as Merbein, Irymple and Red Cliffs along the Murray River, and Wentworth and Balranald in New South Wales. The regional population is around 75,000 people. Of key interest to the study was the irrigated area adjacent to the Murray, extending from the town of Wentworth east to Robinvale. The region produces 20% of Australia’s total wine grape crush, 29% of citrus production, 70% of table grape production and almost 100% of Australia’s dried vine fruit production.

3.1.1 Social Catchments

Table 3-1 Communities within the study region

<table>
<thead>
<tr>
<th>Social catchment</th>
<th>Towns</th>
<th>Population</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mildura</td>
<td>Mildura</td>
<td>54,000</td>
<td>Category 4 large regional centre with opportunities as service centre for region, including health and social services, tourism and alternative energy.</td>
</tr>
<tr>
<td>Wentworth</td>
<td></td>
<td>7,000</td>
<td>Category 1 medium size town dependent of irrigation and to smaller extent tourism. Vulnerable</td>
</tr>
<tr>
<td>Merbein</td>
<td></td>
<td>2,500</td>
<td>Category 1 small town, which has become part of the larger Mildura regional centre. Identity has largely been lost.</td>
</tr>
<tr>
<td>Red Cliffs</td>
<td></td>
<td>5,000</td>
<td>Category 1 medium size town with some individual identity but has become part of the larger Mildura regional centre.</td>
</tr>
<tr>
<td>Irymple</td>
<td></td>
<td></td>
<td>Small town, which has become part of the larger Mildura regional centre. Identity has largely been lost.</td>
</tr>
<tr>
<td>Robinvale</td>
<td></td>
<td>4,300</td>
<td>Category 1 medium sized town highly dependent on irrigated horticulture.</td>
</tr>
<tr>
<td>Balranald</td>
<td></td>
<td>2,500</td>
<td>Small town underpinned by irrigated mixed farming agriculture. High dependence on irrigated agriculture but some diversification with dryland farming.</td>
</tr>
</tbody>
</table>

3.1.2 Irrigated production

Farm-Gate

The majority of irrigated production is from irrigation districts that service 3,500 intensively irrigated properties, with half in the older pumped districts around Mildura and half in private developments.

The major irrigated sectors are wine grapes, citrus, table grapes, almonds, dried fruit, and vegetables. There has been a 75% expansion in the Victorian irrigated area from 1997 to 2009. In the period from 1997 to 2006 for the NSW and Vic areas wine grapes grew 57%, table grapes grew 48%, while dried fruit reduced by 35%. Almonds have become the single largest crop by area and water demand. Most of this growth has taken place outside the traditional pumped districts between Piangil and Wemen, on the Victorian side of the River.

Processing

There is an extensive processing sector and supply chain in the region that is entirely dependent on the success of primary production. As noted above, this processing generates considerable value within the region.

---

9 Please refer to section 3.2.1 for more information and explanation
10 Source: ABS National Regional Profiles Database 2004-08
11 Please refer to section 3.2.2 for more information and explanation
13 from page 5 Irrigated Horticulture of the Lower Murray-Darling 1997 to 2006 SunRISE 21 Mapping
• **Winegrape:** many major wineries operate in the region sourcing product from their own properties as well as from supply contracts from across the wider Riverland and Sunraysia region.

• **Driedfruit:** there are three main dried-fruit processors, packers and marketing companies with two based in Mildura.

• **Citrus:** there are numerous citrus packing companies. Mildura Fruit Company (MFC) controls a significant proportion of the market and provides vital export market access for growers

• **Vegetables:** a processing plant in Merbein has recently been purchased for the supply of carrot juice to Asian markets;

• **Almonds:** Olam International recently bought out Timbercorp’s previous orchards. Select Harvest manage much of the supply chain;

• **Olives:** Boundary Bend Ltd which owns the majority of the olive groves also manages much of the supply chain from seedling production and supply of harvesting machines, to crushing, bottling and retail supply.

**Other industries**

Other industries of significance include:

• Dryland agriculture – predominantly grain production

• Manufacturing

• Tourism

• Mining Resources

• Transport, Logistics and Warehousing

• Agriculture service industries

• Social and education services

**3.1.3 Drought**

Since 2006-07 the region has suffered from the most severe drought in the last fifty years. There was only a 35% allocation on the Murray in Victoria in 2008-09, compared to a long-term average of close to 100%.

---

14 Please refer to section 3.3.4 for more information and explanation

Commodity prices, market forces and the value of the Australian dollar are the primary drivers of production decisions but the recent drought has heightened the speed and extent of the adjustment over the last three years.

Since 2006 there have been very difficult business conditions with low water allocations, low wine grape prices and high temporary water prices.

At a regional level, discussions revealed that the drought has seen impacts of:

- 10,000 to 20,000 ha dried off;
- costs to growers from the large volumes of temporary water purchases at high prices (over $1,000/ML in some periods);
- production did not decline proportionately with growers preferring to purchase water; and
- the value of lost plantings dried off and their replacement costs.

3.1.4 Baseline

The baseline scenario for the region has been assessed and the following insights have been established:

- production will remain stable or increase through productivity gains, especially in modernised systems and for private diverters;
- there are minimal opportunities for efficiency gains as considerable investment has already occurred on-farm to update irrigation systems;
- the potential for improved water services through off-farm modernisation is more likely a regional development issue;
- the future is less certain for small blocks around Merbein, Red Cliffs, in the absence of a modernised system;
- there is likely to be increased diversification of irrigated crops into almonds, avocados in modernised irrigation districts;
- a switch to different varieties and crops will occur as their commodity prices vary. The mix of crops will depend predominantly on the prevailing commodity prices and the price of water for trade;
- there is potential growth for some industries in export opportunities and processing capacity (e.g. almonds, table grapes, dried fruit);

---

16 Please refer to section 3.4 for more information and explanation
• the major centre (Mildura) is likely to experience continued growth and prosperity;

• medium size towns (Robinvalle, Wentworth) are likely to survive provided that commodity prices and profitability continues; and

• smaller towns will continue to contract and possibly lose their identity particularly those that are satellite towns to Mildura: Merbein, Red Cliffs, Dareton, Balranald.

3.1.5 Impact of reduced water availability

The impact of reduced water availability in the region consistent with the Guide proposals is likely to result in the following:

• expectation by some growers that productive and profitable producers will not be directly affected by reduction, as they will not sell and would have the capacity to purchase extra entitlements to manage demand. High Security irrigators are therefore likely to continue to purchase water and possibly achieve further efficiency gains (<10% capacity);

• key concern in the ability of the temporary market to supply enough water at reasonable prices to supply short term demands going forward – much speculation on actions of Commonwealth Environmental Water Holder (will they enter the temporary market?);

• there is minimal opportunity for modernisation as there has been considerable private investment on-farm and there will be little water saved through off-farm modernisation;

• the region is likely to be a net purchaser of water through temporary and permanent water trade although this will again be dependant on commodity and water prices;

• the issue of ‘Swiss cheese’ and stranded assets is of concern in the region and is likely to continue. Any new developments at a large scale are likely to occur outside the irrigation districts in ‘Green field sites’;

• key impacts will be felt in non-modernised, smaller holdings managed by aging producers. A high permanent water price may entice debt-laden producers to leave the industry ‘with dignity’;

• commodity prices are a key variable affecting likely impacts. There is an expectation that continued reduced water availability may require producers of crops experiencing low commodity prices to sell water;

17 Please refer to section 3.5 for more information and explanation
• a reduction in irrigated agriculture will not be offset by an increase in dryland production due to the limited scope for viable dryland farming due to small lot size, soil type and intense nature of supplied infrastructure;

• all towns and villages, except Mildura, are highly dependent on irrigated agriculture and are reliant on the performance of irrigated commodities. Mildura has a more diversified economy and a larger base; and

• impacts on primary production will have a major effect on service providers and local processing. Should production in the Murray-Darling Basin decline, closure of wineries, dried fruit processing plants and packing houses will be considered.

3.1.6 Minimising Impacts

• Strategic buyback - Communities consider that water sales to Government within the Sunraysia Irrigation areas have not provided the water corporations with any substantive capacity to rationalise supply infrastructure without impacting on the capacity to supply remaining farmers. They consider that the ‘Swiss Cheese’ issue could be partially addressed through strategic buyback (in consultation with the Water Authority). Buyback could also be given priority to high salinity impact zones (in consultation with the regional CMA).

• Modernisation – While modernisation will not likely produce significant water savings, the water supply reliability (24hr, 365 day supply) achieved through modernisation where it has been implemented has facilitated higher returns and increased diversification of crops into higher value alternatives to current produce. This may assist the reinvigoration of depressed and vulnerable regions such as Merbein and Red Cliffs.¹⁸

• Industry adjustment – buyback could be utilised to assist in the structural adjustment for some industries experiencing severe commodity price decline and the need to contract supply (e.g. wine industry). Communities consider that buyback could facilitate a more rapid adjustment when undertaken in consultation with the industry.

3.2 Background

3.2.1 Introduction to region and social catchments

The Sunraysia region (see Figure 2-1) extends along the Murray and Darling rivers and is part of the wider Murray Valley. While there is no set definition of Sunraysia, it is known as the irrigated areas of the Mildura and Wentworth Local Government Areas (LGAs), and includes Robinvale which is in the Swan Hill Rural City Council LGA.

¹⁸ The relative costs and benefits of this investment compared to alternative Commonwealth investments would need to be assessed through standard Government processes.
The region has a diverse thriving economy. The major regional locations are Mildura in Victoria and Wentworth in New South Wales. Agriculture, coupled with a population in excess of 75,000 enables the region to sustain a significant commercial and industrial base.

The region's first horticultural industry was dried fruits (raisins and sultanas) followed post Second World War by citrus. More recently it has been dominated by wine grapes, table grapes, large scale wine production (Treasury Wine Estates, Australian Vintage, Constellation Wines) and food processing including olive oil production (Mildura Fruit Company Ltd, Sunbeam Foods, Boundary Bend and Robinvale Estate).

The focus of the study region is the intensively irrigated region along the Murray and Darling Rivers with some consideration of the less intensively irrigated regions in New South Wales on the Murrumbidgee. There are two social catchments within the irrigated area of the region (Figure 2-1).

The Mildura social catchment includes the Mildura and Wentworth Shire councils and includes the townships of Mildura, Ouyen, Merbein, Red Cliffs, Irymple, Wentworth, Buronga, and Dareton.

The Robinvale social catchment includes the medium sized town of Robinvale along with smaller townships of Euston and Balranald.

The Mildura region has a $2.8 billion/yr regional economy\(^\text{19}\) that has shown continued sustained growth over recent years. The population of the region is approximately 60,000.

The top 5 key employment sectors in the Mildura region are:

- Retail trade (3,975 employees, 16.2% of total employment);
- Agriculture, forestry and fishing (3,718 employees, 15.1% of total employment);
- Manufacturing (2,651 employees, 10.8% of total employment);
- Health & community services (2,453 employees, 10% of total employment); and
- Education (1,865 employees, 7.6% of total employment)\(^\text{20}\).

The core of the regional economy is specialised irrigated horticulture and the food processing sectors that add value to these products and create jobs in the region, with around 26% of regional people employed in these two sectors.

The region is dependent on irrigation with a mix of horticulture crops providing considerable diversity. The region has been characterized by the availability of high

---

\(^\text{19}\)&#160;Mildura Development Corporation, Mildura Region Economic Profile 2009
\(^\text{20}\)&#160;Mildura Development Corporation, Mildura Region Economic Profile 2009
security water for horticulture. The Lower Murray Water (Victoria) and Western Irrigation Limited (New South Wales) provides water through irrigation schemes, which have traditionally been small blocks. In addition there are many private diverters operating much larger scale farms frequently on ‘green field’ sites.

The Murray-Darling and Swan Hill region produces 15% of Australia’s red wine grape crush and 25% of Australia’s white wine grape crush. The region produces a significant amount of Australia’s fruit, vegetables and nuts, including 98% of all dried fruit, 74% of table grapes and 24% of all citrus.21

**Mildura Social Catchment**

Mildura is the major regional centre for both social catchments, although major urban centres include the city of Mildura (population 54,000) and Wentworth (7,000). Satellite towns located close to Mildura include Red Cliffs, Irymple and Merbein.

Mildura is a category 3 or 4 centre. While it has a large population, it has considerable dependence on agriculture (in 2006, it had 14% employed in agriculture and manufacturing, just below the cut-off of 15% that would define it as a category 3 town). However, considerable diversity in other activities and in crops produced result in the town being considerably resilient.

Irrigation was developed in the region in the late 1890s (First Mildura Irrigation Trust established in 1887, and Merbein established in 1909). Coomealla and Red Cliffs were built as soldier settlement districts following World War I. Private diverters, as opposed to government sponsored irrigation districts, became more established in the 1950s as power and pumping technology became more economic. There are also cooperative group schemes or trusts running irrigation systems in a number of areas.

Permanent horticulture (grape vines – dried, wine and table, citrus, nuts and olives) and annual horticulture (vegetables) are the dominant irrigation industries. The horticulture industries are dependent on high security irrigation water.

There are extensive processing, packing and other horticulture service industries that have developed in the towns as the irrigation industry has grown.

The viability of town business and community vibrancy has been directly related to irrigation water availability and associated industry prosperity.

**Robinvale Social Catchment**

The Robinvale social catchment is geographically located in the western portion of the region.
The major urban centre is the township of Robinvale (population 4,300). Robinvale is a category 1 town highly dependent on agriculture that was established as a World War II soldier settlement. The district is managed by Lower Murray Water and the irrigation scheme recently been upgraded to provide pressurised water on demand.

The social catchment also consists of the satellite town of Euston and the town of Balranald.

Robinvale social catchment is generally dependant on table grape production in the Robinvale region. There are also other horticulture crops produced including nuts, avocados and citrus. There is some mixed farming reliant on general security irrigation in the area around Balranald and supplied from the Murrumbidgee. These areas have had no allocation over the past decade. There are significant packing, transport and export facilities in the region.

While the Robinvale region is considered a social catchment, the community is also reliant on Mildura for the provision of key services.

### 3.2.2 Irrigation in the region

The current surface water diversion limit for the irrigation valleys of the Basin is shown in Figure 4-2. Victorian Sunraysia draws from the Victorian Murray, while the NSW part of Sunraysia draws from the NSW Murray and the Lower Darling. The NSW and Victorian Murray are the second and third largest diversion valleys in the Basin, respectively.
Figure 3-1. Current diversion limits.\textsuperscript{22}

There are some 3,500\textsuperscript{23} irrigated properties in Sunraysia, with half in the older pumped districts around Mildura and half in private developments.

There has been a 75\% expansion in the Victorian irrigated area from 1997 to 2009\textsuperscript{24}. In the period from 1997 to 2006 for the NSW and Vic areas\textsuperscript{25} wine grapes grew 57\%, table grapes grew 48\%, while dried fruit reduced by 35\%. Almonds have become the single largest crop by area and water demand. Most of this growth has taken place outside the traditional pumped districts between Piangil and Wemen, on the Victorian side of the River.

Irrigation Providers

The main areas of irrigation are

- Lower Murray Water area of operations
- Western Murray Irrigation Limited area of operations (incorporating Buronga, Coomealla and Curlwaa irrigation areas)
- Private diversion from the Darling, Murray and Murrumbidgee rivers

\textsuperscript{22} Source: Table 8.5, MDBA, 2010, Guide to the Proposed Basin Plan.
\textsuperscript{23} 3,479 properties in 2006 from page 6 Irrigated Horticulture of the Lower Murray-Darling 1997 to 2006 SunRISE 21 Mapping
\textsuperscript{24} 2010 SunRise 2009 Report Page 8 SunRISE 21 Inc. Mallee Irrigated Horticulture 1997 to 2009
\textsuperscript{25} from page 5 Irrigated Horticulture of the Lower Murray-Darling 1997 to 2006 SunRISE 21 Mapping
Lower Murray Water area

Lower Murray Water’s area of operation extends from Kerang to the South Australian border taking in the municipalities of Mildura, Swan Hill and Gannawarra. LMW provides the region with urban water and wastewater services, treatment and effluent disposal services, river quality water to stock, garden and irrigation customers, along with the collection and disposal of subsurface irrigation drainage water.

Western Murray Irrigation Limited area

Western Murray Irrigation Limited is a private irrigation company, formed in 1995 as an unlisted public company.

The irrigation areas include Buronga, Coomealla and Curlwaa, covering 4,000ha, and are located in the Murray Valley of NSW. The soils of the area are a mix of sandy loams and clays loams. 20% of land available for irrigation is currently vacant providing opportunities for the future.

The Company has a High Security Water Entitlement Licence as well as a separate Stock and Domestic Water Licence. Since privatisation the Company has made large investments in irrigation systems. The systems are fully pipelined and pressurised, allowing on-farm water efficient systems to operate. 43% of irrigated land has drip technology installed.

Private Diversions

There are many individual irrigation farms, along the length of the Murray, Darling and Murrumbidgee with licences for direct diversion from the rivers.

3.2.3 Key agricultural industries

The Mildura-Robinvale region is highly dependent on horticulture production:

- permanent horticulture - major production in the region involves grapes (table, wine and dried), citrus, nuts and olives;
- annual horticulture - a number of vegetable crops are produced in the region including carrots and asparagus;
- irrigated mixed farms – on the NSW side of the region there is some production of irrigated grains and fodder crops. This generally occurs utilising general security water and has been minimal over the past decade; and
- dryland farming – dryland production of grains occurs on the Victorian side of the region.

A summary of production is provided in Table 3-2.
### Table 3-2. Agriculture production in the Mildura Region

<table>
<thead>
<tr>
<th>Crop</th>
<th>Production (tonnes)</th>
<th>% of Australian Production</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DRIED GRAPE</strong> - Murray Darling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sultana</td>
<td>12,535</td>
<td>98.0%</td>
</tr>
<tr>
<td>Currants</td>
<td>2,030</td>
<td>95.0%</td>
</tr>
<tr>
<td>Raisers</td>
<td>1,121</td>
<td>100.0%</td>
</tr>
<tr>
<td>Other</td>
<td>1,688</td>
<td>98.0%</td>
</tr>
<tr>
<td>Total Dried Grapes</td>
<td>17,374</td>
<td>98.0%</td>
</tr>
<tr>
<td><strong>VEGETABLES</strong> - Mildura Rural City Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrot</td>
<td>30,000</td>
<td>11.0%</td>
</tr>
<tr>
<td>Melon</td>
<td>15,300</td>
<td>7.5%</td>
</tr>
<tr>
<td>Asparagus</td>
<td>900</td>
<td>15.0%</td>
</tr>
<tr>
<td>Potato</td>
<td>14,000</td>
<td>1.0%</td>
</tr>
<tr>
<td>Lettuce</td>
<td>7,500</td>
<td>1.0%</td>
</tr>
<tr>
<td>Zucchini &amp; Squash</td>
<td>1,800</td>
<td>8.0%</td>
</tr>
<tr>
<td>Capsicum &amp; Chili</td>
<td>920</td>
<td>3.0%</td>
</tr>
<tr>
<td>Eggplant</td>
<td>750</td>
<td>&lt;1.0%</td>
</tr>
<tr>
<td>Pumpkin</td>
<td>2,500</td>
<td>3.0%</td>
</tr>
<tr>
<td><strong>OLIVES</strong> - Swan Hill Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olives</td>
<td>13,000</td>
<td>22.6%</td>
</tr>
<tr>
<td>Olive Oil</td>
<td>1,880,000 litres</td>
<td></td>
</tr>
<tr>
<td><strong>GRAINS</strong> - Mallee Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat</td>
<td>574,000</td>
<td>4.2%</td>
</tr>
<tr>
<td>Barley</td>
<td>300,000</td>
<td>4.2%</td>
</tr>
<tr>
<td>Oats</td>
<td>300,000</td>
<td>2.0%</td>
</tr>
<tr>
<td>Canola</td>
<td>30,000</td>
<td>0.2%</td>
</tr>
<tr>
<td>Total Grains</td>
<td>907,000</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

**Source:** AF&CGROUP; Australian Regional Wine Grape & Olive Producers’ Association; Australian Table Grape Association; Australian Olive Industry Association; Australian Table Grapes; Australian Dried Fruit Association; Australian Citrus Growers; Australian Olive & Table Grape Association; Australian Olive Oil Producers; Australian Wine; Australian Table Grape; Australian Table Grape Association; Australian Table Grape.  

**Notes:** Regional boundaries and time frames for the collection of the data above vary greatly. Please refer to the detailed explanation in the Agriculture Section of the Profile. (a) All figures are in tonnes unless otherwise noted. (b) There are other vegetables grown in the Mildura region though the quantities are quite small so they have not been captured in this table.

---

26 Mildura region economic profile (2009) Mildura Development Corporation

EBC, RMCG, Marsden Jacob Associates, EconSearch, Geoff McLeod, Tim Cummins, Guy Roth and David Cornish
3.2.4 Other key industries

The major non-farm industry within the region is the supply of services to the irrigated farming sector and associated water supply organisations.

Emerging new industries are solar power and mineral sands mining. Major deposits of mineral sand are located north of Wentworth and south of Mildura.

Key industries in the region are summarised below (Figure 3-2).

![Graph showing key industries](source: AllGroup GRP Model (2008); ABS Census (2006); ABS S220.0 (2008); ABS 6291.0 (2008))

**Figure 3-2. Gross regional product of key industries.**

Manufacturing

The Mildura region has been actively diversifying and developing additional value to its core strengths through numerous manufacturing sectors. This activity in advanced manufacturing has brought significant value to the region.

Key sectors include:

- **Food and Beverage** – connected to the growing transport and logistics sectors, machinery and equipment manufacturing and a wide variety of services. Some of the products manufactured in the Mildura region include numerous varieties of wine, fruit and vegetable juices and concentrates as well as other types of food products.

- **Wine** - the Murray-Darling region boasts nearly 40 wine producers, ranging from boutique to large scale wineries. They have the capacity to crush between 5 and 120,000 tonnes of wine grapes each annually. The region has the capacity to produce over 400,000 tonnes of wine grapes per annum and approximately 20% of the national crush from more than 40 different varieties.

---

27 The information in this section has been largely sourced from the Mildura region economic profile (2009) Mildura Development Corporation

28 Mildura region economic profile (2009) Mildura Development Corporation

EBC, RMCG, Marsden Jacob Associates, EconSearch, Geoff McLeod, Tim Cummins, Guy Roth and David Cornish
One of the largest wineries in the Mildura region is Lindeman's Karadoc complex, which was established in 1973. The site includes wine production, packaging and a national distribution centre; as well as a popular cellar door.

- **Fruit and Vegetable Processing** - with an abundance of fruit and vegetable production, value-adding processing is a well established industry in the Mildura region. Carrot juice is a big export for the Mildura region and becomes the key ingredient into many dishes in Japan and other Asian countries. Mildura is home to Australia’s largest orange packer and exporter, Mildura Fruit Company (MFC). MFC markets a full range of citrus fruits around the world. MFC sources quality citrus from approximately 130 citrus growers along the Murray and Darling Rivers including the Mildura region.

- **Dried Grapes** - with 98% (or 17,000 tonnes) of Australia’s dried grapes produced in the Mildura region it is not surprising that the region is home to Sunbeam, Australia’s largest dried fruit company. Sunbeam, which also includes the Angus Park brand, services the export, retail and food services markets.

**Tourism**

Tourism is a major industry in Mildura, generating more than $210 million expenditure each year and underpinning around 2,100 full time jobs.

The regional climate is warm and dry. The average annual rainfall total of 292 mm is distributed evenly throughout the year. The climate, along with attractions of the Murray and Darling Rivers, has led to an important tourism industry. The region has established sporting and recreational facilities and a series of festivals attracts visitors all year round.

The semi-arid country includes some of Australia’s most unusual and diverse flora and fauna. The Mildura region comprises 40% of Victoria’s National Parks, including Murray Sunset, Big Desert, Wyperfeld and Hattah Kulkyne. The NSW region is adjacent to the Mungo National Park and the Mallee Cliffs National Park.

An abundance of quality restaurants and eateries celebrate the magnitude of locally-grown produce while Mildura’s reputation as a wine region is further enhanced by a growing number of cellar doors that are emerging among the ranks of nearly 40 wine producers.

**Mining Resources**

The Mildura region is fortunate to have mining resources that are starting to expand and further diversify the economy. The resources currently being extracted include mineral sands; bentonite; and salt.
Transport, Logistics and Warehousing

The Mildura region is strategically located at the junction of Victoria, New South Wales and South Australia. As agricultural production and manufactured goods of all kinds continue to expand, so does the transportation and distribution industry and networks that take these products to market. Supported by key road and rail infrastructure, it is easy to move products and people to anywhere in Australia.

The Mildura Region Transport and Logistics Cluster (MRTaLC) was established in 2007, through joint funding from the Department of Innovation Industry and Regional Development Regional Innovation Clusters Program; Office of Training and Tertiary Education initiative funding through Sunraysia Institute of TAFE; support from the Sunraysia Mallee Economic Development Board (now Mildura Development Corporation Inc.); Mildura Rural City Council; and local industry.

There are over 237 transport and storage companies in the Mildura region.

Agriculture service industries

There is a strong commercial centre that has grown as a result of the horticultural industry and its expansion. For example, it is estimated that 85% of the wine grapes grown in the region are processed locally.

Other service suppliers include:

- irrigation designers and suppliers
- fertiliser and chemical suppliers
- harvest contractors
- agronomic advisors

Social services

All major services such as hospitals, airport, schools, banks, supermarkets, cinema, doctors, lawyers, accountants, other professionals and tradespersons are available.

Key health care services include:

- Mildura Base hospital;
- Mildura private hospital;
- Sunraysia community health services;
- Mallee track health and community services;
- aged care; and
• other community and health organisations.

Education services

The Mildura region has excellent education facilities that contribute significantly to producing a skilled and productive workforce. Specialty training courses exist in horticulture, food processing, transportation and logistics, healthcare, education, business and more. Close ties to local business and industry ensure that the regional education facilities develop and produce the skills that are in demand.

There are multiple options for education in the Mildura region ranging from primary schools to TAFE’s, Latrobe University and adult education providers.

3.3 Water Management, Government Purchases and Drought

3.3.1 Water Management Arrangements

Surface water arrangements in the NSW section of this region were formalised with the development of the Murray and Lower Darling Regulated Rivers Water Sharing Plans (WSP). The Murray and Lower Darling Regulated Rivers WSP applies to the Murray River water source which includes the water between the banks of all rivers from the upper limit of Hume Dam water storage downstream to the southern Australian border and the lower Darling water source which includes all water between the banks of all rivers from the upper limit of Lake Wetherall downstream to the upper limit of the Wentworth weir pool.

In Victoria, the State Government allocates water resources by bulk entitlements to rural and urban water corporations for consumptive use. Goulburn–Murray Water is the delegated resource manager and makes water allocations for all Murray water authorities and private diverters according to the water sharing arrangements set out in the Murray Bulk Entitlements. Lower Murray Water (formerly Sunraysia Rural Water Authority) manages Red Cliffs, Robinvale, Merbein irrigation districts. The first Mildura Trust was a private irrigation trust that supplied water for irrigation to an area adjacent to Mildura29. FMIT area is now managed by Lower Murray Water. Table 3-3 provides a summary of the surface water entitlements.

29 CSIRO 2008 Water Availability in the Murray. A Report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project
Table 3-3 Summary of Surface water entitlements.\textsuperscript{30}

<table>
<thead>
<tr>
<th>Entitlement Class</th>
<th>Victorian Murray Number of Entitlements (ML)</th>
<th>NSW Murray Water Sharing Plan - Murray Number of Entitlements (ML)</th>
<th>NSW Murray Water Sharing Plan – Lower Darling Number of Entitlements (ML)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock and Domestic</td>
<td>Not stated</td>
<td>2,100</td>
<td>3,700</td>
</tr>
<tr>
<td>Local Water Utilities</td>
<td>57,795\textsuperscript{1}</td>
<td>33,336</td>
<td>10,160</td>
</tr>
<tr>
<td>Rural</td>
<td>2,059,823\textsuperscript{2}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Security</td>
<td></td>
<td>198,011 unit shares</td>
<td>7,999 unit shares</td>
</tr>
<tr>
<td>General Security</td>
<td></td>
<td>1,953,508 unit shares</td>
<td>30,288 unit shares</td>
</tr>
<tr>
<td>Supplementary</td>
<td></td>
<td>252,361 units shares</td>
<td>250,000 units shares</td>
</tr>
<tr>
<td>Conveyance</td>
<td></td>
<td>300,000 units shares</td>
<td>0</td>
</tr>
</tbody>
</table>

\textsuperscript{1} Urban bulk entitlements: sum of bulk entitlements to Coliban Water, North East Water, Lower Murray Water and Goulburn Valley Water. In addition Goulburn-Murray Water is required to supply a number of urban centres from its channel system.

\textsuperscript{2} Maximum of bulk entitlements to Goulburn-Murray Water, Sunraysia Water and First Mildura Irrigation Trust, including distribution losses.

3.3.2 Water Procurement

The extent of the buyback under the Restoring the Balance program and other trade out has had an impact on Western Murray Irrigation in NSW, with an estimated 6% of irrigators leaving. The 4% cap in Victoria is currently limiting the ability of a small number of irrigators to sell water entitlement outside of the community districts. The net sale of entitlement from private irrigators is expected to be small. Within the Community Districts approximately 80 properties have taken the Commonwealth Small Block Irrigator Exit Grants. There is considerable concern that the requirement to remove infrastructure to prevent irrigation for 5 years is threatening the viability of those remaining in the District\textsuperscript{31}.

3.3.3 Modernisation

Irrigation supply systems and farm water efficiency is already very high in Sunraysia with limited scope for water savings. Irrigation infrastructure is mostly piped, with main channels (mostly lined) in the community supplied districts. Under normal conditions the infrastructure is around 85% or more efficient. Major upgrades to a pressured supply have occurred in Robinvale. The Sunraysia Modernisation Project (covering Mildura, Merbein and Red Cliffs) is planning investment in new pumps, channel lining/covering, and (as an option for later stages) pressurised supplies for

\textsuperscript{30} CSIRO 2008 Water Availability in the Murray. A Report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project

\textsuperscript{31} Guide to the proposed Basin Plan. Technical background. Part III. Nyah to Border Community Profile
spurs however it is currently unfunded. A 4.5 GL/y saving has been estimated upon completion of Stage 1, and a similar volume estimated for Stage 2 of this project.\(^{32}\)

Communities expect that the potential for further savings through modernization is minimal, as a large proportion of the region has already been modernized through private on-farm investment. On-farm water efficiencies are therefore relatively high.

There continues to be opportunity for off-farm modernization particularly in the irrigation districts of Merbein and Red Cliffs. However, the volumes of water to be saved through modernization are fairly minor and the upgrades would focus on improved service delivery. Irrigation districts of Robinvale and in NSW have already been modernized.

Improved service delivery of water available 365 days and 24/7 provides an opportunity for niche horticulture production and regional development.

### 3.3.4 Drought

Since 2006-07 the region has suffered from the most severe drought in the last fifty years. There was only a 35% allocation\(^ {33}\) on the Murray in Victoria in 2008-09, compared to a long-term average of close to 100%. The effect of the drought gives an indication of the likely impact of the proposed changes in the Guide.

Commodity prices, market forces and the value of the Australian dollar are the primary drivers of production decisions but the recent drought has heightened the speed and extent of the adjustment over the last three years.

Since 2006 there have been very difficult business conditions with low water allocations, low wine grape prices and high temporary water prices.

At a regional level, discussions revealed that the drought has seen impacts of:

- 10,000 to 20,000 ha dried off;
- costs to growers from the large volumes of temporary water purchases at high prices (over $1,000/ML in some periods); and
- the value of lost plantings dried off and their replacement costs.

### 3.4 Baseline – the future without policy change

The ‘baseline’ is a description of the expected future for the towns and social catchments over the coming decade, if the current diversion limit for irrigation water were left unchanged. The baseline is dynamic, not static; that is, there would continue to be variability in factors such as rainfall and commodity prices, and underlying trends would continue.
A return to average climatic conditions and mid range commodity prices will see most irrigation industries in the region return to a positive position. The exception to this situation is wine grapes where returns are currently below the cost of production.

Farm consolidation is likely to continue throughout the region, particularly in the more intensively irrigated areas, leading to larger farms, fewer farm employees and an increased reliance on contract labour and services.

Larger properties are expected to continue to be developed in the private diversion areas while amalgamation of properties in the irrigation districts is likely to be hampered by infrastructure and a legacy of policy decisions. Communities are concerned that uncertainty around the future of the irrigation districts is likely to continue promoting the “Swiss Cheese” effect and reducing the productivity of these areas.

Changes in the mix of commodities produced in the regions would continue as opportunities arise and commodity prices rise and fall.

Overall farm productivity would increase slightly as gains are achieved from adoption of research and development findings, improved management and via gains in increased water use efficiency.

3.4.1 Farm Systems

The region is expected to continue to rely on irrigated horticulture production with the diversity of commodities and the relevance importance of specific crops likely to change. While perennial horticulture will continue to be the mainstay of the region, relative new crops such as almonds and olives are expected to become more prevalent. Wine grapes are likely to decline as the industry adjusts to an over supply. Table grapes and dried fruit are expected to remain relatively stable and some varieties of citrus will increase depending on export opportunities.

Annual horticulture (vegetables) production may increase as growers respond opportunistically to availability of irrigation water.

Mixed farming will be reliant on availability of water and will adjust to allocation of general security water.

3.4.2 Almonds

The farm-gate value of production of almonds is likely to increase significantly as trees reach full maturity. This would result in significant increase in processing required in the region. In the next 5-10 years, almonds may provide the greatest economic contribution in the region.
3.4.3 Olives, Avocados, Pistachios

Other crops such as olives, avocados and pistachios may continue to grow in the region depending on market opportunities and commodity prices.

3.4.4 Table Grapes

Table grapes have experienced an increase in commodity prices and opportunities associated with export into lucrative markets. Whilst the industry appears to have a bright future there is intense pressure for growers to produce high quality grapes. Meeting quality and export standards will continue to be a challenge for the industry.

3.4.5 Dried Fruit

The industry has a positive future with the processors entering into 5-10 year agreements with producers expected to increase production by 60-70%. At the moment there is under utilised capacity in the processing plants and demand is increasing.

3.4.6 Wine Grapes

The wine grape industry has undergone substantial expansion in recent years, particularly through ‘green field’ developments outside the irrigation districts. Wine grape production has also increased in the irrigation districts such as Red Cliffs and Merbein with many traditional table or dried fruit growers switching to wine grapes in the late 1980s. These growers have been particularly at risk during the recent downturn in commodity prices coupled with the high prices paid for high security water. Many of the properties in these areas may exit the industry in the next 2-5 years.

The wine industry has identified the need to reduce national production by approximately 20% to be a sustainable industry in the future. While there is likely to be a significant reduction of growers and production area in the irrigation districts, the overall production for the region would be expected to remain relatively stable or decline by up to 10%. This would be attributed to increased productivity and greater efficiency of the remaining growers.

3.4.7 Citrus

Citrus production is expected to remain at current levels. The recent upturn in the commodity price and export opportunities has stimulated a number of growers to increase their production and develop new high density orchards utilising popular varieties.

3.4.8 Business Sector

The number of businesses servicing the farm sector would remain stable with the horticulture industry expected to contract only slightly. Businesses are likely to
continue the trend of consolidation in the major regional centre (Mildura). The satellite towns (e.g., Irymple, Merbein, Euston) are expected to continue to contract with services moving to Mildura. Robinvale is expected to maintain its service sector, provided the table grape and other industries remain buoyant.

Opportunities associated with mining and solar production are expected to increase. Tourism is also expected to attract greater numbers of participants to experience many of the regions natural and cultural assets. This would be of greatest benefit to the regional centre of Mildura and to a lesser extent Wentworth.

The school population in the larger centre of Mildura is expected to stabilise and possibly expand. There is expected to be further contraction and rationalisation of the smaller primary schools over time. TAFE and Latrobe University provide opportunities for young people to remain in the region post secondary education. Robinvale is expected to continue to struggle to retain secondary school students with an increasing number choosing to travel to Mildura.

Mildura would continue to provide the regional centre for health and other social services. Health services are likely to decline further in the smaller towns with communities expected to travel to the regional centre. Towns such as Balranald and Wentworth would continue to try to provide a health service to an aging population however, recruitment of staff and access to funding will make this increasingly difficult.

3.5 Initial responses to the Guide

Communities in the region were generally familiar with the issues associated with the Murray-Darling Basin. Many had been engaged in water reform over the past two decades and had reviewed extensive volumes of material on the release of the Guide. Others were less well informed and were willing to accept information they heard. There were a number of issues that communities felt strongly about with the respect to the process of producing the Guide. These included:

3.5.1 Mental fatigue of communities in the region

There was significant anger in the community when the Guide was released. This was partly associated with many growers dealing with a decade of drought and decline in profitability for major commodities. Many were feeling tired in dealing with difficult situations and constant change and in some respects the Guide was seen as the ‘straw that broke the camel’s back’.

“What is a willing seller, what is forced?”

At the time of the interviews, much of this anger had subsided and communities were focused on finding a solution.
3.5.2 Misunderstanding of implementation of the Plan

When the *Guide* was released there was a great deal of misunderstanding that accompanied it. In particular the notion that there would be compulsory acquisition of water appears to be a common held belief amongst many growers and community members. Industry leaders understand that compulsory acquisition will not occur although there is still a degree of scepticism and mistrust. The details of the Bridging the Gap program through voluntary buyback and infrastructure upgrades had not been well communicated and many interviewees were not confident that the program would deliver sufficient water and that compulsory acquisition would be the fall back position.

“Concern is that without willing sellers there could be compulsory acquisition”.

3.5.3 Lack of learning from regional experience

Communities felt that to date they have not been listened to. They welcomed the opportunity to explain the issues of the region and the potential impacts of the SDLs. The regions have many years of work developing land and water management plans and designing solutions for environmental outcomes.

“They should have given the community ownership, by getting communities involved”

3.5.4 Credibility and rigour of science and environmental allocations

Many community members felt that too much emphasis had been placed on the MDBAs own scientific analysis and that it lacked credibility. Difficulty in understanding the science encouraged many to actively criticise it.

3.5.5 Many unanswered questions

Many community members have a deep understanding of water reform and how it will impact their business. There were many unanswered questions and a lack of connection between proposed policy changes. This lack of information included whether:

- water would be purchased from a balance of water securities i.e. proportionally from high and general security;
- water would need to be purchased from particular regions as specified in the *Guide* to meet the SDLs or whether the market would operate freely;
- water purchasing would be targeted i.e. targeting areas to manage Swiss Cheese effect or to minimise environmental impacts; and
• the CEWH would re enter the water market with temporary water in times of low water allocation – this would impact on the price of water remaining in the temporary pool.

3.5.6 Disappointment at pitting agriculture against the environment

Many industry members expressed disappointment that the MDBA process had in some respects positioned the environment against agriculture. The region has spent the last two decades working cooperatively to ensure that there are positive environmental outcomes and agriculture industries have been pro-active in ensuring that environmental impacts are minimal.

3.6 Impacts of Reduced Water Availability

3.6.1 Current Diversions and Guide proposals

The Current Diversion Limit and the 4000 GL and 3000 GL scenarios outlined in the Guide are shown below (Table 5-2). It is assumed there will be a mix of different reliabilities of water entitlements procured by Government in order to meet environmental requirements across the range of high and low rainfall years.
Table 3-4. Current diversion limit and ‘Guide’ proposals.\(^{34}\)

<table>
<thead>
<tr>
<th>Region</th>
<th>Scenario</th>
<th>Current Diversion Limit (CDL)</th>
<th>Guide reduction from CDL to SDL(^{35}) (average)</th>
<th>Guide reduction in entitlements before modernisation &amp; before buy back(^{36})</th>
<th>Modernisation ‘bridging the gap’ on and off farm, to 2010(^{37})</th>
<th>Buy-back to date(^{38})</th>
<th>Guide reduction in remaining entitlements after modernisation and after existing purchases(^{39})</th>
<th>GL</th>
<th>GL</th>
<th>%</th>
<th>Entitlement type</th>
<th>GL</th>
<th>%</th>
<th>GL</th>
<th>GL</th>
<th>GL</th>
<th>% of remaining entitlements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vic Murray</td>
<td>4000</td>
<td>1656</td>
<td>592 36%</td>
<td>HRWS component</td>
<td>550 47%</td>
<td>86  137 327 32%</td>
<td>37 118 24%</td>
<td>GL</td>
<td>GL</td>
<td>%</td>
<td>HRWS component</td>
<td>550</td>
<td>47%</td>
<td>86</td>
<td>137</td>
<td>327</td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td>442 27%</td>
<td>LRWS component</td>
<td>137 47%</td>
<td>23 11 103 37%</td>
<td>16  44 118 18%</td>
<td>68 13 24%</td>
<td>GL</td>
<td>GL</td>
<td>%</td>
<td>LRWS component</td>
<td>102</td>
<td>35%</td>
<td>23</td>
<td>11</td>
<td>68</td>
<td>24%</td>
</tr>
<tr>
<td>NSW Murray</td>
<td>4000</td>
<td>1721</td>
<td>635 37%</td>
<td>High Security/High Reliability</td>
<td>92 46%</td>
<td>0   0 0 0</td>
<td>0</td>
<td>GL</td>
<td>GL</td>
<td>%</td>
<td>High Security/High Reliability</td>
<td>92</td>
<td>46%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td>474 28%</td>
<td>Regulated river (Conveyance) IC</td>
<td>0 0%</td>
<td>0   0 0 0</td>
<td>0</td>
<td>0</td>
<td>GL</td>
<td>GL</td>
<td>%</td>
<td>Regulated river (Conveyance) IC</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>General Security/Low Reliability</td>
<td>661 46%</td>
<td>0 192 192 192</td>
<td>192 192 192</td>
<td>192 192 192</td>
<td>GL</td>
<td>GL</td>
<td>%</td>
<td>General Security/Low Reliability</td>
<td>493</td>
<td>35%</td>
<td>0</td>
<td>192</td>
<td>192</td>
<td>192</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Supplementary</td>
<td>70 46%</td>
<td>0   0 0 0</td>
<td>0</td>
<td>0</td>
<td>GL</td>
<td>GL</td>
<td>%</td>
<td>Supplementary</td>
<td>70</td>
<td>46%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>High Security/High Reliability</td>
<td>69 35%</td>
<td>0   0 0 0</td>
<td>0</td>
<td>0</td>
<td>GL</td>
<td>GL</td>
<td>%</td>
<td>High Security/High Reliability</td>
<td>69</td>
<td>35%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Regulated river (Conveyance) IC</td>
<td>0 0%</td>
<td>0   0 0 0</td>
<td>0</td>
<td>0</td>
<td>GL</td>
<td>GL</td>
<td>%</td>
<td>Regulated river (Conveyance) IC</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>General Security/Low Reliability</td>
<td>493 35%</td>
<td>0 192 192 192</td>
<td>192 192 192</td>
<td>192 192 192</td>
<td>GL</td>
<td>GL</td>
<td>%</td>
<td>General Security/Low Reliability</td>
<td>493</td>
<td>35%</td>
<td>0</td>
<td>192</td>
<td>192</td>
<td>192</td>
</tr>
</tbody>
</table>

After modernisation and purchases that have already occurred, scenarios outlined in the Guide translate to a further 31% of high reliability entitlements (and 37% of low reliability entitlements) under the 4000 GL scenario, and 18% of high reliability entitlements (and 24% of low reliability entitlements) under the 3000 scenarios.

It is assumed there will be a mix of both High and General Security water entitlements procured by Government in order to meet environmental requirements across the range of high and low rainfall years.

N.B. around Balranald, farmers use Murrumbidgee entitlements. Where appropriate, the Murrumbidgee scenarios were used; please refer to the Murrumbidgee regional report in Volume 7 for that material.

---

\(^{34}\) Source: EBC consortium analysis based on the Guide Appendix C and other cited sources, assuming pro-rata change across all entitlement classes, and consultation with MDBA.


\(^{36}\) Yield-unweighted entitlements, pro-rata based on use

\(^{37}\) Yield-unweighted entitlements. Source: MJA 2010


\(^{39}\) Yield-unweighted entitlements. Note this ‘gap’ may also be partially met through on and off-farm irrigation modernisation.

\(^{40}\) Note not always the same across entitlement type, even if pro rata as other Government purchases have reduced 2010 entitlements
3.6.2 Farm Level Response

There is general uncertainty about how the Government will procure entitlements, with the general assumption of ‘across the board’ reductions in entitlements being voiced regularly in discussions, followed by mistrust that voluntary acquisition will achieve stated goals.

When raised, the Government position of purchasing only from ‘willing sellers’ evokes a strong response that willing sellers do not exist, but that adverse economic circumstances produce temporary ‘forced’ sellers who will be pressured by financiers (the banks) to sell against their personal preferences.

Modernisation

Being a significant producer of wine and table grapes, the scope for on-farm water efficiency options in Sunraysia appears to be somewhat limited, compared with other regions. In addition, off-farm modernisation has already occurred in some parts of the region (such as Robinvale), with further scope for modernised systems likely to yield minimal water savings, which could be transferred to Government. The major gain from further modernisation is likely to be financial, providing greater reliability of supply (and therefore yield), and the ability to diversify crops.

Buyback

As buybacks will occur from ‘willing sellers’, there is a general expectation that the region will not be directly affected by buybacks in the short term. This is largely under the assumption that the higher value horticulture of the region will be insulated by lower value dairy and rice production elsewhere, which will logically be affected first.

The Mildura/Robinvale region is characterised by a large number of relatively small farms, and a small number of much larger, corporate producing farms. It is considered likely that those producers experiencing prolonged adverse commodity prices will be the most likely to participate in Government buyback activities in the region. This will allow them to pay down farm debts, and in some cases ‘exit with dignity’. In these cases, it can be expected that the entirety of their water entitlements will likely be sold (presumably with an exit fee to their water supplier). Given the small scale of individual farm production, it is unlikely that small portions of small farm entitlements will be sold.

The financial backing of the large corporate wine grape farms is expected to insulate them from adverse commodity prices in the short term, rendering them less likely to participate in buy-back.

As noted, the main driver for participation is expected to be commodity prices, the impact of which is likely to supersede all others in financial terms. In addition to this, farmer demographics is likely to impact on participation decisions, with older
farmers potentially looking for the opportunity to exit the industry as profitably as possible.

"In this area, there’d be no irrigator who’d sell permanent water. It’d be net buyers. Even the wine growers? Some of them would have the strength to change, others have diversity to hold out. Some will adjust, but they’ll keep their water The casualties are the small and medium size growers" (Robinvale grower).

"So if they offer a fair price ($3000/ML), people can go if they want to, leave with dignity, and they’ll get their water" (Sunraysia grower).

"Buybacks has been an out for some, but they’ve lost their livelihood and walked away with nothing after paying debt" (Sunraysia tablegrape grower).

"Support the buy back as an exit strategy for our growers. Want a transparent buy back. Don’t like the buyback strategy – bad mix of general and high security. Some supplementary water is only available when it floods.

"Buybacks – haven’t been a bad thing. They haven’t closed down the blocks, and have allowed some farmers to get out with dignity. But it was commodity prices. No one yet knows the impact on remaining farmers (exit fees and stranded assets), is the only thing" (CMA representative)

**Temporary Water Prices**

There is considerable uncertainty around the future of water pricing particularly in relation to the temporary water market and the impact of the Commonwealth Environment Water Holder (CEWH). As the operational guidelines for the CEWH are currently unknown there was much speculation about the potential for the CEWH to drive prices higher or to participate in trade during low allocation years and maintain lower prices. There were differing views on the correct operation of the CEWH.

Those supportive of CEWH entering market made statements like:

"If there was another dry season, could we afford to pay for it? That’s the concern" (Robinvale grower)

"If the environment buys water, and the temporary pool is smaller, the price will have to go up. I couldn’t understand why the environment wouldn’t sell water. If they don’t need it for particular uses, they should sell in the temporary market." (Robinvale grower)

"The government should have a price that’s fair and reasonable: $3000/ML. Once it’s gone, it’s gone for good. If the CEWH has a surplus, they should sell back to the market. Why wouldn’t they? They’d be silly not to". (Sunraysia grower)
“If the CEWH comes in, temporary water prices go up and is more scarce. In horticulture – have to go on to the market if need water, and temporary price could go right up if CEWH comes in.” (Sunraysia table grape grower)

“If water is available on the temp market the difference between 20 and 30% is purely economic. Don’t get why CEWH wouldn’t be involved in temporary market, and ensure they have the same rules as everyone else” (Sunraysia wine grape representative).

Those not supportive of CEWH entering the market:

“If the government put the water back on the market, that would be a major slap in the face. That would be a sinister act. They should give it back. It would be like the government compulsory acquisition for a railway, and then in ten years time seeing a shopping centre there (Robinvale table grape grower)”

Changes to agricultural production

The ‘Murray Vic’ region of which Sunraysia forms a part (in addition to Cobram and Swan Hill) is expected to experience a 6% decline in the gross value of irrigated agricultural production (GVIAP) to 2018-19 compared to 2005-06 production as a result of the water availability reduction associated with the Plan.41 The most significant reduction in irrigated agriculture affecting the Sunraysia catchment is expected to be in grapes (-6%) and fruit and nuts (-2%). Similar reductions are expected in the ‘Murray NSW’ region.

While a significant reduction in productive output, this is clearly a smaller reduction in irrigated production than might be expected by the reduction in water availability proposed under the scenarios, for a number of reasons:

• Good quality horticultural production is more profitable per unit of water than other uses. As such, it is expected that there will be fewer willing sellers than in other areas, and greater financial capacity to buy in water as required through the market mechanism. It is expected that diary production will have lower capacity to pay and will therefore sell to Sunraysia horticulture once the price reaches a certain point.

• Those that do participate in buybacks are expected to be less productive than remaining farms.

• Potential for consolidation and increased farm efficiencies will continue as farm managers adopt new technologies and practices.

Source: ABARES, 2010, Report to EBC Consortium. It should be noted that 2005-06 was a drought year, so a 6% reduction from this production is not insignificant.
Given that sales of water entitlements are expected from small, potentially isolated blocks, it is not expected that any decrease in horticultural activity is offset by dryland farming. Vacant blocks are unlikely to be viable broadacre farming options.

There was some discussion amongst interviewees of the potential to use the temporary water market to irrigate ‘opportunistic’ vegetable production. For example, the 2010 cyclones and flooding affecting production in Queensland were seen as a strong opportunity for strategic cropping in the area due to dramatically increased short-term prices. While this was discussed with some enthusiasm, resulting profitability was not witnessed during the consultation period.

**Third Party Impacts – Water charges, farm supply costs and shire rates**

The regional water supplier, Lower Murray Water (LMW) recoups one off termination fees from irrigators within its jurisdiction as they sell permanent water entitlements and surrender their delivery share to LMW. In Sunraysia, this termination fee cannot exceed 10 times the total network access charge (essentially represents the fixed access fee).

However, there is a concern about stranded assets as sales occur on an ‘ad hoc’ basis, producing a ‘patchwork quilt’ of irrigated and abandoned properties across the irrigation district, preventing rationalisation. Further, there is anecdotal evidence that in some instances farmers simply abandon the block accruing debt, leaving the termination fee unpaid.

Farm supply costs should not be significantly affected by a reduction in water availability, as these are already consolidating to the towns of Mildura and Robinvale (with some parts of the region suppling from Swan Hill). Smaller satellite towns such as Merbein and Red Cliffs are somewhat in decline regardless of Government action, with impacts on shire rates.

There is a minority view that the more profitable farms in the region will slowly purchase abandoned blocks or blocks for sale in areas such as Merbein, to expand production (Robinvale, for example, has very low land available for expansion). Among those of this opinion is the belief that this adjustment will take many years to occur, should it do so.

### 3.6.3 Impacts to the local economy

**Local Processing**

**Permanent Horticulture**

The majority of wine grapes produced within the region are processed locally, with Mildura perfectly located as a central point of land transportation. The Mildura operation can process grapes from the Murrumbidgee irrigation area and the Riverland if required.

---

Treasury Wine Estates currently processes large volumes of wine at the Karadoc winery. They have recently established a state-of-the-art winery in the Barossa Valley which processes the bulk of quality wine. While it is possible that a threshold exists for production in the region it is unlikely that the volume of wine processed in the region will decline in the short term.

Table grape processing is almost exclusively undertaken on-farm, employing local residents (usually from Mildura town) and backpackers. Table grapes appear to be experiencing high commodity prices, and thus are unlikely to provide any ‘willing sellers’ in the current environment.

Dried fruit processing is undertaken by Sunbeam, which has just over 50% of its processing base in Mildura (employing 160 FTE), processing fruit and nuts from Swan Hill through to the Riverland in SA. As such, localised impacts of changes to water availability will be cushioned by imports from other regions. However, impacts reaching across the MDB will impact on local processing if there is a significant reduction in product for processing. Sunbeam would ideally like to process 25-30,000 tonnes of dried fruit, up from the current 15,000 tonnes per year.

As with most other horticultural processing, citrus operations in Mildura process both local produce and fruit transported from other regions (South Australia, NSW). Like other primary produce, commodity prices dictate the financial health of the industry, with a significant majority of produce exported.

Almond and olive production in the region is characterised by extremely large plantings and in-house processing plants.

**Population and Employment**

There is a general belief in the region that population and employment is underpinned by irrigated agriculture. Certainly, horticulture has historically been the major source of income and employment in Sunraysia. However, the services sector is robust and growing, especially in Mildura where a university campus is now situated and the health sector is a strong employer.

It is arguable that the major population centres of Mildura and Robinvale are robust and self-sustaining in the face of agricultural uncertainties. Population and average incomes have grown strongly in these centres over the past decade, despite adverse commodity prices for wine grapes and the impacts of drought.

The population of Mildura grew 17% from 2001 to 2009, with growth in wage earners across industries. From 2004 to 2009, taxable income in Mildura grew 42%. This is not to argue that there are no significant social problems in Mildura, with unemployment stuck around 8% over this period. However, it is a strong argument that the prospects of the major centre of Mildura is robust and viable over the long term.

---

43 All data from ABS National Regional Profiles Database
Similarly, Robinvale’s population has grown 13% from 2001 to 2009, with taxable income increasing 33% from 2004 to 2009.

This cannot be argued for smaller satellite townships such as Merbein and Red Cliffs, which have experienced population decline over recent years that can be expected to continue, regardless of the Plan. These small townships will be especially vulnerable to reduced water availability, to the extent that it increases population decline.

Given this data, it is likely that these trends will continue regardless of the Plan. Larger town centres such as Mildura and high producing horticultural areas such as Robinvale can be expected to continue population and income growth, while small satellite townships continue to decline.

**Local businesses**

Regional farm supply businesses have consolidated in recent years in the major centres (Mildura and Robinvale). Most farms in the catchment source their supplies from these two centres, or from Swan Hill if conveniently located. As the smaller satellite towns have declined, services have relocated to the major centres over time. To the extent that this has not already happened, this trend is likely to continue. To the extent that reduced water allocation further exacerbates this effect, the impacts will be more acutely felt in the smaller towns.

As a broader regional centre, a number of large farm supply businesses operate from Mildura, with coverage across the entire MDB. As such, localised impacts of the Plan on Sunraysia are perhaps less important to their profitability than the broader health of the agricultural sector across the MDB.

These trends would be reflected in other business areas, such as retail and real estate. Importantly, however, it is not clear that the major centres of Mildura and Robinvale will be directly and significantly affected. These centres have reported economic and population growth throughout the duration of the recent drought, and have broader economic bases. This is especially so for Mildura, but Robinvale has also experienced economic growth and with a modernised irrigation system, is not expected to participate significantly in any buy-back program.

### 3.6.4 Social impacts

**Community identity**

There is a strong community association with irrigated horticulture in the region, especially with wine grape cultivation, table grapes, dried fruit and citrus. While Mildura has grown and diversified economically, this association is retained and a strong belief remains that horticulture is the backbone of the economy and community.
As such, the reduced water allocations present a threat to community identity in that it is perceived as a threat to the sustainability of irrigated horticulture in the region. This is especially so because of the extent of horticulture in the region, which relies on reliable water supply every year.

**Education**

Like other sectors in the region, the primary and secondary education sector is consolidating somewhat in the major centres (especially Mildura). Interviews revealed that secondary school children were increasingly being bussed to schools in Mildura from surrounding towns. This trend appears unlikely to reverse.

Concurrently, tertiary education is a recent and growing addition to the region, with a university campus in Mildura since 1996, hosting over 430 students. While concern was expressed during interviews about a ‘threshold’ population relating to the sustainability of tertiary education in Mildura, no evidence was reported of the threatened sustainability of the campus.

**Demographic change**

Demographics tend to follow the above trends, with strong population growth in major centres (Mildura and Robinvale), and stagnation and more pronounced population aging in smaller satellite towns.

For example, from 2001-09, the population of Mildura grew by 17% from 42,928 to 50,042 persons (more than 2% per year). The population is ageing slightly but not rapidly, with higher population growth in the 45-69 years and 70 or above brackets (up 14% from 2001-2009 per bracket). There was 15% growth in those aged 15-24, and smaller growth for all other age brackets below 45 years old.

These demographic trends appear likely to continue.

Economic growth has occurred in Mildura over the past ten years, despite the drought and historically unfavourable wine grape prices. The impacts of the Plan appear unlikely to dramatically reverse this trend.

Also, alternative economic opportunities for Mildura are being sought, including a significant investment in solar technology.

**Farmer mental health**

Significant mental health concerns were reported for the farming community, due to the cumulative impacts of years of drought, and the financial impacts of adverse commodity prices. Wine grape growers were identified as being specifically vulnerable to mental health issues, following years of low commodity prices during the wine glut.

---

45. All data from ABS National Regional Profiles Database
Cautious optimism about future crops and commodity prices has been tempered by uncertainty associated with the *Guide*.

There is a strong sense of community in the Sunraysia region, and mental health counselling services to assist those in need. However, people are sometimes reluctant to access these services. While services exist to assist those in need, wait times are reported to be a significant impediment to accessing services.

**Local Government Services**

Local government services are under pressure in the small satellite towns around the major centres, in contrast to the growing regional centres, which are growing in population and associated services. This trend is likely to continue.

### 3.7 Community Resilience and Adaptive Capacity

#### 3.7.1 Overall

Communities in the region are relatively well placed with some key attributes, which will they are able to adapt to changing conditions in the future. These include:

- Diversity of commodities produced with potential to shift between crops (although this is not undertaken lightly) depending on prevailing commodity prices.
- High value of the crop that is being produced and economic wealth of the region.
- Recent growth in the region due to expansion of wine grapes, almonds and olives and other highly profitable enterprises.
- Attraction of services to region to support agricultural growth, tourism and mining.
- Large population of the regional centre (Mildura) which provides alternative employment opportunities and a diversity of industry options.
- Strong cultural, sporting and community cohesion of the region due in part to its isolation and independent spirit.

Agriculture communities in the region are dependant on irrigation for their future viability. Given the high value of the crop it is expected that production in the region will be maintained.

The key potential barriers to resilience and adaption in the region will be:

- Unprofitable businesses with high debt unable to finance change to production systems and
- Fatigue of individuals to managing change.
3.7.2 Mildura Social Catchment

The Mildura social catchment is mostly reliant on irrigated agriculture. Employment has traditionally been based on irrigated agriculture and associated service industries/processing. Recent developments in alternative industries have increased the employment opportunities and resilience of Mildura.

Satellite towns are more vulnerable due to the gradual consolidation and movement of services into regional centres.

Wentworth will be vulnerable to changes in the value of irrigated horticulture.

3.7.3 Robinvale Social Catchment

The Robinvale social catchment is highly dependant on the fortunes of the irrigated horticulture industries. Provided commodity prices are reasonable, irrigators should be able to continue to purchase water during low allocation years. This will ensure that the town of Robinvale remains prosperous and viable.

The greatest threat to Robinvale is the gradual leak of students and professionals to Mildura rather than remaining in the region.

3.8 Minimising impacts

Options raised by the Sunraysia community include:

- **Strategic buyback** - Water sales to Government within the Sunraysia Irrigation areas have not provided the water corporations with any substantive capacity to rationalise supply infrastructure without impacting on the capacity to supply remaining farmers. Communities consider that the ‘Swiss Cheese’ issue could be partially addressed through strategic buyback (in consultation with the Water Authority). Buy back could also be given priority to high salinity impact zones (in consultation with the regional CMA).

- **Modernisation** – While key informants argue modernisation will not produce significant water savings, the water supply reliability (24hr, 365 day supply) achieved through modernisation where it has been implemented has facilitated higher returns and increased diversification of crops into high value alternatives to current produce. This may assist the reinvigoration of depressed and vulnerable regions such as Merbein and Red Cliffs.\(^{46}\)

- **Industry adjustment** – buyback could be utilised to assist in the structural adjustment for some industries experiencing severe commodity price decline and the need to contract supply (e.g. wine industry). Communities consider that buyback could facilitate a more rapid adjustment when undertaken in consultation with the industry.

\(^{46}\) The relative costs and benefits of this investment compared to alternative Commonwealth investments would need to be assessed through standard Government processes.
4  Goulburn and Victorian Murray - GMID

4.1  Overview

This section summarises the subsequent sections of this report. For explanation of conclusions summarised in this overview, please refer to the appropriate subsequent section of this report. Please note that this report is not a regional profile, but rather, is a report on the base case and potential impacts of proposed reductions in irrigation water availability. It draws on previously published regional profiles to which the interested reader is referred.\(^\text{47}\)

The area known as the Goulburn Murray Irrigation District (GMID) in northern Victoria is bounded by the Great Dividing Range in the south, the Murray River in the north and extends from Corryong in the east and Nyah in the west. It covers the water catchment areas of Victorian Murray, Kiewa, Ovens, Broken, Goulburn, Campaspe and Loddon.

The region has a high population density relative to other regions in the Murray-Darling Basin and the communities within are strongly interconnected. Water is delivered through approximately 6,300 km of channels distributing water within and across catchments that make up the region. It is necessary to recognise that reductions in water availability in the individual catchments will be felt across much of northern Victoria and go beyond the geographical boundaries of the water catchments within the region.

The focus of this study region covers the majority of the GMID and includes the social catchments of Shepparton, Echuca, Kerang and Swan Hill. The social catchments extend across the Victorian Murray, Goulburn and the northern reaches of the Campaspe and Loddon catchments. Both the Loddon and Campaspe systems provide supplementary water into the Goulburn system that contributes to the reliability of the entitlements in the Goulburn system.

The area represents the biggest irrigation region within the Murray-Darling Basin. The development of the high value agricultural industries such as horticulture and dairy in the region has been a direct result of the availability of an affordable and highly reliable irrigation supply. This has seen the growth of support industries to those agricultural activities not only for the farms but also for the associated food processing post farm that is predominantly located within the region.

In December 2007 NVIRP, a state owned entity was established to implement Australia’s largest modernisation project. This represents a $2 billion investment and aims to recover long-term average annual water savings of 425 GL\(^\text{48}\) which will be shared between irrigators, the environment and Melbourne Water.


NVIRP is critically important for the future of the irrigation region as it will contribute additional water to the environment through the savings that will be made but will also provide a world class irrigation delivery system that helps secure the future of the irrigation industries in the region.

4.1.1 Social Catchments

The region is densely populated with the existence of a high number of communities ranging from large regional centres through to the very small rural towns. Due to the large number of communities within the region, a detailed assessment of every community within the region was not possible.

Primary Irrigated production

The region is commonly referred to as the food bowl of Australia and supports a range of agricultural commodities. The most important irrigated agricultural industries include dairy and horticulture. The GMID comprises 6,300 km of open earthen channels, 800 km of natural waterways, serving an area of approximately 9,900 km$^2$ over six irrigation areas.

It is a region with significant agricultural value, and produces\(^{49}\):

- 22% of the nation's milk which is sold either as fresh milk or value added in the form of butter, cheese, yoghurt and dried milk products;
- 96% of Victoria's tomatoes by weight;
- 90% of Victoria's stone fruit by weight;
- 12% of Victoria's grapes; and
- $1.94$ billion worth of Victoria's $8.3$ billion agricultural commodities, accounting for 24% of the total Victorian value.

The intensive industries such as horticulture and dairy have significant food processing facilities located in the region that drives additional regional economic activity.

4.1.2 Drought

The cumulative impact of successive years of drought has been to lower the resilience of farmers and regional communities. The financial and mental capacity on-farm has been drained and that has flowed through to communities in terms of reduced economic activity and a drop in confidence in the region. The financial strain as a result of a prolonged period of low water availability has been a major

\(^{49}\) NVIRP webpage http://www.nvirp.com.au/ Source: 2005/06 Production Data, Department of Primary Industries and Dairy Australia
driver of the increasing physical and mental health issues observed in regional areas.

The drought has tested the norms and rules of thumb that have helped farmers in their decision-making in the past. The level of uncertainty is high and impacting on the confidence to make decisions.

The lack of confidence in the farming sector flows through into the community. It has impacted on investment as people question the longer-term future of the region.

Due to the reduced water availability during the drought prices for temporary water were extremely volatile peaking at over $1000/ML in 2007-08.

The dairy industry was significantly impacted with regional milk production declining from over 3.0 billion litres in 2001-02 to 1.8 billion litres in 2009-10\textsuperscript{50}. This has created implications for milk processing with reduced factory utilisation, changes in product mixes and retiring of some processing infrastructure\textsuperscript{51}. The Murray Goulburn milk processing facility at Leitchville closed in 2010 as a direct result of reduced regional milk flows.

The processing tomato industry declined from 320,000 tonnes in 2005 to 151,000 tonnes in 2008\textsuperscript{52} as a direct result of reduced water availability and growers being unwilling to make the high cost investment to plant without security of water access.

Implications of drought flow throughout the community. For example Swan Hill College had 1,100 students in 2005, dropping to 960 in 2010\textsuperscript{53}. A drop in student numbers affects subject choices and can lead to a second wave of reduced enrolments as parents potentially move due to lack of options or send children to larger centres (which has a snowballing effect). There are fewer teachers and lower student numbers which results in reduced infrastructure investment.

Drought impacts would be greater if it was not for government programs including:

- support of farm businesses through exceptional circumstances (EC) that has included interest rate subsidies and income support;
- modernisation works providing employment opportunities that has lessened the impact on contractors and local rural suppliers from the reduced demand from drought affected farms;
- Murray-Darling Basing Irrigation Management grants ($20,000 apiece) that provided a stimulus to rural suppliers and contractors;

---

\textsuperscript{50} Personal comms Dairy Australia 2011
\textsuperscript{52} RMCG (2009) TM09002: Strategic Plan (2010-2013) and Industry Development Needs Assessment Australian Processing Tomato Research Council Inc.
\textsuperscript{53} Personal comms Community interviews
• Victorian government’s 50% shire rate subsidy for farms on EC support;
• Victorian government rebate on fixed water charges; and
• the Commonwealth economic stimulus package.

4.1.3 Baseline

The baseline assumes no buybacks, and no modernisation and an opportunity for industries and communities to recover from drought. A summary of the situation after recovery is below:

• horticulture – small growth and maintaining current processing facilities – SPC Shepparton/Mooroopna. Industry currently is challenged with the high Australian dollar and its competitiveness with exports (both fresh and in the canning industry). Margins are tight but the major growers are committed;

• potential for growth in the processing tomato industry with the ability to double capacity at the Echuca plant with additional investment. This investment was started pre drought but has been on hold due to limitations on crop areas because of low water allocations;

• recovery of the dairy industry from 1.8 billion litres to 2.5 billion litres (across the whole Murray Dairy Region). Growth mainly from expansion of current farms but also the reinstatement of former farms with a growth rate of 2-3% per annum. Growth will be slow as it will take time for numbers to recover (cows and people). A stable water environment should see the region return as a priority area for dairy investment – i.e. dairy investment is competitive with other dairy regions;

• milk processors are achieving improved asset utilisation. No new processing but growing in strength and achieving improved profitability;

• mixed farming is recovering and recommencement of a contribution to feed supply for the dairy industry. The ability to be competitive against other high value water users will continue to be challenging;

• increased agricultural activity is regenerating economic activity in regional communities leading to restoration of profitability and reinvestment in businesses;

• more vibrant communities that have confidence to invest and a lowering of the stress related well-being issues as the financial strain on businesses throughout the community is reduced; and

• smaller communities are under pressure as rural population decline continues, as farms expand in size but total farm numbers decline.
4.1.4 Impact of reduced water availability

This section summarises our analysis of the likely impacts of the Guide proposals.

**Permanent horticulture**

- larger modern horticulturalists are expected not to sell entitlements and to continue production (water will come predominately from lower value agriculture);
- an expected acceleration of the exit of farmers who are at the end of their business cycle;
- larger enterprises will potentially make up for the retirements resulting in a small impact on total volumes of production;
- horticultural enterprises in the Swan Hill social catchment are more at risk due to a smaller volume of water available on the temporary water market (allocation market). This will manifest itself in periods of low water allocation when supplementary water purchases are needed to maintain perennial plantings. Farms in the private diversion regions between Swan Hill and Robinvale have grown enormously in the last ten years. Some of these farms are therefore more reliant on the allocation market to meet their water needs than traditional district properties. There is forecast to be upward pressure on temporary water prices especially during dry periods, which will reduce confidence in industry investment and will result in some contraction, if temporary water prices become unaffordable, as occurred in 2007-08; and
- risk will probably increase due to the impacts of higher priced temporary water markets in low allocation years.

SPC assisted farmers during the low allocation seasons through purchasing temporary water to help growers maintain plantings. This has only been a short-term strategy and there will be increased risk for the industry during periods of low water allocations and high temporary water prices.

**Annual horticulture – processing tomatoes**

- Processing tomato industry will be at risk due to increased input costs due to rising annual delivery costs and higher opportunity cost of owning water; and
- Margins are small and costs cannot be passed on to buyers.

**Dairy**

Reduced water availability through sale of entitlements to the Commonwealth would see a continued decline in milk production in the region from the already drought impacted production of 1.8 billion litres. Decline would likely be driven by:
• increased costs of water (both annual charges and temporary water prices) impacting on feed costs and the ability to remain world competitive in milk production;

• the exit rate potentially exceeding that which would be expected based on potential water available, as some farmers will feel that the new operating environment will be too difficult and exit. Many farmers have been “hanging on” for when things improve and with reduced total water available, the view by some will be that the risks of continuing are too high. Additional exits can further impact on confidence especially if leading farmers leave;

• if a result is the loss of a critical mass of farmers needed to support the numerous industries that rely on the dairy industry, there would be flow-on impacts to those sectors;

• existing farms having higher costs if as expected support services and inputs need to be sourced from further afield; and

• increased costs from their expected reduced ability to source fodder from mixed irrigation businesses that are currently in close proximity.

Mixed farming

• business viability will be questioned and many are expected to sell entitlement and exit but some will remain. Those that remain will most likely retain some entitlement for risk management purposes;

• in the longer term there will be a steady move of that water through to the higher value users; and

• opportunistic use of water by mixed farming enterprises will be questioned if the cost of delivery goes up. The cost of keeping access to irrigation infrastructure only to use it now and then is expected to be unviable. If access to water is retained, it must be used or access will become a significant cost burden to the business unless the sale of the temporary water entitlement can cover that cost.

Food processing

• some loss of potential growth may occur in the canning fruit industry;

• tomato processing would be likely to be under threat;

• excess capacity in milk processing facilities exists in the region at current level of production (1.8 billion litres). If production continues to drop without an opportunity for recovery then there will be further pressure to rationalise milk processing facilities;
eighty-five per cent of total milk produced in the region is processed by the three major milk companies with factories located within the region – Fonterra Australia, Tatura Milk Industries and Murray Goulburn Cooperative. Collectively they have 6 processing sites in the region (including the Murray Goulburn Kiewa site). Companies will change product mix in response to reduced milk volumes which has been happening in the drought to maximise returns. There is not a linear response to reduced milk volumes but continuation of reduced milk flows will likely result in further rationalisation; and

given that milk processing is located in the medium to smaller towns, a factory closure in any of those towns will have major implications for that town and will also have a ripple effect through surrounding communities.

**Community businesses**

- the viability of the modernised irrigation system could be in doubt. The system will require even further rationalisation back to a smaller area close to main channels. The investment in NVIRP may be threatened;

- reduction in farm spending will flow directly into businesses within the towns with higher impact in the medium to smaller towns. There could be a flow on effect of reduced population base and reduced agricultural dollars circulating around the towns;

- town businesses that are currently suffering poor profitability may see a “continuing drought” created by increased buybacks, although this may be mitigated by expenditure of the proceeds of buyback in the short to medium term; and

- there will probably be downward pressure on house values in small to medium sized towns.

**Community services**

- reduced capacity to deliver services if there is declining population;

- greater difficulty in attracting investment into regional towns;

- larger centres may be buffered to some extent but growth potential and investment interest may decline; and

- viability of local government is expected to decline in the more agriculture-dependent catchments (Echuca, Kerang and Swan Hill).
4.1.5 Minimising impacts

- strategic targeted buyback to ensure the irrigation system viability into the future;

- engineering works for management of environmental water;

- community infrastructure investment – schools, hospitals to enhance the liveability of regional communities;

- support services in the town such as education - “Deakin at your door step” an initiative in the Swan Hill social catchment to improve university access for rural students; and

- options for trading back environmental water to the irrigators during dry periods.

4.2 Background

4.2.1 Introduction to region and social catchments

Region

The focus of this chapter is the majority of the Goulburn-Murray Irrigation District (GMID) and includes the social catchments of Shepparton, Echuca, Kerang and Swan Hill (Figure 4-1). The social catchments expand across the Victorian Murray, Goulburn and the northern reaches of the Campaspe and Loddon catchments.

Moving towards the east from the Shepparton catchment through to the Swan Hill catchment there is a gradual change from highly populated and intensively irrigated regions to areas less populated with irrigation more dispersed between dry land areas.

The development of the high value agricultural industries such as horticulture and dairy in the region has been a direct result of the availability of an affordable and highly reliable irrigation supply. This has seen the growth of support industries to those agricultural activities, not only to the farms but also for associated food processing post-farm that predominantly occurs within the region.

The irrigation intensity of the region has seen the investment in the regional infrastructure required to support the agricultural activity and population base. The region is characterised by a high number of towns, large and small, that are dispersed throughout the region.

A cross section of the communities within the study region is presented in Table 4-1.
### Table 4-1 Communities within the study region

<table>
<thead>
<tr>
<th>Social catchment</th>
<th>Towns</th>
<th>Population</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shepparton</td>
<td>Shepparton*</td>
<td>34,910</td>
<td>Category 4 large regional centre that will be buffered to some degree from reductions in irrigated agricultural output as it has a critical mass and alternative industries (health, education, retail) that draw from an estimated catchment population base of 160,000(^{55}). Irrigated agriculture has been the foundation for development providing the infrastructure and the population density that has attracted investment in the past. Agricultural supply industries and food processing still remain very important to the community and therefore still exposed to irrigated agriculture.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tatura</td>
<td></td>
<td>4,376</td>
<td>Category 1 medium, moderate dependence. Milk processing facility located in the town which is highly dependent on irrigation. Presence of other employers such as Goulburn Murray Water (GWM) head office, Department of Primary Industries (DPI) and being a commutable distance to Shepparton provides some buffering to direct impacts of reduced economic output from irrigated agriculture.</td>
</tr>
<tr>
<td>Nathalia*</td>
<td></td>
<td>1,432</td>
<td>Category 1 medium, high dependence. Key businesses servicing irrigated agriculture. Presence of other businesses that provides some resilience for the community such as the Catholic school that is drawing students from a much larger rural region than from the immediate Nathalia area, commutable distance to Shepparton and a new nursing home and hospital. Retired farmers moving into town due to the attraction of health facilities.</td>
</tr>
<tr>
<td>Numurkah*</td>
<td></td>
<td>4,643</td>
<td>Category 1 medium, high dependence. Some buffering with businesses such as Riverland oilseed processing plant (not totally dependent on irrigated crops for supply) as well as commutable distance to both Shepparton and Cobram.</td>
</tr>
<tr>
<td>Cobram/Barooga*</td>
<td></td>
<td>5,532/1,455</td>
<td>Category 1 medium, moderate dependence. Key industries dependent on irrigated agriculture. Murray Goulburn milk processing facility and rural supply industries. Located on the Murray River which supports tourism.</td>
</tr>
<tr>
<td>Yarrawonga/Mulwala</td>
<td></td>
<td>5,727/1,986</td>
<td>Medium, moderate dependence. Murray River and Lake Mulwala supporting tourism.</td>
</tr>
<tr>
<td>Undera</td>
<td></td>
<td>636</td>
<td>Small, high dependence. Small community highly dependent economic activity driven by irrigated agriculture. Commutable distance to Shepparton.</td>
</tr>
<tr>
<td>Stanhope</td>
<td></td>
<td>520</td>
<td>Category 1 small, high dependence. Location of Fonterra Australia Limited’s main northern milk processing facility and major employer in town. Exposed to reduced irrigated output especially if milk processing is scaled down.</td>
</tr>
<tr>
<td>Katunga</td>
<td></td>
<td>1,548</td>
<td>Small, high dependence. Small community highly dependent on economic activity driven irrigated agriculture.</td>
</tr>
<tr>
<td>Strathmerton</td>
<td></td>
<td>467</td>
<td>Small, high dependence. Small community highly dependent on economic activity driven by irrigated agriculture.</td>
</tr>
</tbody>
</table>

---

\(^{54}\) Australian Bureau of Statistics 2006 Census QuickStats

\(^{55}\) Community interviews for this study - 2011

EBC, RMCG, Marsden Jacob Associates, EconSearch, Geoff McLeod, Tim Cummins, Guy Roth and David Cornish
<table>
<thead>
<tr>
<th>Social catchment</th>
<th>Towns</th>
<th>Population</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>12,358</td>
<td>Category 4 (or 3) medium, moderate dependence.  Major food processing facilities</td>
</tr>
<tr>
<td></td>
<td>Echuca/Moama *</td>
<td>3,331</td>
<td>present (Fonterra, Cedenco Simplot) and other businesses directly supporting</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>irrigated agriculture and therefore exposed to a downturn in irrigated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>agricultural output.  Tourism provides some buffer but agriculture and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>manufacturing remains an important economic driver.</td>
</tr>
<tr>
<td>Rochester *</td>
<td>1,849</td>
<td></td>
<td>Category 1 medium, high dependence.  Murray Goulburn milk processing facility</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>a key employer in the town which is highly reliant on irrigation.  Hospital</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>upgrade, good commuter rail transport to Bendigo and commutable distance to</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Echuca provides some buffering of impacts of reduced agricultural output.</td>
</tr>
<tr>
<td>Kyabram *</td>
<td>6,902</td>
<td></td>
<td>Category 1 medium, high dependence.  Known as a dairy town with many</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>businesses directly supporting irrigated agriculture.  Has some financial and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>legal businesses that were originally established in the town who have</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>expanded into other towns but they retain head offices in Kyabram.</td>
</tr>
<tr>
<td>Lockington</td>
<td>421</td>
<td></td>
<td>Category 1 small, high dependence.  Small community highly dependent economic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>activity driven irrigated agriculture</td>
</tr>
<tr>
<td>Tongala</td>
<td>1,623</td>
<td></td>
<td>Small, high dependence.  Small community highly dependent economic activity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>driven by irrigated agriculture.  Recent scaling down of Nestle dairy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>processing plant example of exposure to declining irrigated agriculture as</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>a result of drought that flows through to the community.</td>
</tr>
<tr>
<td>Kerang</td>
<td>Kerang *</td>
<td>3,780</td>
<td>Category 1 medium, high dependence.  Regional centre with presence of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>government services (DPI, Local government) providing some buffer.  Exposed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>to drain of population and services to larger regional centres (Swan Hill,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Echuca, Bendigo).</td>
</tr>
<tr>
<td>Cohuna</td>
<td>1,893</td>
<td></td>
<td>Category 1 medium, high dependence.  Major businesses supporting irrigated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>agriculture.  Highly dependent on the dairy industry for economic activity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>within the town.</td>
</tr>
<tr>
<td>Boort *</td>
<td>773</td>
<td></td>
<td>Category 1 small, high dependence.  On the edge of the irrigation district.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dry land agriculture an important contributor.  Major high value irrigation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>developments within close proximity making important contributions to the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>community.</td>
</tr>
<tr>
<td>Pyramid Hill</td>
<td>465</td>
<td></td>
<td>Category 1 small, high dependence.  Small community highly dependent economic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>activity driven irrigated agriculture.</td>
</tr>
<tr>
<td>Swan Hill</td>
<td>Swan Hill *</td>
<td>9,684</td>
<td>Large moderate dependence – Regional centre servicing both irrigation and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>dry land agriculture.  Horticulture an important economic contributor to the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>community that is highly dependent on irrigation.</td>
</tr>
<tr>
<td>Lake Boga</td>
<td>725</td>
<td></td>
<td>Small, high dependence Small community highly dependent economic activity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>driven irrigated agriculture</td>
</tr>
</tbody>
</table>

* Communities visited as part of the interview process.
Figure 4-1 Map of the Goulburn-Broken social catchments, showing categories of towns

N.B. Kerang is considered a Category 1 town as it is highly dependent on agriculture. This is in contrast to the analysis carried out in this project and shown in Figure 2-1 and Table 4-1. The percentage of employees in agricultural and post farm value chain in 2006 for Kerang was 13%. This is marginally under the cut off of 15% in the analysis, however anecdotally community members identified the town as category 1.

Shepparton social catchment

The Shepparton social catchment is located in the east of the region and covers an area that is the most intensively irrigated and densely populated of the four social catchments that make up the region.

The catchment is dominated by the city of Shepparton (population 34,910\textsuperscript{54}), which is the major regional centre for northern Victoria and southern NSW. It has a critical mass and has alternative non-agricultural industries (health, education, retail) that draw from a catchment population base of 160,000\textsuperscript{57}. The city has grown on the back of irrigation that has provided the infrastructure and the population density resulting in the attraction of investment in the past. Agricultural supply industries and food processing still remain very important to the community. The majority of the permanent horticulture enterprises and associated food processing facilities that make a significant economic contribution to the region are located within the catchment. The intensity of the irrigation development in the region results in a larger population and increased prevalence of medium sized and small communities within the region compared to the other social catchments.

Medium sized communities such as Nathalia (population 1,432\textsuperscript{54}), Numurkah (population 4,643\textsuperscript{54}), Tatura (population 4,376\textsuperscript{54}), Cobram (population 5,531\textsuperscript{54}) and Yarrawonga (population 5,727\textsuperscript{54}) are all highly dependent on irrigated agriculture but they also have some buffering capability as well:

- Nathalia has a catholic school that draws from a large region beyond the normal boundaries of the town, commutable distance to Shepparton, and a new nursing home and hospital. Retired farmers are moving into town due to the attraction of health facilities.
- Numurkah – Riverland oilseed processing plant (not totally dependent on irrigated crops for supply), and commutable distance to Shepparton and Cobram (workforce – 30% work in Shepparton, 30% work in Cobram, 30% work in Numurkah\textsuperscript{58})
• Tatura – Milk processing, commutable distance to Shepparton, Tatura Department of Primary Industries centre, and G-MW head office.

• Cobram/Yarrawonga – Tourism with attraction of the Murray River and Lake Mulwala, and major milk processing facility in Cobram.

Spread throughout the catchment are a number of smaller communities of populations less than 1000 such as Undera, Stanhope, Wunghnu, Waaia, Katamatite and Strathmerton. The small towns have a high dependence on irrigated agriculture.

Irrigation has driven the growth within the social catchment transforming the region from a sparsely populated sheep grazing area into an intensive and highly productive irrigation region. Surface water is sourced primarily from the Murray, Goulburn and Broken rivers with the key water storages being Lake Eildon, Hume and Dartmouth. The irrigation network is managed and operated by Goulburn-Murray Water (G-MW) a Victorian Government statutory water corporation. There is also access to groundwater (deep lead and shallow) in the region but represents less than 10% of the total water use.

Major food processing occurs within the social catchment with the presence of SPC Ardmona that has two fruit and vegetable processing sites located in Shepparton and Mooroopna (with a third in Kyabram that lies in the Echuca social catchment) and numerous fruit packing facilities throughout the catchment. There are also major milk processing facilities located in Cobram (Murray Goulburn Cooperative), Tatura (Tatura Milk Industries) and Stanhope (Fonterra Australia), as well as a specialist dairy processing facility at Strathmerton (Bega Cheese Limited).

**Echuca social catchment**

Echuca is located in the centre of the region. The catchment is split north to south by the Campaspe River, with higher density of irrigation development and population in the east and more dryland area dispersed amongst irrigation development in the west. The catchment is dominated by the city of Echuca (population 12,358), which is the main administration centre. Located on the Murray River, tourism is an important industry in the town but food processing and manufacturing remain critically important.

Important medium sized towns within the catchment include Rochester (population 1,849), Tongala (population 1,261), Kyabram (population 6,902). There is a number of smaller towns with populations less than 1000 people such as Lockington, Girgarre, and Nanneella which are all highly dependent on irrigated agriculture.

Food processing is an important industry in the catchment with facilities located in Echuca (Fonterra Australia, Cendenco, Simplot), Rochester (Murray Goulburn Cooperative), Girgarre (Heinz) and Kyabram (SPC Ardmona).
The social catchment has some perennial horticulture around Kyabram and processing tomatoes are grown throughout the catchment but dairy remains the most important agricultural industry.

Surface water is sourced primarily from the Murray, Goulburn and Campaspe rivers with the key water storages being Eildon, Hume, Dartmouth and Eppalock. The irrigation network is managed and operated by Goulburn-Murray Water (G-MW) a Victorian Government statutory water corporation.

A recent development in the region has been the decommissioning of the Campaspe irrigation district. Successive years of zero or very low water allocations had irrigation farms in the district under financial pressure and the majority of irrigators voted to accept an offer from NVIRP to close the district.

The Campaspe system provides water to the Goulburn System under the G-MW Campaspe Bulk entitlement to supplement the Goulburn allocation.

There is also access to groundwater (deep lead and shallow) in the region but represents less than 10% of the total water use.

**Kerang social catchment**

The Kerang social catchment is located in the west of the region.

Kerang (population 3,780\(^{54}\)) is the main administrative centre for the region. The town and catchment are highly reliant on irrigated agriculture. Cohuna (population 1,893\(^{54}\)) is another key town that has a high reliance on the dairy industry. It also supports some major manufacturing businesses that not only service the immediate area but have grown to support services outside the catchment. Boort is an important town in the social catchment which is highly dependent on irrigated agriculture. It has major processing tomato and olive industries surrounding the town. Mixed farming has been historically important to Boort, in particular lucerne production. Tourism associated with Lake Boort is very important to Boort. During the drought, the community purchased water for the lake to ensure tourism could continue. There are a number of smaller communities within the irrigation area with population less than 1000 including Leitchville, Pyramid Hill, Boort, Koondrook Mitiamo, Gunbower and Murrabit.

The catchment has a lower irrigation intensity than the Echuca and Shepparton catchments with more dry land dispersed between irrigation areas. The major irrigation industry is dairy followed by mixed farming enterprises. There is some higher value horticulture located in the region but areas are relatively small. There is a major olive plantation and processing factory east of Boort that has been critically important for that town during its development. The plantation and processing now provides ongoing economic activity.
Piggeries are an important intensive animal industry contributing 30% of Victoria’s piggery industry.\footnote{Gannawarra Shire web page http://www.gannawarra.vic.gov.au/}

Limited food processing is located in the region with the majority of product exported outside of the catchment. The recent closure of the milk processing facility in Leitchville has impacted on local jobs and confidence (a direct consequence of reduced milk production during the drought).

The prevalence of poorer soil types in the catchment that have limited productive potential without irrigation make it exposed if water is lost from the region.

There is additional competition for resources from larger centres that are within an hours drive (Echuca, Swan Hill and Bendigo).

The region has been severely impacted by recent floods and will increase its vulnerability to further shocks. Flood impacts are still unfolding and the impact on individual businesses will vary. For some it will represent a short term set back as flood impacts may have been small or that they were in a strong financial position prior to the flood while others may have no further room to move and forced to exit farming.

Surface water is sourced primarily from the Murray, Goulburn and Loddon rivers with the key water storages being Eildon, Hume and Dartmouth. The irrigation network is managed and operated by Goulburn-Murray Water (G-MW) a Victorian Government statutory water corporation. The Loddon also provides a volume of water under the G-MW Loddon Bulk entitlement to supplement the Goulburn allocation.

**Swan Hill social catchment**

The Swan Hill social catchment is located in the western end of the GMID. Swan Hill (population 9,684) is the key regional centre servicing both the dryland and irrigation areas of the catchment. Tourism is an important industry but agriculture remains the key economic driver in the region. There are a number of smaller communities with populations of less than 1000 including Lake Boga, Nyah West, Tresco, and Woorinen that will be exposed to a decline in water availability.

Irrigation in the catchment is serviced from the western end of the Torrumbarry irrigation district or direct from the Murray River.

Dryland agriculture (Mallee) has as bigger influence on the regional economy than the other social catchments in the region.

Surface water is sourced primarily from the Murray River with the key water storages being Hume and Dartmouth. The irrigation network is managed and
operated by Goulburn-Murray Water (G-MW) a Victorian Government statutory water corporation.

4.2.2 Irrigation in the region

Background

The area known as the Goulburn Murray Irrigation District (GMID) in northern Victoria is bounded by the Great Dividing Range in the south, the Murray River in the north and extends from Corryong in the east and Nyah in the west. It covers the water catchments areas of Victorian Murray, Kiewa, Ovens, Broken, Goulburn, Campaspe and Loddon.

The combined GMID area represents the largest water diversion region in the Murray-Darling Basin (Figure 4-2) below.

![Figure 4-2. Current diversion limits. The Victorian Murray is the third largest, and the Goulburn the fourth largest diverter in the Basin.](image)

The irrigation system in the GMID was first developed in the late 1800s to early 1900s but the system underwent its biggest development in the mid 1950s with a major upgrade to Lake Eildon. This was followed with the construction of Lake Dartmouth that was completed in the 1960s. The upgrades increased the amount of water available so more water entitlements were able to be distributed in the designated irrigation areas. Additional water combined with further development of solider settlement blocks stimulated significant growth in the region.

---

The region has a high population density relative to other regions in the Murray-Darling Basin and the communities within are strongly interconnected. Water is delivered through approximately 6,300 km of channels distributing water within and across catchments that make up the region. It is necessary to recognise that reductions in water availability in the individual catchments will be felt across much of northern Victoria and go beyond the geographical boundaries of the different water catchments within the region.

**System details**

The GMID covers an area of approximately 27,577 km² with irrigators sourcing water primarily through approximately 6,300 km gravity channel network. In addition to the gravity irrigation districts there are three pumped irrigation districts in the western end of the region, river diverters along the main river systems as well as groundwater users. Figure 4-3 below provides a diagrammatic representation of the GMID.

The key water storages in the region include Lake Eildon, Lake Eppalock, Cairn Curran Reservoir, Dartmouth Dam and Hume Dam. There are a number additional water storages and weirs throughout the region that are used in the distribution of water through the system.

**Figure 4-3 Diagrammatic representation of the GMID**

The GMID is commonly referred to as the nation’s food bowl and accounts for a very large proportion of the gross value of horticultural and dairy production in Australia, as demonstrated in Table 4-2.

---

### Table 4.2. GMID: Gross Value of Production in 2005-06 ($’000).

<table>
<thead>
<tr>
<th>Shire</th>
<th>Greater Shepparton</th>
<th>Moira</th>
<th>Campaspe</th>
<th>Gannawarra</th>
<th>Swan Hill</th>
<th>Loddon</th>
<th>Total</th>
<th>Total Australian Production</th>
<th>Percentage produced in the GMID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>80,125</td>
<td>13,062</td>
<td>3,654</td>
<td>40</td>
<td>–</td>
<td>69</td>
<td>96,951</td>
<td>359,900</td>
<td>26.94%</td>
</tr>
<tr>
<td>Pears</td>
<td>55,008</td>
<td>6,412</td>
<td>1,913</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>63,333</td>
<td>85,700</td>
<td>73.90%</td>
</tr>
<tr>
<td>Apricots</td>
<td>5,036</td>
<td>2,704</td>
<td>749</td>
<td>0</td>
<td>2,726</td>
<td>–</td>
<td>11,215</td>
<td>23,800</td>
<td>47.12%</td>
</tr>
<tr>
<td>Cherries</td>
<td>2,703</td>
<td>6,205</td>
<td>1</td>
<td>–</td>
<td>2,363</td>
<td>147</td>
<td>11,419</td>
<td>97,900</td>
<td>11.66%</td>
</tr>
<tr>
<td>Nectarines</td>
<td>4,754</td>
<td>15,992</td>
<td>333</td>
<td>–</td>
<td>36,371</td>
<td>–</td>
<td>57,450</td>
<td>105,700</td>
<td>54.35%</td>
</tr>
<tr>
<td>Peaches</td>
<td>15,613</td>
<td>35,708</td>
<td>310</td>
<td>58</td>
<td>15,918</td>
<td>–</td>
<td>67,608</td>
<td>107,900</td>
<td>62.66%</td>
</tr>
<tr>
<td>Plums</td>
<td>9,299</td>
<td>3,521</td>
<td>165</td>
<td>54</td>
<td>14,254</td>
<td>–</td>
<td>27,293</td>
<td>53,600</td>
<td>50.92%</td>
</tr>
<tr>
<td>Olives</td>
<td>28</td>
<td>453</td>
<td>41</td>
<td>7</td>
<td>202</td>
<td>13,710</td>
<td>14,440</td>
<td>43,900</td>
<td>32.89%</td>
</tr>
<tr>
<td>Almonds</td>
<td>–</td>
<td>47</td>
<td>–</td>
<td>2</td>
<td>19,807</td>
<td>–</td>
<td>19,856</td>
<td>104,500</td>
<td>19.00%</td>
</tr>
<tr>
<td>Milk</td>
<td>138,946</td>
<td>177,091</td>
<td>236,637</td>
<td>113,205</td>
<td>10,175</td>
<td>30,965</td>
<td>707,019</td>
<td>3,341,300</td>
<td>21.16%</td>
</tr>
<tr>
<td>Total</td>
<td>311,512</td>
<td>261,194</td>
<td>243,805</td>
<td>113,367</td>
<td>101,816</td>
<td>44,891</td>
<td>1,076,585</td>
<td>4,324,200</td>
<td></td>
</tr>
</tbody>
</table>

4.2.3 Key agricultural industries

The GMID region has four main irrigated farming industries, as follows.

**Dairy**

Dairying is the main water user in the region and is spread across the whole of the GMID and in 2004-05 used 56% of the available water. Prior to the drought the region represented the largest dairy region in Australia. Dairy farming in the GMID is highly reliant on irrigation water to provide its feed base at a cost that allows it to remain internationally competitive.

The region has provided a stable and consistent milk supply built on a reliable water supply which has seen all of the major milk processing companies in Australia developing a presence in the region. Due to milk’s perishable nature it also requires local processing into value added products.

The key companies that have key processing plants located in the region include:

- Murray Goulburn Cooperative (2 processing plants located at Rochester and Cobram with an additional plant at Kiewa that is outside this study region);
- Fonterra Milk Australia (2 processing plants located at Stanhope and Echuca); and
- Tatura Milk Industries (1 processing plant located at Tatura).

---

63 RMCG analysis – NVIRP business case 2009
Specialist processors not involved in direct milk supply but are value adding into dairy products produced within and outside of the region include:

- Nestle (1 plant located at Tongala); and
- Bega Cheese Limited (1 facility located at Strathmerton).

Companies that source milk from the region but process outside of the region include:

- Parmalat;
- National Foods/Dairy Farmers;
- United Dairy Power;
- Australian Consolidated Milk Pty Ltd (also supply milk to processing companies within the region); and
- True Organic Cooperative.

**Permanent horticulture**

The permanent horticulture in the region is highly diverse and is dispersed across the GMID but is more concentrated in the Shepparton and Swan Hill social catchments. More than half of the gross value of the Australian pear, nectarine, plum and peach crop is produced within the GMID, while the area also accounts for a significant value of the national apple and apricot crop.

There are numerous packaging facilities spread throughout the region with SPC being the major processor. SPC supports three key plants located in Shepparton, Mooroolbark and Kyabram.

Major olive orchards are located at Boort. They produce a significant proportion of Australia’s olive crop.

**Annual horticulture**

The major annual horticultural crop grown in the region is tomatoes, both fresh and processed.

There are processing plants located in Echuca and Girgarre with secondary processing in Shepparton and Echuca.
Mixed farming

Mixed farming enterprises prior to the drought had been a significant user of water. In season 2004-5 mixed farming enterprises used 36%\textsuperscript{64} of the water available.

Historically, mixed farming enterprises have been an important support industry to dairy providing both fodder and agistment.

4.2.4 Other key industries

Transport

The intensity of the agricultural production and processing in the region has seen the development of major transport businesses. Shepparton and Swan Hill have developed into major trucking hubs and throughout the region there are many transport companies operating local, state and national routes.

The region is well serviced by rail with three main lines providing both bulk commodity transport as well as passenger services. The three lines include:

- Tocumwal - Shepparton - Melbourne;
- Deniliquin - Echuca - Bendigo - Melbourne; and
- Piangle - Swan Hill - Bendigo - Melbourne.

Intensive livestock production

The two major intensive livestock industries are pig and poultry. The majority of the pig industry is located in the Echuca and Kerang social catchments with poultry mainly located in the Shepparton social catchment.

Water supply

Goulburn-Murray Water operates the irrigation distribution network and is Australia’s largest rural water authority. It is a major direct employer but will also engage local contractors to develop and maintain its extensive irrigation network.

Due to the population density and high number of rural communities, the urban water businesses are significant. The three urban water authorities servicing the region are Lower Murray Water, Coliban Water and Goulburn Valley Water. They are responsible for the supply of water to the urban communities in the region as well as providing wastewater management.

\textsuperscript{64} RMCG analysis – NVIRP business case 2009
Irrigation services

There is a significant irrigation services industry in the region that supports both the irrigation supply network but also the infrastructure on farm. Major businesses exist throughout the region that provide both ongoing maintenance of systems but also involved in the development and introduction of improved technology. Major irrigation supply business such as AWMA in Cohuna, Rubicon in Shepparton and Humes in Echuca are examples of important businesses located in the region servicing the local irrigation industry as well as supplying services outside of the area.

Tourism

The region has a very significant tourism industry that is primarily focused along the Murray River. It is of particular importance to the region especially to the communities directly located on the river from Cobram through to Swan Hill. Major river towns such as Yarrawonga, Cobram, Echuca and Swan Hill benefit from the attraction that the river provides and have major accommodation and tourist facilities.

Service industries

A range of Government and non-Government services are located within the larger urban centres in the region. These include public sector services such as heath, education, policing and support services, and privately owned businesses which include the retail sector and the agricultural services sector.

4.3 Water management, Government purchases and drought

4.3.1 Water management arrangements

Almost all of the water used for consumptive use in the area is from regulated systems. Unbundling of water entitlements occurred in July 2007 which saw the separation of traditional entitlements of water rights in districts and take and use licences on waterways into a water share (High reliability water share (HRWS) and low reliability water share (LRWS)), delivery share and water-use licences. Unbundling meant that each irrigator was allocated one HRWS and 0.48 LRWS for every ML of water entitlement they held.

The right to use, flow and control of surface and ground water are all governed under the Water Act 1989 (Vic).

Goulburn-Murray Water operates the irrigation distribution network and is Australia’s largest rural water authority.

A summary of surface water entitlements is presented in Table 4-3
Table 4-3. Summary of surface water entitlements.

<table>
<thead>
<tr>
<th>Entitlement Class</th>
<th>Number of Entitlements (GL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Reliability Water Share – Goulburn/Broken</td>
<td>977</td>
</tr>
<tr>
<td>Low Reliability Water Share – Goulburn/Broken</td>
<td>438</td>
</tr>
<tr>
<td>High Reliability Water Share – Vic Murray (excluding Lower Murray Water districts)</td>
<td>695</td>
</tr>
<tr>
<td>Low Reliability Water Share – Vic Murray (excluding Lower Murray Water districts)</td>
<td>291</td>
</tr>
<tr>
<td>Bulk Water Entitlements – Urban</td>
<td>114</td>
</tr>
</tbody>
</table>

Note: Table 4-3 does not include the surface water entitlements for Campaspe, Loddon, Ovens or Kiewa valleys. Entitlements include both gravity irrigation districts as well as river diverters.

4.3.2 Water recovery

There are a number of different initiatives that have been undertaken by Government to help restore the balance between consumptive use and environmental requirements prior to the release of the Guide to the proposed Basin Plan. Two such initiatives have been the Living Murray and Water for Rivers which have secured water for the environment.

In 2007 the Victorian Government launched the Northern Victorian Irrigation Renewal Project (NVIRP), which is aimed at modernising the GMID irrigation system as well as delivering additional water to the environment from the water savings generated. This represents a $2 billion investment and aims to recover long-term average annual water savings of 425 GL\(^{66}\), which will be shared between irrigators, the environment and Melbourne Water.

It is estimated that delivery system modernisation combined with the On-Farm Irrigation Efficiency program, will contribute approximately 158 GL of HRWS and 57 ML of LRWS\(^{67}\) to the environment from the Victorian Murray and Goulburn catchments.

In addition to the water savings investments, the government's Restoring the Balance in the Murray-Darling Basin program (buyback) has acquired approximately 254 GL of HRWS and 21 GL of LRWS\(^{68}\) from the Victorian Murray and Goulburn catchments.

---

\(^{65}\) Source: EBC consortium analysis based on information from Victorian water register (http://www.waterregister.vic.gov.au - accessed on 10/12/2010) and Goulburn Murray Water Bulk entitlement information.

\(^{66}\) NVIRP web page http://www.nvirp.com.au/\(^{66}\)

\(^{67}\) Source: EBC consortium analysis based on the Guide Appendix C and other cited sources, assuming pro-rata change across all entitlement classes, and consultation with MDBA.

\(^{68}\) Source: EBC consortium analysis based on the Guide Appendix C and other cited sources, assuming pro-rata change across all entitlement classes, and consultation with MDBA.
Savings generated from modernisation and investment in the On-Farm Irrigation Efficiency program will help bridge the gap between the current diversion limits and the sustainable diversion limits outlined in the Guide to the proposed Basin Plan.

4.3.3  Drought

The cumulative impact of successive years of drought has lowered the resilience of farmers and regional communities. The financial and mental capacity on farm has been drained and that has flowed through to communities in terms of reduced economic activity and a drop in confidence in the region. Managing the normal risks involved in agriculture on top of the recent very difficult operating environment is pushing many to the limits.

A prolonged period of drought has tested the norms and rules of thumbs that have helped farmers in their decision-making in the past. The level of uncertainty is high and impacting on the confidence to make decisions.

The lack of confidence in the farming sector flows through into the community. It has impacted on investment as people question the longer term future of the region.

**Dairy**

The dairy industry has been severely hit by the reduced water availability. Farmers have had to make major changes to their farming systems moving from a perennial pasture feed based system to annual crops and a higher reliance on bought in feeds (effectively substituting for irrigation water on their own properties). This change has increased the cost base and complexity of the farming system which some farms have managed, but many have not, resulting in a drop in farm numbers and milk production from the region.

Although farmers have adapted to the changed operating environment, the financial strain has been growing, indicating that for many there has been the implementation of short-term coping mechanisms rather than strategies that provide longer-term financial viability.

ABARE farm survey data in the period from 1999-00 to 2007-08 shows total debt growing by 41% from $367,000 to $518,000. The biggest driver has been the increased requirement for working capital, which has increased by 200% from $84,000 to $255,000 during this time. 69

Regional milk production has declined from over 3.0 billion litres in 2001-02 to 1.8 billion litres in 2009-2010. This has created implications for milk processing with reduced factory utilisation, changes in product mixes and retiring of different aspects of processing infrastructure70.

---

A Murray Goulburn milk processing facility at Leitchville closed in 2010 as a direct result of reduced regional milk flows.

**Horticulture**

Horticulture, unlike dairy, has no substitute for water and therefore was highly exposed to the extremely high temporary water prices experienced during the drought. SPC assisted farmers during the low allocation seasons through purchasing temporary water to help growers maintain plantings. This has only been a short-term strategy and there will be increased risk for the industry during periods of low water allocations and high temporary water prices.

The processing tomato industry declined from 320,000 tonnes in 2005 to 151,000 t in 2008\(^1\) as a direct result of reduced water availability as growers were unwilling to make the high cost investment to plant without security of water access. There has been some recovery since, in line with improved water availability, but the industry experienced a significant set back in the 2010-2011 season with the floods. It was estimated up to 100,000\(^2\) tonnes of the potential 220,000 tonne processing tomato crop was lost due to flooding that will have major financial implications for the affected farms.

**Mixed farming**

Mixed farming enterprises were able to be more opportunistic with their water use and although some small volumes were used to finish off crops they were a net seller of temporary water. This provided an added income stream that partially overcame the losses incurred through failed crops.

**Towns and communities**

The small to medium sized towns throughout the region have felt the impacts of the drought, as their economies are reliant on agricultural activity in their immediate area. The reduction in the “foot traffic” has impacted on town businesses reducing income and profitability. Local retail businesses in the smaller communities have been affected as they have limited options to replace the reduction in spend from the local community. Some have diversified but often that has come at the expense of other businesses in the town which have previously supplied the product or service.

A common strategy has been to scale down and “hang on” until the operating environment improves. This attitude applies not only to businesses that see a longer-term future but also to business owners at the end of their business cycle who are waiting for potential buyers for their business. Achieving true value for their business will not occur until profitability returns under more normal operating conditions.

---

\(^1\) RMCG (2009) TM09002: Strategic Plan (2010-2013) and Industry Development Needs Assessment Australian Processing Tomato Research Council Inc.

\(^2\) Community interviews for this study - 2011
Some businesses responded to the local decline in activity by expanding into other areas less affected by the drought and low water allocations. This has added some complexity to their businesses but has allowed them to maintain or even grow during the drought.

The drought impacts flow throughout the community. For example at Swan Hill College student numbers dropped from 1,100 in 2005 to 960 in 2010. A drop in student numbers affects subject choices and can lead to a second wave of reduced enrolments as parents potentially move due to lack of options or send children to larger centres (a snowballing effect). Lower student numbers then results in reduced infrastructure investment.

The financial strain as a result of a prolonged period of low water availability has been a major driver of the increasing physical and mental health issues observed in regional areas. Regional health services have and continue to struggle to meet the demand.

Drought impacts would be greater if it were not for government programs including:

- Support of farm businesses through exceptional circumstances (EC) that has included interest rate subsidies and income support;
- Modernisation works providing employment opportunities that has lessened the impact on contractors and local rural suppliers from the reduced demand from drought affected farms;
- Murray-Darling Basing Irrigation management grant ($20,000) that provided a stimulus to rural suppliers and contractors;
- Victorian government’s 50% shire rate subsidy for farms on EC support;
- Victorian government rebate on fixed water charges; and
- Commonwealth economic stimulus package.

The support provided has directly assisted farmers during this period but has also flowed through the community in terms of increased spend by the farmers themselves. Programs such as the school infrastructure investment as part of the Commonwealth’s stimulus package have also assisted in reducing the impact of drought and other economic shocks such as the global financial crisis on regional communities.

4.4 Baseline – the future without policy change

The ‘baseline’ is a description of the expected future for the towns and social catchments over the coming decade, if the current diversion limit for irrigation water
were left unchanged. The baseline is dynamic, not static: that is, there would continue to be variability in factors such as rainfall and commodity prices, and underlying trends would continue.

4.4.1 Permanent horticulture

A small growth is predicted but the current processing facilities will be maintained (SPC Shepparton/Mooroopna). The fruit industry is currently challenged by the high Australian dollar and its competitiveness with imports (both fresh and in the canning industry). Margins are tight but the major growers are committed. Continued rationalisation of farms will continue as smaller operators coming to the end of their business cycle will exit and their production output most likely will be absorbed by larger growers. There have already been high levels of investment in irrigation technology to improve water use efficiency and therefore only moderate gains are expected in the future.

4.4.2 Annual horticulture

There is growth potential in the processing tomato industry if the water environment is more stable. The scale of the growth will be dependent on the industries’ ability to compete with imports. The industry has a high uptake of technology such as subsurface drip and therefore there will only be moderate gains in water use efficiency in the future.

4.4.3 Dairy

A recovery of the dairy industry from 1.8 billion litres to 2.5 billion litres of milk (across the whole Murray Dairy Region) is predicted in the baseline case. Growth will come mainly from the expansion of current farms but also the reinstatement of former farms with a growth rate of 2-3% per annum. The market fundamentals remain strong with growing world demand for dairy products that will underpin the recovery. Dairy will continue to be the major water user in the region.

Growth will be slow as it will take time for numbers to recover (cows and people). A stable water environment should see the region return as a priority area for dairy investment, i.e., dairy is competitive with other dairy regions and attracts investment.

Dairy farmers showed a high level of innovation and ability to adapt during the drought and many of the lessons learnt will be implemented into the future. A higher focus on optimising the yield from irrigation water will continue and although perennial pasture will return as part of the feed base it is unlikely to return to levels seen pre-drought. Annual crops and perennial crops such as lucerne will make up more of the home-grown feed base of farms into the future.

Farms will continue to implement improved irrigation technology but efficient border check irrigation will continue to be an effective and appropriate technology.
employed on the majority of the soil types in the region. Underlying trends of increasing farm size and productiveness will continue.

Milk processors will achieve improved asset utilisation with increased milk production compared to current drought production levels. No new processing will be required but they will be growing in strength and achieving improved profitability and competitiveness in world markets.

4.4.4 Mixed farming

The baseline will see mixed farms recovering and recommencement of a contribution to feed supply for the dairy industry. They will continue to be more opportunistic users of water but longer term trends will continue with a gradual decline in water use by mixed farming operations as water moves towards higher value uses. Border check gravity irrigation will be the dominant irrigation method used.

4.4.5 Business sector

It is expected that the increased agricultural activity in the base case would regenerate the economic activity in regional communities, leading to post-drought restoration of profitability and reinvestment in businesses within the community. The number of businesses servicing the farm sector is expected to remain stable but returning to pre-drought levels of business activity and employment.

Improved profitability will increase the level of confidence of business owners and see reinvestment and a higher willingness to take on business risk. Buyers for businesses will also return providing exit options for those businesses owners who are at the end of their business cycle or wanting to look for different opportunities.

The medium to larger sized towns will recover in line with the major businesses within those towns. Increased employment opportunities will assist in retaining and potentially growing the population base within the townships that will in turn support the services and facilities within those communities.

Major centres such as Shepparton will retain a critical population mass that will allow them to build on alternative industries that are currently present such as education and health services. They will continue to leverage against this added strength to attract investment into the region.

Irrigation areas will always support a higher population base than dry land areas but there will be continuing trends of farm amalgamations and uptake of improved technologies that will see ongoing decline in the rural population base. This impact will be felt more in the smaller communities that do not have major businesses supporting employment within the towns. The rate of decline will be slow that will provide the communities time to adjust.
The smaller to medium sized communities such as Stanhope, Tongala, Strathmerton, Tatura, Kyabram, Rochester, and Girgarre that support food processing facilities will have a strong employment base that will provide added security to those townships.

4.4.6 Community services

There will continue to be challenges faced by the smaller rural councils to maintain the current level of services and infrastructure. They will need to be innovative in their approaches to meet future expectations of the community. Improved economic activity driven by increased output from irrigated agriculture will reduce the pressure and allow time for councils to continue to adjust.

Improved employment opportunities will retain and potentially attract families into the region allowing school enrolments to be maintained in smaller towns and grow in the larger towns. This will allow for greater subject choices and reduce the pressure on parents to look further afield to meet their educational expectations for their children. This will also aid in the retention and attraction of teachers to the region and allow communities such as Swan Hill to build on initiatives such as Deakin at your Door Step (A University offering in Swan Hill).

The improved economic conditions will lower stress related well-being issues experienced during the drought. However, rural health services will continue to be inadequate in the smaller towns unless there is significant government funding provided to re-establish these facilities. The shortage of doctors and specialist medical services especially in the western area of the region (Swan Hill and Kerang social catchments) will lead to people travelling to the larger regional centres. This will impact on the choice of retirement location by the elderly and will lead to further increased retail spending in larger regional centres.

4.5 Response to Basin Plan process

The community response to the Guide was one of frustration and anger which was reflected in the often very emotive responses that were seen at the public meetings when the Guide to the proposed Basin Plan was released.

The rural communities in the region had been struggling with the pressures of the drought and were in a vulnerable position. At the time of the release of the Guide there had been some optimism growing in the region with recent improved weather conditions. For many, the proposals in the Guide were seen as major set back at a time when things were finally seeming to turn around. Many saw the Basin Plan as a political drought that was being forced upon them just as they were coming out of the most severe natural drought in their working lifetime.

Managing the normal market and seasonal risks associated with agriculture is challenging enough for farmers, but when what is seen as a political risk was added, it pushed many to their psychological limits.
Strong views were expressed during the community interviews that there was no effective consultation with local communities in the development of the Guide. The engagement of local knowledge and expertise in the development of the Northern Region [Victoria] Sustainable Water Strategy was used as an example of how more acceptable outcomes could have been achieved.

The information presented in the Guide was also very difficult for many to understand. The Guide introduced new terminology such as current diversion limits and there was confusion about what was counted and what was not in terms water that had been delivered to the environment in the past (i.e. Water for Rivers, The Living Murray).

Interpreting the information in the Guide so that an individual irrigator could understand the likely impact to their entitlements and implications on their livelihood was very difficult. Subsequently people feared the worst and their concerns and anger grew with every newspaper headline.

Community members lacked confidence in the process and in the information presented such as the ABARE modelling of economic impacts. The seemingly very low long term impact on jobs and economic activity described by the ABARE modelling was seen by many as detached from reality that therefore put questions in people’s minds about other information presented in the Guide to the proposed Basin Plan.

### 4.6 Impacts of Reduced Water Availability

#### 4.6.1 Current diversions, and Guide proposals

The Current Diversion Limit and the 4000 GL and 3000 GL scenarios outlined in the Guide are shown below (Table 5-2). It is assumed there will be a mix of different reliabilities of water entitlements procured by Government in order to meet environmental requirements across the range of high and low rainfall years.
Table 4-4 Current diversion limit and ‘Guide’ proposals

<table>
<thead>
<tr>
<th>Region</th>
<th>Scenario</th>
<th>Current Diversion Limit (CDL)</th>
<th>GL</th>
<th>Guide reduction from CDL (%)</th>
<th>GL</th>
<th>Guide reduction in entitlements before modernisation &amp; before buyback</th>
<th>GL</th>
<th>GL</th>
<th>%</th>
<th>Entitlement type</th>
<th>GL</th>
<th>%</th>
<th>GL</th>
<th>GL</th>
<th>% of remaining entitlements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 BASE CASE</td>
<td></td>
<td></td>
<td></td>
<td>MODERNISATION TO DATE</td>
<td></td>
<td></td>
<td></td>
<td>MODERNISATION TO DATE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remaining CHANGE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Buy-back to date</td>
<td></td>
<td></td>
<td></td>
<td>Guide reduction in remaining entitlements after modernisation and after existing purchases</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vic Murray</td>
<td>4000</td>
<td>1656</td>
<td>592</td>
<td>36%</td>
<td>550</td>
<td>47%</td>
<td>86</td>
<td>137</td>
<td>32%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td>1656</td>
<td>442</td>
<td>27%</td>
<td>411</td>
<td>35%</td>
<td>86</td>
<td>137</td>
<td>18%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goulburn</td>
<td>4000</td>
<td>1593</td>
<td>593</td>
<td>37%</td>
<td>480</td>
<td>50%</td>
<td>72</td>
<td>117</td>
<td>291</td>
<td>HRWS component</td>
<td>72</td>
<td>117</td>
<td>169</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td>1593</td>
<td>442</td>
<td>28%</td>
<td>358</td>
<td>37%</td>
<td>72</td>
<td>117</td>
<td>169</td>
<td>LRWS component</td>
<td>72</td>
<td>117</td>
<td>169</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Broken</td>
<td>4000</td>
<td>14</td>
<td>6.3</td>
<td>45%</td>
<td>6</td>
<td>34%</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>HRWS component</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td>14</td>
<td>5.6</td>
<td>40%</td>
<td>5</td>
<td>30%</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>LRWS component</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>30%</td>
<td></td>
</tr>
</tbody>
</table>

4.6.2 Water sales to Government

The impact of the 4000 GL and 3000 GL scenarios outlined in the Guide would be buffered to some extent by the modernisation program (NVIRP) that is currently being implemented in the GMID. However, the two scenarios still would require significant volumes of entitlement to be purchased by the government to bridge the gap between the current diversion limit (CDL) and the new sustainable diversion limit (SDL).

Table 5-2 shows the volume of entitlement that is required to bridge the gap between the CDL to the SDL for the two scenarios.

It is assumed there will be a mix of both high and low reliability water shares procured by Government in order to meet environmental requirements across the

---

Note: EBC consortium analysis based on the Guide Appendix C and other cited sources, assuming pro-rata change across all entitlement classes, and consultation with MDBA.


Yield-unweighted entitlements, pro-rata based on use

Yield-unweighted entitlements. Source: MJA 2010


Yield-unweighted entitlements. Note this ‘gap’ may also be partially met through on and off-farm irrigation modernisation.

not always the same across entitlement type, even if pro-rata as other Government purchases have reduced 2010 entitlement
range of high and low rainfall years (this issue is discussed in Volume 4 of this study).

4.6.3 Farm level response

The scale of the reduction in the water available for consumptive use in the 3000 GL and 4000 GL was confronting to farmers. A high degree of concern and fear was expressed that the volume that will be required to meet the two scenarios will put the future of irrigation in the region at risk. The main driver of that concern was about the potential cost burden left on remaining irrigators to maintain the irrigation infrastructure in the region. The combination of a reduced volume of water delivered through the system and untargeted buyback may result in a “Swiss cheese” effect, potentially leading to the cost of irrigation water becoming prohibitive (this is discussed further in Volume 4 of this study).

Modernisation

Delivery Infrastructure

In December 2007 NVIRP, a state owned entity was established to implement Australia’s largest modernisation project. This represents a $2 billion investment and aims to recover long-term average annual water savings of 425 GL\(^1\) which will be shared between irrigators, the environment and Melbourne Water.

NVIRP is critically important for the future of the irrigation region as it will contribute additional water to the environment through the savings that will be made but will also provide a world class irrigation delivery system that helps secure the future of the irrigation industries in the region.

Currently the impact of the modernisation program varies across the social catchments which is related to the different stages of the roll out of the program. In areas that have seen works implemented it has provided a much needed stimulus for contractors, irrigation designers and irrigation suppliers in the absence of farm demand due to the drought.

Across the region individual farmers are taking advantage of the opportunities the modernisation program presents and it is providing them with the ability to lift their water use efficiency through improved water delivery and on farm works.

A component of the program is to connect as many irrigation properties as possible to a modernised backbone channel system which requires reconfiguration of the current channel supply network. Some communities consider that this is disenfranchising some irrigators who are concerned about their ability to connect to the system if they are not located on the backbone.

\(^1\) NVIRP web page http://www.nvirp.com.au/
**On farm**

There has been ongoing investment by irrigation farms in the GMID to improve their water use efficiency and they will continue to do so. The on farm irrigation efficiency program has provided some additional incentive for irrigators to upgrade current systems. Two delivery partners (Goulburn Broken Catchment Management Authority and the Australian Processing Tomato Research Council Inc.) were successful in the first round of the program securing funding of approximately $31 million for the region.

The continuation of the program will be important for the region as it provides water to the environment as well contributing to enhancement of the productivity of the region.

It is estimated that NVIRP, combined with the On-Farm Irrigation Efficiency program, will contribute approximately 158 GL of HRWS and 57 ML of LRWS to the environment from the Victorian Murray and Goulburn catchments.

**Buyback**

Irrigators within the GMID have been participating in the buyback program and up until November 2010 there has been a total of approximately 254 GL of HRWS and 21 GL of LRWS from the Victorian Murray and Goulburn catchments.

There are a range of drivers behind the decision to sell including:

- financial pressure to sell and retire debt;
- the opportunity to semi retire by selling water but remain on the farm;
- an opportunity to capitalise on the value of water entitlement and continue to operate by trading on the temporary water market; and
- an opportunity to capitalise on the value of water entitlement but buy back entitlement and continue to operate.

Due to the financial pressure placed on farms as a result of the drought, the communities’ view is that the majority of the water entitlements sold to the government has been from sellers under financial duress.

It is believed that there has been limited flow through of the proceeds of buyback to the community as a result of the sale of entitlements with the benefits of the sale residing mainly with the individuals selling. Buyback as a mechanism to bridge the gap between the CDL and SDL is viewed as “continuing the drought for regional communities”. The economic activity driven by that water is lost to the region with

---

82 Source: EBC consortium analysis based on the Guide Appendix C and other cited sources, assuming pro-rata change across all entitlement classes, and consultation with MDBA.

EBC, RMCG, Marsden Jacob Associates, EconSearch, Geoff McLeod, Tim Cummins, Guy Roth and David Cornish
limited additional benefits flowing through to the community from sale of the water to the government.

Major questions have been raised about the future of former irrigation farms that have had water entitlements sold. The practicality of conversion to viable dry land farms is challenged by:

- the need to demolish existing infrastructure and the cost of conversion from irrigation to dry land;
- heavy clay soils and low rainfall that represent a significant proportion of the irrigation area is marginal cropping land and more suitable to low intensity broad acre grazing; and
- having contiguous properties to deliver the required increased scale for viable dry land operations.

Many former irrigation farms are sitting idle and weed infested, as productive alternative uses have not been found.

Concerns are raised about the implications of the buybacks due to increased annual charges for irrigation delivery infrastructure and the temporary water market. Communities consider there is a real risk that price increases as a result of reduced water availability could threaten the viability and competitiveness of remaining irrigators.

Current non-targeted buyback is increasing community concerns about future irrigation system viability.

Changes to agricultural production – 4000 GL scenario

The loss of irrigation water from the region is expected to decrease the value of agricultural production from the region. The decline will not be a linear response to the level of Government water entitlement purchased. This will be due in part to:

- less productive farms selling water to the Government;\(^\text{83}\)
- a higher proportion of lower value water users (mixed farming) selling compared to higher value water users (horticulture);
- productivity gains achieved by remaining irrigators taking advantage of improved water delivery through modernisation and on farm irrigation upgrades; and
- some small dry land production gains from previously irrigated areas.

\(^\text{83}\) Although it should be noted this represents an opportunity cost insofar as it prevents that water being bought up by more productive, expanding farmers
The dairy industry and mixed farming operations will be most exposed to a reduction in the water available in the region. Permanent horticulture will generally retain entitlements and the volumes required most likely in the long term come from mixed farming then from the dairy industry.

Following is a summary of the likely impacts of reduced water availability for the scenarios proposed within the Guide.

**Permanent Horticulture**

Risk in horticultural businesses will be expected to increase due to the impacts of higher temporary water markets in low allocation years.

Larger modern horticulturalists are expected to retain entitlements and continue production (water will come from lower value agriculture).

The exit of farmers who are at the end of their business cycle in perennial horticulture will be accelerated

Larger enterprises will potentially make up for the retirements resulting in a small impact on total volumes.

Horticultural enterprises in the Swan Hill social catchment are more at risk due to a smaller volume of water available on the temporary water market (allocation market). This is expected to manifest itself in periods of low water allocation when supplementary water purchases are needed to maintain perennial plantings. Farms in the private diversion regions between Swan Hill and Robinvale have grown enormously in the last ten years. Some of these farms are therefore more reliant on the allocation market to meet their water needs than traditional district properties. There will be upward pressure on temporary water prices especially during dry periods, which will reduce confidence in industry investment and will result in some contraction, if temporary water prices become unaffordable, as occurred in 2007-08.

Large olive plantations cannot absorb higher costs of water delivery as they sell on a competitive international market. Therefore there could be a threat to the olive industry around Boort.

SPC assisted farmers during the low allocation seasons through purchasing temporary water to help growers maintain plantings. This has only been a short-term strategy and there will be increased risk for the industry during periods of low water allocations and high temporary water prices.

**Annual horticulture – processing tomatoes**

The processing tomato industry will be at risk due to increased input costs due to rising annual delivery cost and opportunity cost of owning water. The margins are small and costs cannot be passed on to buyers in an international market.
**Dairy**

Reduced water availability is expected to see a continued decline in milk production in the region from the already drought impacted production of 1.8 billion litres. A decrease to 1.2 from 1.5 billion litres would be anticipated due to:

- increased costs of water (both annual charges and temporary water prices) impacting on feed costs and the ability to remain world competitive in milk production;

- the exit rate potentially exceeding what would be expected with potential water available, as some farmers will feel that the new operating environment will be too difficult and exit. Many farmers have been “hanging on” for when things improve and with reduced total water available the view that the risks of continuing is too high. Additional exits can further impact on confidence especially if leading farmers exit;

- a loss of the critical mass of farmers that is needed to support the numerous industries that rely on the dairy industry. This loss of critical mass could also reduce the level of influence the industry has to ensure that the policy environment is balanced;

- a higher cost to existing farms for inputs and support services that need to be sourced from further afield; and

- increased costs due to the reduced ability to source fodder from mixed irrigation businesses that are currently in close proximity.

Total regional milk production is expected to drop by 1 billion litres to 1.3 billion litres compared to the base case of total regional production of 2.5 billion. Based on an average farm size of 1.6 million litres (245 cows) this equates to 625 to 810 less dairy farms in the region compared to the base case. Operating costs are estimated at 75% of gross income most of which is spent locally. Therefore the loss of 625 to 810 dairy farms in the region will reduce the dairy spend by $260 to $340 million (based on a farm gate value milk value of 35 cents per litre).

There is concern about the 4000 GL scenario taking the dairy industry over a tipping point in terms of level of processing in the region, number of farms and subsequent support industries.

**Mixed farming**

A large proportion of mixed farmers are expected to sell but some will remain. The small amount of water they retain will remain valuable to them for risk management.

---

84 Dairy 2010 Situation and Outlook Fact Sheet A snapshot of the Murray Dairy Region
In the longer term there will be a steady move of that water through to the higher value users. If water is worth $2400/ML the value to sell as allocation or sell entitlement permanently will be too high to justify use.

Opportunistic use of water by mixed farming enterprises will be unlikely if the cost of delivery goes up. The cost of keeping access to irrigation infrastructure only to use it now and then is expected to become unviable. If a farmer has access to water, it is expected to be used or access will become a significant cost burden to the business unless the sale of the temporary water entitlement can cover that cost.

**Changes to agricultural production – 3000 GL scenario**

The general trends and implications for the different agricultural industries for the 3000 GL scenario would be similar to the 4000 GL but of a slightly reduced scale. Permanent horticulture will tend to retain entitlements and therefore the impact on the value of agricultural output will be small. There would still be an increased level of risk within the industry especially during dry periods and that there would be an acceleration of the exits from those businesses at the end of their business cycle.

Annual horticulture, in particular the processing tomato industry, would still be exposed in the 3000 GL scenario. The anticipated increased cost of temporary water trade and annual water charges will put the industry at risk and unable to compete against lower cost imports.

Dairy and mixed farming would be the industries that will experience the highest impact. The 3000 GL scenario is expected to see a large proportion of mixed farms selling and the dairy industry potentially maintaining or dropping slightly from the current drought level of production (1.8 to 1.6 billion litres).

**Third Party Impacts – Water charges, farm supply costs and shire rates**

The GMID is undergoing Australia's largest modernisation project, and is aimed at providing a world class irrigation system that can underpin the future of the irrigated agricultural industries in the region. There are major concerns that with the reduction in water available for use through the system the subsequent increase in annual costs will not be sustainable for a number of irrigation businesses. Termination fees lessen the impact but interviewees consider that they are not considered to be adequate to offset the potential increase in costs to remaining irrigators (this is a complex issue that is discussed further in Volume 4 of this study).

NVIRP already involves a contraction of the irrigation network and there is a real risk that further rationalisation will need to occur beyond what is already proposed to achieve a viable system in a reduced water environment. A buyback process that is not targeted could also add further risk to the future viability of the system leading to a “Swiss cheese” effect.

Rationalisation of the number of businesses providing farm input supplies would mean many farmers will need to travel further to access farm inputs. The reduced
turnover by the remaining farm suppliers could lead to increased reseller margins to maintain viability.

Local Government rates would be expected to increase for remaining farm businesses following buyback and farmer exit. Shires have two forms of response to a reduced level of rate collection, either to maintain their rate income or to reduce services. A reduction in the level of services is expected to lead to a reduction in the maintenance of rural roads. Either strategy will impact on the remaining farm businesses.

4.6.4 Impacts to the local economy

Local Food Processing

Horticultural Processing

There could be some loss in potential growth in the canning fruit industry but the current processing facilities are likely to remain at the current level of throughput.

The tomato processing arm of SPC and Cedenco may be threatened.

Milk Processing

There is excess capacity in milk processing facilities in the region at the current level of production (1.8 billion litres), which would be utilised in the base case. However, if production continues to drop without an opportunity for recovery then there will be further pressure to rationalise milk processing facilities.

Eighty-five per cent of total milk produced in the region is processed by the three major milk companies with factories located within the region – Fonterra Australia, Tatura Milk Industries and Murray Goulburn Cooperative. Collectively they have 6 processing sites in the region (including the Murray Goulburn Kiewa site). Companies will change product mix in response to reduced milk volumes which has been happening in the drought to maximise returns. There is not a linear response to reduced milk volumes but continuation of reduced milk flows will likely to result in further rationalisation.

The key statistics in 2009-10 for the three main milk processors in the Murray Dairy Region include:

- $827 million invested in processing infrastructure (the three major processors only).
- farm suppliers with $4.2 billion invested on farm.
- added value product to the value of $1.5 billion ($826 million in export).

---

- 1455 full time employees and 250 casual employees
- $146 million paid to employees who live in the region.
- $405 million spent on consumables to process the regional milk supply.
- $64 million spent on repairs, maintenance and capital much of which is spent locally.

Milk processing is located in the medium to smaller towns. A factory closure in any of these towns will have major implications for the town and will also have a ripple effect through surrounding communities.

Milk processing rationalisation will have flow through affects to the businesses that supply inputs and services to the processing facilities. There will be implications for a whole range of businesses such as maintenance contractors, transport businesses, chemical suppliers, and engineering companies down to the local takeaway food store.

**Population and Employment**

The population across the region would be expected to decline with reduced water availability and production because:

- there is expected to be a loss of employment as farm numbers decline and former irrigated properties are aggregated into the remaining farming enterprises as farmers seek to operate more area with less labour;
- many of the non-retirement age farmers selling into the buyback are expected to leave the region (most with families) as they will not be able to access suitable employment within the region;
- some retirement age farmers selling into the buyback are expected to also leave the region but some will remain. They will locate to the larger centres with the services they require; and
- there is expected to be a loss of employment in other sectors of the community corresponding to declining revenue and demand for services including, but not limited to irrigation corporations, food processing, transport, specialist agricultural and engineering services, schools, councils and local businesses.

**Local businesses**

The farm supplies business sector would experience a percentage decline in sales similar to the percentage reduction in agricultural output as result of the drought that would put pressure on employee numbers. Large supply firms would be expected to contract to the larger regional centres.
The providers of farm supplies and capital items (motor vehicles, farm equipment) are expected to come under significant competitive pressure from similar businesses located in the regional centres. There is a growing tendency for the larger farm businesses to do more of their business in the larger centres where there is a greater availability of goods.

These changes would have a higher impact on the category 1 and 2 towns dependent on supplying the irrigated agriculture sector such as Cohuna, Rochester, Kyabram and Stanhope.

The food/supermarket sector would experience a decline in sales proportionate to reduction in population. The food sector has reported sales are directly proportional to population and business viability is linked to the proportion of ‘luxury’ items (non essential items such as bread and milk) sold.

The retail sector within the all the small towns would be expected to be severely impacted by a reduction in water availability, particularly the businesses such as clothing and giftware normally supported by ‘discretionary’ spending. The discretionary spend sector (retail trade, cafes and restaurants) are more exposed when farm businesses are under financial strain as has happened during the drought.

Many businesses that have continued to trade during the drought have done so in the expectation that the operating environment would improve in the future. The 3000 GL and 4000 GL scenarios would see similar or reduced levels of production relative to the drought particularly in the dairy and mixed farming industries. Many of the smaller townships within the region are highly dependent on these industries and therefore a continuation of the economic activity similar or worse than the drought will see a number of businesses unable or unwilling to continue.

There is a major concern in communities that the shift to a lower socio-economic grouping could increase markedly under the proposed scenarios, leading to a shift in retail demand and further reduction in the discretionary spending capacity of the community.

Businesses are currently suffering poor profitability. Increased buybacks will create a "continuing drought" for small businesses in towns. Many are expected to give up and sell their businesses, which is expected to lead to empty shops.

There would be downward pressure on the value of housing in small to medium sized towns. This can restrict peoples options in that they may not be able to afford to relocate (i.e. asset fixity), and if they lose their job they may have no alternative than to go on welfare benefits and stay in the town.

There is community concern that an increasing number of people from a lower socio-economic background are relocating to the small to medium sized towns within the region due to the availability of low cost housing. Community concerns
relate to perceived social issues, need for greater support services than are available, and declining economic activity. This trend is expected to increase as the local population declines in line with the scenarios proposed.

4.6.5 Different impacts across the region

The GMID covers a large area and the impacts of the 3000 and 4000 GL scenarios will vary across the different social catchments and also within those catchments. There are major differences in the sensitivity through the four social catchments in the GMID.

Sensitivity is greater if there is:

• no regional centre;
• no alternative industries – tourism, manufacture, health, education;
• no permanent horticulture (or permanent horticulture is small);
• large distances to irrigation sources (pressure on delivery infrastructure);
• limited diversification of the agriculture (% of agricultural activity driven by irrigation).

Of the four social catchments, the impact tends to be worse from east to west across the region. The Kerang social catchment is the most sensitive to a drop in water availability compared to the other three catchments in the region.

The key differences between the social catchments within the GMID are summarised below.

Shepparton Social Catchment

The major regional centre, Shepparton, provides a buffer as it is diverse economy. Shepparton itself will be buffered to some degree from reductions in agricultural output as it has a critical mass and alternative industries (health, education, retail) that draw from a catchment population base of 160,000. However it has grown on the back of irrigation. It has provided the infrastructure, and the population density which has resulted in the attraction of investment of the past. Agricultural supply industries and food processing still remain very important to the community and therefore impacts, although buffered will still be experienced.

Townships in close proximity to Shepparton can also benefit from some of the buffering that Shepparton has in the face of less agricultural activity as a result of reduced water availability. Townships within an approximately 50 km radius provide people with the attraction of living in a smaller community, lower cost of housing but having employment opportunities in the larger centre.
The majority of the permanent horticultural enterprises and associated processing facilities are located in the catchment. Only small reductions in permanent horticulture are forecast with the implementation of the plan and therefore the economic activity of the sector is unlikely to change greatly.

The intensity of irrigation and level of infrastructure is high. The practicality and viability of converting former irrigation properties to dry land enterprises due to this level of intensity is questionable.

The density of population due to the intensity of irrigation in the region has also resulted in a higher prevalence of smaller communities than some of the other social catchments within the region. These communities could be exposed to a reduction in the population base in their immediate vicinity.

Medium sized communities such as Nathalia, Numurkah, Tatura, Cobram and Yarrawonga are all sensitive to declining agricultural activity but they also have some buffering capability as well:

- Nathalia – Has a large Catholic school that draws from a large region, a new hospital, commutable distance to Shepparton, and a new nursing home and hospital. Retired farmers moving into town due to the attraction of health facilities;

- Numurkah – Riverland oilseed processing plant (not totally dependent on irrigated crops for supply) commutable distance to Shepparton and Cobram (workforce – 30% work in Shepparton, 30% work in Cobram, 30% work in Numurkah – source Numurkah real estate interview);

- Tatura – Milk processing, commutable distance to Shepparton, Tatura DPI centre, GMW head office;

- Cobram/Yarrawonga – Tourism with attraction of the Murray River and Lake Mulwala, Murray Goulburn milk processing facility in Cobram; and

- Smaller communities such as Undera, Stanhope, Wunghnu, Waaia, Katamatite, Katunga Strathmerton are much more sensitive as there are limited alternatives that can replace the people and economic activity provided by irrigated agriculture.

**Echuca Social Catchment**

The catchment is split between east and west by the Campaspe River. The easterly area has a higher density of irrigation development and population. The westerly area is less intensive with more dryland area dispersed amongst irrigation development.

There is significant food processing industry in Echuca, Rochester, Girgarre and Kyabram (support businesses to processing industries), and therefore the Echuca
social catchment will be severely affected if there is a flow on from agriculture to processing.

Echuca is buffered to some extent by tourism but has an agricultural and processing base. Tourism is beneficial to agriculture because it provides improved liveability for agricultural workers and it is relatively easier to attract workers.

Although Echuca is a prosperous looking town it suffers significant social disadvantage and has a housing shortage. Housing is expensive and there are very few houses for rent. An effect on employment would increase social disadvantage. The majority of other communities in the social catchment have limited buffer to a decrease in agricultural activity – Lockington, Tongala, Kyabram, Girgarre, Merrigum are all highly sensitive.

Rochester was impacted by the closure of the Campaspe irrigation district and recent floods. It does have some buffer with Murray Goulburn milk processing facility, a new hospital and good commuter rail transport to Bendigo.

The social catchment has some perennial horticulture around Kyabram and processing tomatoes grown throughout the catchment but dairy remains the most important industry.

**Kerang Social Catchment**

Kerang social catchment has high dependence on irrigated agriculture with limited diversity. The exposure to the dairy industry is high. Recent closure of milk processing facility in Leitchville impacted on local jobs and confidence (a direct consequence of reduced milk production through the drought).

Irrigation is less intensive with more dry land dispersed between irrigation areas. Soil types are poorer and productivity is lower from dry land areas (the soils need irrigation and production is of low value without it).

There is limited higher value irrigated industries such as permanent horticulture (the exception is olive plantations in Boort that have been critically important for that town).

The region has experienced significant permanent water entitlement sales prior to the commencement of the buyback program.

There is competition for farm resources and investment resources from larger centres that are within an hour’s drive (Echuca, Swan Hill and Bendigo).

The social catchment has been highly impacted by the recent floods. This will increase the vulnerability of communities to further shocks. The flood impacts are still unfolding, however the impacts are likely to take some time to fully understand. Some farms were flooded for a prolonged period of time and dairy production has stopped on many farms.
There is limited diversity and has seen scaling down of business operations due to drought or expanding outside of the region to retain business turnover. The population is older and is already having difficulty retaining young people within the community.

**Swan Hill Social Catchment**

There is a bigger influence of dry land agriculture (Mallee farming) in the local economy compared to other social catchments in the region. Irrigated horticulture is the second biggest contributor and is a very important industry providing a buffer against drought.

"The town used to close down in droughts before the development of the irrigated horticulture industry";

The irrigated horticulture is diverse – stone fruits, grapes and citrus. Other irrigated agricultural industries such as dairy and mixed farming have significantly reduced over the past decade and are only small contributors to the local economy.

Because of the long lasting drought and the recent floods, the town and its local agricultural industries are in a more difficult position. This will mean that a drop in water availability will have a greater impact. In the past, rice production north of the river has been a significant contributor to the town and therefore any implications on that industry will impact on the town even if horticulture may hold its value.

Swan Hill is further from Melbourne compared to other major centres in the region and therefore finds it harder to attract professionals to work in the town. It is not as attractive as Mildura in size and services – "we’re in a black hole – not large enough and too far from capital cities’.

The population of Swan Hill has stabilised around 10,000 for the last 20 years. There is fear a small drop in population will have a spiralling affect – the community believes they are on the brink of that spiral at the moment. The importance of that population threshold for sensitivity is consistent with the findings of this study.

Swan Hill has the lowest year 12 or equivalent attainment rate in the State but at the same time has a high uptake in apprenticeships. Any jolt to the economy is likely to be experienced at this level in the workforce.

Well-being issues are pronounced with high levels of suicide. This situation has led to a community program named “Healthy minds” to address the situation. Health workers are reporting that cases are more complex than in the past as further stressors are placed on families.
### 4.6.6 Social impacts

#### Community identity

The GMID has developed to be a significant food producing region. Communities have been developed based on the increased agricultural output and higher population base generated by the access to irrigation water.

Communities have a feeling that their contribution to the national economy and supply of fresh safe food is being overshadowed by the need for environmental sustainability. People within the communities are fully aware of the need to maintain the health of the river systems as their livelihoods depend on them. There is a strong feeling that the environmental stewardship that has been demonstrated in the regional areas is being overlooked and concern that the voting power of the urban populations will not provide a balanced outcome that is required.

#### Education

Quality of education and learning outcomes are linked to the size of schools and the socio-economic demographic of the community because:

- it is easier to attract teachers to a bigger centre/school;
- there is a greater commitment by the students to learn; and
- subject options available to students in small schools will be limited.

As the number of students coming from a lower socioeconomic base increases, the quality of education for remaining students appears to decrease, as community members advise there appears to be less commitment by the students, and teachers need to spend a greater proportion of time with the students from lower socioeconomic backgrounds who are less committed or have a poorer grasp of the basic principles taught in earlier years of their education.

This change and the decline in student numbers in some schools is making recruitment of teachers difficult. Adoption of the 3000 GL and 4000 GL scenarios will compound this trend. Attraction to the medium sized and smaller communities will be more difficult and communities such as Swan Hill that are located further away from capital cities will be more vulnerable.

Shepparton, with a larger population base and the presence of education institutions such as La Trobe University, University of Melbourne and Goulburn Ovens Institute of TAFE, provides choices and a higher ability to retain and attract students to the area. The attraction will often come at the expense of surrounding communities.
Demographic change

Employment opportunities within the region outside of the major towns are highly dependent on irrigation and the ability to retain young people is challenging. When a young person leaves the area to pursue education or other employment opportunities, they are unlikely to return. The region's irrigation farming community has tended to have an older average age, is reducing in size and having continued dependency on agriculture as the primary industry.

There will continue to be an aging population as older residents stay in the region and younger residents migrate to seek suitable employment. This is expected to particularly be the case for the small to mid sized category 1 towns in the region (Cohuna, Kerang, Boort, Nathalia, Numurkah). Echuca, Swan Hill, Cobram, and Shepparton will have a stronger attraction to retain younger people with improved employment opportunities and the general facilities and services available in the towns.

The trend towards lower housing costs due to an increase in properties for sale is expected to attract lower socioeconomic migrants to some towns in the region.

Farmer mental health

The continued pressures of the drought and financial strain on families have been worsening which is impacting on family relationships. This is resulting in family breakups and higher risk taking in children (resulting in, for example teenage pregnancies). Overall well-being is considered to be extremely poor ranging from low level anxiety to severe depression and cases of self harm.

Health workers reported that cases that are being presented are more complex and taking more time with family break up, depression, gambling, drug taking, self harm all presenting in the one case. This is putting pressure on services and ability to move to the next client.

Rural people can be more vulnerable as there is often a generational connection to the land. There is a high sense of failure if forced from the land increasing the levels of anxiety and depression as a result. The strong connection to the land will often see farmers make decisions about staying on the land at the detriment to their own and their family's health and well-being.

The fragility of the rural communities is expected to be tested in both the 3000 and 4000 GL scenarios.

The health sector will continue to come under increasing pressure to deal with the growing decline in people’s well-being. Communities report that the drought combined with the uncertainty created by the Basin Planning process has lead to a significant proportion of the farming community suffering from anxiety and depression. This level is expected to increase with the adoption of the scenarios proposed. The health services currently available within the social catchments are...
inadequate to deal with this level of demand, particularly with the low availability of general practitioners in the smaller communities.

Local government services

The sensitivity and resilience of the local government services will vary across the region, however there will be increasing pressure on all councils to maintain current services and infrastructure if the economic output of the region declines. The value of land is linked to its productivity and therefore if productivity declines then land value will decline. This is expected to have an impact on shire revenue and local government will either increase rates or reduce services.

This would lead to a reduced capacity to deliver services resulting in more pressure on the more discretionary services – do they keep servicing local swimming pools, maintaining the local hall or library services? Reduction of such services reduces the liveability of rural communities and also can have potential social implications. For example the public pool in small towns is often one of the few recreational activities for young people – what do they do if it is taken it away?

4.7 Community resilience and adaptive capacity

All of the communities within the region have shown a high degree of resilience and proven ability to adapt to a changing environment. However, there are limitations to how far communities can go to make up the gap between what they will lose in economic activity as a result of reduced water availability, to gains they might make through adaptation and pursuit of alternative industries.

All of the local shires are active in looking for alternative industries and strategies to attract new investment into their regions. This will continue but it is acknowledged that irrigated agriculture provides the economic engine for the region and is the basis of the regional prosperity.

The region has a very significant tourism industry that is primarily focused along the Murray River. It is of particular importance to the region especially to the communities directly located on the river from Cobram through to Swan Hill. Major river towns such as Yarrawonga, Cobram, Echuca and Swan Hill benefit from the attraction that the river provides and have major accommodation and tourist facilities. Tourism provides some buffering affects to those towns, but it is considered that further enhancement of the tourism opportunities will not replace the lost economic activity that will result with a reduction in water available to irrigation under the 3000 GL and 4000 GL scenarios.

There are other industrial opportunities being investigated including solar and natural gas for the west of the region but there are no firm plans in place. Alternative industries need a genuine reason for being able to operate in a region with demonstrated competitive advantages for doing so. Any industry that requires
inducements or subsidies to set up and operate is not expected to provide the long-term viable alternatives that are required.

Strong views were expressed by members of the community that continued investment in irrigation infrastructure both in the delivery system and on farm to achieve water savings needs to have the highest priority. Productivity in the region can be enhanced while at the same time delivering water to the environment. This will help maintain the economic base in the region and allow for rural communities to prosper.

4.8 Minimisation of impacts

The main strategies that were discussed by regional communities that would minimise the impacts of reduced water availability include:

- continued and increased investment in irrigation infrastructure both in the delivery system on farm to generate water savings as well as enhancing the productivity of the region;
- strategic targeted buyback to ensure the irrigation system viability into the future;
- engineering works for management of environmental water to help reduce the required volume of water required but still achieving the required environmental outcomes;
- increased use of local knowledge to help develop improved outcomes. The development of the Northern Region Sustainable Water Strategy was an example of a process that has delivered community acceptable outcomes; and
- development of management strategies that would allow for trading back environmental water to the irrigators during dry periods.

These issues are discussed in detail in Volume 4 to this study.

In addition, within the region people suggested:

- community infrastructure investment – e.g. schools, hospitals to enhance the liveability of regional communities helping retain the population base; and
- improvement of opportunities for education – for example, in the Swan Hill social catchment there is a initiative that brings University education closer to communities through a program called Deakin at your door step”. This is a collaborative project with the local TAFE and Deakin University to provide greater opportunities for rural students.
5 Loddon

5.1 Overview

The Loddon region extends from the southern edge of the Murray-Darling Basin near Trentham to Kerang in the north. The water used for irrigation is pumped directly from the river.

Water from the Loddon catchment also provides a supplement to the Goulburn Murray Irrigation District (GMID) via the Loddon River and Waranga western channel. This use is considered part of the Goulburn-Murray valleys for the purposes of this report.

5.1.1 Social Catchments

Table 5-1 Communities within the study region

<table>
<thead>
<tr>
<th>Social catchment</th>
<th>Towns</th>
<th>Population</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bendigo</td>
<td>Greater Bendigo</td>
<td>100,000</td>
<td>Large regional centre with range of major industries, reasonably insulated from changes to irrigation</td>
</tr>
<tr>
<td></td>
<td>Bridgewater</td>
<td>400</td>
<td>Category 1 or 2 - Small rural town west of Bendigo. Dependent on dry land and irrigated agriculture, tourism on the river.</td>
</tr>
<tr>
<td></td>
<td>Newbridge</td>
<td>470</td>
<td>Category 1 or 2 - Small rural town west of Bendigo. Dependent on dry land and irrigated agriculture.</td>
</tr>
</tbody>
</table>

Irrigation in the Loddon catchment only affects a small area to the west of the Bendigo social catchment.

The towns of Bridgewater and Newbridge are located on the Loddon River. They are situated close to the City of Bendigo and therefore many services are purchased in Bendigo.

5.1.2 Primary Irrigated production

Loddon diverters

Irrigated production is from diversions from the Loddon River and used directly through farmer-owned infrastructure to the farm. Agricultural production is mainly mixed farming producing lucerne hay, or grazing cattle or sheep, with some wine grape production. Lucerne hay is sold to either dairy farmers or horse owners. Markets are located both close to the source and throughout Australia.

Around 500 ML is used for intensive potato production at the southern end of the catchment. This is regulated by a small storage at Newlands.

Source: ABS National Regional Profiles Database 2004-08
5.1.3 Drought

Allocation of water during the drought was zero on the Loddon system. Some irrigators have some access to ground water which has helped them maintain production, however most diverters have been severely affected by drought through not having irrigation water and their dry land farming being severely affected.

5.1.4 Baseline

In the absence of the Basin Plan, the Loddon diverters would restore their irrigation infrastructure and re-sow lucerne pastures.

Wine grape production has been severely affected by drought. The unreliability of irrigation water in supply and quality has left some doubt about depending on irrigation from the river. This may lead in the long term to wine grape production moving away from the Loddon River.

5.1.5 Impact of reduced water availability

Mixed farming production will be reduced proportionately to the buyback. Farmers who sell water entitlement may eventually need to increase farm size as dryland farming becomes a greater proportion of their enterprise, in order to remain viable.

5.1.6 Minimising Impacts

Buyback by the Commonwealth of low reliability water rather than high reliability water would minimise impacts across the region as a whole.

5.2 Background

5.2.1 Introduction to region and social catchments

The Loddon region extends from the southern edge of the Murray-Darling Basin near Trentham to Kerang in the north. The water for irrigation is pumped directly from the river.

Water from the Loddon catchment also provides a supplement to the Goulburn Murray Irrigation District (GMID) via the Loddon River and Waranga western channel. This use is considered part of the Goulburn-Murray for the purposes of this report.

There is one social catchment within the irrigated area of the Loddon region. Social catchments in the region are shown in Figure 1-3.

Bendigo Social Catchment

The Bendigo social catchment includes the city of Bendigo (Greater Bendigo City Part A SSD) with a population of approximately 90,000 people, and the surrounding peri-urban area of Greater Bendigo – Part B (SLA) with approximately 12,000
people. The Greater Bendigo Part B SLA includes approximately 146,000ha of agricultural land. Total value of agricultural production (2006) was approximately $63 million.

The Loddon diverters have little impact on the Bendigo social catchment. The social impact is important in the small towns of Bridgewater and Newbridge. Bridgewater and Newbridge are located to the west of the Bendigo social catchment. Along the Loddon River are small towns such as Eddington and Serpentine. They are highly dependent on agriculture. The major regional city of Bendigo (population 90,000) is the economic centre of the social catchment and Bendigo is important to Bridgewater and Newbridge.

The medium-sized urban centre of Castlemaine is to the south East of Bridgewater and Newbridge.

The city of greater Bendigo is not reliant on irrigated agriculture, however the prosperity of agriculture within 150 km radius of Bendigo is important to the Bendigo economy. Major poultry and pig farming industries have grown within the social catchment. These industries are reliant on a guaranteed water supply.

The irrigation districts to the north of Bendigo have an impact on Bendigo. Bendigo is the main shopping city for much of the western part of the Goulburn Murray Irrigation District (GMID), and the prosperity of Bendigo is potentially affected to an extent by the MDB plan in the GMID.
Figure 5-1. Social catchments in the Loddon, showing relative vulnerability of towns to reduced irrigation.
N.B. The small towns along the Loddon River are not shown in Figure 5-1. The towns to the north along the Murray River are discussed in the Goulburn Murray report (chapter 3.1).

5.2.2 Irrigation in the region

The current surface water diversion limit for the irrigation valleys of the Basin is shown in Figure 5-2.

Figure 5-2. Current diversion limits. The Loddon is the seventh smallest irrigation region diverter in the Basin.57

Regulated diversion from the Loddon River consists of 21 GL of high reliability supply and 7 GL of low reliability supply.

Water from the Loddon catchment also provides a supplement to the Goulburn Murray Irrigation District (GMID) or 88 GL via the Loddon River and Waranga western channel. This use is considered part of the GMID for the purposes of this report.

5.2.3 Key agricultural industries

Lucerne is the significant crop, grown in rotation with oats, hay and canola. The racing industry is the main buyer. Yields are about 12 tonnes/hectare, with a farm gate price of $250/tonne – i.e. $3,000 per hectare.

Potatoes are supplied to McCains for processing in Ballarat or the fresh market in Melbourne.

5.2.4 Service Industries

Bridgewater has a significant rural produce store, a large fertiliser distributor, a successful winery and water skiing is very important for tourism in the summer months.

A range of Government and non-Government service are located within the larger urban centres of Bendigo and Castlemaine. These include public sector services such as health, education, policing and support services and privately owned businesses which include the retail sector and the agricultural services sector.

5.2.5 Tourism

The Loddon River is important for tourism for fishing, skiing, and camping.

5.3 Water Management and Drought

5.3.1 Water Management Arrangements

There are around 200 diverters with licences of 23GL located between Newlands in the top of the catchment and Fernihurst in the north. There are many sleeper and dozer licences.

The Loddon diversions are managed by Goulburn Murray Water.

5.3.2 Drought

The Loddon catchment was severely affected by drought. Many irrigators had access to ground water which was also affected by drought. Most irrigation farms are also large dry land farms and although the dry land proportion of the farm was also affected by drought, the farm was still able to operate. The drought meant lucerne was not irrigated and therefore production was reduced.

The drought had a devastating impact on wine grape production. Yields were reduced and some vines were dried off. This was accompanied by a contraction in the sector.

5.4 Baseline – the future without policy change

The ‘baseline’ is a description of the expected future for the towns and social catchments over the coming decade, if the current diversion limit for irrigation water were left unchanged. The baseline is dynamic, not static; that is, there would continue to be variability in factors such as rainfall and commodity prices, and underlying trends would continue.

5.4.1 Loddon diverters

The Loddon diverters are looking forward to a return to normal rainfall and anticipate good years of commodity prices. They consider their irrigated land important to their
farm business and intend to re-sow lucerne and eventually expand production. Some upgrade of infrastructure is required, however they haven’t lost confidence in their irrigation supply despite a number of years without any irrigation water.

The Loddon supply is unreliable for permanent planting of horticulture and therefore expansion is unlikely. Water quality is a concern for horticultural production.

Higher in the catchment there is potential for high value horticultural crops such as pyrethrum.

5.5 Response to Basin Plan process

There is a lot of anger around the *Guide* and a high level of uncertainty about the future due to the *Guide*, the cumulative negative economic and social impacts of drought and the 2011 floods.

Farmers during the consultation expressed a feeling of loss of control of their destiny due to a combination of drought and the Basin Plan.

5.6 Impacts of Reduced Water Availability

5.6.1 Water Procurement by Government

The *Guide to the proposed Basin Plan* proposed a reduction from the current diversion limit of between 12 GL and 11 GL, which would reduce licenced diversions (i.e. the 115 GL of current licenced diversions) by 36 – 41% (Table 7-2). To date, 3 GL has already been purchased, so under the *Guide*, further buybacks (or modernisation) of between 8 and 10 GL would be envisaged.

*Table 5-2. Current diversion limit and ‘Guide’ proposals.*
### 5.6.2 Farm Level Response

**Irrigated production**

Water would be most likely to be purchased from sleepers and dozers and producers growing low value agricultural products. Therefore the reduction in value of irrigated production would be likely to be low in the early stages of buyback.

**Modernisation**

Modernisation options are minimal.

**Buyback**

Irrigation farmers on the Loddon River are large dryland farms with a small area of irrigation. This small area gives them the ability to sell lucerne or finish off lambs or cattle. For example, one farmer interviewed gains 60% of his income from the 20 to 30% of his land that is irrigated. The irrigated area of the farm changes the farming

---

89 Yield-unweighted entitlements, pro-rata based on use
90 Yield-unweighted entitlements. Source: MJA 2010
92 Yield-unweighted entitlements. Note this ‘gap’ may also be partially met through on and off-farm irrigation modernisation.
93 not always the same across entitlement type, even if pro rata as other Government purchases have reduced 2010 entitlement

---

<table>
<thead>
<tr>
<th>Region</th>
<th>Scenario</th>
<th>Current Diversion Limit (CDL)</th>
<th>Guide reduction from CDL to SDL²⁸ (average)</th>
<th>Guide reduction in entitlements before modernisation &amp; before buyback²⁹</th>
<th>Modernisation ‘bridging the gap’ on and off farm, to 2010³⁰</th>
<th>Buy-back to date³¹</th>
<th>Guide reduction in remaining entitlements after modernisation and after existing purchases³²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>GL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entitlement type</td>
<td>GL</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entitlement type</td>
<td>GL</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entitlement type</td>
<td>GL</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loddon</td>
<td>4000</td>
<td>95</td>
<td>43 45%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>HRWS component</td>
<td>9 41%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% of remaining entitlements</td>
<td>36%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>LRWS component</td>
<td>3 41%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% of remaining entitlements</td>
<td>36%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>Goulburn supplement (assume HRWS)</td>
<td>36 41%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% of remaining entitlements</td>
<td>28%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>3000</td>
<td>95</td>
<td>38 40%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>HRWS component</td>
<td>8 36%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% of remaining entitlements</td>
<td>31%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>LRWS component</td>
<td>3 36%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% of remaining entitlements</td>
<td>31%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>Goulburn supplement (assume HRWS)</td>
<td>32 36%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GL</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% of remaining entitlements</td>
<td>22%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
system. Without irrigation these farms would need to expand their dry land area by around five to eight times their irrigated area. Therefore the price at which farmers are prepared to sell their water is dependent on the value of dry land. Farmers would need to be able to sell their water and buy dry land to replace it. Farmers in interviews considered water would be tightly held.

“Water (per ML) would have to be 2-3 times the price of land (per acre) to justify selling it. It doesn't make sense to sell water (and then buy land) at the current prices.” – Irrigation farmer

Changes to agricultural production

Irrigated production would be reduced to a smaller number of high value users. These would be wine grape growers and some lucerne producers.

Third Party Impacts – Water charges, farm supply costs and shire rates

There is concern amongst potato growers high up in the catchment about water infrastructure pricing and buybacks making irrigation unviable as there is a small number of irrigators and a critical mass is required to keep the system going. As water is highly valued, however, potato growers are unlikely to be sellers.

5.6.3 Impacts to the local economy

Local Processing

The local processing is of wine grapes. It is uncertain whether buybacks would affect the future of the wine industry as there is a small number of vineyards and the impact will depend on the decisions made by a small number of business owners.

Population and Employment

Population in the Bendigo social catchment is unlikely to be affected. Bendigo has less dependence on agriculture, and is a category 4 town (see section 1.1).

The towns of Bridgewater and Newbridge will recover more slowly from drought. Bridgewater would grow despite the buyback, however both towns are likely to be affected through lower local business, decreased population and employment.

5.6.4 Social impacts

Community identity

Farmers during the consultation expressed a feeling of loss of control of their destiny. This is due to a combination of drought and the Basin Plan.

The communities of Bridgewater and Newbridge will be affected. The football club numbers have been affected by drought and there is a concern this will continue with buybacks.
Education

There is likely to be a minimal impact on education.

Demographic change

There is likely to be a minimal impact on the demographics of the social catchment, however there would likely be local impacts of some farmers leaving farming after selling their water entitlements to the Commonwealth.

Local Government Services

The Loddon Shire is concerned about the future of small towns, however recognises Bridgewater and Newbridge are dependent on Bendigo, so the council is encouraging linkages to Bendigo. For example, these towns are becoming residential towns for Bendigo workers.

5.7 Community Resilience and Adaptive Capacity

5.7.1 Bendigo Social Catchment

The Bendigo social catchment contains a large, diverse economy. It is relatively resilient to the impact of reduced irrigation, however the impacts if the proposals as set out in the Guide were implemented would be likely to be significant and long term due to the impact on agricultural industries throughout the GMID.

The Loddon catchment irrigators have a small impact on the city of Bendigo. However, the future of the small towns along the Loddon River is likely to be threatened if proposals similar to those in the Guide are implemented. They would be likely to decline to the scale of towns in the dry land areas, or would overcome the impacts by attracting residents to live in the towns and commute to Bendigo for work.

5.8 Minimisation of Impacts

Buyback of low reliability water rather than high reliability water by the Commonwealth would minimise impacts across the region as a whole.
6 Campaspe

6.1 Overview

The Campaspe region extends from the southern edge of the Murray-Darling Basin near Woodend in Victoria to the Murray River at Echuca in northern Victoria. The areas of interest to this study were three groups of water users in the community:

- Campaspe diverters from the Campaspe river south of Lake Eppalock;
- rural water users in the Coliban system located around Castlemaine, Harcourt and Bendigo; and
- urban water users in the Coliban water system located primarily in Bendigo.

Water from the Campaspe catchment provides a supplement to the Goulburn Murray Irrigation District (GMID) via the Waranga Mallee channel near Rochester and irrigation water to the Campaspe irrigation district around Rochester. These uses for the purposes of this project are considered part of the GMID, and addressed in the Goulburn and Murray section of this report (chapter 3.1).

6.1.1 Social Catchment

Bendigo

The Bendigo social catchment is dominated by the City of Bendigo. A number of smaller towns are affected by irrigation in the Campaspe catchment, in particular Elmore and Goornong.

The towns of Bridgewater and Newbridge have been included as they are in the Bendigo social catchment but are in the Loddon catchment. They are discussed in the Loddon catchment report (chapter 4.1).

6.1.2 Irrigated primary production

Campaspe diverters

Irrigated production is from diversions from the Campaspe River and used either directly or pumped through farmer owned infrastructure to the farm. Agricultural production is mainly mixed farming producing lucerne hay, or grazing cattle or sheep, with some wine grape production.

Lucerne hay is sold to either dairy farmers or horse owners. Markets are located both close to the source and throughout Australia.
Coliban rural users

Irrigated production is highly varied from high value horticulture, stock water in intensive pig and poultry production, to very low value agricultural uses on rural residential properties.

6.1.3 Drought

Campaspe diverters had zero allocation and some access to ground water during the drought.

In the Coliban rural system, significant agricultural users had a 30% allocation. Other rural users on the Coliban system had zero allocation.

Coliban urban users had severe water restrictions during the drought. A pipeline was built from the Goulburn irrigation supply to Bendigo during the drought to secure Bendigo’s water supply.

6.1.4 Baseline

The Campaspe diverters would restore their irrigation infrastructure and re-sow lucerne pastures.

Modernisation of the Coliban rural system would enable savings to be gained for the Coliban urban system.

There is expected to be an expansion of intensive industries and horticulture.

6.1.5 Impact of reduced water availability

There will be a threat of closure of the farmer owned schemes involving Campaspe diverters.

Bendigo water supply will require further purchases from the Goulburn system and ongoing pumping of water to supplement the urban supply.

Ultimately Bendigo’s water supply could be considered expensive and uncompetitive with other regional cities.

6.1.6 Minimising Impacts

The impact on the Campaspe catchment could be minimised by:

• purchase of low reliability water from Campaspe diverters or buybacks to the 3000 GL limit;
• modernisation of the Coliban rural system to achieve water savings; and

• purchase of water from the Goulburn system rather than the Campaspe system. This would eliminate the likely cost of pumping water from the Goulburn system in the future for Bendigo’s urban supply.

6.2 Background

6.2.1 Introduction to region and social catchments

The Campaspe region extends from the southern edge of the Murray-Darling Basin near Woodend in Victoria to the Murray River at Echuca in northern Victoria. The areas of interest to this study were three groups of water users in the community:

• Campaspe diverters from the Campaspe river south of Lake Eppalock;

• urban water users in the Coliban water system located primarily in Bendigo; and

• rural water users in the Coliban system located around Castlemaine, Harcourt and Bendigo.

Water from the Campaspe catchment provides a supplement to the Goulburn Murray Irrigation District (GMID) via the Waranga Mallee channel near Rochester and irrigation water to the Campaspe irrigation district around Rochester. These uses for the purposes of this project are considered part of the GMID.

There is one social catchment within the irrigated area of the region.

Bendigo Social Catchment

The Bendigo social catchment includes the city of Bendigo (Greater Bendigo City Part A SSD) with a population of approximately 90,000 people, and the surrounding peri-urban area of Greater Bendigo – Part B (SLA) with approximately 12,000 people. The Greater Bendigo Part B SLA includes approximately 146,000 ha of agricultural land. Total value of agricultural production (2006) was approximately $63 million.
## Table 6-1 Communities within the study region

<table>
<thead>
<tr>
<th>Social catchment</th>
<th>Towns</th>
<th>Approximate Population(^{94})</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bendigo</td>
<td>Greater Bendigo</td>
<td>100,000</td>
<td>Category 4 large regional centre with range of major industries, reasonably insulated from changes to irrigation</td>
</tr>
<tr>
<td></td>
<td>Castlemaine</td>
<td>7000</td>
<td>Category 2 medium sized rural town. Close and well connected to Melbourne.</td>
</tr>
<tr>
<td></td>
<td>Kyneton</td>
<td>6000</td>
<td>Category 2 Medium sized rural town. Close and well connected to Melbourne.</td>
</tr>
<tr>
<td></td>
<td>Harcourt</td>
<td>400</td>
<td>Small rural town north of Bendigo. Dependent on dry land and irrigated agriculture</td>
</tr>
<tr>
<td></td>
<td>Goornong</td>
<td>250</td>
<td>Small rural town north of Bendigo. Dependent on dry land and irrigated agriculture</td>
</tr>
<tr>
<td></td>
<td>Elmore</td>
<td>650</td>
<td>Category 1 small rural town between Bendigo and Echuca. Dependent on dry land and irrigated agriculture</td>
</tr>
<tr>
<td></td>
<td>Bridgewater</td>
<td>400</td>
<td>Small rural town west of Bendigo. Dependent on dry land and irrigated agriculture. (In the Loddon catchment)</td>
</tr>
<tr>
<td></td>
<td>Newbridge</td>
<td>470</td>
<td>Small rural town west of Bendigo. Dependent on dry land and irrigated agriculture. (In the Loddon catchment)</td>
</tr>
</tbody>
</table>

The Bendigo social catchment is located in the centre of the Campaspe catchment. The social catchment contains the major urban centre of Bendigo (population 90,000), and medium sized urban centre of Castlemaine.

The city of greater Bendigo is not reliant on irrigated agriculture, however the prosperity of agriculture within a 150 km radius of Bendigo is important to the Bendigo economy. Major poultry and pig farming industries have grown within the social catchment. These industries are reliant on a guaranteed water supply.

The Harcourt apple-growing area is very important for both high value agricultural production and tourism.

The irrigation districts to the north of Bendigo have an impact on Bendigo. Bendigo is the main shopping city for much of the western part of the Goulburn Murray Irrigation District (GMID), and the prosperity of Bendigo is potentially affected to an extent by the MDB plan in the GMID.

---

\(^{94}\) Source: ABS National Regional Profiles Database 2004-08
Figure 6-1. Social catchments in the Campaspe, showing relative vulnerability of towns to reduced irrigation.
6.2.2 Irrigation in the region

The current surface water diversion limit for the irrigation valleys of the Basin is shown in Figure 6-2.

Figure 6-2. Current diversion limits. The Campaspe is the eighth smallest irrigation region diverter in the Basin.

Three groups of water users are in the community:

- Campaspe diverters from the Campaspe river south of Lake Eppalock;

- rural water users in the Coliban system located around Castlemaine, Harcourt and Bendigo; and

- urban water users in the Colban water system located primarily in Bendigo.

Water from the Campaspe catchment provides a supplement to the Goulburn Murray Irrigation District (GMID) via the Waranga Mallee channel near Rochester and irrigation water to the Campaspe irrigation district around Rochester. These uses for the purposes of this project are considered part of the Goulburn-Murray (chapter 3.1).

Campaspe diverters

Lucerne is the significant crop, grown in rotation with oats, hay and canola. The horse racing and breeding industry is the main market.

---

Average lucerne yields are about 12 tonnes/hectare, with a farm gate price of $250/tonne – i.e. $3,000 per hectare.

There are a few high value enterprises including wine grapes.

**Coliban rural users**

Irrigated production is highly varied from high value horticulture, stock water in intensive pig and poultry production, to very low value agricultural uses on rural residential properties.

Bendigo’s peri-urban region includes a mixture of rural residential, small-scale irrigation, apple growers, and other intensive uses (pigs, poultry).

Harcourt produces approximately 40% of Victorian apple production; in addition, Hazeldene’s poultry and the QAF piggery are important agricultural industries which require a very reliable source of water.

These intensive industries employ large numbers of local people. These include casuals for apple picking; 800+ employees in the poultry industry; and piggery employees.

Most of these users rely on Coliban (rural) water. Of the 15 GL of Coliban Rural water, approximately 3.3 GL is used by horticultural users and 1 GL by intensive users.

A profile of Coliban rural users is shown in Table 6-2:

<table>
<thead>
<tr>
<th>Table 6-2. Profile of Coliban rural users</th>
<th>Number of licences</th>
<th>Proportion of licences</th>
<th>Volume of entitlement (ML)</th>
<th>% of entitlement</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;25 ML</td>
<td>101</td>
<td>6%</td>
<td>6102</td>
<td>41%</td>
</tr>
<tr>
<td>10.001 - 25 ML</td>
<td>224</td>
<td>13%</td>
<td>3546</td>
<td>24%</td>
</tr>
<tr>
<td>5.001 - 10ML</td>
<td>299</td>
<td>18%</td>
<td>2710</td>
<td>18%</td>
</tr>
<tr>
<td>2.001 - 5ML</td>
<td>593</td>
<td>36%</td>
<td>2059</td>
<td>14%</td>
</tr>
<tr>
<td>0 - 2ML</td>
<td>448</td>
<td>27%</td>
<td>605</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1665</strong></td>
<td><strong>100%</strong></td>
<td><strong>15021</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

This table shows only 100 licence holders hold greater than 25 ML of entitlement.

In 2005/06, a year when use was restricted due to drought, 1736 ML was used in horticulture and 485 ML was used in intensive livestock production.

Around 1200 Coliban rural users have a small (<5 ML) entitlement for stock and domestic use. The majority of this water (approximately 5,300 ML) is delivered to the property through leaking channels. There is potential for substantial savings through modernisation, however the cost per ML is high.

---

96 Source: Coliban water – analysis of data by RMCG
Coliban urban supply and demand

Bendigo’s population and economy are growing rapidly. Local businesses are very confident about the future and expect to need 800+ new employees in next 5 years.

Proposed growth includes Hy-Line poultry hatchery (producing eggs for CSL pharmaceuticals, and human serum); Marong business park; and a major lamb abattoir. These developments require a secure water supply.

Bendigo, Castlemaine and Kyneton are the major towns situated in the southern Campaspe catchment. The region is experiencing strong population growth that is projected to continue at almost 50 per cent above the Victorian regional average. The main driver of population growth is its appeal to ‘tree-changers’, supported by improved road and rail links to Melbourne, jobs and investment, and cultural development.

By 2026, it is projected that the region will be accommodating an extra 58,000 people with the majority of these being along ‘the Calder corridor’ between Bendigo and Melbourne. (Projections for population growth in Table 6-3 below).

Table 6-3 Projected population growth by Local Government Area (LGA)\textsuperscript{97}

<table>
<thead>
<tr>
<th>Local Government Area</th>
<th>Projected population growth</th>
<th>Major town in LGA</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Greater Bendigo</td>
<td>38,000</td>
<td>Bendigo</td>
</tr>
<tr>
<td>Macedon Ranges Shire</td>
<td>15,000</td>
<td>Kyneton</td>
</tr>
<tr>
<td>Mount Alexander Shire</td>
<td>5,000</td>
<td>Castlemaine</td>
</tr>
<tr>
<td>Total</td>
<td>58,000</td>
<td></td>
</tr>
</tbody>
</table>

Bendigo is the major regional centre in the Southern Loddon Mallee region. It acts as a service hub to many small towns in the area. With a 2006 population of 96,543, current growth trends indicate that Greater Bendigo will increase its population to 131,259 by 2026.

Castlemaine is a community with a population of 7,074, situated in Mount Alexander Shire. The town is at the centre of a major demographic shift attracting a high population of highly educated people from Melbourne. The council is expecting growth of 5,000 by 2026.

Coliban Water’s projections show that total water demand in the Coliban Water Supply System, based on current consumption patterns, is likely to increase by 45 per cent from 37,200 ML/yr in 2002 to 54,000 ML/yr by 2055.\textsuperscript{98}

That involves an increase in demand of 16,800ML. That increase is almost exactly the same as the volume available from the water currently allocated to the rural supply system that Coliban Water is currently proposing to reconfigure.

\textsuperscript{97} DPCD, 2008 Victoria in Future (VIF)
6.2.3 Key agricultural and other industries

Intensive Livestock Production

The region has major pig and poultry production and expanding food processing industries.

Irrigation Water Supply

The Campaspe diversions are managed by Goulburn Murray Water and the Coliban rural system is managed by Coliban Water.

Service Industries

A range of Government and non-Government service are located within the large urban centres of Bendigo and Castlemaine. These include public sector services such as health, education, policing and support services and privately owned businesses which include the retail sector and the agricultural services sector.

Tourism

Tourism within the region is dominated by visitors to the goldfields and events held in Bendigo and Castlemaine.

---

6.3 Water Management, Government Purchases and Drought

6.3.1 Water Management Arrangements

The catchment can usefully be described in three parts:

- the southern highlands. This contains the storages in the Coliban system and Lake Eppalock on the Campaspe;

- the regulated system between Lake Eppalock and the Waranga Western Channel at Rochester, where the majority of the regulated irrigation is located; and

- the river below the Waranga Western Channel running to the junction with the Murray at Echuca.

There are two sets of storages:

- the older storages established by the precursors of Coliban Water designed to provide water for the towns of the region and support early gold workings. These are high in the southern catchment on the Coliban River:
  - Upper Coliban, capacity of 37,770 ML;
  - Lauriston, capacity of 19,790 ML; and
  - Malmsbury, capacity of 17,780 ML; and

- Lake Eppalock, further north at the edge of the Great Dividing Range and on the Campaspe River itself. It has a capacity of 312,000 ML. Its major use is to supply irrigation customers downstream. Coliban Water holds 18% of the yield for urban supply.

One of the characteristics of the catchment is its extreme variability between years.

The location of the Campaspe valley is set out in Figure 6-1. Much of the irrigated agriculture within the geographical boundaries of the catchment relies on water from the Goulburn system supplied through the Western Waranga Channel (WWC). The Rochester Irrigation District, much of which is located within the Campaspe valley, is supplied from the WWC and has ten times the total entitlement of the Campaspe Irrigation District. Therefore this chapter only deals with the water uses outside the Goulburn Murray irrigation District.

The following analysis focuses largely on the Campaspe catchment as a hydrological unit, as that is the basis for the MDBA proposals. However, any assessment of the impacts of changes to the SDLs on the regional economy will also need to take account of the impacts on the local community from any change in entitlements within the Goulburn system.
6.3.2 Water Procurement

A major buyback has been carried out of the Campaspe irrigation district. To date, 19 GL has already been purchased. This has had an effect on the Echuca social catchment, in particular the town of Rochester.

No water has been purchased from the Coliban system or Campaspe diverters.

6.3.3 Drought

The impact of drought was variable in the region depending on the security of entitlements and the water management arrangements:

This is summarised in Table 6-4.

**Table 6-4. Impact of drought, Campaspe.**

<table>
<thead>
<tr>
<th>Water use</th>
<th>Drought Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campaspe diverters</td>
<td>No allocation during the drought. Some farmers have access to ground water.</td>
</tr>
<tr>
<td>Coliban rural users</td>
<td>Low or 0 allocations for rural residential users. Many users were left with only tank water for stock and domestic use and fire fighting. Many users carted water. Significant agricultural users were given a 30% “emergency” allocation.</td>
</tr>
<tr>
<td>Coliban urban users</td>
<td>Severe water restrictions. Loss of garden trees and plants. Health problems due to people managing their water for gardens. A recycled water scheme was built during the drought and a range of parks and gardens in Bendigo now have secure water supplies. Bendigo is now on permanent water restrictions.</td>
</tr>
</tbody>
</table>

6.4 Baseline – the future without policy change

The ‘baseline’ is a description of the expected future for the towns and social catchments over the coming decade, if the current diversion limit for irrigation water were left unchanged. The baseline is dynamic, not static; that is, there would continue to be variability in factors such as rainfall and commodity prices, and underlying trends would continue.

6.4.1 Campaspe diverters

The Campaspe diverters are looking forward to a return to normal rainfall and anticipate good years of commodity prices. They consider their irrigated land important to their farm business and intend to re-sow lucerne and eventually expand production. Some upgrade of infrastructure is required, however they haven’t lost confidence in their irrigation supply despite a number of years without any irrigation water.

---

100 Source: EBC consortium analysis
6.4.2 Coliban rural

The agricultural users are expanding their production of pigs and poultry. Apple production in Australia is threatened by imports, however yields are very high on modern orchards and a number of large progressive orchardists are expanding in Harcourt.

6.4.3 Coliban urban

The future for Bendigo, Castlemaine and surrounds is projected to be very prosperous. Communities are becoming increasingly linked with Melbourne through employment and tourism. Bendigo is a very important city in the Murray-Darling Basin. In future it will require significantly increased water as well as ongoing investment in water efficiency measures.

6.5 Response to Basin Plan process

The Campaspe diverters expressed a frustration at the level of proposed buyback and the Guide being perceived as a final plan. The Urban users had little knowledge of the Basin Plan and weren’t concerned, as they didn’t believe they would be affected.

6.6 Impacts of Reduced Water Availability

6.6.1 Water Procurement by Government

The MDBA has estimated total inflows into the Campaspe as 333 GL; current diversions as 155 GL; water used by the environment and losses as 24 GL; and outflows as 153 GL, or 54% of the outflows that would be expected without development. The diversions of 155 GL comprise 115 GL in licensed diversions and 40 GL in interception (16 GL for basic rights associated with farm dams, 23 GL for farm dams other than basic rights, and 1.2 GL for plantation forestry).

A total of 115 GL of entitlements are held in the system. This comprises 4 GL for regulated diversions in the Campaspe Irrigation District, near Rochester; 22 GL for regulated diversions from the Campaspe river (near the towns of Goornong and Barnadown); 9 GL for unregulated supply above Lake Eppalock; 54 GL for high-reliability urban supply by Coliban Water; 12 GL for low-reliability urban supply to Ballarat, by Central Highlands Water (through a pipeline); and 15 GL held by NVIRP for the environment.

The Guide to the proposed Basin Plan proposed buybacks of between 40 GL and 52 GL in the valley, which would reduce licensed diversions (i.e. the 115 GL of current licensed diversions) by 35 – 45%. To date, 19 GL has already been...
purchased, and it is anticipated that 8 GL will be saved through modernisation. Further buybacks of between 19 and 33 GL are envisaged.

For practical purposes, the proposed buybacks would have to come from two sources: the 22 GL in regulated entitlements (15 GL of high reliability, and 7 GL of low reliability) held by Campaspe river diverters, and/or the 54 GL of high-reliability urban supply held by Coliban Water, of which 15 GL is set aside for the rural supply system ("Coliban Rural").

Table 6-5. Current diversion limit and ‘Guide’ proposals.

<table>
<thead>
<tr>
<th>Region</th>
<th>Scenario</th>
<th>Current Diversion Limit (CDL)</th>
<th>Guide reduction from CDL to SDL 105 (average)</th>
<th>Guide reduction in entitlements before modernisation &amp; before buyback 106</th>
<th>Modernisation ‘bridging the gap’ on and off farm, to 2010 107</th>
<th>Buy-back to date 108</th>
<th>Guide reduction in remaining entitlements after modernisation and after existing purchases 109</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>GL GL % Entitlement type</td>
<td>GL % 110 GL GL GL % of remaining entitlements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campaspe</td>
<td></td>
<td>4000 115 52 45% HRWS component</td>
<td>31 82% 8 19 12 120%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LRWS component</td>
<td>15 82% 0 0 7 100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coliban Rural HRWS component</td>
<td>13 82% 0 0 13 82%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3000 115 40 35% HRWS component</td>
<td>23 63% 8 19 2 17%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LRWS component</td>
<td>12 63% 0 0 7 100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coliban Rural</td>
<td>10 63% 0 0 10 63%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In summary, the 4000 GL scenario would require purchase of the majority of entitlements from Campaspe diverters and Coliban rural users (because of the high level of existing purchases, the Guide proposals would entail procuring more than 100% of high reliability in the valley (in the 4000 GL scenario), as shown in Table 6-5). It is likely only the high value users would remain in the Coliban rural system.

The viability of a modernised Coliban rural system would be in question. The modernisation of the Harcourt system is in the planning phase. It is likely this is the only part of the system which would remain, if proposals like those in the Guide

---

106 Yield-unweighted entitlements, pro-rata based on use
107 Yield-unweighted entitlements. Source: MJA 2010
109 Yield-unweighted entitlements. Note this ‘gap’ may also be partially met through on and off-farm irrigation modernisation.
110 not always the same across entitlement type, even if pro rata as other Government purchases have reduced 2010 entitlement

EBC, RMCG, Marsden Jacob Associates, EconSearch, Geoff McLeod, Tim Cummins, Guy Roth and David Cornish
were implemented. The supply of water to intensive users on the Coliban rural system would be difficult without the many other users on the system.

It is highly unlikely that the urban water authorities will seek to offer up water for sale from their existing entitlements, especially as the marginal costs of supply augmentation beyond the rural reconfiguration program are higher than the market price that buyback will be able to command.

Coliban Water is developing a new water plan 2013 – 2018. This plan will need to identify where additional water will come from to service Bendigo's needs.

A previous Coliban Water plan (2006) suggested 22 GL will need to be found from somewhere. Bendigo may need to pipe water (from the Goulburn), recycle, or users will need to change their behaviour.

6.6.2 Farm Level Response

Campaspe diverters

The proposals in the Guide would represent a need to procure a very high proportion of Campaspe river diverters' entitlements (Table 6-5).

River diverters are dominated by two syndicates (Goornong and Barnadown) that hold 2 GL between them. The syndicates need to retain all their water to remain viable. Fixed costs (e.g. delivery charges) would be spread across a diminishing pool. There is limited scope for buybacks within a syndicate. While unbundling has progressed, permanent transfers need collective approval.

There is a difference between “serious” irrigators (who are in syndicates, have bigger farms, and use more water) and “casual” irrigators. Interviewees considered that the bigger irrigators play a role as “community leaders”. Casual irrigators use their water more speculatively, and may sell their water rights at high prices when the time is right. There is a perception that buybacks will unfairly impact on the “serious” irrigators “for whom the system is designed.”

If buybacks occur to the proposed level, a few diverters are expected to remain on the Campaspe River. The syndicated schemes may fail due to members of the syndicate deciding to sell their entitlement.

This would lead to farming becoming dry land with a small amount of irrigation. Land values are high around the Campaspe River and farm expansion is difficult. In the long term dry land farms need to become very large to remain viable.

Coliban rural

If buyback was successful among the Coliban rural users, water is unlikely to be purchased from the important agricultural users. The water would need to be
purchased in small packages from many users. The market is undeveloped for entitlements from the Coliban rural system.

The outcome would depend on whether modernisation of the system occurs.

Modernisation of the Coliban rural system would yield significant savings. Plans are being prepared and community consultation is underway with the community to develop the most effective way of modernising the system which is highly inefficient.

If there were no modernisation, these rural residential users would then have no access to stock and domestic water and be reliant on tank water. If they were to sell part of their entitlement as part of modernisation, they would not be affected by the buyback as they would effectively be selling water that currently is lost in transmission.

**Coliban urban**

If the water is sourced from Coliban rural users in Coliban Water’s rural supply system, there is a potential risk of undermining the demand-supply strategy for the region.

It is highly unlikely that the urban water authorities will seek to offer up water for sale from their existing entitlements, especially as the marginal costs of supply augmentation beyond the rural reconfiguration program are higher than the market price that Buyback will be able to command.

Coliban Water is developing a new water plan 2013 – 2018. This plan will need to identify where additional water will come from to service Bendigo’s needs.

A previous plan (2006) suggested 22 GL will need to be found from somewhere. Bendigo may need to pipe water (from the Goulburn), recycle, or users will need to further change their behaviour.

In summary:

- purchase of water from the Coliban rural system will be in small lots and difficult to implement. Users value their water highly as it is their only supply for fire fighting and gardens in dry years;
- water will be retained by higher value users; and
- some Campaspe diverters may sell. This could lead to fragmentation of the system.
6.6.3 Changes to agricultural production and third party impacts

Campaspe diverters

Irrigated production could be reduced to a small number of high value users. These would be wine grape growers and some lucerne producers.

Diverters’ irrigation schemes could become unviable due to irrigators leaving the group schemes.

Coliban rural users

The high value users would likely retain their water, however the viability of the system may be threatened as water costs would be likely to increase.

Coliban urban users

Water is expected to be purchased from the Goulburn system and pumped to Bendigo. This would be likely to be viewed by stakeholders as a perverse and unsustainable consequence.

Water is not expected to be purchased from the Coliban urban bulk entitlement, however the pool available for purchase by Coliban water within the Campaspe system will be severely reduced. If insufficient water was available for Coliban water to purchase entitlement from the Campaspe system, water could be obtained through purchase of entitlement from the Goulburn system and pumping from the Waranga channel. This would require ongoing pumping costs estimated at $400 – 600 per ML which would be a high cost to Coliban urban water users.

6.6.4 Impacts to the local economy

Local Processing

Permanent Horticulture

Assuming Harcourt apple growers do not sell their entitlement, there will be little impact on the permanent horticulture industry. It is unclear how buybacks would affect security (if at all), and permanent horticulture may suffer in dry years if the total pool of water is reduced for trade.

Population and Employment

The population in the Bendigo social catchment is unlikely to be affected. Bendigo has a very low dependence on agriculture.

It is assumed Bendigo will acquire the water required for critical human needs. In this case, the direct impact on Bendigo of the Guide proposals would be minor apart from a possible increase in water charges to residents.
Local businesses

There would be little impact to local businesses as they are buffered by commercial activity in the large city of Bendigo.

6.6.5 Social impacts

Community identity

The communities most likely to be affected would be the small, agriculturally dependent towns of Elmore and Goornong. The irrigators are community leaders. Sale of irrigation water would lead to a decline in farm viability, larger farms and fewer farm workers.

Education

Numbers in schools at Elmore and Goornong would be expected to be reduced.

Demographic change

A small, negative demographic impact would be felt north of Bendigo around the towns of Goornong and Elmore, as older farmers retire and potential move into bigger centres like Bendigo, and younger people are obliged to leave in search of work.

Farmer mental health

The 4000 GL scenario, if implemented as set out in the *Guide*, would almost close down the Campaspe diversions. Given the scale of buyback and the current time schedule for buybacks, this would lead to rapid adjustment and associated stresses.

The 3000 GL scenario, however, would have little impact on irrigation from Campaspe diverters as it represents far smaller proportional change.

Local Government Services

There would be minimal impact on local government services in Goornong and Elmore because service provision in those towns is small.

6.7 Community Resilience and Adaptive Capacity

6.7.1 Bendigo Social Catchment

The Bendigo social catchment is a large, diverse economy. It is relatively resilient to the impact of reduced irrigation, however the impacts if the *Guide* proposals were implemented would be likely to be socially significant and long term.

Bendigo Kyneton and Castlemaine are located high in the catchment and are rapidly growing urban centres. They have a rapidly growing need for water. They
are also developing industries that are dependent on secure water supplies and they are currently unaware of the potential impact of the Basin Plan.

The Bendigo social catchment is also partly dependent on the large irrigation district to the north and will be affected by a reduction in irrigation in the Goulburn and Murray catchments.

6.8 Minimisation of Impacts

The impact on the Campaspe catchment can be minimized by:

- modernisation of the Coliban rural system to achieve water savings; and

- purchase of water from the Goulburn system rather than the Campaspe system. This would eliminate the likely cost of pumping water from the Goulburn system in the future for Bendigo’s urban supply.
7 Ovens

7.1 Overview

The Ovens region comprises alpine catchment areas that contain the King and Ovens rivers plus other nearby tributaries, all of which flow in a northerly direction toward the Murray River between Yarrawonga and Rutherglen.

The main town in the region is Wangaratta. The water storages are Lake Buffalo of 23.3 GL and Lake William Hovell of 13.5 GL.

7.1.1 Social Catchments

Table 7-1 Communities within the study region

<table>
<thead>
<tr>
<th>Social catchment</th>
<th>Towns</th>
<th>Population</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wangaratta</td>
<td>Wangaratta</td>
<td>17,000</td>
<td>Category 4 - Medium, regional city, service providers to agricultural sector with buffering from industry and tourism.</td>
</tr>
<tr>
<td>Myrtleford</td>
<td>Myrtleford</td>
<td>2,700</td>
<td>Category 1 - Small service providers to agricultural sector with some buffering from tourism.</td>
</tr>
<tr>
<td></td>
<td>Bright</td>
<td>2,100</td>
<td>Category 2 - Small, dependence on agriculture and tourism.</td>
</tr>
</tbody>
</table>

7.1.2 Irrigated primary production

The majority of irrigated production is from direct diversions from the rivers in the region.

In the 2005-06 year total irrigated production in the Ovens was $56 million. Production was dominated by grapes ($24.5 million) and fruit and nuts ($18.8 million), followed by dairy ($4.6 million) and meat cattle ($3.2 million).

Agriculture as a percentage of Gross Regional Product in 2005-06 was approximately 12.5% Myrtleford and only 1.5% Wangaratta.

The region is in a transition phase due to the closure of the tobacco industry and new agricultural and horticultural businesses are establishing

Employment in irrigated agriculture is through dairy, wine grapes and horticultural industries, with a combination of surface and groundwater used for irrigation.
7.1.3 Drought

There was a low impact of drought compared to other social catchments in the Murray-Darling Basin, largely due to the region having a more reliable water supply, and less dependence on irrigation.

Wangaratta, and to a lesser extent Myrtleford, social catchments have diverse industries and businesses which have created some resilience towards drought events.

7.1.4 Baseline

It is anticipated there will be growth and expansion of high value agricultural enterprises such as nuts, wine grapes, berries, pumpkin seeds.

The local communities are working on research and extension to introduce new high value irrigated crops.

Tourism in the region is a very important industry, especially some of the agricultural (food and wine) tourism.

7.1.5 Impact of reduced water availability

Changes to agricultural production will depend on the level of buybacks that are planned, and then, what level of buybacks can be achieved.

The likely changes to agricultural production would be a combination of the following (assuming buybacks achieve the proposals in the Guide – although it is questionable that there will be sufficient willing sellers):

• continuing recovery from the decline of the tobacco industry, expansion of the dairy industry and expansion into new horticultural crops would cease if the water allocation and entitlement markets were smaller;

• development of high value horticultural crops may no longer be pursued due to restricted water availability on the market. This would lead to decreased investment in new and emerging horticultural crops;

• exit of some smaller dairy farm businesses after they sell entitlement;

• contraction in the dairy industry in response to entitlement sales, with a higher proportion of businesses becoming rain dependent enterprises rather than utilising supplementary irrigation and improving efficiency;

• decreased employment in dairy and horticulture;

• reduced turnover amongst agricultural service and equipment providers;
• decreased supply and turnover amongst some processors such as, potentially, the pumpkin factory in Myrtleford; and

• flow-on impacts to the tourism industry (one of the largest sectors in the region), fuel providers, accommodation and office equipment suppliers, due to the link with agriculture and tourism in the region.

7.1.6 Minimising Impacts

Infrastructure improvement and access

Water supply to irrigators could be improved with better storage infrastructure. There are cost effective opportunities to create new water storages in the region that would minimise the impact.

Improved water trading

Irrigators would like to see tagged water trading adopted.

Enhance tourism

Improvement to the viability and scope of the local tourism industry with less reliance on agricultural (food and wine) based tourism would assist in mitigating the impact.

7.2 Background

7.2.1 Introduction to the region and social catchments

The Ovens region comprises alpine catchment areas that contain the King and Ovens rivers plus other nearby tributaries, all of which flow in a northerly direction toward the Murray river between Yarrawonga and Rutherglen.

The two social catchments in the region are different, with the Wangaratta catchment containing the rural city of Wangaratta, a diverse community; and the Myrtleford social catchment which has a higher dependence on agriculture. Approximately half of the population in the region is urban.
Figure 7-1. Social catchments in the Ovens, showing relative vulnerability of towns to reduced irrigation.

N.B. Myrtleford is considered a Category 1 town as it is highly dependent on agriculture. This is in contrast to the analysis carried out in this project and shown in
Table 7-2. The percentage of employees in agricultural and post farm value chain in 2006 for Myrtleford was 13%. This is marginally under the cut off of 15% in the analysis, however anecdotally community members identified the town as category 1.

**Wangaratta Social Catchment**

The Wangaratta social catchment is located in the north-western end of the Ovens catchment.

The major urban centre of Wangaratta has a population of 17,000. Wangaratta is a category 4 town. It is medium to large and has a diverse economy.

Wangaratta has a great diversity of industry and economic activity from tourism, retail, manufacturing and agricultural service providers. Some of the tourism businesses are linked to food and wine and hence irrigated activities.

Major irrigated businesses include wine grapes, horticulture and some livestock. Some irrigation is from groundwater sources.

Irrigated agriculture is only part of the agriculture of the region. The majority of agriculture is dry land, however irrigation is required for most high value enterprises.

**Myrtleford Social Catchment**

Myrtleford is geographically located in the south-eastern portion of the region.

Urban centres include Bright, Myrtleford and Oxley/Milawa, all of which have populations of approximately 2000 people and are category 1 or 2 towns.

The social catchment is continuing to adapt and rebuild since the closure of the tobacco industry in 2006, with a migration to dairy and high value horticultural crops.

Agriculture is a significant contributor to the region with beef and sheep meat, wine grapes, horticulture and some cereal production. Irrigated agriculture is only part of the agriculture of the region. The majority of agriculture is dry land, however irrigation is required for most high value enterprises.

Tourism and the agricultural service industries are significant contributors to economic activity.
7.2.2 Irri gation in the region

The current surface water diversion limit for the irrigation valleys of the Basin is shown in Figure 7-2.

![Figure 7-2. Current diversion limits. The Ovens is the third smallest irrigation region diverter in the Basin.][1]

The major storages in the region are Lake Buffalo on the Buffalo river at 23 GL and Lake William Hovell on the King river at 13.5 GL.

There is a combination of private diversions predominantly from the King and Ovens rivers and also some groundwater extraction to meet irrigation requirements.

The irrigation systems in the region tend to be sustainable and with the good quality soils and natural rainfall in the region there has not been the historical detrimental impact to land that has occurred in some other irrigated regions of the Murray-Darling Basin.

7.2.3 Key agricultural industries

The main agricultural industries (irrigated and dry land) in the region in order from greatest total value to least are: meat cattle, wine grapes, fruit and nuts, dairy sheep and other livestock, cereals and nurseries.[2]

---

7.2.4 Key other industries

In the Ovens region, Agriculture, Forestry and Fishing was the fourth largest employment sector. Other major sectors include are set out below.

Retail trade

Wangaratta is a large regional centre and has a diverse range of retail trade to service both urban requirements for goods and services and also the regional and specialised agricultural businesses.

Manufacturing and construction

Wangaratta is a regional hub for a local construction industry of residential, commercial and specialised agricultural and industry plant and equipment.

Health and community services

A range of Government and non-Government service are located in Wangaratta. These include public sector services and privately owned businesses.

Education

The combined activity of normal primary and secondary education streams with The Centre community college mean that education is a significant contributor to the social and economic framework of the region.

Tourism

Tourism within the region is dominated by visitors to the wineries and food tourism venues. For example, Brown Brothers winery, located at Milawa, attracts in the vicinity of 100,000 visitors each year.

There is also a local focus on attracting tourist ‘events’ such cycling that provide substantial employment and economic benefits to the region.

7.3 Water Management, Government Purchases and Drought

7.3.1 Water Management Arrangements

The main rivers in the catchment are the Ovens and King, which meet at Wangaratta and then flow on to join the Murray at the head of Lake Mulwala, upstream of Yarrawonga.

There is a low level of diversions in the system relative to natural flows. Total entitlements are around 75 GL whereas the average annual flows are around 1,425 GL.
During the summer months the Ovens river does not flow into the Murray but is absorbed into sand at Peechelba.

Table 7-2. Summary of Surface water entitlements

<table>
<thead>
<tr>
<th>Entitlement Class</th>
<th>Number of Entitlements (GL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>11.5</td>
</tr>
<tr>
<td>Regulated High Reliability Water Shares</td>
<td>26.2</td>
</tr>
<tr>
<td>Regulated Low Reliability Water Shares</td>
<td>12.5</td>
</tr>
<tr>
<td>Supplementary</td>
<td>18.2</td>
</tr>
<tr>
<td>Registered dams</td>
<td>9.4</td>
</tr>
</tbody>
</table>

7.3.2 Water Procurement

No purchases have taken place to date.

7.3.3 Agricultural production

In the 2005-06 benchmark year total production in the Ovens was $56 million. Production was dominated by grapes ($24.5 million), and fruit and nuts ($18.8 million), followed by dairy ($4.6 million) and meat cattle ($3.2 million).

7.3.4 Drought

The impact of drought was less than in most regions of the Murray-Darling Basin.

7.4 Response to Basin Plan process

The community is surprised there is a proposed buyback in the Ovens catchment due to the excellent environmental condition of the catchment and the low level of diversions. They are frustrated by what they see as a lack of understanding by the MDBA of their catchment.

7.5 Baseline – the future without policy change

The ‘baseline’ is a description of the expected future for the towns and social catchments over the coming decade, if the current diversion limit for irrigation water were left unchanged. The baseline is dynamic, not static; that is, there would continue to be variability in factors such as rainfall and commodity prices, and underlying trends would continue.

A return to average climatic conditions and mid-range commodity prices will see farm consolidation, expansion and new intensive crops and systems adopted throughout the region.

---

Farm productivity is expected to increase adoption of new crops and intensive farming systems and better utilisation of land and water resources is occurring. There is also evidence that younger people are moving into the region to commence or recommence farming.

The existing irrigated agricultural system used in the Ovens region is viewed locally as one of the healthiest in the Murray-Darling system due to the good levels of rainfall and soil types. There is no sense of a desire to change the existing irrigation of agricultural land due to the health and sustainability that already exists.

There is a potential opportunity for other operations in the hot and dry irrigated locations to move to the region, particularly as a mechanism to manage climate variability. There is still potential room for expansion and increased agricultural intensification in the region due to the high-quality soils and water resources.

7.5.1 Dairy

The dairy sector in the region has some competitive advantages compared to other regions in Australia. The climate, water security, soils and access to market (processing) is favourable for the local dairy industry. Accordingly, it is expected that the dairy sector will continue to grow. The dairy industry is seen locally to have a comparative advantage over irrigated dairying in northern Victoria. The region is promoting the advantages of dairying in north East Victoria despite high land prices.

7.5.2 Horticulture

The horticulture sector is predominantly in a growth and development phase, largely due to the cessation of the tobacco industry and farmers looking to new crops and market opportunities. There is expected to be ongoing investment in these high risk and high return crops into the future as the climate, water and access to market is favourable for development of these enterprises. The local council and industry bodies are conducting research and extension into new crops which are suitable for the climate and soils.

7.5.3 Tourism

The tourism sector is anticipated to grow considerably in the future. Regional tourism events are often based around local food production and the continued development of tourist destinations such as cheese factories and wineries will create further growth.

7.6 Impacts of Reduced Water Availability

7.6.1 Water Procurement by Government

There have been no sales of water to the Commonwealth for the environment to date. See Table 7-3 below.

Table 7-3. Current diversion limit and ‘Guide’ proposals.
### 7.6.2 Farm Level Response

There is strong resistance to the prospect of water purchases in the Ovens catchment because:

- water is highly valued as it ensures high value crops can be grown; and
- there has been a large investment in irrigation infrastructure (pipes and sprinklers) which would be written off if water is sold.

This may seem counter-intuitive, given the high proportion of sleeper licences. The region is still adjusting to the cessation of tobacco growing and many growers are still considering their options. Some farmers may see sale of water as an option for exit, however they believe their water is very valuable and water purchases may need to be at high values.

Some small irrigators may sell their water as they have not used it for some years and may see selling water as an option for funding retirement from farming.

Farm responses to the reduced water availability are likely to include some businesses leaving agriculture and some business which have gone out of tobacco into beef cattle deciding their water is not worth keeping for low value production.

---


115 Yield-unweighted entitlements, pro-rata based on use

116 Yield-unweighted entitlements. Source: MJA 2010


118 Yield-unweighted entitlements. Note this ‘gap’ may also be partially met through on and off-farm irrigation modernisation.

119 not always the same across entitlement type, even if pro rata as other Government purchases have reduced 2010 entitlement
High value horticultural businesses are unlikely to sell their water and businesses that want the option to move into high value production are also unlikely to sell their water.

Some small and less viable dairy farms may sell their water as they will move into beef cattle production.

The impact will be more significant in the Myrtleford social catchment due to its higher reliance on agriculture and agricultural based industries.

In summary buybacks necessary to meet the Guide proposals would face a significant local opportunity cost, as they would be expected to prevent the potential development of high value horticulture, introduction of new crops and expansion of dairying.

**Modernisation**

System modernisation is not relevant as all irrigators are diverters.

Two options require consideration for improved irrigation management which could allow water to become available for the environment:

**Off stream storages**

Off stream storages would allow less diversions in summer and increased diversions during high flows in winter.

**Improved flow regulation**

Due to the variability of flows due to electricity generation, farmers own around 140% of their requirement in licences. This ensures they can have access to the water they require throughout summer. This would not return water to the river, but would provide greater certainty to farmers.

**Buyback**

The economies of the Wangaratta and Myrtleford social catchments are closely associated with the Ovens water system. A total of 78 GL of entitlements are held in the Ovens system. This comprises 11 GL in urban bulk entitlements; 26 GL in regulated high-reliability water; 12 GL in regulated low-reliability water; 18 GL in unregulated water; and 9 GL in registered dams.\(^{(120)}\)

Only a fraction of the licenced water is actually used. The *Victorian Water Accounts 2009-10* reported that 49 GL was used in the Ovens system in 2008-09, and 45 GL in 2007-08.\(^{(121)}\)

---


\(^{(121)}\) Victorian Water Accounts 2009-10, page 96

EBC, RMCG, Marsden Jacob Associates, EconSearch, Geoff McLeod, Tim Cummins, Guy Roth and David Cornish
According to interviewees, of the 26 GL in licences (high-reliability regulated water) held in the Ovens, Buffalo and King rivers, only 7.6 GL (29%) is used in an average year. Of 7.6 GL in unregulated water licences held in the Upper Ovens, only about 40% are used (3.0GL). This brings total usage to 10.6 GL.

This relatively low level of usage is reflected in the MDBA’s estimates for inflows, diversions and outflows. The MDBA has estimated total inflows into the system as 1,804 GL; current diversions as 83 GL; water used by the environment and losses as 13 GL; and outflows as 1,706 GL, or 99% of the outflows that would be expected without development. The diversions of 83 GL comprise 25 GL in licenced diversions and 58 GL interception (17 GL for basic rights associated with farm dams, 9.4 GL for farm dams other than basic rights, and 32 GL for plantation forestry).

Significantly, users in the Ovens system have significant access to groundwater resources. The MDBA has estimated that current groundwater diversions total 15 GL, and no change to this is proposed.

The Guide has proposed buybacks of between 10 GL and 11 GL. These buybacks would reduce current licensed surface water diversions (i.e. the 25 GL of actual diversions, as opposed to the total entitlements of 78 GL, most of which are not used) by 40 – 45%.

This proportion is uncertain, as local discussions indicated the proportion to be up to 80%. Despite significant investigation, this proportion has been difficult to determine. This uncertainty is due to it being unclear what water product is required for the environment.

If the MDBA purchased water used, the 11 GL buyback would require all water to be purchased.

The likely sale of water entitlements to the Australian Government would firstly come from small dairy farmers and sleeper water entitlements that are not actively utilised, although with the large proportion of water entitlements being required under buyback it is anticipated that the Guide proposals will be difficult to achieve.

During recent times of irrigation entitlement buyback, sleeper water licenses have not been sold despite the high offer prices as the entitlements are held by irrigators to provide maximum flexibility from time to time and to enable future business expansion opportunities.

---

122 Personal communication with Kerry Murphy, TAFCO, Myrtleford.
Changes to agricultural production

The changes to agricultural production will be a combination of three impacts:

- continuing recovery from the decline of the tobacco industry, consolidation of the dairy industry and expansion into new horticultural crops would cease;

- existing production from dairy businesses would be impacted with reduced production coming from small farms who may exit the industry or larger farms who may not be able to sustain higher levels of pasture production during summer months; and

- high value horticultural crops currently in development may no longer be pursued due to restricted water availability on the market.

Third Party Impacts – Water charges, farm supply costs and shire rates

Buyback at the proposed level in the Guide is considered likely to lead to significantly increased water charges due spreading infrastructure charges over a significantly lower licence volume. This could make irrigation unviable for many and continuation of irrigation very difficult for the remaining farms.

7.6.3 Impacts to the local economy

Wine Grapes

The largest impact to processing would be likely to be from the wineries reducing intake in the region. Some of the surface irrigation licenses in the King and Ovens valleys are used to irrigate high value wine grape crops which then support the local wineries who then support the local tourism industry.

The direct impact would be likely to be a slight decrease in intake for some of the processors who may then have to decrease scale or some may even exit the industry.

Pumpkin Factory

A recent development has been a proposal for a processing plant for pumpkins seed oil. Trial crops are currently being grown.

Dairy processing

Dairy products are processed at the dairy factory at Kiewa. The combination of reduced production in the Goulburn Valley and North East Victoria may threaten the factory, however this is dependent on the impact of the plan in the GMID and company policy.
Population and Employment

The population across the region would be likely to suffer a slight decline due to the small to medium wine producers having lower intake and requiring less seasonal staff, loss of employment as dairy farms consolidate and some of the new and emerging businesses struggle, and the flow on effects to the tourism which may result in fewer jobs in the industry.

Local businesses

Assuming the *Guide* proposals were able to be implemented in the region, the local businesses in Myrtleford would remain static and would not recover from the impact of loss of tobacco.

7.6.4 Social impacts

Community identity

The Myrtleford community is most likely to be affected. It is currently working to overcome the adjustment from losing its tobacco industry.

Demographic change

The trend of younger people moving to the region and participating in farming businesses would be likely to cease as there would be fewer opportunities for employment in intensifying agricultural and horticultural sectors.

Accordingly, the anticipated demographic impact in is likely to be an increase in the average age of the population. There may also be issues with unemployment due to the number of people currently employed in the agricultural sector.

7.7 Community Resilience and Adaptive Capacity

7.7.1 Overall

The resilience of the Ovens communities is high, given the diverse nature of the economies, particularly in Wangaratta. There are pockets of vulnerability, however. Myrtleford is highly dependent on agriculture and is struggling to recover from the loss of tobacco. Shops are barley viable and a boost to trade is required. Myrtleford is a prosperous looking town but according to local people, this hides the fact that growth is stagnant.

7.7.2 Wangaratta social catchment

The Wangaratta social catchment is a diverse blend of rural and urban industries and businesses. Due to the existing diversification in place in the Wangaratta social catchment it is anticipated that the communities would be relatively resilient.
Tourism and some of the downstream services provides to tourism and agriculture are likely to experience some impact from the reduction in water availability, however the Wangaratta catchment is well balanced and positioned to continue with growth and diversity of business activity.

7.7.3 Myrtleford social catchment

The Myrtleford social catchment is closely aligned with agriculture and irrigated agriculture therefore is less resilient and has a smaller base to commence adaptation and building new high value businesses.

The small towns and outlying communities would face a significant period of adjustment and adaptation to changing population, industries and community as some enterprises grow and others contract due to the changes in water availability.

7.8 Minimisation of Impacts

Infrastructure improvement and access

Water supply to irrigators could be improved with better storage infrastructure. There are cost effective opportunities to create new water storages in the region that would minimise the impact.

Improved water trading

Irrigators would like tagged water trading adopted.

Enhance tourism

Improvement to the viability and scope of the local tourism industry with less reliance on agricultural (food and wine) based tourism would assist in mitigating the impact.
8 Kiewa

8.1 Overview

The Kiewa region covers the Kiewa valley, an alpine valley in North East Victoria. The region is located within the Indigo Shire, has a population of approximately 12,000 with the town of Kiewa being the single urban centre. The Kiewa region is one of the smallest sub-catchments in the Murray-Darling Basin and flows into the large Murray catchment.

8.1.1 Social Catchments

The Kiewa social catchment is small and contains two small towns (Table 8-1).

<table>
<thead>
<tr>
<th>Social catchment</th>
<th>Towns</th>
<th>Population</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kiewa</td>
<td>Kiewa</td>
<td>1700</td>
<td>Category 2 (or 1) small, highly dependent on dairy, dairy processing and horticulture.</td>
</tr>
<tr>
<td></td>
<td>Mt Beauty</td>
<td>1700</td>
<td>Small, highly dependent on dairy. Tourism during summer and the snow season.</td>
</tr>
</tbody>
</table>

8.1.2 Primary Irrigated production

Irrigated production is from licensed diversions from the Kiewa River.

Employment in the irrigated agriculture sector is important, predominantly through the dairy industry.

The region is in a transition phase due to the closure of the tobacco industry, and new agricultural and horticultural businesses are establishing.

8.1.3 Drought

The region experienced lesser drought impacts in comparison to the remainder of the Murray-Darling Basin.

8.1.4 Baseline

There is an expectation of future agricultural growth, with farmers expanding dairying with improving efficiency and scale, and farmers diversifying into horticulture.
Young people are expected to migrate into the region due to good employment prospects and business opportunities. It is expected that agricultural operations will consolidate and expand.

People would be attracted to work in agriculture due to the attractive environment and access to large regional cities of Wangaratta, Wodonga and Albury.

8.1.5 Impact of reduced water availability

Sale of water entitlements (if successful at the scale proposed in the Guide) would be likely to cause some smaller dairy farm businesses to exit the industry. The dairy industry would contract with a higher proportion of businesses becoming rain-dependent enterprises rather than utilising supplementary irrigation and improving efficiency.

Land values in the region are high, and as a result there is likely to be insufficient capital generated from dairy businesses who sell water entitlements to fund additional land acquisitions and hence maintain efficiency with a greater proportion of dryland farming.

A smaller irrigation sector locally would be likely to lead to decreased investment in new and emerging horticultural crops.

There may be decreased employment in the dairy sector in the region, including the dairy factory at Kiewa.

Agricultural service providers in Myrtleford and Kiewa would be impacted by lower levels of agricultural activity and hence turnover.

8.1.6 Minimising Impacts

Infrastructure improvement and access – Water supply to irrigators could be improved with the installation of new storages or access to existing storages within the valley; thereby potentially resulting in a possible ten-fold increase in a minimum river flow rate pumping threshold. There are cost effective opportunities to create new water storages in the region that would minimise the impact of the Basin Plan.

Improved water trading – currently the system does not have an effective water trading mechanism to facilitate long-term and short-term transfer of water entitlements. If it is possible to remove or reduce restrictions on water trade, that would help minimise the impact of reduced water availability.

8.2 Background

8.2.1 Introduction to region and social catchments

The Kiewa region extends from the Murray River, near Barnawartha, south through the Indigo Valley, and includes the Kiewa Valley and towns of Kiewa and
Yackandandah. The river basin is approximately 100 km long and 20 km wide, beginning at the Bogong High Plains and running northward to the Murray River. One social catchment within the irrigated area of the region is considered in this report.
Figure 8-1. Social catchments in the Kiewa (adjacent to the Ovens), showing relative vulnerability of towns to reduced irrigation.

N.B. Kiewa is considered a Category 1 town as it is highly dependent on agriculture. This is in contrast to the analysis carried out in this project and shown in Table 7-2.
The percentage of employees in agricultural and post farm value chain in 2006 for Kiewa was 13%. This is marginally under the cut-off of 15% in the analysis, however anecdotally community members identified the town as category 1.

**Kiewa Social Catchment**

A single category 1 urban centre within the catchment; the small town of Kiewa.

The social catchment has a history in agricultural production and service provision to the agricultural sector.

Until its recent closure in 2006, tobacco was the major industry in the catchment.

Agricultural production is now focused around dairy, mixed farming and horticultural enterprises. Murray Goulburn have a milk factory in Kiewa that sources milk from the local region, and some horticultural producers are focusing on the supermarket trade due to the proximity to transport and warehouse distribution on the Hume highway.

The major economic activity in the social catchment is the service industry, especially tourism, with some of these businesses linked to agricultural produce.
8.2.2 Irrigation in the region

The current surface water diversion limit for the irrigation valleys of the Basin is shown in Figure 8-2.

![Figure 8-2. Current diversion limits. The Kiewa is the smallest irrigation region diverter in the Basin.](image)

The major storage is the Rocky Valley reservoir with storage of 28GL and it is associated with hydroelectric power generation. There are other minor storages.

The main source of irrigation is high reliability licensed diversions from the Kiewa River.

The Kiewa valley has considerable potential for agricultural expansion, given the good soils, mild climate and reliable rainfall compared to other regions. The Rural City of Wangaratta and Alpine Shire are promoting the ‘Agrifood’ project based around the agricultural competitive advantages of the region in rainfall, climate, irrigation and amenity.

8.2.3 Key agricultural industries

The Kiewa region has two main irrigated farming systems - dairy and horticulture.

Dairy is an established industry in the region and is supported by the local milk factory. The dairy farms use supplementary irrigation water for pasture production.

---

Since the closure of the tobacco industry there have been new horticultural planting occurring for crops such as green tea, capsicums and pumpkins for seed.

### 8.2.4 Key other industries

The major (non-farm) industries within the region are service providers to the farming sector, and tourism. The service industries in the region, including tourism, collectively account for around 70% of the Gross Regional Product according to historical data (2005-2006).

**Service providers**

Service providers and agricultural supply retailers in Myrtleford and Kiewa have an established business presence in the region. The service providers supply technical resources and farm consumables and equipment supplies to the agricultural businesses in the region.

**Tourism**

Tourism within the region is linked to the agri-tourism, snowfields, wineries and proximity to Melbourne, Albury-Wodonga and the Hume highway. The tourism industry is significant in the region and a major contributor to economic activity. The link between irrigated agriculture, local food production and tourism is very important.

### 8.3 Water Management, Government Purchases and Drought

#### 8.3.1 Water Management Arrangements

The water resources of the Kiewa valley are relatively undeveloped. The MDBA has estimated total inflows as 689 GL; current diversions as 25 GL; water used by the environment and losses as 7 GL; and outflows as 657 GL, or 96% of the outflows that would be expected without development.\(^{128}\) The diversions of 25 GL comprise 11 GL in licenced diversions and 14 GL interception (4.5 GL for basic rights associated with farm dams, 2.1 GL for farm dams other than basic rights, and 7.1 GL for plantation forestry).\(^{129}\)


8.3.2 Water Procurement

No water has been purchased by the Commonwealth for the environment to date in this valley.

The EBC interview process for this study found that the local community cannot understand why irrigation water would be purchased from the Kiewa catchment. The reasons for this are:

- a very low proportion of flows are diverted for irrigation;
- the health of the catchment is very good;
- the quality of irrigation water is very high;
- the value of irrigation water is very high; and
- the value of agricultural production is very high.

The small total amount of water required from the Kiewa catchment is a high proportion of that used locally for irrigation, so would have a significant impact on water use in the Kiewa social catchment.

8.3.3 Drought

The impact of drought has been less than in most of the Murray-Darling Basin.

8.4 Response to Basin Plan process

The community is surprised there is a proposed buyback in the Kiewa catchment due to the excellent environmental condition of the catchment and the low level of diversions. They are frustrated by the apparent lack of understanding by the MDBA of their catchment.

8.5 Baseline – the future without policy change

The ‘baseline’ is a description of the expected future for the towns and social catchments over the coming decade, if the current diversion limit for irrigation water were left unchanged. The baseline is dynamic, not static; that is, there would continue to be variability in factors such as rainfall and commodity prices, and underlying trends would continue.

A return to average climatic conditions and mid-range commodity prices will likely see farm consolidation, expansion and new intensive crops and systems adopted throughout the region.

Farm productivity is expected to increase adoption of new crops and intensive farming systems and better utilisation of land and water resources is occurring.
There is also evidence that younger people are moving into the region to commence or recommence farming.

The existing irrigated agricultural system used in the Kiewa region is viewed locally as one of the healthiest in the Murray-Darling system due to the good levels of rainfall and soil types. There is no sense of a desire to change the existing irrigation of agricultural land due to the health and sustainability that already exists.

There may also be the opportunity for other operations in the warm and dry irrigated locations to move to the region, particularly as a mechanism to manage climate variability. There is potential for expansion and increased agricultural intensification in the region due to the soils and water resources.

8.5.1 Dairy

The dairy sector in the region has some competitive advantages compared to other regions in Australia the climate, water security, soils and access to market (processing) is favourable for the local dairy industry. Thus it is expected that the dairy sector will continue to grow and consolidate in the region.

8.5.2 Horticulture

The horticulture sector is predominantly in a growth and development phase, largely due to the cessation of the tobacco industry and farmers looking to new crops and market opportunities. There is expected to be ongoing investment in these high risk and high return crops into the future as the climate, water and access to market is favourable for development of these enterprises.

8.5.3 Business Sector

The business and ancillary agricultural service sector is expected to remain stable and achieve modest growth opportunities as local agricultural enterprises adopt new crops and technologies.

8.5.4 Rural Communities

The region has seen some migration of new and younger people to the region to commence employment, and new business ventures. The local amenity of the region, proximity to regional centres and ongoing population and economic growth indicate that the local communities will continue to expand into the future.

8.6 Impacts of Reduced Water Availability

8.6.1 Water Procurement by Government

According to the farmers interviewed, approximately 13 GL of water entitlements (all high reliability, unregulated) are held in the Kiewa valley.
The *Guide to the proposed Basin Plan* proposed buybacks of between 4.4 GL and 4.9 GL. These buybacks would reduce entitlements by between 30 – 34%, and diversions by between 39 – 45% (Table 8-2).

**Table 8-2. Current diversion limit and ‘Guide’ proposals.**

<table>
<thead>
<tr>
<th>Region</th>
<th>Scenario</th>
<th>Current Diversion Limit (CDL)</th>
<th>1 BASE CASE</th>
<th>2 MODERNISATION TO DATE</th>
<th>3 BUYBACK TO DATE</th>
<th>4 REMAINING CHANGE</th>
<th>Guide reduction in remaining entitlements after modernisation and after existing purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kiewa</td>
<td>4000</td>
<td>GL GL %</td>
<td>Entitlement type</td>
<td>GL GL %</td>
<td>GL GL %</td>
<td>GL % of remaining entitlements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>4.9 45%</td>
<td>HRWS component</td>
<td>5 33%</td>
<td>0 0</td>
<td>5 33%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nil LRWS component</td>
<td>0 0%</td>
<td>0 0</td>
<td>0 0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td>11 4.4 39%</td>
<td>HRWS component</td>
<td>5 30%</td>
<td>0 0</td>
<td>5 30%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nil LRWS component</td>
<td>0 0%</td>
<td>0 0</td>
<td>0 0%</td>
<td></td>
</tr>
</tbody>
</table>

This proportion is uncertain, as local discussions indicated the proportion could be up to 80%. Despite significant investigation, this proportion has been difficult to determine. This uncertainty is due to it being unclear what water product is required for the environment.

If the MDBA purchased water that is currently used, the 4.4 GL buyback would require all water to be purchased.

The likely sale of water licenses to the Australian Government would firstly come from small dairy farmers and sleeper water licenses that are not actively utilised, although with the large proportion of water entitlements being required under buyback it is anticipated that this will be difficult to achieve.

Even though many entitlements appear to be “sleepers”, if they are bought there will be a significant impact. It is likely “sleeper” water will be activated in the future – hence, buying sleeper water limits the potential for expansion and incurs an opportunity cost for the community. Productive users who hold sleeper water are

---

131 Yield-unweighted entitlements, pro-rata based on use
132 Yield-unweighted entitlements. Source: MJA 2010
134 Yield-unweighted entitlements. Note this ‘gap’ may also be partially met through on and off-farm irrigation modernisation.
135 not always the same across entitlement type, even if pro rata as other Government purchases have reduced 2010 entitlement

EBC, RMCG, Marsden Jacob Associates, EconSearch, Geoff McLeod, Tim Cummins, Guy Roth and David Cornish
unlikely to sell. According to Kiewa farmers interviewed, even unused sleeper water has not recently sold, despite high prices.

Irrigators own more entitlement than they need to maximise flexibility of when they can pump. So-called “sleeper” water is used for this purpose.

There is potential for “sleeper” water to be used for other purposes (e.g. bottled water) in future.

8.6.2 Farm Level Response

Farm responses to the reduced water availability are likely to include some businesses having to exit the industry, a decreasing investment in new crops and technologies and a reduction in cash receipts to farming businesses thereby impacting expenditure and business expansion.

In some situations, in particular in the dairy industry there would be a requirement for less labour units, resulting in some unemployment.

Buyback

The Guide to the proposed Basin Plan proposed buybacks in the region of between 4.4 GL and 4.9 GL thus reducing water entitlements by between 30 – 34%, and diversions by between 39 – 45%.136

The likely sale of water entitlements to the Australian Government would likely come from small dairy farmers and sleeper water entitlements that are not actively utilised.

During recent times of irrigation entitlement buyback, sleeper water entitlements have not been sold despite the high offer prices as the entitlements are held by irrigators to provide maximum flexibility from time to time and to enable future business expansion opportunities.

Changes to agricultural production

The changes to agricultural production compared to the baseline are likely to be as follows:

• the continuing recovery from the decline of the tobacco industry, expansion of the dairy industry and expansion into new horticultural crops would probably cease.

• the existing production of, in particular, dairy businesses would be impacted with reduced production coming from small farms who would exit the industry or larger farms who may not be able to sustain higher levels of pasture production during summer months if they sell entitlement.

dairy farms may cease irrigation and dairying and convert to beef cattle production.

Purchase of a very high proportion of entitlements would, if achieved, change the catchment to dry land beef production, which is unprofitable and tends to be a lifestyle farming operation for retired farmers. The only commercial agriculture in the catchment is irrigated and therefore commercial agriculture could effectively cease.

8.6.3 Impacts to the local economy

Dairy

The Kiewa dairy factory is a focal point for the local community and underpins the local dairy industry plus the supplies to the dairy industry. A decline in milk production for the region could lead to reduced employment at the dairy factory.

Population and Employment

The population impact in the region would most likely be negative as many of the dairy businesses employ multiple staff. Some of the dairy businesses would have to reduce staff levels if they sold water entitlement.

The combined impacts of reduced farm expansion in dairy and horticulture plus the flow-on effects to processing and agricultural service providers and suppliers would be an opportunity cost that would result in a decrease in the population growth that has been experienced recently.

Tourism

Loss of irrigated agriculture will lead to the tourism industry losing agriculture and food as its attraction for tourists. Wineries, berry farms, nut farms, small dairies are an important tourist attraction. The projected growth in these industries would be prevented and this opportunity cost would flow to the tourism industry.

Agriculture service and equipment providers

There has been historical pressure on agricultural service and equipment providers, predominantly due to the closure of the tobacco industry and the resultant decline in farm cash turnover. Additional pressure on the retailers to the agricultural sector may result in an unprofitable situation and business closures.

8.6.4 Social impacts

Community identity

The community is focused around the dairy industry and the Kiewa dairy factory. If this facility were to reduce employment or close altogether there would be a very significant impact on the local community. The likelihood of this factory closing is
difficult to determine as it is dependent on the impact of buybacks in the Goulburn and Victorian Murray catchments and company strategy.

**Demographic change**

There are (in the base case) good prospects in the region for employment in the agricultural sector and hence an attraction for younger people to reside in the region, as has been evidenced in historical trends.

The trend of younger people moving to the region and participating in farming businesses is likely to cease if the proposals in the *Guide* are implemented, due to fewer opportunities for employment in intensifying agricultural and horticultural sectors.

Therefore the anticipated demographic impact of the *Guide* would be likely to be an increase in the average age of the population. There may also be issues with unemployment due to the number of people currently employed in the agricultural sector.

### 8.7 Community Resilience and Adaptive Capacity

The Kiewa social catchment has high resilience due to its close proximity to large regional centres such as Wodonga and Wangaratta. The population of the social catchment is likely to increase with or without the MDB Plan as it is a very attractive place to live.

The rural areas are attractive for people who work in Wodonga or Wangaratta to live and commute to work. The Alpine Shire has a deliberate strategy to retain agricultural land for agriculture through its planning scheme, and to build the agricultural economy.

### 8.8 Minimisation of Impacts

**Infrastructure improvement and access** – Water supply to irrigators could be improved with the installation of new storages or access to existing storages within the valley; thereby potentially resulting in a possible ten-fold increase in a minimum river flow rate pumping threshold. There are cost effective opportunities to create new water storages in the region that would minimise the impact of the Basin Plan.

**Improved water trading** – currently the system does not have an effective water trading mechanism to facilitate long-term and short-term transfer of water entitlements. If it is possible to remove or reduce restrictions on water trade, that would help minimise the impact of reduced water availability.