



The Drying Lake

Lake Boga's experience of change and uncertainty

Department of Planning and Community Development
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Executive Summary

Introduction

The town of Lake Boga in northern Victoria experienced the loss of its lake in early 2008 due to ongoing drought conditions. This lake was central to the town's recreation and tourism industry and formed a defining point of identity for residents and visitors.

Lake Boga sits on the northeastern edge of the Mallee region of Victoria, near the River Murray. Historically, the region has benefited economically from both dryland and irrigation agriculture. Both drought and flood events have remained strong in the memories of older people in Lake Boga with farmers and non-farmers alike remembering the extreme wet-dry cycles of the local environment. Such experience has contributed to a tough and resilient local character. During the Second World War, a flying boat maintenance depot was established at Lake Boga, and this period of history has had a lasting effect on the town and its sense of identity. The population of Lake Boga has remained relatively steady over the past 25 years with around 700 residents. The town sits within both a rural landscape and in the shadow of a regional centre, Swan Hill.

The town was chosen as a research case study by the Victorian Department of Planning and Community Development in order to understand the experience and impact of the drying lake on the local community. This qualitative study was conducted through in-depth interviews with Lake Boga residents. A total of 45 participants were involved and approximately 35 hours of interview material were obtained.

Such research can inform government in a number of ways. It provides information about a community and the way it responds to change. This in turn can provide insights about the vulnerability or resilience of a community or of particular groups within that community. This can provide government with a better understanding of what support, advice or information might be most beneficial for communities seeking to deal with such change.

Climate change projections suggest that south-eastern Australia may become hotter and drier in the future. The research undertaken at Lake Boga is therefore of relevance to climate change debates, especially those around community impacts and adaptation responses. A drier future is likely to place greater pressure on streamflow and water resource allocation. Therefore, the ways in which communities use and value water are extremely important when dealing with decisions around water resource allocation and prioritisation.

Another aspect of this research relates to the spatial outcomes of environmental change, in particular, whether environmental change might lead to out-migration or whether people will remain in an area and adapt to such change. Ultimately, this information can provide insights about possible future settlement patterns and the degree to which they are influenced by environmental or other factors.

Findings

Lake Boga, when full, provided significant social and economic benefits to the local and regional community. The lake was the centre of activity for the town and provided a space for popular events such as regattas and water skiing competitions. Importantly, the lake was a place where the community gathered and socialised.

The lake dried up completely in February 2008. In the three months that followed, the smell of rotting fish permeated the town and a plague of gnats occurred. Of more lasting impact was the fine dust of the lake bed which was raised on windy days. Respondents talked about emotions of anger, frustration and shock in the immediate aftermath of the lake drying. Some expressed a feeling of embarrassment about living in Lake Boga once it had dried. Losing the lake meant the loss of a key recreational resource and has therefore limited the opportunities for locals to participate in many healthy outdoor activities. Mental health impacts have also been experienced with the loss of water creating high levels of stress and anxiety for many people. A less obvious impact was the feeling of social isolation caused by the loss of a key community meeting place. The decline in visitor numbers also contributed to this feeling of isolation, particularly among older residents.

The loss of the lake has had direct economic impacts on local businesses as fewer visitors meant less money coming into the town. Casual and part-time employment opportunities have decreased as businesses generally hired additional labour during peak tourist seasons (summer and Easter). Nevertheless, the proximity of Swan Hill has played an important role in limiting the economic impacts of the dry lake as it continues to provide sources of employment, and hence income, for working-age people. Swan Hill also offers a range of goods and services which continue to be accessed by the residents of Lake Boga.

One of the biggest economic impacts arising from the dry lake has been a fall in property values, particularly around the lake frontage. Without the lake, these houses have a lower value, and may be difficult to sell, even at a lower price. Many home owners are trapped by this loss of asset value. While lower house prices is a major issue for those holding property, it does have a benefit for those who are seeking affordable housing.

Other economic impacts are less direct. The proximity of the lake provided a range of physical and social activities close at hand. With the lake gone, costs are now incurred to access equivalent recreational activities as people need to travel in order to access them.

Out-migration has been a relatively small part of the community response to the drying lake. While the town's resident population has not changed significantly through out-migration, the part-time visitor population has fallen greatly. This reduction in visitors to Lake Boga is a form of population loss even though it is not 'out-migration' per se.

The local community responded to the crisis in many different ways. A community advisory group called Lake Boga Inc. was set up by Swan Hill Rural City Council which became the intermediary between the community and the council. Another response that received a great deal of publicity was the Dry Lake Bed Dinner, which attracted over two thousand people. When speaking about the future, respondents made reference to feelings of hope and anticipation. Because the lake has now been incorporated into the Mid-Murray Storage Project, locals expect water to return to the lake. The hope of water returning is an important factor in sustaining the community's morale.

Despite the pain and frustration which people have undergone as a result of drought and the dry lake, many recognise that important lessons can be learned from this experience. Generally such lessons involved the realisation of how much the lake had meant to them. This gave many a passion and a sense of purpose in making sure that the lake would never again be taken for granted once the water had been returned.

Emerging themes

There was a widespread feeling that various authorities had failed to adequately manage a range of situations as the lake dried. Some of these criticisms included: too many agencies involved; time lags in action; lack of information and conflicting information; and, barriers that hindered local action. The complex structure of management arrangements added to community frustration, anger and stress as the lake dried and different authorities became involved.

The drying of Lake Boga is generally not seen by residents as being caused by climate change. In fact many are sceptical about climate change theory and governments' focus upon it. Nevertheless, the use of language around the term climate change is complex and people have different understandings of the concept. For some, the term has become so politicised that they are inherently suspicious of it. Many find the evidence of climate change confusing or contradictory. Personal experiences of the local climate are a key source of evidence for those who have experienced previous floods, droughts, and good years. A current drought or high intensity rain event may simply be seen as a 'normal' part of the Australian climate by those experiencing it. For these reasons it is very difficult to generalise about the exact view that people hold regarding climate change. This is because the question itself means so many things, the evidence covers many types of outcomes, and the natural environment of Australia has such variation, especially when viewed through the lens of personal experience on the land.

Alongside irrigation allocation rules and arrangements for urban water supplies, there are now also rules for environmental flows. Recreational water use has generally had a lower level of priority than other uses. The case of Lake Boga suggests that communities place a high value on recreational use of water. Benefits of the lake ranged from healthy activities around water-based recreation to the social benefits of having an inclusive place to gather. There were concerns raised about who makes the decisions on water use and how public value of the resource is assessed, balanced and prioritised.

Uncertainty emerged as a strong theme in the study – not just the inherent uncertainty about future events, but that agreements made about Lake Boga's water allocation carried uncertainty regarding the timing of water returning. For many, uncertainty meant that planning and decision making became difficult and consequently stressful. At an individual level, people like certainty and concrete information which can provide a level of comfort, empowerment and a sense of control over the future.

The emotional responses of individuals have been identified as a key determinant of their ability to act and respond to change. This research shows that people move on and resolve to respond at different stages and at different individual rates when confronted by a major negative environmental change. Initial feelings of anger and frustration can take time to make way for an ability to participate in a constructive response.

Value of the research

This research project provides a model which may be applied to other locations experiencing environmental change.

The types of change which are foreseen under climate change scenarios would be suited to this kind of analysis, for example, changes along coastlines or in alpine environments. Gathering information from communities living in different environments and with different socio-economic characteristics would therefore deepen our understanding of how communities react and adapt to changing circumstances. In turn this would give government and other authorities greater ability to target assistance and support in more sophisticated and effective ways.

It is hoped that this report will be an important product for the community of Lake Boga. The documentation of their story is a powerful way in which they can share their experience and engage with other communities who may be facing the drying of their lake. Using research and information to facilitate such support networks is an important role for government to play.

Acknowledgements

This report has benefited greatly from the input of numerous individuals and organisations.

First and foremost, the researchers would like to thank the members of the Lake Boga community who offered the fieldwork team their hospitality and their stories. Their openness and willingness to engage with the research team was greatly appreciated, particularly given the difficult times they had experienced with the loss of their much prized lake. Our thanks also to those who provided photos for this report, allowing us to fully appreciate the lake before, during and after its drying.

Within the Victorian State Government, the research team was assisted by policy makers and researchers across a number of departments and statutory authorities. These included: Planning and Community Development; Primary Industries; Sustainability and Environment; Environmental Protection Authority; Regional Development Victoria, and North Central Catchment Management Authority. Other organisations involved in discussions during the course of the project included the Victorian Council on Social Services and McCaughey Centre at Melbourne University.

The enthusiasm for the research project, expert advice offered, and insightful comments regarding policy implications, provided highly valuable input for this final report.

The research team also acknowledges the valuable input provided by Goulburn-Murray Water and Swan Hill Rural City Council. Both organisations have been the ‘first port of call’ for many associated with Lake Boga and the challenges it faces. Their ability to deepen the researchers’ understanding of complex land and water management arrangements in the region has been greatly appreciated. The quality of this report has been enhanced by the information and feedback which they have provided.

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1. Introduction

1.1. Purpose of the study

The town of Lake Boga in northern Victoria experienced the loss of its lake in early 2008 due to ongoing drought conditions across south eastern Australia. This qualitative study of the town was undertaken by the Victorian Department of Planning and Community Development in order to understand the experience and impact of this environmental event on the local community.

Such research can inform government in a number of ways. It provides in-depth information about a community and the way it responds to change. This in turn can provide insights about the vulnerability or resilience of a community or of particular groups within that community – are some people affected more than others, and do some people adapt more readily than others? This can provide government with a better understanding of what support, advice or information might be most beneficial for communities seeking to deal with such change.

A part of this understanding also involves the testing of assumptions that government might be making about communities. For example, it is often assumed that those with fewer economic resources will be most affected by rapid change because adjustment often involves the need to access economic resources. Rural communities are often assumed to have high levels of social capital – that is, they are strongly bonded through networks and relationships which can offer support during times of difficulty. Yet these assumptions need to be tested with real-world examples, as many communities are multi-faceted, containing several distinct communities rather than one single homogenous group of citizens.

Another aspect of this research relates to the spatial outcomes of environmental change. In the face of drought or a drying lake, do people choose to leave an area? If so, what is the point at which the decision is made? If people stay, is it a choice or are there barriers which prevent a move? Ultimately, this information can provide insights about possible future settlement patterns and the degree to which they are influenced by environmental or other factors.

Climate change projections suggest that south-eastern Australia may become hotter and drier in the future. The research undertaken at Lake Boga is therefore of relevance to climate change debates, especially those around community impacts and adaptation responses. A drier future is likely to place greater pressure on streamflow and water resource allocation. Therefore, the ways in which communities use and value water are extremely important when dealing with decisions around water resource allocation and prioritisation.

1.2. Research methodology

For this research study, the community of Lake Boga near Swan Hill in north-western Victoria was chosen as a case study. The town of 700 people experienced a relatively sudden and significant environmental change. In early 2008 the lake that was central to the town's recreation and tourism industry dried up completely.

During October 2009, three researchers spent a week in Lake Boga conducting 33 in-depth interviews with locals. These interviews aimed to explore: life before the lake dried up; experience and explanation of the event; community responses; and views about the future of Lake Boga. A total of 45 participants were involved and approximately 35 hours of interview material were obtained. Characteristics of the participant sample are provided in Appendix One and the interview schedule in Appendix Two.

A policy round table was held in Melbourne on November 12th which provided an opportunity to explore policy implications of the research. Themes emerging from this discussion include the role of government agencies in assisting communities facing environmental change, and the difficulties for both government and communities as they deal with uncertainty and risk.

The research team returned to Lake Boga on the 9th December in order to present preliminary findings of the research to residents who participated in the interviews. This return visit was a key part of the trust-building process as well as a verification of research findings.

Following this process of consultation with stakeholders and participants, analysis was completed and this report prepared.

1.3. Policy relevance of the study

During the course of the project, various decision makers and policy professionals were consulted to determine the level of interest in undertaking the research.

From these discussions it became evident that little research had been done to examine emerging trends in community responses to environmental stress in regional Victoria. Most of the evidence on this issue is anecdotal, and it was seen to be useful to have more up to date examples of current trends and community perceptions.

There was particular interest in the issue of population movement, for example, under what circumstances do people move due to environmental stress? Are there tipping points for these choices? And where might people move to?

It was also felt that research on responses to environmental change could complement the work by CSIRO and Victorian Department of Sustainability and Environment (DSE) on regional climate change projections (www.climatechange.vic.gov.au).

Findings from the Lake Boga research project may be of relevance to a range of government agencies interested in community adaptation and resilience in the face of climate change.

There was support for the study being localised in a small, previously unstudied location. Interest was expressed in expanding the research model to other communities, particularly coastal, who are facing environmental change in line with climate change projections.

Other areas of policy relevance included:

- the relationship between the drying lake and community wellbeing (e.g. health impacts, service needs);
- what the community observed regarding governments' role and response to the drying lake;
- planning for dry lakes management strategies;
- ways in which communities value water and other environmental assets; and,
- community engagement strategies.

1.4. Structure of the report

This report has three main sections. Chapter Two provides a background to Lake Boga in terms of history, socio-economic profile and water systems (both natural and man made). Chapter Three analyses the findings from the fieldwork and is structured around the key themes explored through the interviews: the full lake; the drying lake; social, economic and demographic impacts; reactions and responses; views on climate change; and, future prospects for the town. Chapter Four discusses key themes arising from the findings including issues around: management and governance; communication and uncertainty; water resources; attitudes towards climate change; community impacts and adaptation; economic and demographic change.

2. Background

2.1 Historical context

Lake Boga is located along the Murray Valley Highway, 40 kilometres north of Kerang and 15 kilometres south of Swan Hill (figure 1). It sits on the northeastern edge of the Mallee region of Victoria. The lake has an area of just over 800 hectares and with its large circular shape has proven highly suited to various water sports such as water-skiing, racing, yachting and swimming.

(www.murrayriver.com.au/lake-boga)

Aboriginal nations have lived along the River Murray and around its associated lakes for tens of thousands of years. Food and water supplies were abundant and remains of middens and cooking ovens have been found. The first Europeans, led by the explorer Major Mitchell, visited the Swan Hill district in 1836 looking for land to settle. On the basis of Major Mitchell's favourable reports, pastoralists soon followed and established large sheep stations along the Murray. From the 1860s, some of the larger pastoral properties were subdivided and selectors started to replace squatters in the Swan Hill region and around Lake Boga and Fish Point. Selectors also started opening up the central and western Mallee, establishing grain farms. During this period of European settlement the local indigenous population fell sharply. A European settler noted: "in 1848 it was estimated that there were 3,000 natives living on the Murray River between Echuca and the Darling junction; now, in 1896, there are not sixty." (cited in Gardner 1986, p. 1).

Lake Boga was officially designated a town in 1892. The local football team was established in the same year, making it one of Victoria's oldest. By the end of the nineteenth century, irrigation systems had been developed along the River Murray and the agricultural economy around Lake Boga and Swan Hill diversified. An irrigation pump was installed by the State Rivers and Water Supply Commission at Tresco near Lake Boga in 1904. In the first few decades of the twentieth century Lake Boga could boast a range of local businesses: butter factory; post office; butcher; general store; stock and station agent; public hall; and mechanics' institute. In 1927, the street scene became complete with the establishment of the Commercial Hotel. By 1939 the town offered a range of seventeen businesses which provided goods and services to the local population (Gardner 2000, p. 231).

Soldier settlement schemes were established after the First and Second World Wars. Some of the early schemes were located in the Mallee but subsequently many were sold or abandoned by returned soldiers due to the harsh climate and small lot sizes. Later schemes, following the Second World War, were generally better planned and located closer to the River Murray. Robinvale, downstream from Swan Hill was one of these.



Lake Boga is located on the northeastern edge of the Mallee region of Victoria

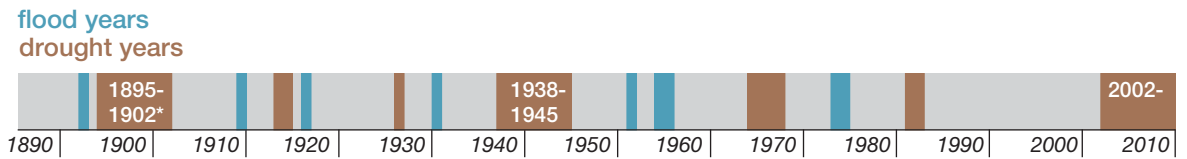
Figure 1: Location of Lake Boga



In the late 1930s, Lake Boga was identified as a suitable site for flying boat operations. Aside from the suitability of the lake, the area also had a railway depot and good power supply. In 1942 a flying boat maintenance depot was established at Lake Boga, the role of which was to repair and maintain Australian, American and Dutch flying boats including Sunderland, Glen Martin Mariners, Kingfishers and Walrus aircraft as well as Catalinas. The depot remained in operation until 1947. This wartime period of Lake Boga's history has had a lasting effect on the town.

Older residents remember the associated social activity as American and Australian servicemen flew into town and held various social activities such as dances and movies in the local hall. Visual reminders of this period still exist in the town – a number of wartime bunkers can still be seen and one has been converted into the local Catalina museum. Anchor blocks used to tether the flying boats became visible with the drying of the lake. A total of 1,050 flying boats arrived at, and departed from, the Lake Boga depot between 1942 and 1947 and a total of more than a thousand defence force personnel were stationed at the associated barracks.

Figure 2: Droughts and floods in the Murray-Mallee region of Victoria, 1890 to 2010



* The Federation Drought affected Australia between 1895 and 1902. Around half the national sheep flock died as a result of this drought. In 1902, the River Murray stopped flowing at Swan Hill and could be crossed by foot. The Federation Drought tends to be seen as a benchmark by many rural communities, and stories of the time have been handed down and are still discussed 100 years later in communities like Lake Boga.

Sources: Gardner 1986, 2000; Australian Bureau of Meteorology 2009

In the post-Second World War period, the region benefited from a strong rural economy with agricultural products being the mainstay of Australia’s export markets. Nevertheless, the natural environment presented the full range of challenges with 1940s droughts and dust storms being replaced by some of the State’s wettest years on record during the 1950s. Being in a riverine area, flooding presented major problems for local farmers as it did later in the 1970s. Both drought and flood events have remained strong in the memories of older townspeople in Lake Boga (figure 2). In fact, both farmers and non-farmers share a strong memory and shared experience of the extreme wet-dry cycles of the local environment. Such experience has contributed to a tough and resilient local character. In fact, the toughness of farming in the Mallee is widely recognised across Australia.



Between 1942 and 1947 a flying boat maintenance depot existed at Lake Boga. This wartime history is an important part of the town’s identity

2.2 Lake Boga – a statistical overview

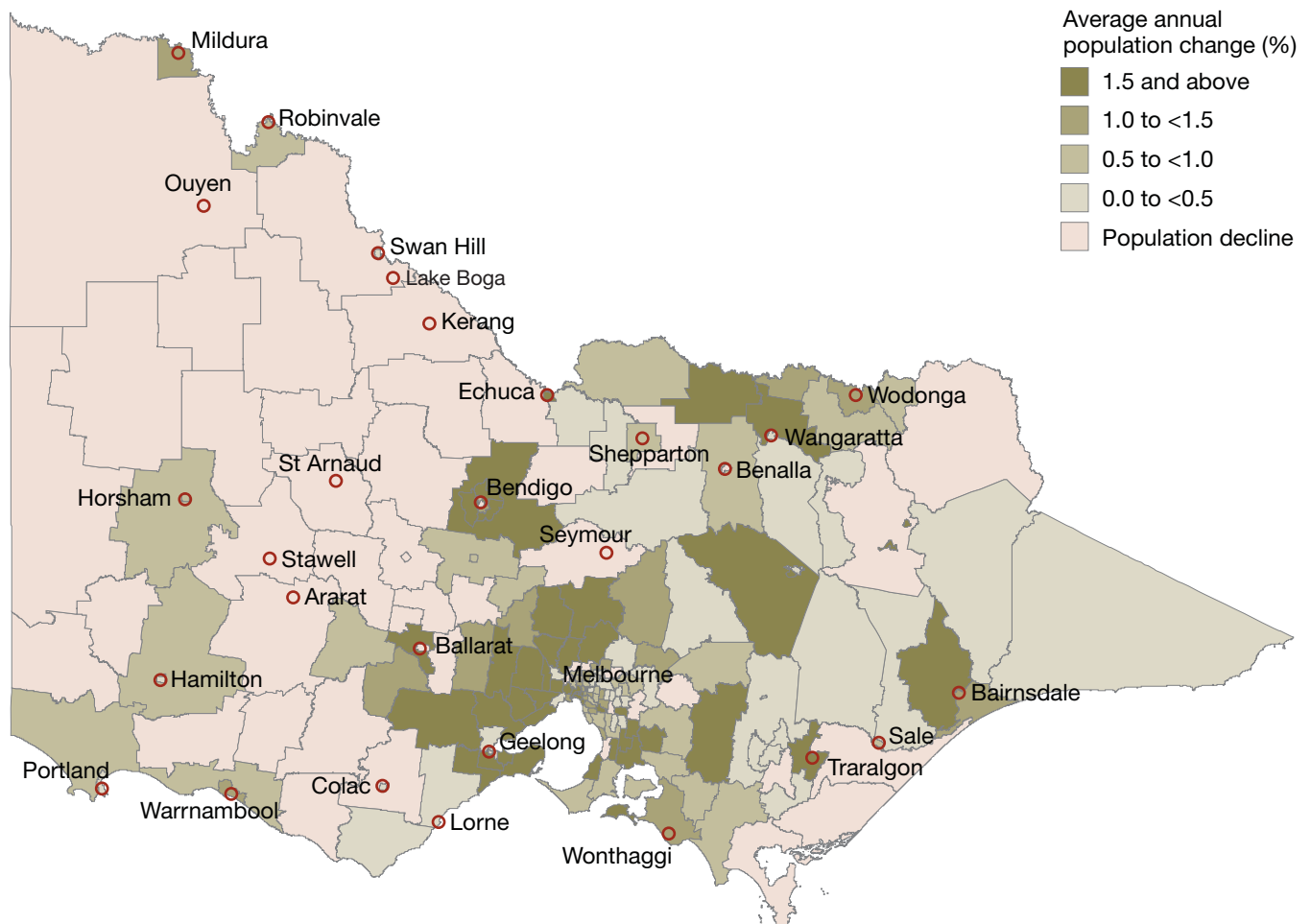
The Victorian context

Population growth in Victoria during the past decade has been greatest in areas in and around Melbourne and also in many of the larger regional cities, particularly Bendigo, Ballarat and Geelong (figure 3). Between 2001 and 2007, Melbourne grew at an annual average rate of 1.6%. Regional areas adjacent to Melbourne’s outer boundary¹ grew at 1.3% during the same period while the rest of the state grew at 0.7%.

Population decline occurs in some rural regions of Victoria, most notably the dryland farming areas in the west of the state. The reasons for this trend can include: capital intensification of agriculture requiring fewer workers; rationalisation of services into fewer, larger centres; increased personal mobility allowing people to access goods and services further away; and increasing economic and social attractiveness of urban lifestyles. Because of these factors, regions which are remote from urban areas face particular challenges in retaining and attracting population. Rural areas (those areas outside of towns and cities) have experienced lower rates of population growth than country towns or regional cities during the past decade.

¹ Municipalities of: Greater Geelong; Moorabool; Macedon Ranges; Mitchell; Murrumbidgee; Baw Baw and Bass Coast.

Figure 3: Population change in Victorian Statistical Local Areas, 2001 to 2007



Source: ABS Regional Population Growth, Cat. No. 3218.0

Population change in Lake Boga

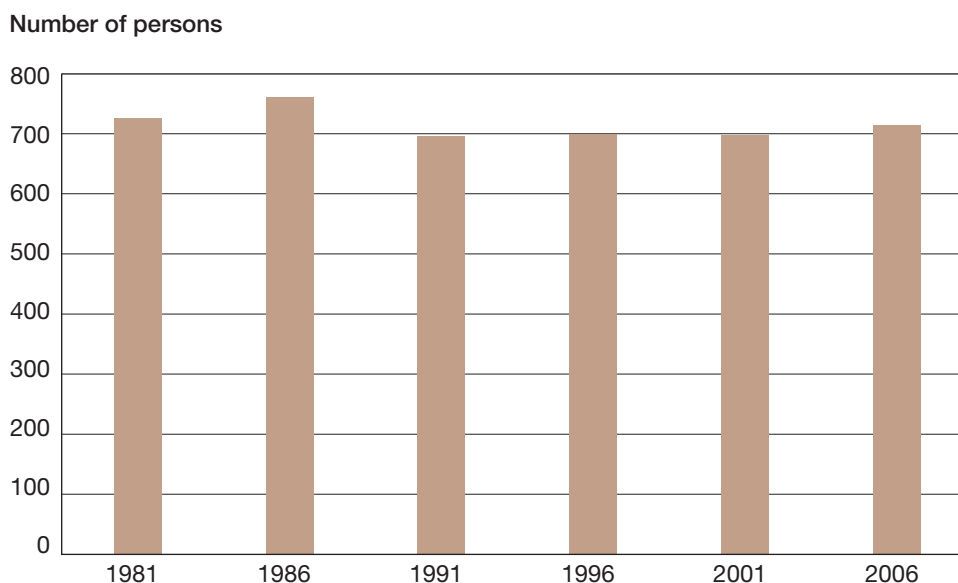
The population of Lake Boga has remained relatively steady over the past 25 years (figure 4). In fact, during the decade 1991 to 2001 it only varied by two persons. By the time of the 2006 census the population of Lake Boga was 715.

This steadiness of the town's population hides the changes that can occur as a result of population turnover. The location of Lake Boga on the edge of the Mallee, yet within proximity to Swan Hill, suggests that two opposing trends may be at work. On the one hand, rural towns in dryland farming areas to the south of Lake Boga have lost population. Farm sizes have increased and there are fewer people now living in rural areas. On the other hand, regional centres like Swan Hill and Mildura have generally grown as they have become the focus for services and employment for a wide region. Personal mobility brought by car ownership and general improvement of main roads over the past quarter century have led to services being concentrated in fewer larger centres across the regional landscape. Large retail corporations and services such as banking have rationalised into fewer centres over that period.

Figure 5 shows the relative population change of Swan Hill city and the rural areas around it since the Second World War. While both city and rural areas experienced population growth during the late 1940s through to the mid 1960s (due to soldier settlement schemes and expansion of irrigation agriculture), rural areas have since seen a slow decline. The urban area of Swan Hill has continued to grow and has only seen a flattening of its growth rate in the 2000s. The overall effect of this trend is that rural areas of the municipality have experienced a falling share of population – from 67% in 1947 to 53% in 2006. Population projections suggest that this may fall to 50% in the coming twenty years.

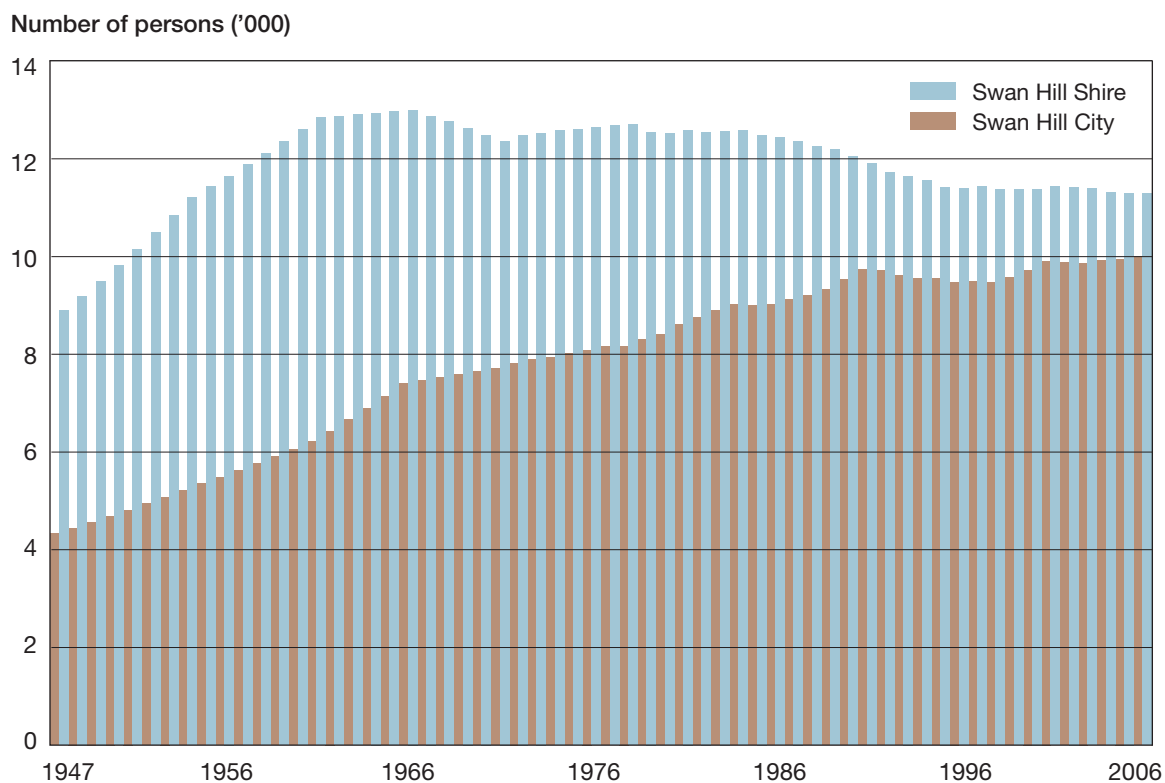
Lake Boga sits within both a rural landscape and within the shadow of a regional centre. When the lake has water, it provides a high amenity location for those commuting to Swan Hill, or those seeking a retirement option. Meanwhile, the township area has more affordable housing (i.e. smaller houses without a lakeside view) which is also attractive for those who may be unable to afford prices within Swan Hill. This relative affordability has increased with the loss of the lake as house prices have fallen.

Figure 4: Population of Lake Boga, 1981 to 2006



Source: DPCD 2008, Towns in Time

Figure 5: Population of Swan Hill Shire and Swan Hill City, 1947 to 2006²



Source: DPCD unpublished data based on ABS figures

2 The current municipality of Swan Hill comprised the municipalities of Swan Hill Shire and Swan Hill City prior to 1994. Data used in this table for the years after 1994 are based on SLA geography. The combined SLAs of “Swan Hill (RC) – Robinvale” and “Swan Hill (RC) – balance” are equivalent to the former Shire region while the SLA of “Swan Hill (RC) – Central” is comparable to the former municipality of Swan Hill City.

Comparison of Lake Boga in 1986 and 2006 (table 1) reveals some of the ways in which population characteristics have changed during a period where overall numbers in the town remained steady. In 1986 the majority of town residents were employed in agriculture or retail; by 2006, most were employed in retail and health care.



Agriculture is an important source of employment in the Lake Boga region

Table 1: Selected industry of employment, Lake Boga, 1986 and 2006

Selected industry of employment*	1986		2006	
	No	%	No	%
Agriculture, Forestry and Fishing	50	17.4	36	11.3
Manufacturing	17	5.9	35	10.9
Retail Trade	40	14.1	45	14.1
Accommodation and Food Services	7	2.5	19	5.9
Health Care and Social Assistance	19	6.7	43	13.4

*Applies to persons aged 15 and over

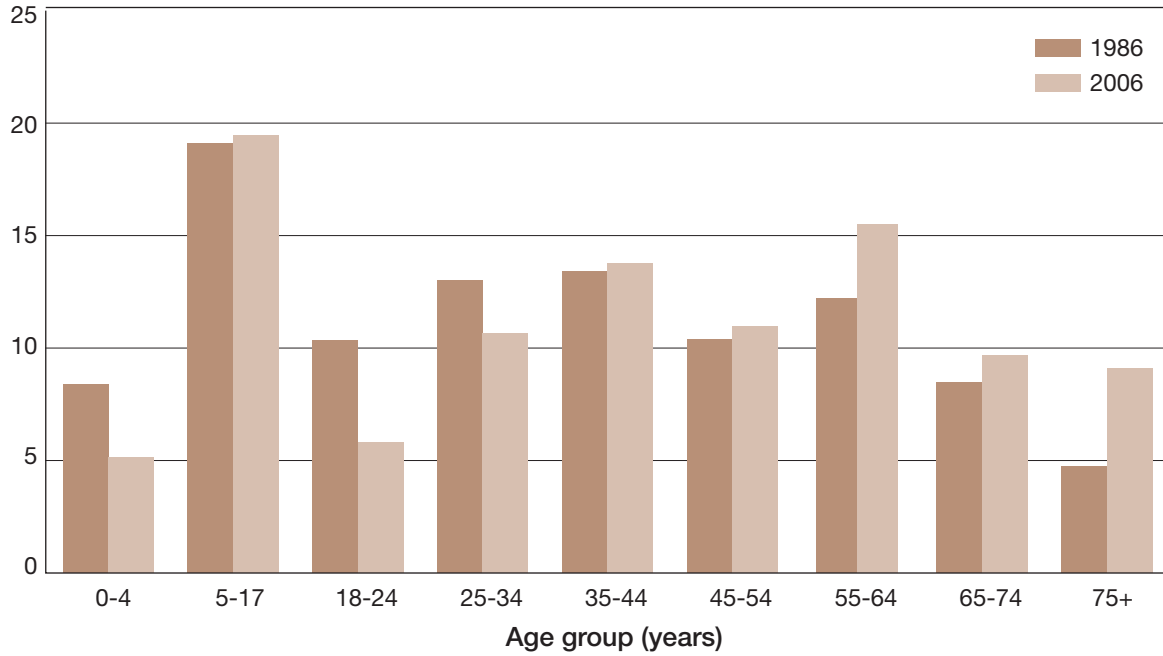
Source: DPCD 2008, Towns in Time

Over the same twenty year period, the age structure of Lake Boga also changed (figure 6). In 1986, 209 residents were under the age of 18 (28%) and 100 were over 65 (13%). By 2006, 175 residents were under the age of 18 (25%) and 133 were over 65 (19%).

Lake Boga has also seen changes in the characteristics of households over the past decade (figure 7). There has been an increase in the numbers of couples without children and lone-person households. These households are likely to comprise couples whose children have left home, those who have retired and those who are older or widowed, living alone. Numbers of one parent families have increased from 69 to 82 over the period, although as a proportion of all households, this represents only a small increase from 26 percent to 27.5 percent.

Figure 6: Age structure of Lake Boga, 1986 and 2006

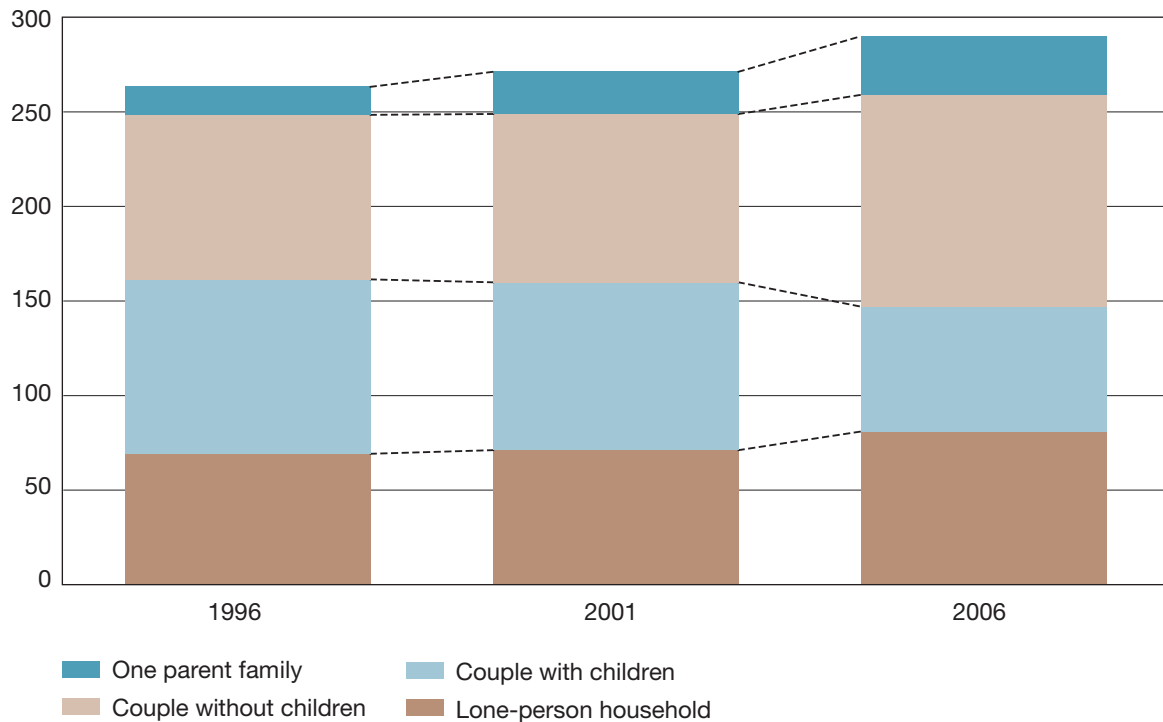
Number of persons



Source: DPCD 2008, Towns in Time

Figure 7: Household types in Lake Boga, 1996, 2001 and 2006

Number of families/households



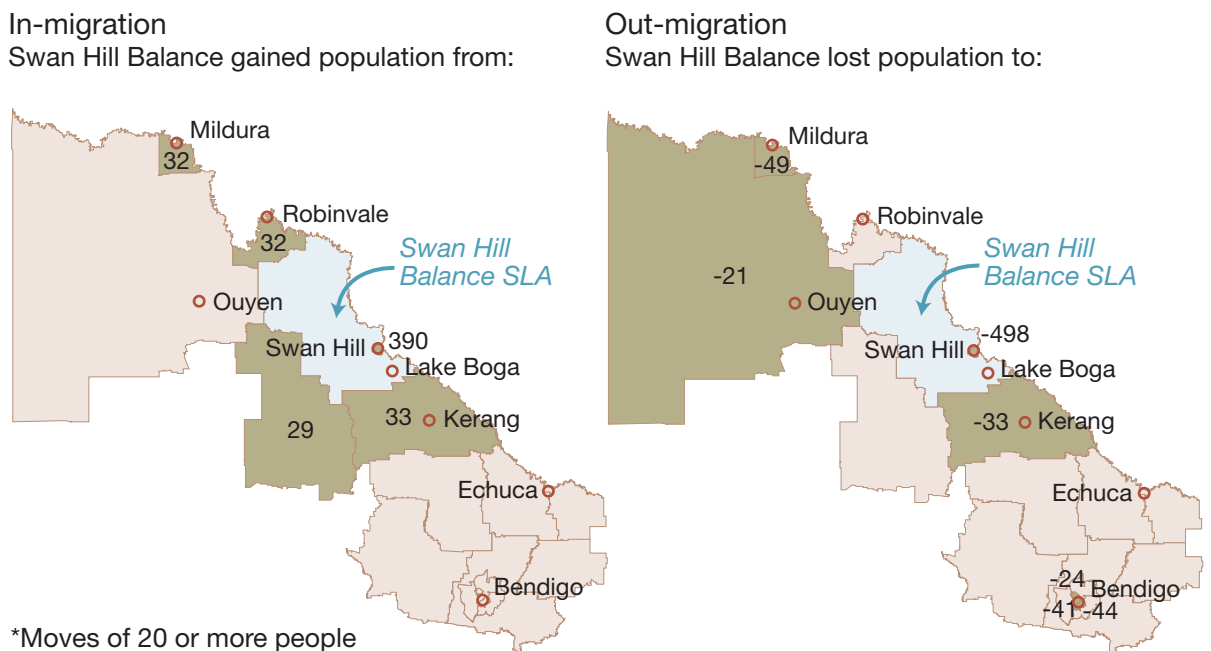
Source: DPCD 2008, Towns in Time

Migration patterns

People are most mobile in their early adult years. Within regional Victoria there is a pattern of net migration loss among young adults as they move to regional cities or Melbourne for education, employment and social opportunities. At a sub-regional level, these migration patterns may be mediated by regional cities. Rather than moving to Melbourne, many rural youth move to a regional city. For young adults who have grown up in Lake Boga, the proximity of Swan Hill may make also make commuting a viable alternative to moving residence. Others may seek education or employment in a centre like Bendigo – closer to Melbourne but without some of the disadvantages (e.g. costs) of a large metropolitan area.

Those moving *into* an area like Lake Boga are more likely to be older – those seeking a lifestyle change or reaching retirement age. Lake Boga has traditionally attracted these people because of its landscape qualities (i.e. the lake) and small-town community. For those still in the workforce, or those wanting access to a range of goods and services, the proximity of Swan Hill makes Lake Boga a more attractive option than towns further afield. In fact the combination of small-town feel with large-town access is highly attractive. Other towns in Victoria which have this combination of features have seen population growth – Castlemaine, Kyneton, Clunes, to name a few. The difference with Lake Boga, and the likely reason for its slower growth, is partly distance from Melbourne – it tends to attract people from within the region rather than from the very large population source of Melbourne (figure 8).

Figure 8: Migration flows in and out of Swan Hill – Balance SLA, 2001 to 2006



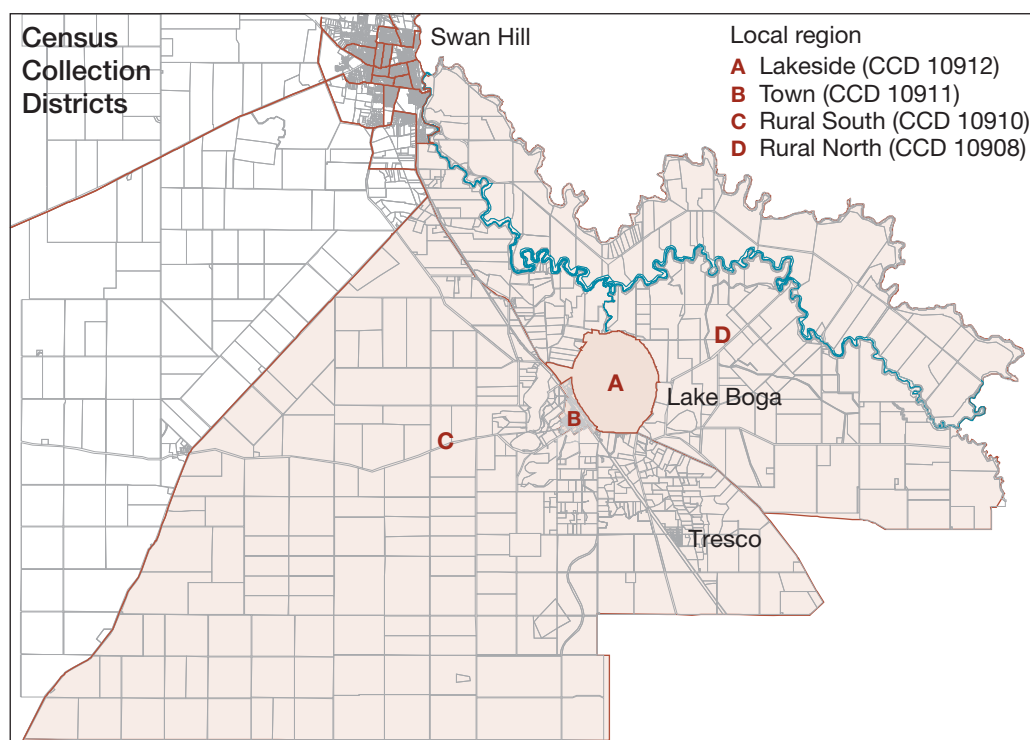
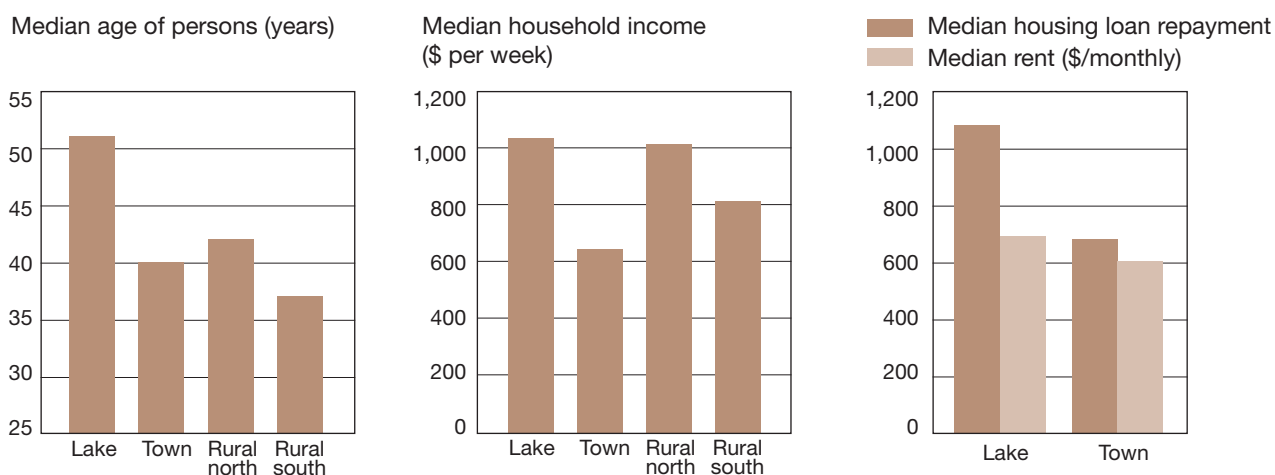
Source: ABS Census 2006, customised migration matrix

Population characteristics within Lake Boga

The smallest geographic level at which ABS data is publicly available is Census Collection Districts (CCDs). The township of Lake Boga is covered by two of these districts, generally corresponding to township and lakeside areas. Adjacent rural areas are covered by two additional districts (figure 9). This allows some analysis of demographic characteristics at a detailed level.

The median age of residents is higher around the lakeside (51 years) than in the township area to the west of the railway (40 years). This reflects the attraction of the lakeside area for many retirees, and the relative attraction of the town for young families. Rural areas to the north have a slightly higher median age (42) than to the south (37). The median age for Victoria overall is 37 years.

Figure 9: Selected medians for local regions in and around Lake Boga 2006



Source: ABS Census 2006, Table B02

There are income variations within the region. Incomes for lakeside residents are, on average, higher than for those in the township area of Lake Boga. Median incomes for rural areas are also higher than for the township. Rental and mortgage payments are generally lower in the township area than for lakeside properties and rents are low in the rural areas also.

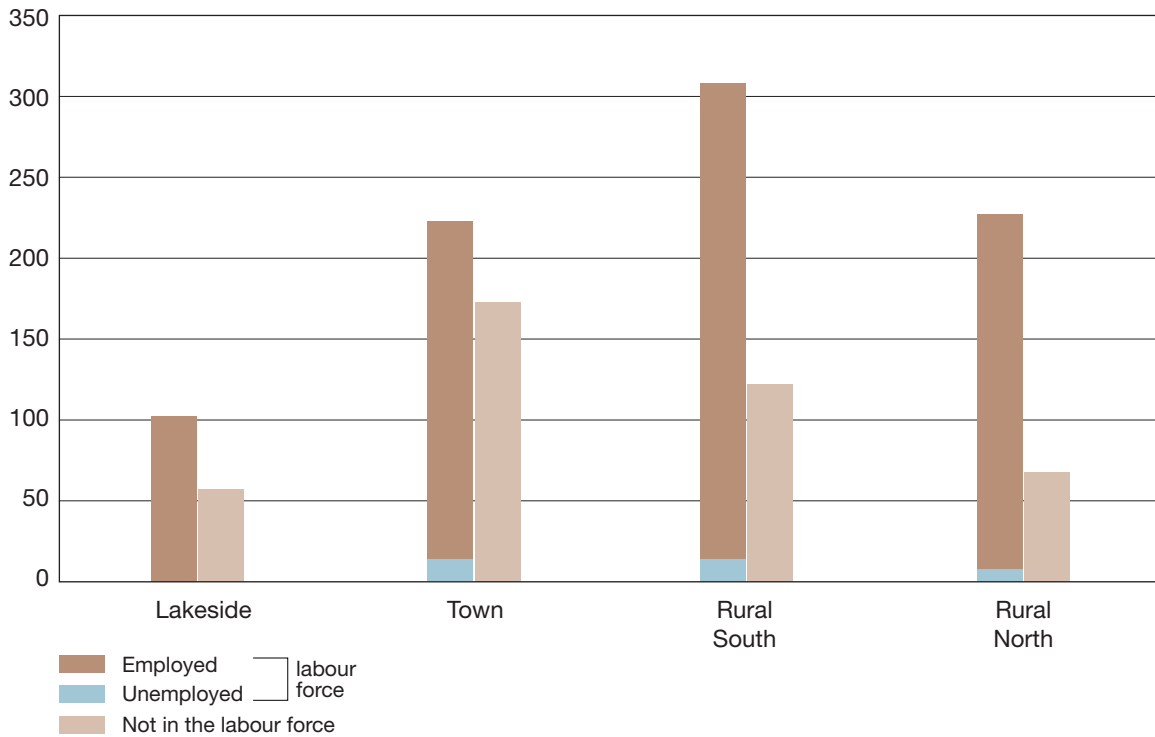
An important difference between the lakeside and township areas of Lake Boga are the levels of participation in the workforce. Employed and unemployed people are counted as being part of the workforce while those classified as 'not in the workforce' include full-time retirees, stay-at-home parents, and those who may be unable to work. In the township area, 223 people are not in the workforce, representing 44% of the adult population (figure 10). This proportion is higher than for the lakeside area (36%) and the rural areas (23% north, 28% south).

Those living in Lake Boga (town and lakeside combined) and in the labour force numbered around 330 people in both 1986 and 2006. Over the course of this period, the proportion of the labour force that was unemployed fell from 14% to 4.5% (figure 11). Numbers of unemployed are relatively small, and comprised less than 15 people in each of the 4 collection districts at the time of the 2006 census. The lakeside area shows the lowest level with no unemployed recorded in the 2006 census, while the township area had a rate of 5.8% (13 persons). The rural areas had rates of 3.5% (rural north, 8 persons) and 4.6% (rural south, 14 persons).



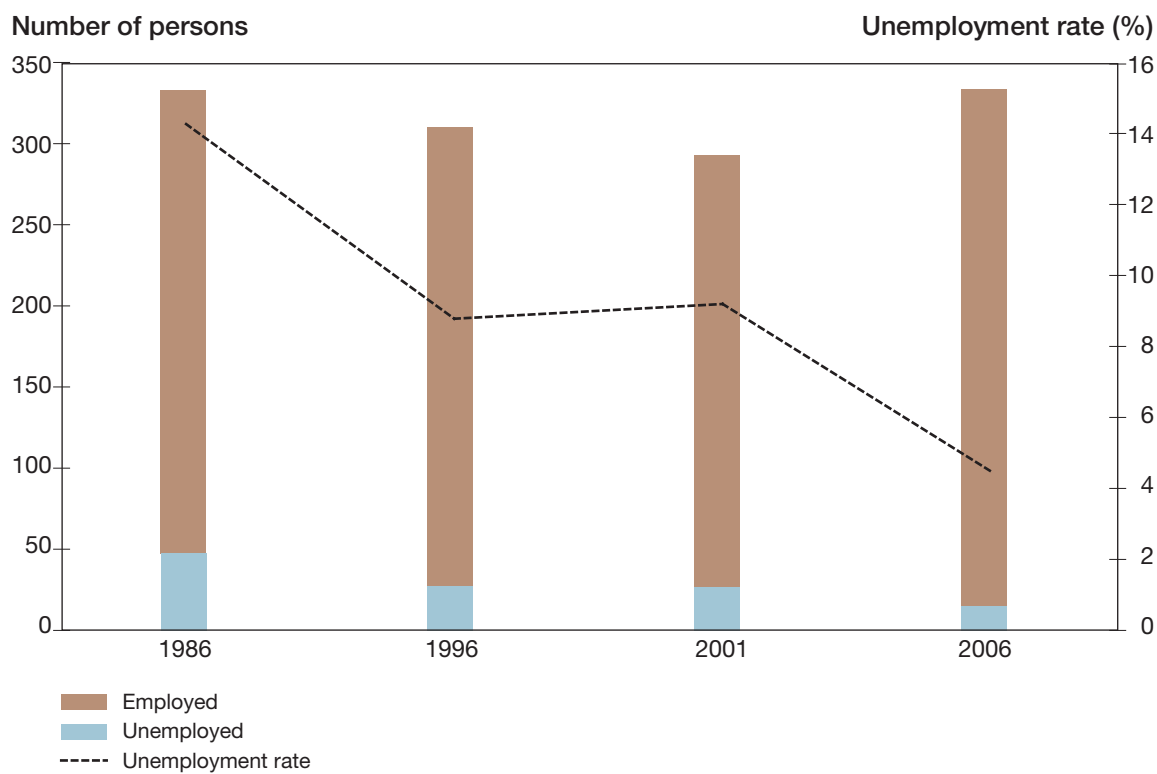
Figure 10: Labour force characteristics, Lake Boga sub-regions, 2006

Number of persons



Source: ABS Census 2006, Basic Community Profile, Table B41

Figure 11: Labour force status of residents, Lake Boga, 1986 to 2006



Source: DPCD 2008, Towns in Time

2.3 Water management and irrigation in the Lake Boga region

Natural water systems

Lake Boga is part of a complex system of lakes, rivers and man-made infrastructure to the south of the River Murray and immediately west of the Loddon River (figure 12). It is the most northerly of the Kerang Lakes, a complex natural system which comprises around 50 lakes, swamps and marshes. The largest lakes in this area are: Kangaroo Lake; Lake Boga; Lake Cullen; Lake Tutchewop; and Lake Charm.

Lake Boga fills through flood flows from the Avoca River (figure 13). It can also receive water from the Little Murray River as well as the Loddon River via the Kerang Lakes System. The Avoca River has highly variable flows which cease during dry years. Uses of the lakes are varied – some such as Middle Lake are internationally recognised Ramsar³ listed wetlands, supporting bird life and significant native vegetation. Others are important as part of the Torrumbarry irrigation system, while Lakes Charm and Kangaroo are used for recreational boating, skiing and fishing, as is Lake Boga when it has water (www.kerangonline.com.au/kerang_lakes_system/).

³ The Ramsar Convention on Wetlands of International Importance aims to promote the conservation and sustainable use of significant wetlands around the world. Eight wetlands within the Kerang Lakes are listed under the terms of this convention, but Lake Boga is not included (DSE 2004).

Figure 12: Loddon-Mallee region of Victoria

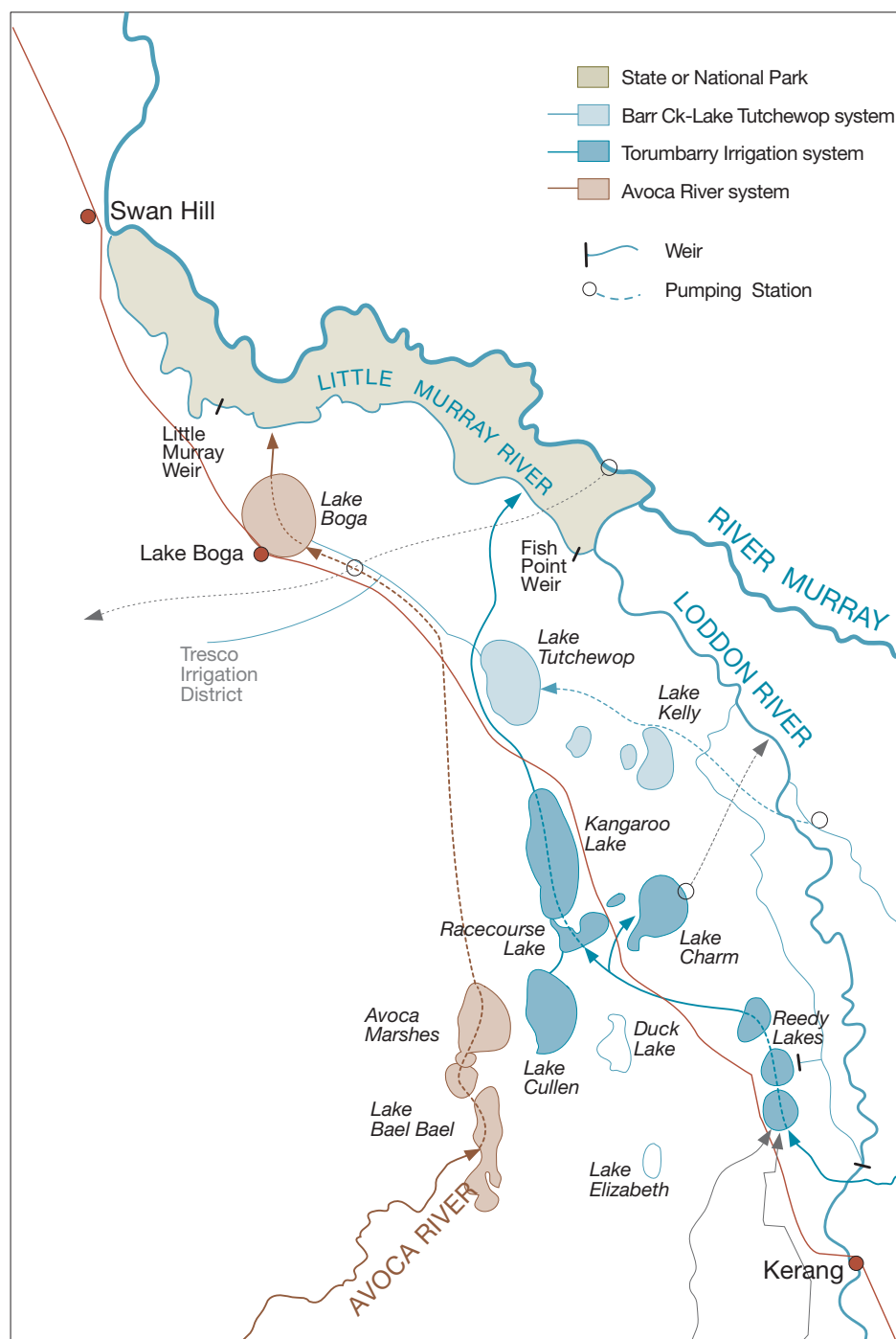


Source: Adapted from NCCMA 2007

Irrigation systems

Until the mid 1960s Lake Boga was part of the Torrumbarry Irrigation System. It was taken out of this system because of salt levels in the irrigation water which were damaging local fruit crops. Neighbouring Lakes Charm and Kangaroo are still within the Torrumbarry Irrigation System (figure 13).

Figure 13: Irrigation and river systems in the Kerang Lakes region



Source: Adapted from NCCMA 2007

Being outside the irrigation system, Lake Boga relies on flows from the Avoca River, and River Murray, when available. There have been no flood inflows from the Avoca River since 1996. All water sourced for the Lake after 1996 was from surplus flows in the River Murray. These flows are accessed under specific conditions: when the River Murray is declared to be in surplus flow by the Murray Darling Basin Authority, Lake Boga can access water from the Murray via Fish Point Weir. To be in surplus, the river flows at Torrumbarry Weir (upstream from Swan Hill towards Echuca – refer figure 12) generally need to be greater than 12,000 ML per day. Such flows cause Fish Point Weir to overflow and the weir gates are opened at this point, allowing water to flow into Lake Boga via the outfall structure on the northern end of the lake. Up to 1,000 ML per day can flow into the lake during such events.

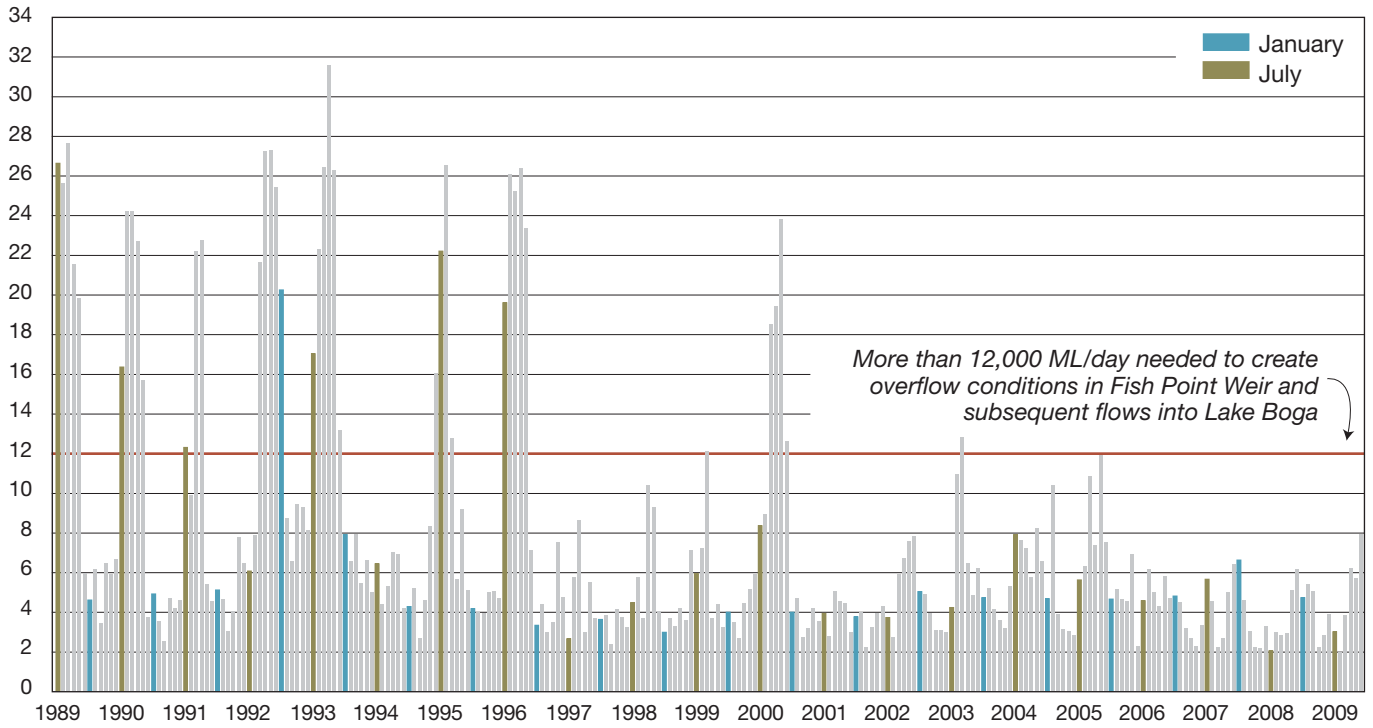
Although Lake Boga is not part of the Torrumbarry System, it is designated as a component of the Mid Murray Storage Project. As part of the Victorian Government's *Our Water Our Future* strategy, a decision was made earlier this decade to decommission Lake Mokoan, an irrigation storage upstream on the Goulburn River near Wangaratta, and return it to its original wetland regime. The water previously held in this storage has been returned to River Murray flows and some of this additional flow is now allocated to be captured and stored for irrigation in Lake Boga, Lake Charm and Kangaroo Lake, as part of the Mid-Murray Storage Project. Under the project, it is proposed that Lake Boga still be filled primarily via the Murray River, with a small amount of flow coming from the Torrumbarry system. This is in contrast with Lake Charm and Kangaroo Lake, which are both filled primarily through the Torrumbarry system.

Recent rains in October 2009 led to Lake Charm and Kangaroo Lake reaching capacity. However, Lake Boga did not receive water at this time, partly because the Murray remained too low to generate surplus flows via Fish Point Weir (figure 14), and the Victorian tributary flows through the Mid Murray Storage project were not able to be passed through the channel at the southern end of Lake Boga – this channel requires upgrading to increase capacity. Such upgrading of the southern channel is envisaged under a proposal to decommission the Little Murray Weir which lies to the north of Lake Boga. If the Weir is decommissioned then upgrading works would be undertaken, with an expected completion date of mid-2011.

With Lake Boga being part of the Mid-Murray Storage project, the harvesting, storage and release of raw water will become the primary management objective of the lake while public recreational use would be a subsidiary management objective. It is proposed that Goulburn-Murray Water, as the relevant regional water supply authority, will be assigned the responsibility for management of the water resource stored in this lake. However, other aspects of the management of the use of Lake Boga also rest with the Swan Hill Rural City Council and Department of Sustainability and Environment. A Memorandum of Understanding that clarifies various responsibilities between the authorities is currently being finalised.

Figure 14: Average monthly flows for the River Murray at Swan Hill, 1 July 1989 to 23 Dec 2009

Megalitres per day ('000)



Source: Murray Darling Basin Authority 2009, customised request

3. Findings from the study

3.1 The full lake

As the name 'Lake Boga' suggests, the full lake has historically been the centrepiece of the town's identity. The recent history of Lake Boga was told by the participants through detailed stories and relaying fond memories of the way of life that the lake offered in the past.

For most of the interviewees the full lake was the central component of the benefits of living in Lake Boga. The activities, lifestyle and community aspects that were referenced as advantages were, in most cases, linked strongly to the time when the lake was full and functional.

The lake was central to everything ... our daughter was married down on the lake, we had dad's 90th birthday down there, it was just a really nice place to go with your friends. (Interview 2)

The lake was the centre of activity for the town and provided a space for popular events such as regattas, skiing competitions, and 'splash-ins' of the historical Catalina warplanes. On weekends during the summer there were farmers' markets on the foreshore which promoted the local horticultural producers and attracted tourists. Regular events such as the New Year's Eve festival and fireworks were also spoken about as highly successful and enjoyable nights for both tourists and locals. People spoke with pride about the level of tourism that was generated during this time.



They came from far and wide, from all over Australia, to be here. (Interview 15)

Much of the tourism in the summer months was regular with many families coming every year and staying for the whole summer. There was a sense that these regular visitors were very much a part of the fond memories participants had of summer in the town.

There were people who would come back every year just for the fishing. Europeans, Italians and the like ... They came from all around, just to stay in the caravan, get out of the city and catch fish that were plentiful and easy to catch. (Interview 24)

They also spoke positively about how busy and active the town was at this time. Regional tourism was an important part of this story with people coming from Swan Hill year round to use the lake for swimming, boating and fishing.

There were people who lived in Swan Hill who'd bring their caravans down and park them all the way around the lake. They'd commute from here during school holidays so that the kids would be here all the time. And so mum looked after the kids and dad went to work or vice versa. (Interview 15)

The lake was the centre of activity for the town and provided space for popular events

Photo credit: Meg Irvin

The lake was a place where the community got together and was an attractive place for young people to socialise. People spoke about the opportunities it offered to meet new people, catch up with friends and provide a safe place for kids to play while the parents socialised.

The major feature drawing the tourist trade was the opportunity for sport and recreation. Water skiing, boating, fishing and swimming were activities that provided entertainment all year round but also gave the town a real boost during the tourist seasons.

During the summer there was just a mass of cars out the back ... and a mass of young kids down the back skiing and having a sociable time. (Interview 5)

With the ski boats it was like Bourke St, you almost needed traffic lights sometimes, there were boats just going around and around all the time. (Interview 13)

The day-to-day opportunities of an outdoor lifestyle and quiet enjoyments were also mentioned. This included the benefits of having space for barbeques, walks and the views that the lake offered.

We would have two or three caravans around here and at times I would make a barbeque for about 25 of them. (Interview 8)

I don't think you could put a monetary value on the entertainment and outdoor activities that the locals enjoyed because of its existence. (Interview 10)

The summer months in this region of Victoria are hot and traditionally the lake provided natural and inexpensive relief from the heat.

When we get northerly winds up here it is normally pretty hot, about 40 or 45, but because the wind blows off the surface of the water it's like a big evaporative air conditioner. (Interview 7)

The relief was seen as especially important for the farmers of the region who saw the lake as a place of respite from the harsh, dry conditions that come with farming in the Mallee.

The farmers were in drought for that many years and have had tough times. They come down here and it's an outlet for them. In those days when the lake was full you could say that that helped their emotions ... it was just a great day out for them. (Interview 22)



The lake was a place where the community got together and was an attractive place for young people to socialise

Photo credit: Meg Irvin

For those who had lived in the region for a long time, the lake formed an integral part of their memories of growing up and their sense of family history. Others moved into Lake Boga and bought property because of the lake and the lifestyle it provided. Some of these respondents bought houses around the lake in order to retire, some moved from the city to live a semi-rural lifestyle while others made a decision to build businesses around the tourist trade that the lake provided. For others, a relationship had led to the move.

He lured me up here with the water.
(Interview 8)

Other advantages of living in Lake Boga were spoken about in a more broad and ongoing way, such as the strong sense of community and the small-town lifestyle.

It's a small town so you've got good community engagement and spirit, it's friendly and everyone knows everyone. I find that's good. (Interview 14)

Similarly, there were a number of interviewees who expressed a strong attraction to the wider area of northern Victoria, its climate and its distinctive environmental features.

It's more than living here. It's my home. That's why we retired here. I've always felt an affinity with the area. (Interview 11)

Respondents mentioned very few disadvantages of living in Lake Boga. A small number cited remoteness as an issue, specifically the distance from Melbourne, which was seen as being both a political and practical problem.

3.2 The drying lake

The drying process

When I look back I guess we took the lake for granted. It was just a part of our lives. (Interview 1)

The lake had been drying for several years and dried up completely in February 2008. The remembered experience of this time varied between interviewees. For some the speed of the drying was a shock, others noted that the decline in the lake's condition had been occurring for many years. The majority of respondents did express shock at the fact that the lake had finally 'dried up completely', unlike other times when the water level had dropped but was refilled naturally or by authorities.

It wasn't necessarily a surprise because we could see it over a period of time, but I suppose we always thought there would be a chance of some environmental flows, or significant falls over the catchment ... so it was a bit of a shock. (Interview 29)

Immediate impacts

The events that immediately followed the drying were severe and had a lasting effect upon the community. One of the most cited impacts was the smell of rotting fish that permeated the area for at least a three-month period. As the water receded, the large fish stocks in the lake began to die. The interviewees spoke about the lack of attempts by authorities to fix the looming problem in the initial stages, despite offers by professional fishermen to fish out the lake. With the high temperatures over summer deoxygenating what was left of the water, there was a final kill which left what was reported to be tens of thousands of rotting fish corpses.

The water was that hot that it cooked them. They all died within a ring around the edge of the lake and it was probably about 20-30 metres wide ... and they all died within a matter of two to three days. (Interview 6)

The poor things had to die the most shocking death. They were literally cooked in the water. (Interview 28)



The final stage of the lake drying caught many residents by surprise – they had not expected it to dry completely

Photo credit: Fred O'Bryan

The heat over the next couple of months added to the problem, as did any rain which opened the dried carcasses and renewed the smell. At this stage of the drying process the nature of the mud in the lake bed made it impossible to retrieve the bodies. The stench in these months was described as unbearable at times and caused the community a great deal of anguish.

It was a bit like living near a sewage treatment plant I suppose. The smell of rotting carcasses just wasn't a nice thing. (Interview 17)

Some expressed a feeling of being isolated and abandoned by authorities at this time.

It would never have happened anywhere near the city area. You just wouldn't put up with it. It was just absolutely sickening. (Interview 5)

Another significant impact was the gnat⁴ plague which, at its peak, persisted for around two to three months as insects bred in the mud. People told stories of tornado-like swarms rising from the trees at dusk, of not being able to leave the house at night and finding deep piles of sticky dead gnats outside their houses in the morning.

It altered your way of living for three or four months. You couldn't eat or drink outside. It was impossible to do that. You couldn't have a light on outside, you couldn't have a light on inside. Even your television had insects all over it ... These damn things would come down chimneys, they'd go anywhere. (Interview 7)

4 Also referred to as midges by the respondents.



You just couldn't walk outside of a night time. If you had to go outside, to the rubbish bin or whatever, you would just hold your breath and run. (Interview 5)

Dust has always been a problem in this region of Victoria but with the fine dust of the lake bed becoming fully exposed, the impacts were more intrusive and frequent. The interviewees who lived around the lake were most affected. They told stories of dust storms that filled houses, destroyed furniture and caused health problems such as eye and throat inflammations.

Dust storms in Boga are like talc. Shit everywhere. It takes six hours to clean the house. (Interview 7)

The cumulative impact of all of these problems meant that people were forced to endure the summer heat not only without the relief of the lake but with added discomforts.

People with evaporative air-conditioning couldn't use their air-conditioning because it just dragged the stench in. (Interview 5)

High summer temperatures in early 2008 deoxygenated what was left of the water. This led to a final fish kill which resulted in thousands of exposed and rotting carcasses

Photo credit: Katrina Strange

3.3 Social impacts

Losing the lake was not simply a matter of losing a recreational resource. The impacts that stemmed from the drying had serious implications for the wellbeing of individuals, families and the community as a whole.

The lake was basically the jewel that brought people together. We don't have that anymore. (Interview 1)

Health issues

The full lake provided a space for diverse forms of physical activities in the form of sailing, water skiing and swimming, among others. Many of the interviews highlighted the loss of these activities and the impact that it has had on the opportunities to participate in healthy outdoor exercise. There was a particular emphasis on the benefits of the lake as a space where every age group could exercise and enjoy themselves together. Fishing and sailing were seen to be particularly inclusive activities that could create strong bonds.

It keeps families together ... that's the one thing about boating and fishing ... it's something that they loved and those things in themselves are very, very important family wise. (Interview 23)

Young people were active and sociable when spending time at the lake, and this was seen to be a highly positive aspect of the town's social life. Since it has gone dry it has been more difficult for young people to find things to do outdoors. This has caused some worry in the community about both the possible health issues for young people as well as broader social problems that come with the lack of activities for youth in small towns.

The only thing that's got going here for the children is the skate park which took a few years to get that going. Now, at any other time you'd probably find them down at the lake, in the water, doing all sorts of things. (Interview 15)

I honestly believe that with the lake drying up the impact on health issues has been a big thing for younger kids and the older generation. You've got a great school here and a lot of young kids. Where do they go on the weekends? (Interview 1)



Since the lake has gone dry it has been more difficult for young people to find things to do outdoors

As a more direct health impact, the dust storms were reported to have had negative implications for some people's health. This included breathing problems and eye and throat irritations. There was also some concern for the unknown health impacts of the dust and the fact that little had been done to test the soil in the dry lake bed or surrounds.

I get hay fever and asthma when we get that dust coming over and it's really bad. It's shocking. (Interview 18)

[friends of mine] live off rain water. We've got salty soil and goodness knows what other toxins are in it, catching on their roof and then going in their water tank. And they said they've stopped using it because they were getting rashes. (Interview 26)

As well as the physical health issues, the interviews would suggest that the mental health impacts associated with the lake drying were both prevalent and persistent. The loss of the water marked a period of high levels of stress and anxiety for many people. This was particularly the case for the business owners who indicated their levels of stress were associated with the worry that they had about their financial position and decisions about what to do in the future.

Individual isolation

Many indicated that they knew more people in the town when they were able to spend time down at the lake. The lake acted as an informal meeting place for locals and offered a chance to meet new community members and the regular tourists. In the absence of this space it has been more difficult for some people to socialise without being involved in formal clubs or events. The fact that there are fewer people visiting the town has had a personal impact on some of the interviewees. Without the attraction of the lake, the families of older residents have less incentive to visit and stay for long periods of time.

Our old friends still come up, people our age, but their kids and their kid's kids don't come ... The water was always the attraction. (Interview 8)



Fine dust blowing off the dry lake bed remains an ongoing problem for many residents of Lake Boga

Community wellbeing

The way that a community defines itself and understands its own identity can affect the way people feel about where they live. The full lake provided a strong, positive image of the town as a sporting and recreational playground for the region. The interviewees were extremely proud of this image. The loss of the lake brought with it a belief among some that the identity and point of pride in the town had been lost.

We don't have an identity anymore. We're just Boga, no lake. In fact when my wife addresses envelopes with the return address on the back she crosses out the 'Lake'. (Interview 4)

It's just like the heart of it has been taken from us. (Interview 2)

The connection between water and wellbeing was also a point that people referred to when talking about the impacts. They felt that they had lost a key component of what made the town a liveable place – the water.

We live in a dry continent and most people in Australia gravitate towards water. We had it in abundance and it made it a special, good place to live and if you think of the name Lake Boga and you take the lake out you're only left with Boga and it's ... [symbolic] of the effect of water on the community; it's a loss of heart if you like. (Interview 11)

I think swimming is very calming, it's very relaxing, you can just sit and watch the lake ... The kids don't see that, they don't see that that is part of life. (Interview 1)

The atmosphere of the lake, it was so serene and tranquil – all those 'you beaut' phrases. But you go elsewhere and it's not the same, it's not the same sort of atmosphere that the lake brought. (Interview 22)

Sporting and service clubs are recognised as highly valuable assets that encourage community connectedness and social inclusion. They are important social outlets for a wide range of people and offer a reason to get together on a regular basis. Historically, Lake Boga has had a strong tradition of clubs and community groups. Some of those mentioned by participants were: the Lions club, the yacht club, the sea scouts, the life saving club, the football club and the bowls club.



A number of community clubs in Lake Boga had water-based activities as their main focus

The loss of water-based sporting activities has forced the temporary closure of the yacht club and has had a significant impact on the operations of some of the other groups. The Lake Boga sea scouts is a highly successful and popular group that involves young people in water-based events and activities as well as community service responsibilities. The drying of the lake has meant that the group needs to travel to other lakes to conduct their activities and this has made it more difficult to maintain involvement and attract new members.

Despite the decline of the water-based clubs some of the other groups such as the bowls club, the football club and the Lions club have remained strong. Many people spoke about the importance of maintaining those clubs and the positive effect they have had on the town, particularly during the most difficult period of the lake drying.

For some of the participants there was one relatively positive impact of the lake drying, in that new networks were created to deal with the crisis. The opportunity to be involved and respond to the town's problems brought people together and created a renewed sense of community resilience and strength.

The community is still making the best of the worst. (Interview 22)



Despite the decline of water-based clubs, others, such as the football club have remained strong

3.4 Economic impacts

Direct economic impacts

As a tourist and visitor attractor, Lake Boga created jobs and brought a great deal of money into the community. The loss of the lake has had direct economic impacts on tourism businesses like the motels. Two motels in the town have closed since the lake dried.

Their summer period of income has gone. Totally gone. The motel's gone. That motel was a pretty thriving motel. And it was always nice. And the one out the road the Catalina Motel ... it's just devastating. (Interview 1)

A remaining tourism accommodation establishment (bed and breakfast) is still operating. The local caravan park remains operational due to support from the Swan Hill Rural City Council which owns the foreshore property. While managers are retained to run the property, the loss of visitors to the lake has meant a major loss of revenue.

They're down to virtually no tourists – they're just surviving on local workers that work on the farms. (Interview 24)

The loss of visitor numbers has had a broader impact across all retail businesses and services in the town. Income generated through tourism and, in particular, through large events such as the Easter Regatta was a major source of wealth for the community and the region. Businesses affected by this loss of income include the local hotel, service station, general store, post office, museum, observatory and marine automotive business.

Realistically the lake is a source of income ... for example if you own and operate a speed boat or a ski boat and you take it out for a day it's going to cost you a minimum of \$100 ... If you multiply that by ... say 100 boats on the lake, it's a lot of money ... So when that input disappears ... and you look at your bottom line, it's shrunk considerably. (Interview 4)

Casual and part-time employment opportunities have been affected by the loss of the lake as businesses would generally hire additional labour during peak times.

You can get through the basis of the year on two or three employees. Come holiday season when you've got an influx of visitors you'll need a lot more than that so it's obviously had an impact. (Interview 4)

We used to be able to employ someone. We always had a worker here but now we have to do it on our own because the work's not here like it used to be, so we have to do it ourselves to keep the business going. (Interview 19)

The proximity of Swan Hill does provide alternative sources of such employment, although some interviewees suggested that Swan Hill businesses had also been negatively affected by the loss of major events at Lake Boga.

The farming community has been affected by the drought and this has had the reported effect of cutbacks on costs such as labour. In some cases this means hiring casual workers rather than permanent, in other cases it means hiring fewer people overall. Across all businesses, farming and town-based, drought reduces income and labour costs are likely to be rationalised as a result.

Most of us are living off reserves. Now, reserves only last so long and then they're gone and then what? You're in trouble. Nobody's got any money to buy your property so your property's sold for almost nothing, so what do you do? What do you live on? (Interview 18)

There is less direct economic impact for those who commute to Swan Hill for employment as their earnings are not dependent on the lake and its associated tourism. Close proximity to Swan Hill allows access to goods and services for those in Lake Boga, but it may make it more difficult for some local businesses to thrive.

House prices

One of the biggest economic impacts attributed to the dry lake has been a fall in property values. This impact is more pronounced in the lakeside area than the township area of Lake Boga, although with so few sales, it is difficult to obtain any data to quantify the situation. Certainly, properties along the foreshore of Lake Boga were generally the premium housing stock of the town – newer in construction, larger and more expensive with attractive lake views. Without the lake, these houses have a lower value, and may be difficult to sell, even at a lower price. Higher value properties attract higher rates, thus lakeside residents pay higher rates than those in the township. This has been a point of some contention since the lake dried.

Their rates haven't gone down with ... what they think its value [is]. (Interview 14)

Many who lived around the lake had invested their life savings in their property.

We were devastated. I mean this is our Super package ... I suppose it cost me three hundred thousand including the land. You put water in the lake and you upgrade the foreshore here, you're talking half a million dollars worth. (Interview 30)



Many home owners are trapped by this loss of asset value.

They can't afford to leave unless they are prepared to accept a lesser value than their property was originally worth when there was water in the lake. (Interview 24)

Nevertheless, property values are likely to return when water returns. This creates a particular problem of uncertainty. The lakeside population is trapped by loss of value in their asset, but that value would return when water returns. So should one hang in there or sell up and make a loss? Most people (and the same is true for farmers during drought) will hang on to the asset until they can get a reasonable return.

There's a few people that'll put their houses on the market when the water goes back in ... Their attitude is that if they try and sell now they won't get the dough for their house. (Interview 7)

Interviewees suggested that many would indeed sell at the point that water returns to the lake.

I know a lot of people who actually live on the lake are waiting for the lake to fill up so they can sell and get out. (Interview 14)

One of the biggest economic impacts arising from the dry lake has been a fall in property values of lakeside residences

This may bring a churn in population rather than a decline as property changes hands. Whether the event of the lake drying will have an ongoing impact on property values is unclear – if the lake fluctuates rather than remaining full will this affect values?

While lower house prices is a major issue for those holding property, it does have a benefit for those who are seeking affordable housing, for example, young families who may find Swan Hill too expensive for first home purchase, or those on lower incomes. So a strange effect is that house sales halt around the lake as owners hold on until the asset value can be realised, while new housing starts to appear in the town or on the highway where demand can be driven by affordability.

The house prices have gone down ... it hasn't meant a drop in population because there has been a shift ... some people have sold out ... because it's devalued the place, other people move in and can afford those houses.

(Interview 6)

Indirect economic impacts

As a recreational resource, the lake provided a range of opportunities close at hand. This closeness of recreational activity provided children and teenagers with a range of physical and social activities. In essence it provided 'free' childminding for many families.

My son grew up actually on the lake so it was only a matter of going out the back yard and going for a swim. *(Interview 5)*

It brings the community together. Gives them an outlet, a recreational outlet without it costing any money. That's the most important. Doesn't cost them a lot of money to go and sit on the edge of the lake with a picnic. *(Interview 21)*

With the lake gone, costs are now incurred to access recreational activities.

We don't have a swimming pool so cost-wise with the drought, to transport kids to Swan Hill for recreation is enormous.

(Interview 1)

There's an economic side to it all as well, in that people had to travel further to have their recreation with lakes further down the track ... *(Interview 17)*

Clearly, the loss of a local recreational outlet has created the need to travel in order to access equivalent activities. For those who may be transport disadvantaged (the elderly and the young) this can have a larger impact than for those with access to a car. And those with a car will be faced with additional travel costs.

3.5 Demographic impacts

Out-migration

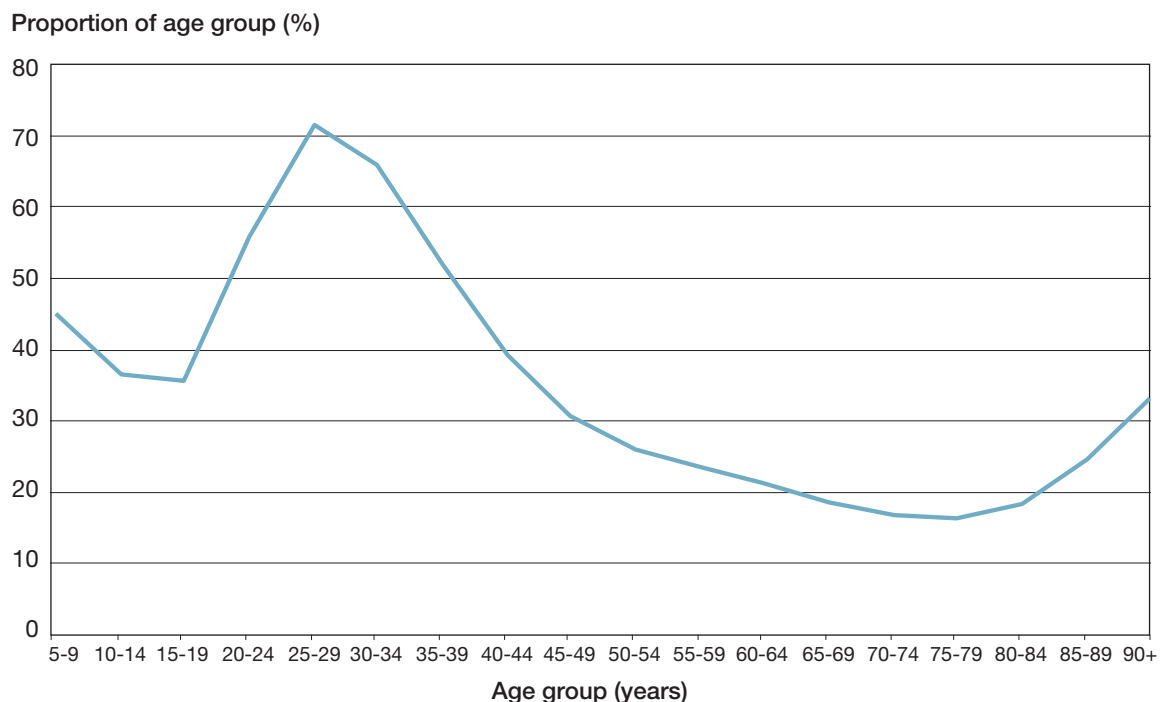
In discussions about environmental change it is sometimes assumed that people will migrate away from areas suffering drought or other hardship towards areas that have more favorable climatic conditions. However, the decision to migrate is a complex one, involving considerations around many factors such as: employment; family; friendship networks, and personal history. It is also a decision in which age plays an important role. People are generally most mobile in their late teens and early twenties when decisions around leaving home, gaining higher education and seeking employment, are made (figure 15). Beyond this age, people are generally much more settled, especially as they partner and raise children. While some will move at retirement age, the numbers who do so are much smaller than the numbers of people moving as young adults.

This pattern of movement is well recognised within regional communities as young adults generally have to leave a small-town community to seek education and employment opportunities, while some older people move to larger centres with better services.

Every little town loses a few people, like people get old, they either move to a bigger city where they've got the services as in doctors and stuff close by, and the kids go somewhere else. They don't stay around any more. Like once upon a time there was youth on the farm, [and they] would stick around. Now days the youth seems to be off getting a job somewhere else. (Interview 19)

For others, the anchor of home is an overriding factor, encompassing historical family connections with an area, an affinity with the local environment (beyond just the lake) and a strong sense of community within Lake Boga and the surrounding Murray-Mallee region.

Figure 15: Proportion of population who moved between 2001 and 2006, by age group, Victoria



Source: ABS Census 2006, table B26

Nothing would induce me to go and live anywhere else. I've seen a fair percentage of Australia and ... you know people get excited about the east coast. I've sailed on the east coast quite a few times in summer time and can't believe how people live there at all. Like, we get it hot here – but it's beautiful clear heat. They get it fairly hot, not that hot, only in the mid 30s, and it's unbearable. The humidity is so high you just sweat. (Interview 33)

Because I've lived here so long and this is home to my children ... and the things that you get involved in – that's your life. So just 'cos the lake dries up I don't think you need to dry up too and go off somewhere else. (Interview 15)

There's more here than the water. (Interview 8)

While this sense of belonging was commonly held by those who had lived for many decades or all of their life in the region, even some newcomers had become strongly attached to the local community.

I kept sitting there thinking, do I really want to build a house opposite a dry lake bed? And so I hung off for a year and ultimately after weighing up all of my options, including finding another lake that hadn't run dry, I decided that I liked it here ... Water or not, I like it here. (Interview 10)

Nevertheless, there was a clear group of residents who had moved to Lake Boga for the lake and associated lifestyle. For this group, out-migration was a more difficult option because of the current impact of the dry lake on their house prices. In essence they had become a 'trapped' population who wanted to leave but felt unable to do so financially.

I'd move out tomorrow if I could sell this property at a reasonable price. (Interview 25)

There were reports of some people having left Lake Boga since the lake dried, although only a handful of specific examples were given.

I know one lady who would have stayed here but decided to leave the area because she said, no it's no good to me without the lake being there ... that's the only one person I do know ... She hadn't lived here for a great deal of time. (Interview 15)

There was a bloke moved here from Western Australia. Poor bugger. He was English and he bought a house ... just as the lake went dry and he had a small child and that's when the gnats just went beserk. He just couldn't handle it and he put his house on the market ... He ended up selling for a loss. (Interview 5)

Others who were reported as having left seem to have done so for a variety of reasons, not just the lake.

I think a couple of people probably might have [left] ... but I feel somehow that would already have been in the pipeline. (Interview 15)

We will [move] but it won't be for the reason that we're sick of living here. It will be because of our lifestyle. I'll be too old to enjoy the lake or our kids aren't here any more ... or business opportunities. It certainly won't be for the reason of the lake. (Interview 7)

Furthermore, for those in the farming community, a variety of economic and environmental factors were likely to affect any migration decision.

We have [thought of leaving] but again it's got nothing to do with the lake. It's got to do with how much money we lose ... water allocation and feed prices ... we've got a whole range of issues – the lake is not an issue in terms of us staying where we are. (Interview 3)

Again, this points to the complexity of migration moves, which are rarely undertaken for a single reason alone.

Perhaps more subtle was the importance given to 'sticking out' the hard times, which appears to be a feature of many rural communities, but particularly in the Mallee which has, throughout European settlement, been a notoriously challenging environment.

I think most people who live in a country area are fairly resilient – they've seen things die and grow. You just learn to survive and I think most of the old residents will have been through varying traumas and tests and they've lasted them out ... Droughts and floods, locust plagues ... There's plenty that can happen so ... you just get used to coping I think.
(Interview 11)

I mean we get sick of the dust and we really didn't like the smell and all that sort of thing but life goes on. There's always hardship somewhere and challenges in your life; you just have to try to work around them. (Interview 33)

An interesting finding arising from the Lake Boga study is that town's resident population has not been subject to great change through out-migration, but that the part-time visitor population has been strongly impacted. Part-time residents such as holiday home owners, and visitors to an area are often not included in formal population counts. While the Australian Bureau of Statistics does count visitors on census night, this occurs in mid-winter every five years and, as such, does not coincide with the peak periods for Lake Boga (Easter and summer time). A reduction in visitors to Lake Boga is a form of population loss even though it is not 'out-migration' per se.

... the holiday houses around the lake – people probably don't visit them as much anymore. So [people] haven't left, they just don't come ... A lot of [houses] seem empty a lot of the time. (Interview 3)

For those who had thought about moving at some point, there were a variety of potential locations considered – from moving into Swan Hill to moving as far away as possible.

Personally I want to get out 'cos I reckon it's got no future. That's why I sold my farm and in the near future I want to get out of here – go somewhere where it rains. Northern New South Wales, Byron Bay ... why sit here and beat your head against the wall and hope that every single cloud that comes over, that it's going to rain and it doesn't? (Interview 12)

Options such as Queensland or coastal Victoria were mentioned by some. Part of the attraction of these locations was the potential to recapture the lifestyle elements associated with boating and fishing. Others saw regional centres as offering more opportunities, with Echuca, Bendigo and Geelong mentioned.

3.6 Reactions and responses

Community feelings

Feelings about an event such as the lake drying are obviously highly subjective and complex. Nevertheless there were some common elements in responses. The range of emotions reported by respondents appeared to vary depending on which period of time was being referred to, from when the lake first dried to now.

The emotional response of the majority of individuals was strongly negative when discussing how they felt at the time of the lake drying. These feelings were most commonly expressed as anger, frustration and shock.

Everybody's just angry and upset and insecure because they've got no living and their assets have gone down the drain. (Interview 28)

Depression was mentioned but remains somewhat of a hidden problem with most people preferring to talk about it happening to other people rather than themselves. Many mentioned the plight of business owners.

It's not only their income that's depressed, it's them themselves. (Interview 24)

The negativity of this time had impacts community wide and it was difficult to avoid even for people who said they were trying to remain positive.

I tried to keep pretty positive ... but you see people ... and it ends up getting you down at the end of the day. And that's the way I felt the town was going, it was really getting down. (Interview 14)

In relation to the way people felt in their day-to-day lives, there were more subtle emotional responses. For example, a number of respondents spoke about the way the view of the lake made them feel as they drove past it everyday.

Every time I drive over the hill from work and see just desert and dirt where there used to be a big blue horizon – it's just hard to get used to. (Interview 14)

Some also expressed a feeling of being embarrassed about living in Lake Boga after the lake had dried. Interestingly, those feelings of embarrassment resonated at different points throughout the interview, particularly when asked about the impact on the 'identity' of the town. Some people were embarrassed to call it *Lake Boga*. Similarly, people spoke about the impact of outsiders judging the town negatively by the way that it looks. Others extended this feeling of embarrassment to the belief that their problems should not be publicised in case people decided not to visit the town in the future.

At the moment they'd look at it and think, shit, why go to a dry hole? (Interview 22)

As people moved to discussing the comparisons between the current condition of the town and its past, there was mention of feelings of loss and grief. The tone of these comparisons contained a great deal of nostalgia with the participants directly identifying the impact of this loss.

You just wait for the day when it all comes back again and things can get back to the way they were. (Interview 17)

When speaking about the future however there was reference to feelings of hope and anticipation. Some participants indicated that, more recently, they were attempting to think about the situation differently. Much reference was made here to the concept of being resilient and patient.

I think you've got to be a bit philosophical about things or you'll just be miserable about it forever. (Interview 11)

No matter where you live you've just got to hang in there ... you can't just run off when things go wrong. (Interview 23)

It happened. A lot of people are worse off than what we are as far as what the drought has done to them, so you've got to be thankful you've got a roof over your head and you've still got a nice open space. (Interview 30)

The emotional responses differed somewhat between lakeside residents and farmers. Lakeside residents were more likely to mention feelings of anger and frustration towards authorities and use stronger language to describe their feelings. In contrast, the farmers generally downplayed the question of feelings and emotions, talked about them in terms of other people or shifted the focus to what should be done rather than how they felt at the time.

Frustration with authorities

There was a widespread feeling that various authorities had failed to adequately manage a range of situations as the lake dried. Complaints about these management and governance issues took up a significant portion of the interviews.

Perceived handballing of responsibility

As the lake dried it became clear to the interviewees that there was significant confusion about the responsibilities of the multiple agencies involved in the management of the lake. At the time the lake dried, a different authority was responsible for each of the following aspects: the foreshore; the water; the dry lake bed; the native fish; the introduced fish; the smell of the rotting fish and the clean up of the lake bed. The issue of insects breeding in the mud was one that was not covered as a specific responsibility of any agency.



As the lake dried, associated problems such as a gnat plague brought frustration for many local residents

Photo credit: Fred O'Bryan

The participants indicated that a range of authorities was involved, including: Swan Hill Rural City Council; Goulburn-Murray Water; Environment Protection Authority Victoria; Department of Primary Industries, and Department of Sustainability and Environment. The majority of people reported disappointment and disillusionment at the way these groups managed the situation, treated the community and appeared not to cooperate with one another. People spoke about the frustrating experience of trying to get information on which agency to contact. Many would go to the local authorities as a first point of call and after being passed on to a number of other contacts felt that they were back where they started.

There's all these demarcations. The [local authority] will only do to the water's edge, then it becomes someone else's responsibility, and someone else's responsibility. Now, you can go through those three steps and they'll tell you to go back to square one ... It's bureaucracy gone mad. (Interview 30)

In the months following the lake drying, many of these agencies were involved in community meetings which were mostly spoken about as public displays of the problem of agencies shifting responsibility.

Every time there was a public meeting it was always somebody else's fault so there was handball, handball, handball. There were four or five organisations that were in control of that lake and not one of them would make a decision. It was someone else's problem every time. (Interview 21)

There was also frustration at these various authorities for the perceived lack of planning for the area. A number of respondents believed that many of the problems could have been avoided if the value of the lake had been recognised years earlier and plans put in place to secure and protect the lake as an important tourism and recreation resource.

Time lags in action

Many of the respondents expressed extreme frustration not only with the decisions of authorities but also the time it took to make those decisions. The fish deaths were put forward as the most glaring example of various authorities' inability to make decisions and implement action with the necessary speed. Essentially the majority of respondents believed that the impacts following the fish deaths could have been avoided if the authorities had acted faster.

A guy wanted to net them but he was denied permission because there were native fish in there. When we said we should get water to save the native fish, DSE said 'no, there's no native fish in there'. And then they said 'oh right, there's no native fish, we'll let the guy come in to catch the carp', but by that time the water level had got too low to get a boat in there to harvest the fish. (Interview 6)

Lack of information and conflicting information

The complexity of the management situation, combined with the inherent difficulty of some of the emerging issues, led to conflicting information being circulated within the community. Many of the interviewees indicated that they had little or no information about the reasons behind the decisions made by the authorities at this time or since. The frustration that came from the lack of explanations and information also led to rumours starting in the community around causes of the lake drying as well as when and how water would return. The impact of these rumours was highlighted by many participants as quite damaging. It resulted in a lack of trust in the information coming from authorities and the media.

You've got personnel on one side saying one thing, contradictory information from other personnel – and both in relative positions of authority – add into that the fact that you've got rumours arising that we'll have water by Christmas or whenever, and all you finish up with is a big bag of misinformation. (Interview 4)

In the week that the interviews were held, an article was published in the Swan Hill Guardian entitled “Floods before fill. No water in sight for Lake Boga” (O'Connor 2010, p1). The article reported that, contrary to what most participants believed, there was only a small likelihood of water filling Lake Boga in the near future. Many of the interviewees believed that this was contradicting the information provided by Goulburn Murray Water in the past and was insensitive to the difficult situation in which the community found itself.

The majority of participants who mentioned information problems held a view that it would be more useful to hear the truth about the future of the lake, however unpalatable that may be.

All I've ever asked of anyone, of any government department, is the truth. If you can't fill it, tell us you can't fill it, or say yes you'll get water when it rains. (Interview 22)

Distance and decision making

There was resentment expressed by some of the respondents about how decision making in Melbourne affects a regional community such as this. This was expressed in a number of ways. One view was that, due to Lake Boga's distance, people based in Melbourne did not understand the local context and the potential impacts of their decisions. It was also expressed as a political issue in that the region was too far away and held too few votes to be a concern for Melbourne-based decision makers.

It's just all been political dealings done in Melbourne. But it doesn't affect their lifestyle, it affects us. (Interview 6)

At a more local level there were also concerns expressed that Lake Boga was on the periphery of concern for the local decision makers. Some respondents spoke about feeling like they had been forgotten in regional planning and others felt as if they were being deliberately ignored.



Lake Boga is a town that has a strong volunteering and community service history

Photo credit: Meg Irvin

Barriers to community action

While there was much frustration with the perceived lack of action by agencies, people also spoke about their annoyance at being blocked by authorities from implementing their own solutions, such as clearing the weeds or cleaning rubbish from the lake bed. In some cases this was seen to be understandable. For example, during the Second World War the lake was used as a military base for the Catalina flying boats. Following the drying it was revealed that there were an unknown number of unexploded ordinances and other military material exposed on the lake bed. The Australian Department of Defence was responsible for dealing with these issues and making the lake bed safe for people to walk on and take vehicles on to. This process took some time.

Following clearance by the Department of Defence, the community indicated that they were still restricted from 'getting on with' the jobs that they felt needed to be done. Lake Boga is a town that has a strong volunteering and community service history. They have won tidy town awards five times since 2004 and have well-supported sporting clubs as well as volunteer organisations. For those who raised the clean up as an issue, there was a sense of lost pride in not being able to do it themselves.

A number of participants made a comparison between Moulamein (across the border in New South Wales) where, following the drying of that lake, people were able to go out and clean up the dry bed themselves using their own trucks and donated fuel. In Lake Boga, the multiple agencies involved meant that it took some time to understand the management issues and restrictions. Subsequently, there were long delays in giving permission to community groups wanting to participate in the clean up. For many this appeared highly bureaucratic and unnecessary.

I know the community were at the point where they wanted to get their hands on to it and take ownership of it and fix it up themselves but they weren't able to ... In Boga you couldn't do that because of so many different organisations involved ... That was disappointing as well. It would've been a good thing for the community to get together and try to improve it off their own back. (Interview 14)

Community actions

The Lake Boga people are very resilient and opportunistic I suppose you'd say and they make the best of what they've got.

(Interview 22)

Despite the frustrations about the clean up process there were many different ways that the community directly responded to the crisis. A community advisory group called Lake Boga Inc. was set up by Swan Hill Rural City Council and this became the intermediary between the community and the council. The group was responsible for coordinating action, creating a community plan and disseminating information. The people interviewed who were part of the group generally felt that, despite some organisational issues, this was a constructive way to respond.

Some participants, however, indicated that they felt excluded from the workings and decisions of this group. There was also some feeling of being underwhelmed with the progress and results that the group have been achieving over time. Members of Lake Boga Inc. were aware of this sentiment.

I think they get frustrated because there's no answers. But we can't give them answers because I'm afraid the powers that be are not immortal and they can't just pluck the water out of the sky and put it in there. *(Interview 15)*

During 2008, several public meetings were held. Immediately following the drying of the lake, the meetings aimed to manage the crisis of the fish dying and the gnats. It was at these meetings that the agencies attempted to explain the complexity of the situation. For the most part the interviewees saw these meetings as unproductive and frustrating. Some participants indicated that, due to the confrontational nature of these sessions, they did not feel comfortable to express their views or participate meaningfully. This was particularly the case for some older residents.

I know there had been meetings that I hadn't been to because, well I have enough to do and also because of my hearing. *(Interview 24)*

During the later meetings, the concept of creating a community plan for the area was introduced. This was met with strong resistance from many people who thought that it was inappropriate to plan for the future of the area without certainty on the future of the lake. In this case, the anger that had built up in the previous meetings made it difficult to move forward with the plan that was proposed.

They [the council] came out here last year and tried to do a community plan and they nearly got axe murdered ... I mean it worked in other communities, it just didn't work in Boga 'cos the issues that Boga has gone through in the last couple of years are still raw, the people are still angry.

(Interview 14)



Lake Boga Inc. was established as a community advisory group

The Dry Lake Bed Dinner

One major community response that received a great deal of publicity was the Dry Lake Bed Dinner. The idea for the event came from a number of local women who decided that something positive needed to be done to boost community morale and bring people together. The dinner, which involved people bringing their own food and being seated at tables around the lake, also aimed to encourage the idea that the dry lake could still be used for enjoyable purposes. In conjunction with the dinner there was also a walk across the lake bed in which five hundred people participated and were awarded certificates.

The event was a highly successful one which attracted over two thousand people. Some attendees travelled from other dry lake communities such as those in South Australia. Factors which contributed to the success of the event included: the leadership of a small number of key community members; high levels of volunteering among the community; support from the local council, and financial assistance through a small state government grant. Most interviewees regarded the Dry Lake Bed Dinner as an extremely positive and uplifting event. Participants pointed to psychological benefits of the dinner, for example, it made people feel more positive about a situation that had long been seen as wholly negative and hopeless.

It was one of those things that was really good for the community in the sense of saying, ok we've got this bloody lake that's an eyesore, it's dry, it's a real concern but, you know, let's try to be a bit positive about it ... It was trying to develop a positive attitude. (Interview 16)

Others simply indicated that it was a chance to get together and have a good time using the lake again for enjoyment in a different way.

It just shows that you can have a damn good time without water being in there too. (Interview 15)

We took the boat down and had all our friends in it. The grandchildren had fishing rods ... I made a lot of fish with magnets on them and they caught them with magnets. (Interview 23)

It got people together again, communicating, which is very important. (Interview 30)

For one interviewee who had moved to the town just before the lake dried, the dinner was a chance to understand what it was that people had lost.

It was a real community feel and I kind of went, oh this is why it is, people miss this. It's not just the water, they miss community, the feeling, the intangible thing of 'this is what community is'.

(Interview 3)

The attention and tourism that the dinner attracted had the effect of creating a renewed sense of community pride. It not only brought the local community together but also encouraged the much missed family and regular visitors to return.

It brought a lot of people from far away, in fact it brought families together ... and some of those families reminisced about during the war or pre-war of what happened here. So yes, it was a good way of getting people here. *(Interview 19)*

A minority expressed some reservations about the concept of celebrating the fact that it was dry, while others pointed out that the dinner was an interim measure while waiting for water to return.

Preparing the lake for when water comes back

Some recognised that the dry lake represented an opportunity for making environmental and infrastructural improvements.

The bonus of it is that we've been able to clean it up and make it a very safe lake for skiing when, hopefully, eventually it does become full again. *(Interview 26)*

A lot of infrastructure can be done, a tremendous amount of infrastructure, by beautifying the lake all the way around ... then the water comes back and you do a great advertising campaign saying 'Boga Is Back!'. *(Interview 30)*

[As part of a Landcare group] we're trying to bring back some of the original flora and fauna ... birds just fly through over time and, now that there is a habitat here for them, they are starting to hang around again. *(Interview 17)*

Many people interviewed understood that such actions could be seen as a sign of strength and resilience in the community.

The perseverance and persistence of people has been quite impressive.

(Interview 16)



The dry lake has provided opportunities for cleaning up the lake bed and making environmental improvements in preparation for water coming back

Photo credit: Meg Irvin

3.7 Climate change

Most respondents regarded drought as the main reason for the lake drying. All of those who lived on a farm or in the farming district mentioned the drought as a factor, and around half the town and lakeside people mentioned the drought. Nevertheless, when asked about climate change, most were dismissive of this as an explanation.

There's no such damn thing as climate change according to people. It doesn't exist. It's nature. Just nature ... There's a terrible lot of people who don't believe in this climate thing. It's a big joke. Everyone jokes about it. (Interview 27)

It's a lot of rubbish in my view. (Interview 24)

Only three of the 45 respondents expressed the sentiment that human-induced climate change was likely to be a real phenomenon. Taken at face value, almost all of those interviewed expressed doubt or disbelief about climate change, yet peoples' understanding of the term is varied. For example, some see climatic change as a purely natural phenomenon, not human-induced. The implication seemed to be that this was not to be worried about too much because it is a natural process.

My father ... he never got upset about it. He said it always rains after a dry spell. (Interview 24)

We've had five droughts this century – this is just another one. (Interview 7)

We don't reckon it's climate change, it's just a cycle. Not too many around here believe in climate change. I think it's just the excuse they use. (Interview 21)

A smaller number of respondents talked about natural cycles in terms of climate changing over the longer term, over thousands of years.

Climate change has been going on, on this planet since it began. We've had droughts we've had change of weather ... the interior of Australia ... was at one time a forest. Now it's a desert. Climate change is an activity that is going to continue on this planet one way or another. (Interview 19)

For others though, the cycles of Australian climate made it all the more difficult to distinguish abnormal events.

Climate change. I don't know really ... it's an intangible situation. How do you clarify it? ... Australia's been known for it hasn't it, over nearly 200 years that we've been here. We go through these periods – the earth dies then all of a sudden after years, bang, it flourishes again. (Interview 30)

There is perhaps more suspicion than scepticism in some other comments.

I've got a funny feeling if it wasn't for a thing called global warming there'd probably be a lot of people out of jobs ... a lot of people have done quite nicely out of it. (Interview 32)

Climate change is a political ploy. (Interview 19)

The use of language seems to be important in people's attitudes to climate change. For example, the term 'global warming' was used derisively in response to colder weather events, such as alpine snowfalls which occurred unusually late, in October 2009. Furthermore, focus on a single indicator such as temperature made it difficult for people to see any clear pattern of warming.

They say it hasn't been this hot for 100 years or 200 years so therefore does that mean that 200 years ago, did we have climate change then? (Interview 7)

In contrast, the term 'climate shift' gained some traction with one respondent who saw evidence of weather systems moving southwards as predicted by climate change forecasts. Furthermore, the same respondent saw a positive outcome in terms of greater care being taken with water resources.

The whole of the climate change, climate shift, whatever you want to call it, has been a good kick up the arse for the whole of the southern states of Australia to say 'right we've got to be wise with water'. (Interview 26)

There are important psychological elements in people's reactions. For some, dealing with the scientific uncertainties and competing information proves difficult. Others suggest that the prospect of climate change is too daunting to easily accept.

I'm in the complete bull dust camp. But then I'm a farmer and we're biased and we have a vested interest and wouldn't like to agree with it [climate change] because it would mean I don't have a future here.

(Interview 3)

3.8 Views on the future

The short term

Respondents were overwhelmingly hopeful of water returning to the lake. Of the 23 respondents who provided an opinion on the subject, 19 indicated that they thought water would return.

There's hope. A lot of hope. Everyone's positive, they know it's coming it's just a matter of when. (Interview 7)

While a small number of respondents suggested that water would return sooner rather than later, most indicated that the timeframe was uncertain.

It's in the lap of the gods in some respects. (Interview 29)

The fact that Lake Boga has been included in the Mid-Murray Storage Project has given people some kind of certainty. Furthermore, the visible activity around infrastructure investment is seen by many as a sign of water being returned.

You know that State Government don't spend money on nothing ... there's your proof – they've spent 500K on the outlet from Kangaroo Lake. (Interview 7)

I cannot see Goulburn Murray [Water] spending all this money and going ahead with all ... that work if they weren't fairly sure that the water was going to come back. (Interview 8)

The only note of caution in relation to government action is the potential for the policy environment to change.

At the minute there's no question that there will be water in the lake, but governments change their mind fast. (Interview 3)

There's always a chance [that] the government backpedals. You always think about that. (Interview 29)

With the general expectation of water returning, many respondents had opinions about the impact of this event on the community. For some, the view was wholly positive.

It would be fantastic. Such a positive thing for the area. It would be wonderful. (Interview 27)

For others, the prospect of water returning, while positive, was tinged with a realisation that the town would not automatically return to what it had been.

I'd imagine there'd be a fairly slow to moderate comeback of people that use the lake ... There's a huge economic outlay to be able to resurrect those [motels] to be in current day standards ... The lake foreshore I'd imagine would need to have a bit of work done to it. (Interview 17)

It will take a long while to recover because people are used to going to other places like Kangaroo and Charm. People build patterns of behaviour. I think it would be very hard ... I think it will be very slow. (Interview 11)



Investment in upgrading local water infrastructure is seen by many as a sign of water being returned

There was also a recognition that the timeframe for water returning was an important factor affecting the recovery process.

The longer it goes, the harder it is to get back to where we were. (Interview 6)

The long term

People often have difficulty envisaging the future. It is inherently uncertain and mostly unknowable, especially into the medium and longer term. In order to make a future scenario more concrete, the interview schedule included an example of a lake which had remained dry for a period of 10 years – Lake Hindmarsh in western Victoria. Interestingly, this question emerged as the most confronting for interviewees. No one had considered this length of dryness in relation to Lake Boga and some took time to conceptualise the idea.

Whereas short-term outlooks had been generally optimistic, longer-term outlooks became much more divergent – positive, negative, mixed and, for some, unable to be clearly considered. Many respondents who had been talkative and articulate throughout the interview were challenged by the question, and some appeared to struggle with the implications⁵.

⁵ the symbol '---' indicates a pause in the response.



--- as I said, I haven't been that upset about it because I've always maintained [water would return] --- but if it did get to 10 years and nothing was happening --- I'd be --- yeah --- very um --- quite upset by it really. (Interview 20)

Others preferred to avoid thinking about the implications.

I don't know what I'd do ... don't go there. (Interview 8)

If it was an extended period of time, I wouldn't like to think about it really. (Interview 29)

For those who reflected upon the scenario, there were two quite different responses. There were those who saw a very negative prospect for the town if the lake stayed dry.

It would be absolutely devastating. (Interview 25)

There'd be no opportunity for it to grow. (Interview 22)

I think it'd be catastrophic to the community here. I think it'd just die. (Interview 30)

Many saw out-migration as a natural consequence if the lake remained dry.

Ten years, you'll see them slowly drift away. People will say, 'no we've had enough'. (Interview 7)

[Older people] would stay ... but other people would cut their losses and get out. (Interview 30)

Tourists who used to visit Lake Boga seeking water-based recreational activities are now travelling to other locations, such as Lake Charm

But others saw a different future.

I think it will go on just the way that it is right now ... It probably won't get very much bigger ... It's a little suburb of Swan Hill ... I can just see it plodding on.

(Interview 15)

Boga, the township will probably still survive. It'll certainly shrink ... but Boga, probably because of its proximity to Swan Hill, is probably still going to be cheap rent ... it'll always survive ... because it's commuting distance from Swan Hill and it's cheaper rent and cheaper properties. *(Interview 12)*

Certainly, the lakeside residents were more likely to see a negative future without the lake. Twice as many lakeside responses envisaged a negative rather than positive future (10:5), whereas numbers were even among town-based residents (4:4). Nevertheless some lakeside residents saw a more mixed or even positive future for the town. One lakeside resident, for example, saw the possibility of needing to adapt to a different environment.

If going to the lake was one of your sole outlets, it would be demoralising and saddening and depressing. But because I have other interests and other things I can do ... I just get on and do it.

(Interview 10)

Of interest was the connection made by some respondents between the lake being dry and broader issues of drought. Potential loss of water for irrigation purposes was seen as having widespread ramifications for the future of the district.

If the lake's not going to be filled then you've also got the issue with all the ... irrigation farmers, so it's going to affect them as well because obviously they're not going to have their full water right ... and if they start closing up their doors and just walking off, that's going to have an impact. *(Interview 22)*

I would think the lack of agricultural activity due to lack of water would be more important [than the dry lake]. *(Interview 11)*

A number of people wavered between the two possibilities and expressed both negative and positive outcomes. Others recognised that changes were occurring, not just because of the lake, but because of a wider context of change.

When I first came up here, Lake Boga had a railway station and several shops and all that sort of thing. Well all that's died and that's not just because of the lake. It's part of the changes in our society. *(Interview 11)*

Dealing with uncertainty

Uncertainty emerged as a strong theme when considering the future. Uncertainty was expressed about many aspects of Lake Boga's situation. It was not just the inherent uncertainty about future events, but the fact that even agreements made about Lake Boga's water allocation carried uncertainty regarding the timing of water returning.

I still believe we will definitely get water ... but we can't make rain. *(Interview 23)*

For many, uncertainty meant that planning and decision making became difficult and consequently stressful.

What we need is a definitive statement from someone. I suppose I'm talking about the water bodies ... but at the moment the best we can get is an 'if'. (Interviewee 4)

Local rumours had not helped the situation.

It's an informational problem realistically because we still don't know. Even now, I mean we've been assured by some people that you know, you'll have water in 'x' amount of time whereas another body will say no that's not true. *(Interview 4)*

People are getting false hopes ... people get this expectation that it's going to happen and their hopes are raised.

(Interview 22)

Yet the importance of maintaining hope in the community was noted by one respondent.

You've got to give people hope. Get rid of the despair. No, there's got to be an element of hope or people will give up, and I'd hate to see that happen. *(Interview 4)*

Prioritisation of water resources

Allocation arrangements for water resources are complex and there are varying levels of knowledge within the community about processes of prioritisation and the range of policy and legislative arrangements. Alongside irrigation allocation rules and arrangements for urban water supplies, there are also rules for environmental flows. Recreational water use has generally had a lower level of priority than other uses. The complexity of these competing priorities and the involvement of different agencies and levels of government adds to the level of uncertainty.

When there's surplus flows in the river, then they'll put water in Lake Boga but that's a Murray Darling Basin Authority question not a local question, and so, when they've got surplus flows are they going to send it into Lake Boga or into the Coorong? Which one has the higher environment value? (Interview 3)

Interestingly, some locals expressed their view that irrigators should receive a higher priority than recreational users of water. The following quotes are all from non-farmers.

I'd rather have fresh fruit and veges on my plate than a recreational lake. (Interview 26)

How can we save water in the lake for recreation when the farmers weren't getting any water for their livelihood? (Interview 7)

There's probably more important places for water to go than to fill up our little lake. (Interview 32)

It should be kept in mind that it may have been difficult to express an opposing view. Community members had strong sympathies with farmers in the region and were aware of their suffering under the drought. This may have made people feel unable to voice the view that water should be available for recreational purposes when farmers were suffering. In fact, one respondent who spoke in favour of recreational use of water did so within the context of the farming community themselves.

The irrigators need somewhere to recreate as well ... Why should people in the country be deprived of the opportunity to have recreational skiing? ... Why should they have to travel miles and miles whereas in Melbourne you have a lot of facilities? (Interview 22)

Locals had more difficulty understanding the decision-making processes around environmental flows.

One lake they filled up because it had some little fish called a hard[y] head ... They filled that lake up to save these fish. Well what about all the fish in Lake Boga? ... It just didn't make sense to me. (Interview 24)

They're putting water into lakes to save the Murray hardyhead, good water, clean water, they're putting water into the Hattah forest to save the trees. But they couldn't save some [Lake Boga] fish. (Interview 21)

A number of respondents saw allocation issues extending beyond the local situation. Two respondents made reference to the Victorian north-south pipeline.

The north-south pipeline has a big impact. They're taking water out of the Murray and taking it down to Melbourne, but they're not supplying water up here for farmers and places like Lake Boga. (Interview 22)

Others talked more generally about the problem of over-allocation and over-development.

Then you've got this over-development with olives and almonds and that sort of thing ... like that Cubby station and some of those other places up on the Darling – they're catching more water than they should have ever been allowed to catch. It's big developments that are taking too much out. (Interview 9)

The expansion in everything that needed water [has] been greater than probably it should ... that's what has made the water short ... I mean I'm not one to knock progress but it just went a little bit to its limits. (Interview 23)

The theme of over-development can also be seen in some of the comments relating to population growth and the ways in which this has put additional demands on Australia's water resources.

As an older person we knew what they went through in 1902 [the Federation drought] ... We all know our storages have been drained to the very limit [in the current drought], but of course you have to remember the greater population we have since 1902 ... that's why this one has been a bit worse. (Interview 23)

Twenty years ago Australia had enough people. We're a dry continent and if they keep bringing people in, I don't know where they're going to get water from. (Interview 9)

Learnings for the future

Despite the pain and frustration which people have undergone as a result of drought and the dry lake, many are able to see that this experience is one from which important lessons can be learned. Generally such lessons involved the realisation of how much the lake had meant to them. This gave many a passion and a sense of purpose in making sure that the lake would never again be taken for granted once the water had been returned.

People will no longer take it for granted ... I think there'll be a lot more proactive people trying to keep the lake. (Interview 8)

In the long run it is probably a good thing because people are aware now that things like this can happen ... It's educated people that they've got to be just a bit more careful [about water]. (Interview 23)

Such comments extended beyond the shores of Lake Boga to include a much wider community, urban as well as rural.

We are in a dry country ... water's been an asset we have been frivolous with for many years. People are starting to realise now, even in Melbourne, that it's not an endless supply and we've got to be able to use it a lot more efficiently. (Interview 22)

4. Discussion of key themes

4.1 Management and governance issues

Environmental change, and its consequences for the community, raises important challenges for government. In situations where a highly valued natural resource is put under pressure or lost, there is likely to be community stress and potential conflict between community expectations of authorities and the ability of government to rapidly respond to a changing situation. Roles and responsibilities that may have developed over years, or even decades, can be greatly tested when environmental conditions change. A good example of this is the jurisdictional complexities that emerged as Lake Boga dried. Arrangements for management of the lake, including the different legal jurisdictions applying to the water, the fish, the lake bed and the foreshore, made sense while the lake was full. However, as the lake's edge moved, difficulties arose over who should manage what was variously perceived as 'foreshore' or 'lake bed'. Responsibilities over fish stock also seemed relatively clear while the lake was full – the Department of Primary Industries (DPI) had been responsible for stocking the lake for recreational fishing. However, if the fish were dead, then the expertise of DPI officers would not necessarily match the nature of the problem that locals wanted fixed.

The complex structure of management arrangements for Lake Boga understandably led to community frustration, anger and stress as the lake dried and different authorities became involved. This research reveals additional aspects of peoples' attitudes to the response (or lack of response) by authorities. Findings suggest that there is an expectation among many community members that governments and related authorities are fully capable of managing complex and unexpected change. Further to this there is an expectation that government departments are coordinated and cooperative – that information given to, or received from, one agency will be known by others (perhaps analogous to the way in which information is shared within a small town). An implication of this is that communities are likely to become highly frustrated when government fails to meet these expectations, even in the face of situations that may have few if any clear solutions. Interestingly, the perceived failings of authorities and lack of coordination were not seen as an inability to handle a new and complex situation. Rather they were interpreted by many in the community as a lack of concern or interest in the town's problems – in a sense the community took it personally. It follows from this finding that there is room for improvement in a number of areas in relation to the way that government communicates and interacts with communities facing these types of change.



Jurisdictional complexities emerged as the lake dried. For example, the fact that different authorities were responsible for the foreshore and lake bed respectively made emerging problems such as weeds a complicated issue

Photo credit: Katrina Strange

The Department of Sustainability and Environment is currently undertaking a Dry Lakes Management Project which includes an assessment of the management responsibilities for drying lakes in Victoria (DSE 2009). The aim of this project is to outline the management issues that are associated with drying lakes and to define the responsibilities of different authorities into the future. The Lake Boga case study complements this work by outlining some of the specific difficulties that were experienced from a management perspective. It also demonstrates that some lakes are more complicated than others in their management requirements, for example, those like Lake Boga which have multiple uses and a community reliant upon lake activities. From a planning perspective this becomes important when considering future risks for other lakes in Victoria.

Government is often in the situation where it must balance priorities across a wider context than just the local situation. This is particularly the case in terms of water policy. Some participants recognised this by acknowledging the scarcity of water and the need for prioritising uses across the state. However, a significant amount of frustration was expressed about the feeling of being forgotten or ignored by decision makers. Perceptions of the importance of local problems and the tendency to heighten their significance may be an unavoidable local community characteristic. The frustration that was expressed by many in Lake Boga does suggest that there is a role to be played by authorities in explaining the wider context more clearly. Therefore the role of effective community engagement by authorities is critical to ensure that local communities better understand the reasons for decisions that affect them or will affect them in the future.

Work by Sandman (1991) indicates that people are more likely to be angry about man-made situations than natural situations. In other words, if an event like the drying of a lake was seen as being caused by drought alone, then people would be more likely to accept it as a natural event, beyond their control. If, however, the event were seen to have been caused or exacerbated by human actions (or inaction) then the response may be expected to be angrier or more vocal. It is important for government to understand the ways in which communities may react to events and the degree to which they feel authorities may be responsible. This understanding can assist in making community engagement more productive.

4.2 Communication and uncertainty

It is generally believed that an informed community will have the ability to better determine its future. The more information a community has, the more empowered it is to act and respond. However, issues arise when a situation is inherently uncertain or when authorities do not have all the required information at hand at the time it is most needed (which can easily occur if an event has not been foreseen in time to adequately identify and assess necessary information).

Furthermore, this particular event of the lake drying, affected a wider group of people than particular authorities may have traditionally dealt with. Goulburn-Murray Water, for example, is an authority whose main clients (legislatively and financially) are irrigation farmers. Communication with this audience has developed over time and there is a mutual understanding around the technicalities of allocation, infrastructure capacities, and key decision-making indicators.

If a particular event precipitates the need to engage with a different community (e.g. townspeople) on a different topic (recreational water) then the engagement process may need to be altered and it may take time to develop effective communication strategies and mutual understanding of each others' concerns. When a new relationship is precipitated by a stressful event such as the drying lake, there may be a greater chance of misunderstandings and difficulties in communication.

Goulburn-Murray Water could, and did, provide information on scenarios for water returning to Lake Boga. Those relating to infrastructure upgrades were able to be set within some type of timeframe, but the exact timing of water returning ultimately depends on rainfall and this is inherently uncertain.

At an individual level, people like certainty and concrete information. Such information can provide a level of comfort, empowerment and a sense of control over the future. It can also have practical benefits for decision making, especially for those whose livelihood may be negatively affected by the lake being dry or those trying to decide whether to stay or leave the area.

Thus important questions are raised about how government and other authorities can effectively deal with communities undergoing new, unexpected or 'slow burning' crises which involve uncertainty. What type of information should be provided? To what degree should information be adjusted to different audiences with different concerns? Should there be an ongoing process of engagement and, if so, how should it be structured and delivered? A number of respondents in the Lake Boga study indicated that they would rather hear bad news than no news or misleading news. But if government itself cannot give a certain answer, how should it proceed? Is it enough to tell people that there is uncertainty, even if that response is likely to cause anxiety or anger? And how is such a stance perceived in a situation where people are wanting decisive leadership and action?

Of interest, perhaps, is the fact that one group within rural communities who have to deal with uncertainty in their decision making on a daily basis is farmers. Because so much of the success of their business is determined by weather, there is a constant process of making decisions on the basis of uncertain future events. In fact, the way in which long-term weather information is provided to farmers is expressed in terms of probabilities rather than specific forecasts (Australian Bureau of Meteorology 2010). While not being as accurate as a short-term forecast, it can assist farmers in weighing up various options and strategies over a seasonal period. Furthermore, by its very nature it highlights that there is uncertainty about future events. It therefore aims to set a realistic expectation for those using the information to make decisions.

4.3 Water resources

This research project did not aim to address issues around water policy. However, what did emerge from discussions with locals and from review of documents, was that the complexity of water policy, allocation systems, prioritisation of uses, and the range of authorities involved, creates an extremely difficult environment in which to communicate clear and simple messages. This is a major challenge for engagement processes. Furthermore, the experience of a drying lake is not just about water. It is about foreshore, habitat, and lake bed, among other things.

The complexity of water allocation processes can be seen in the case of Lake Boga. In order for water to go into the lake one of three scenarios is needed:

1. Infrastructure upgrades to be completed and water to be available to fill the lake via the Torrumbarry system. This can occur only at restricted flows until infrastructure upgrades are completed – these are likely to be in mid-2011.
2. Higher river flows (which may include floods) that raise the Murray River and cause Fish Point Weir to overflow. This would only occur under flood conditions and after allocation commitments to other users were honoured (refer box 1).
3. Floods that cause the Avoca River to overflow into Lake Boga (noting that the Avoca marshes would first need to be saturated). Such an event would be part of that river's natural process.

Understanding the values that communities place on the different uses for water is an essential part of planning the future direction of water policy. The case of Lake Boga suggests that there is a high value placed on recreational water by communities that are based around a resource such as a lake. In this study the benefits were diverse, ranging from the health benefits that come from water-based recreation to the social benefits of having a multipurpose, inclusive place to get together. Much of the focus of current water policy is on consumptive uses (including irrigation) and water for the environment. While the participants did recognise the importance of these uses, questions were raised about where water for the purposes of recreation and amenity fits into the story. There were also concerns raised about who makes the decisions on water use and how public value of the resource is assessed, balanced and prioritised. The people of Lake Boga were both willing and capable of understanding the difficulty of this process. What emerged strongly as a message from their discussions was the view that even in times of scarcity, water for the purposes of enjoyment is an important and valid consideration.

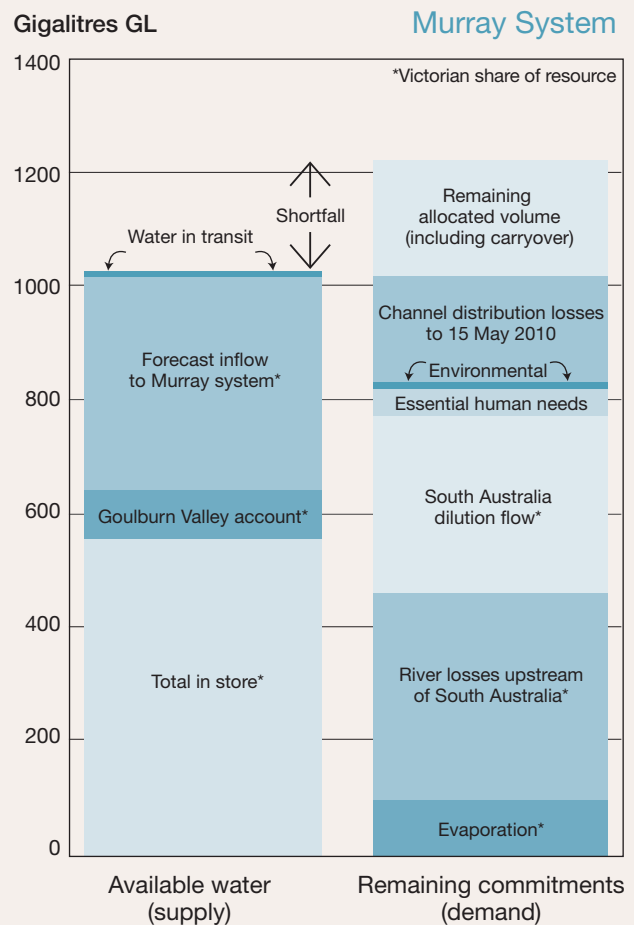
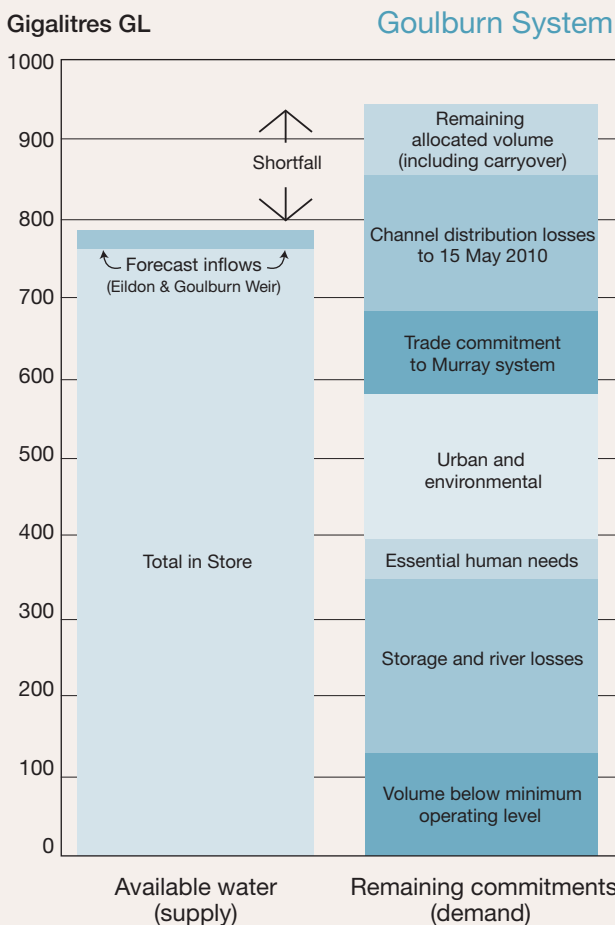
Box 1: The process of allocating water within the Torrumbarry Irrigation System

The Torrumbarry Irrigation System distributes water through both natural and man-made systems. Goulburn-Murray Water allocates resources for use during the irrigation season which normally runs from mid-August to mid-May the following year. Water available for allocation is determined by the volume held in storages, minus initial commitments (e.g. urban and environmental) and losses during the storage and delivery of water (e.g. seepage and evaporation). Remaining water resources can then be allocated to irrigators (see diagram below).

Allocations can increase over the course of an irrigation season. At the start of the current season (July 2009) Goulburn-Murray Water were unable to make allocations because water storage levels and rainfall remained too low. By October 2009, when the fieldwork for the Lake Boga study was undertaken, allocations of 35% for the Murray River and 33% for the Goulburn River had been announced. By January 2010 these allocations had risen to 60% and 50% respectively following substantial rainfall events in the catchments and improvements in storage levels (Goulburn-Murray Water 2009).

Torrumbarrly irrigation area

Water in store and commitments as at August 2009



Source: Goulburn-Murray Water 2009

4.4 Attitudes towards climate change

The use of language around the term climate change is complex as people have different understandings of the concept. For some, the term has become so politicised that they are inherently suspicious of it, especially now that it is associated with policy initiatives involving perceived taxes (recent debates over an emissions trading scheme for Australia for example). Others appear cynical in the face of what might be regarded as a climate change ‘industry’ of officials and consultants who appear to be benefiting from the debate itself.

There are different timeframes evident when people talk about climate change. Many are willing to accept long-term climate change happening over geological time – the climate shifting over millennia. This is often cited as an example that the climate has always been changing and so is nothing new. The current speed of change which arguably is a critical factor concerning governments and many in the community, appears not to have created great concern in some rural quarters. The experience of having lived through extreme weather events may be a factor influencing this view.

There is still much debate around the degree to which humans have or can influence climatic change, and this further divides opinion. It clouds the issue because when some are asked generally about whether they think climate change is creating certain outcomes, they may hear the question in terms of whether humans are responsible for the change – many will hold a view that climate change is occurring but is a natural phenomenon, as outlined in the previous paragraph.

At another level, people find the evidence of climate change confusing or contradictory. Personal experiences of the local climate are a key source of evidence for those who have experienced it first hand – notably farmers, but more generally regional communities who remember previous floods, droughts, and good years. This evidence base from personal experience is a critical one, and one that should be recognised. It does, however, provide a dilemma for those dealing with climate change in Australia because Australia’s climate is inherently variable. For this reason, a current drought or high intensity rain event may be seen by many as simply a ‘normal’ part of the Australian climate.

In addition, people are often sceptical about the types of indicators they are presented with as part of climate change debates. The example of ‘highest temperature for 100 years’ makes people wonder why it was so hot 100 years ago if climate change is a recent phenomenon. This response is logical when people are hearing specific examples. In order to gain a broader appreciation of climate change science, a much wider range of information needs to be considered and applied. Allied to the indicator problem is that of cold or wet weather events which are seen as running counter to climate change predictions of warmer and drier conditions. The fact that variability and more intense events are an expected part of climate change outcomes is difficult to comprehend when it appears to run against the underlying phenomenon of global warming. And again, underlying trends are difficult for individuals to identify in the face of normally wide variation in weather events.

For these reasons it is very difficult to generalise about the exact view that people hold regarding climate change because the question itself means so many things, the evidence covers many types of outcomes, and the natural environment of Australia has such variation, especially when viewed through the lens of personal experience on the land.

A question also arises as to whether it is necessary for individuals to be 'believers' in climate change, or whether there simply needs to be an appreciation of certain aspects of the debate, for example, the possibility of lower average streamflow in the Murray-Darling basin in the future compared to the past 200 years (during which time many of our water resource decisions were being made). In this respect, the approach used by the Victorian Department of Primary Industry is instructive. Rather than focusing on the broad scope of climate change issues, extension officers work with farmers to better understand the key climate drivers that explain the local district's rainfall and streamflow variations. Following this, data is introduced to show that some of these key climate drivers are now shifting and that historical patterns may not return – farmers are able to assess this information within the specific context of farming decisions such as planting regimes and tillage methods, rather than buying in to a much wider climate debate.

It is also important to recognise that people have difficulty envisaging future events. Distant risks do not engender the same response as immediate threats. Concrete examples of risks are more likely to connect with a person's experience or emotions and may therefore elicit a stronger emotional response than would theoretical examples (CRED 2009, ch. 3). Findings from the Lake Boga study concur with this explanation in regard to the use of a concrete example in the interview – Lake Hindmarsh – to explore the potential implications of a continuation of dry lake conditions. Even though the example was not identical to the situation of Lake Boga, it nevertheless challenged people to think about a particular scenario because it had actually happened somewhere.



4.5 Responding to change: adaptation and resilience

The terms 'adaptation' and 'resilience' are often used in relation to the ways in which communities and individuals cope with change. In common parlance, resilience can be defined as the ability to 'bounce back' after a negative event, whereas adaptation can be defined as the effective adjustment to a new set of circumstances. The people of Lake Boga were proud of their resilient spirit and saw this as an important part of their historical identity. However, there may be some discrepancy between how people define and value this trait in areas such as Lake Boga and how it is understood within a government policy perspective of 'building resilient communities'.

Lake Boga residents show resilience in terms of bouncing back from an unexpected and severe event – the drying of their lake and the immediate aftermath (dead fish and gnats). But in many ways they have not really adapted to a new environment – rather they have adapted to an interim phase while they await the return of their water. Events such as the Dry Lake Bed Dinner aimed to recapture something that had been lost – the sense of community around the lake's edge rather than establishing a new dry lake tradition. Farmers dealing with drought can show a similar resilience, but it is the hope of better seasons ahead that often fuels this resilience, rather than seeing the dry period as a permanent feature of the environment. Perhaps running counter to the argument outlined above is evidence of diversification among both town-based business owners and farmers in the research study. Whether these were undertaken as interim or long-term adjustment strategies would require further research to fully analyse.

The emotional responses of individuals have been identified as a key determinant of their ability to act and respond to change. This research shows that people move on and resolve to respond at different stages and at different individual rates when confronted by a major negative environmental change. Initial feelings of anger and frustration can take time to make way for an ability to participate in a productive response. If government is working within a policy context where behaviour change is an expected or desired outcome, there is a need to consider this variable timeframe of adjustment when targeting assistance.

Similarly, this research suggests that different groups in the community are more comfortable responding to change in different ways. Some are drawn to formalised processes such as meetings and committees. For these people, part of the process of responding and adapting is centred on having some level of understanding and control over the formal management of the situation. Others prefer a 'hands on' approach and believe that the best way to move forward in a difficult situation is to get things done immediately. For these people the formalised process of management is frustrating and alienating. There are still others who are unsure of what needs to be done or are not able to participate in any of the above possibilities. In this study there were a number of interviewees who indicated that they felt uncomfortable or unable to be involved in the meetings or cleanup because of health reasons. The message from this finding is that a 'community' is not going to respond to any difficult and significant change in a homogenous way. In recognising the diversity of preferred responses that people have to these situations government can be better placed to assist, if necessary.

4.6 Community impacts

The social benefits of the full lake were diverse and the drying of the lake has led to a range of often interconnected community impacts. On an individual, family and community level the loss of water in Lake Boga has meant that people have had to cope with some major social changes. These social changes and pressures can often be more subtle than obvious economic ones, however they were mentioned frequently by participants as a significant concern.

Peoples' sense of identity is influenced by where they live and how they feel about that place. Social structures are partly formed around place-based features such as climate and access to open space. In the case of Lake Boga, the lake has always been a point of social bonding that was cheap and accessible. The simple acts of having barbeques and 'catching up' around the lake, being able to swim and sail, and enjoying the view over the water were normal parts of life that made people feel content and connected. Rapid change affecting long-established social behaviours across a whole community can have serious impacts on how people feel about how and where they live.

This study also highlighted the connection that people make between the benefits of water in the landscape and individual wellbeing. The multiple expressions of this view among community members in Lake Boga indicates that having access to water for recreation and amenity is a key determinant of the attractiveness and liveability of an area. People spoke about how this access to water provided opportunities for psychological and spiritual renewal. State government policy recognises that living in an area that one sees as attractive and liveable is likely to have a positive impact on personal wellbeing (DPC 2005). For the community of Lake Boga, loss of the lake, the decline in the area's attractiveness and the associated environmental problems such as dust, has translated into a negative impact on wellbeing. A wider recognition of the connection between water and wellbeing could serve to unite policy concern across government agencies that deal with these issues.



Communities that rely on a single natural asset can be vulnerable to environmental change therefore planning for diverse sources of recreation is important.

The issue of community strength and vulnerability has, for some time, been of concern for both social planning and environmental policy (DPCD 2009). This study highlights the complexity of some of these issues for communities and highlights the potential vulnerability of other towns which may be facing these types of environmental conditions now or in the future. Communities that are reliant on one form of recreational outlet (i.e. a lake) may be more vulnerable to these types of shocks than communities that have multiple assets or opportunities. When the asset is a natural one, such as a lake or a beach, they have the potential to be particularly fragile. Communities that rely on a single natural asset could therefore be vulnerable to environmental change or resource scarcity. Planning for diverse sources of recreation is particularly important for these communities.

Work is currently being conducted internationally and in Australia on the social and community impacts that are likely under climate change scenarios in areas such as mental health and social justice (McCaughey Centre 2009). Much of this work has suggested that climate change is likely to disproportionately impact sections of the community that are already disadvantaged. This applies to both socially and politically marginalised groups and/or sections of society that have lower socio-economic status. Many of the findings from the social impacts section of this study would support this view.

Social isolation has increased as a result of the lake drying and the changes that followed. Three groups can be identified as being particularly affected. The first group are older, less mobile residents who benefited from the convenience of having the lake and its associated social activities nearby and easily accessible. These people find it difficult to travel further or make more effort to see people regularly. The second group that may be identified are retirees whose families live elsewhere. They were likely to feel the impact of social isolation in terms of the decreased frequency of family members visiting them. Without the lake there was less entertainment for young children and this has discouraged some families from coming from Melbourne and elsewhere to spend the school holidays. The third group are those who may feel uncomfortable joining in formalised social activities or clubs. Many lakeside activities were informal – the use of the area for walking, swimming and having picnics provided opportunities to meet others in a relaxed and comfortable way. Without the lake, some of these quieter members of the community have felt more isolated.

In contrast to the view that the disadvantaged bear most of the burden when change occurs, the Lake Boga study suggests that those with higher socio-economic status (i.e. lakeside residents and business owners) may bear a high economic cost of such change. The physical attractiveness of the area has been affected negatively by the loss of the lake. Those who have made business or property investments on the basis of the lifestyle and amenity benefits of the region carry a large burden of stress and financial loss as a result of the lake drying.

4.7 Demographic and economic change

Population and settlement

Lake Boga, like many small regional towns, has lost services over the past half century. However, the town itself has generally maintained its population level. The attraction of the lake and the proximity of Swan Hill have been important in explaining this retention of population. While people may travel to Swan Hill for goods and services, the lifestyle and amenity benefits of Lake Boga assured its attraction as a residential location.

A question arises as to the degree to which Lake Boga would have expanded if the lake had not dried. Population data suggest a stable population over the decades preceding the drying. Compared to some other regional centres, like Bendigo and Ballarat, Swan Hill has experienced relatively slow growth over recent times (table 2). So, while Lake Boga does have a dormitory role to Swan Hill, its rate of growth may be limited if the regional centre itself is not experiencing strong growth.

If water returns to the lake in the next few years then many residents would realise the value of their asset and move. Presumably others would buy and Lake Boga would regain its amenity and lifestyle appeal for new investors. Some businesses would rebound reasonably quickly although others such as the motels, which have experienced degradation during their closure, may require more substantial investment to

resurrect. Overall, Lake Boga would be likely to return to having a stable, slow growing population base.

Another question which may be considered is whether Lake Boga can retain its existing population, or even grow, without the lake having water. If the lake stayed dry for many years then lakeside residents would face a difficult choice – stay without the amenity in which they had invested, or move and bear a substantial economic loss on their asset. Business owners would face the same choice as the lakeside residents – sell at a loss or hang on. The direct loss of income for most businesses may make it difficult to sustain their businesses although diversification, which has already occurred, is a viable way to extend income sources. Those currently working in Swan Hill have a greater degree of economic protection. While the amenity and lifestyle loss may be great for some, others may be less affected – to some degree the daily pattern of commuting would remain the same and recreational opportunities may be accessed at other lakes in the region or may be substituted for different kinds of activity. While there could be a loss of population through gradual out-migration and ageing, the attraction of cheap housing may maintain a population base by attracting new residents – those on low incomes or those with young families who may not be able to afford to buy property in Swan Hill. Such a trend may change the character of Lake Boga but the total effect on population levels would be minimal.

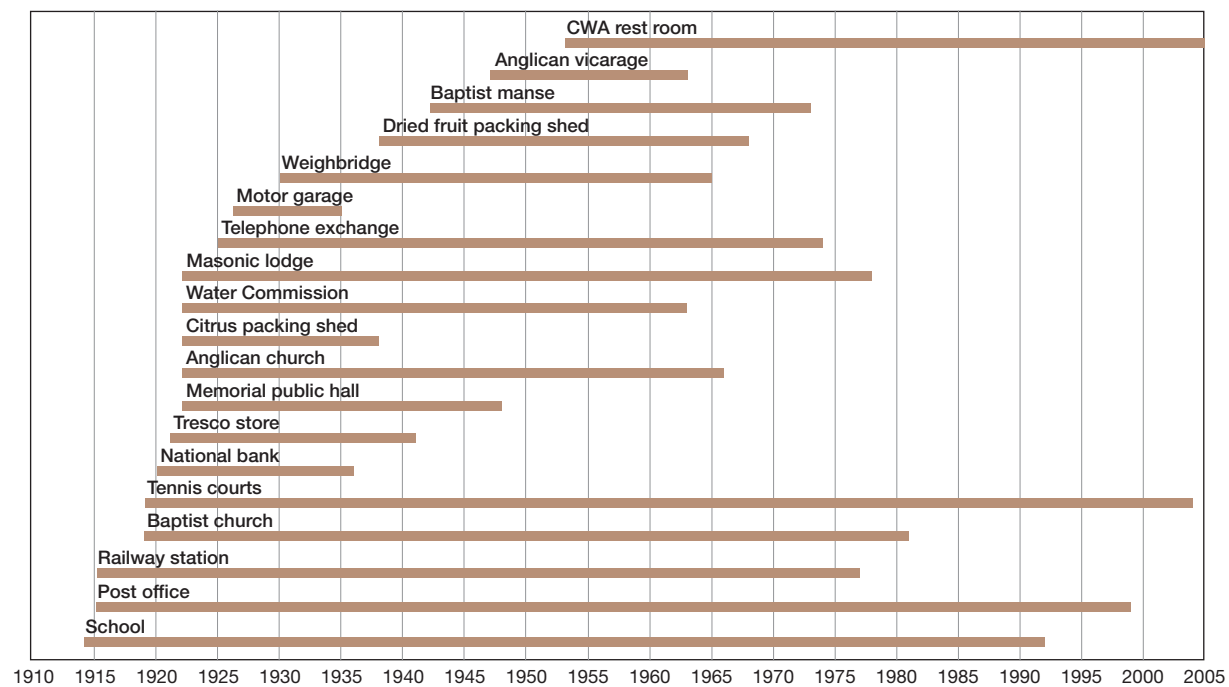


Lake Boga has maintained a steady population level. While some have moved out, others are attracted by the town's relatively cheap housing and its proximity to Swan Hill

The discussion above suggests that Lake Boga is able to retain population. This stands in contrast to some other towns in the wider region that have experienced long-term population decline. Interestingly, the town of Tresco, only 5 kilometres from Lake Boga provides a vivid historical example of changing settlement geography over the past century. Tresco was established in the early twentieth century, based around irrigation agriculture. The town flourished in the 1920s (figure 16) and by 1930 it boasted 15 business or service facilities. This level of servicing remained relatively stable until 1960 after which services declined and

population levels declined. Interestingly, the town did not suddenly ‘die’ – over the next 40 years it lost services at a fairly regular rate with the final facilities closing in the early 2000s. And despite the loss of all services, the township still has a resident population. The story of Tresco is instructive because it mirrors the history of many small towns in the Mallee and Wimmera over the twentieth century. Importantly, it shows that out-migration and population decline tend to be slow processes. This may be the case even in the face of relatively rapid environmental change or climate variability.

Figure 16: Services in Tresco township, 1910 to 2005



Source: Local historical marker, Tresco, 2009



The town of Tresco, 5 kilometres from Lake Boga, provides an interesting historical example of settlement change in the region

Table 2: Population growth rates in selected regional centres, Victoria, 1996 to 2006

	2006 population (enumerated)	Average annual growth rate 1996 to 2006 (%)
Mildura	29,054	1.94
Echuca	12 ,392	1.76
Warragul	11,345	1.74
Traralgon	21,466	1.18
Bendigo	71,935	1.14
Wodonga	29,535	1.11
Shepparton	28,878	1.04
Warrnambool	28,029	1.02
Ballarat	75,015	1.00
Geelong	136,518	0.66
Horsham	13,290	0.55
Wangaratta	16,749	0.53
Colac	10,562	0.37
Swan Hill	9,702	0.35
Bairnsdale	11,026	0.14
Portland	9,716	-0.02
Sale	13,092	-0.16
Moe	15,156	-0.30
Morwell	13,186	-0.46

Source: DPCD 2008, Towns in Time

It is harder to forecast trends for rural populations around Lake Boga because the critical factor is drought and water allocations, rather than just the situation of Lake Boga itself. A wider consideration of drought impacts was beyond the scope of this study. However, it is worth noting that the agricultural sector in the region is a significant generator of wealth and productivity. Multiple impacts of drought, rural restructuring, global market variability and demographic change will influence the

future of agricultural industries, the health of which will have an impact of the wealth of the broader region. The relationship between rural areas and towns such as Lake Boga is not as direct as it once was – farmers are likely to source goods and services from a range of locations, not from the nearest small town. Yet it is clear that the wellbeing of the farming community, translated into income, has benefits for the local and regional economy.

Economic impacts

The loss of water in Lake Boga has had major economic impacts through the decrease in visitor numbers and the impact on house values. However, it did not have the effect of a large number of direct job losses in the way that, say, the closure of a large processing factory might have. Many residents of Lake Boga are either retired, not in the labour force, or are commuting to Swan Hill for work.

The key income effects from the drying lake are for business owners in the town. The lake provided a significant income stream for many businesses in Lake Boga and provided some casual employment opportunities in peak seasons. The economic benefits extended beyond the town to Swan Hill and the broader region where many visitors used accommodation services, spent money and visited regional tourist attractions. Seasonal tourists brought additional income for more general businesses in Lake Boga such as the general store and local pub. These enterprises provide important services for the local population but, deprived of the higher profits of peak season, they are less viable than in the past. This has brought concern to many who fear that such businesses might close should the lake remain dry over an extended period.

Although the town had lost services over the previous 50 years, it was not in a state of ongoing decline – those businesses remaining enjoyed the benefits of the tourist trade. And with water returning it could be argued that such businesses may remain and regain some prosperity.

Potentially, some of the social impacts and costs outlined earlier in this report may lead to indirect economic costs. For example, negative impacts on people's wellbeing can lead to associated costs of healthcare. Lessened recreational opportunities may create health issues through lack of physical activity. And the loss of such activities for children and teenagers and young adults may produce boredom leading to anti-social behaviour. Such causal connections and the economic outcomes cannot be determined from this study, however, further research could explore such themes more specifically.



Loss of tourist visitors to the lake has had a major impact on businesses such as the caravan park

5. Conclusion

Summary of findings

Lake Boga, when full, provided significant social and economic benefits to the local and regional community. The drying of the lake led to tangible negative impacts such as dying fish, an insect plague and ongoing dust issues. It also led to more subtle impacts such as increased social isolation caused by the loss of a key community meeting place. The decline in visitor numbers also contributed to this feeling of isolation, particularly among older residents.

In terms of economic impact, lakeside home owners and local businesses have been specifically affected by declining property values and loss of tourist income. An indirect economic cost felt by many has been the additional transport costs incurred when accessing equivalent recreational activities such as swimming and boating. Findings from this study have extended our knowledge about the groups that may be most affected by environmental change – not only poorer or disadvantaged groups, but also those who have invested (financially and emotionally) in a particular landscape or lifestyle.

The hope of water returning is an important factor in sustaining the community's morale. Because the lake was recently incorporated into an irrigation project, locals expect water to return to the lake. When attention was drawn to other lakes that have remained dry for up to 10 years, respondents appeared not to have considered such a scenario for Lake Boga. Because of this, the majority of respondents are waiting for a return to normal rather than adapting to a new situation.

The spatial context of regional areas is an important contributor to how towns experience change. The proximity of a regional centre, Swan Hill, has played an important role in limiting the economic impacts of the dry lake as it continues to provide sources of employment, and hence income, for working age people. Swan Hill also offers a range of goods and services which continue to be accessed by the residents of Lake Boga.

Out-migration has been a relatively small part of the community response to the drying lake. Some are trapped by loss of asset value and are waiting for water to return before selling their property. Others regard the local area as home, with or without the lake, and are likely to stay irrespective of any long-term environmental change. Out-migration and population decline tend to be slow processes. This is likely to be the case even in the face of relatively rapid environmental change or climate variability.

Implications for policy

Multiple agencies and multiple responsibilities characterise the management of drying lakes. Lake Boga provides an example of the difficulties that come from such complex management arrangements. Interviewees expressed frustration with current arrangements and a desire for simpler, more effective management structures. These findings are important for authorities at local, regional and state levels. While the many jurisdictional arrangements may make sense within an historical or legislative context, they are more likely to be experienced as confusing and frustrating by communities dealing with stressful environmental change. Findings from this research would therefore suggest the need for greater cooperation across agencies, simplification of management arrangements where practicable and improved communication with local communities when various authorities are involved in decision-making processes. Interestingly, the perceived failings of authorities were not seen as an inability to handle a new and complex situation. Rather they were interpreted by many in the community as a lack of concern or interest in the town's problems.

Current water priorities, expressed through government policy and legislation, include consumptive uses (including irrigation) and the environment. Protection of recreational values has received less attention. However, this study has revealed the range of benefits which Lake Boga provided to its residents in terms of formal and informal, passive and active recreational opportunities. Much of the community's sense of wellbeing came from the lake – not only in terms of physical wellbeing but also psychological and spiritual wellbeing. This range of inter-related values and benefits associated with the water resource suggests that greater attention and priority should be given to protecting and prioritising recreational water resources. It should also be noted that communities like Lake Boga which are economically and socially reliant on a key environmental feature like a lake may be particularly vulnerable to environmental change associated with water resource scarcity.

The drying of Lake Boga is generally not seen by residents as being caused by climate change. In fact there is widespread scepticism about climate change theory and governments' focus upon it. Given the attention given to climate change policy by various levels of government, this finding may seem surprising. However, the ways in which people hear and understand the debate and its relevance to them varies greatly. When consulting with communities on the issue, it is therefore important to understand community perspectives. The responses from people in Lake Boga suggest that there is actually a wide range of opinions, understandings and explanations relating to the role of climate change in this event. In many cases these views are informed by personal experience of the local environment. Developing communication strategies that acknowledge this local experience may engender more positive policy outcomes.

Uncertainty emerged as a strong theme in the study – not just the inherent uncertainty about future events, but that agreements made about Lake Boga's water allocation carried uncertainty regarding the timing of water returning. For many, uncertainty meant that planning and decision making became difficult and consequently stressful. At an individual level, people like certainty and concrete information which can provide a level of comfort, empowerment and a sense of control over the future.

The emotional responses of individuals have been identified as a key determinant of their ability to act and respond to change. This research shows that people move on and resolve to respond at different stages and at different individual rates when confronted by a major negative environmental change. Initial feelings of anger and frustration can take time to make way for an ability to participate in a constructive response. This has implications for how government interacts with communities that are experiencing change. A standard approach of consultation through public meetings may work for some people, but others may wish to have more action-oriented approaches or smaller, less intimidating forums. This suggests the need for government to better understand community dynamics and customise responses accordingly.

Value of the research

This research project provides a model which may be applied to other areas experiencing environmental change in Victoria and beyond. The types of changes which are foreseen under climate change scenarios would be suited to this kind of analysis, for example, changes along coastlines or in alpine environments. Communities who enjoy these environments and rely on them for their economic livelihood may be affected in different ways from those in Lake Boga. Gathering

information from communities living in different environments and with different socio-economic characteristics would therefore deepen our understanding of how communities react and adapt to changing circumstances. In turn this would give government and other authorities greater ability to target assistance and support in more sophisticated and effective ways.

Finally, it is hoped that this report will also provide an important product for the community of Lake Boga itself. The documentation of their story is a powerful way in which they can share their experience and engage with other communities who may be facing the drying of their lake. Using research and information to facilitate such support networks is an important role for government to play.

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Appendix 1: Overview of participant characteristics

Interviews were undertaken between 12th and 16th October 2009. Each interview ran for approximately 45 minutes.

Total number of interviews	33
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Total number of participants	45
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Interview type

Couple	12
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Single	21
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Age structure

25-40 years	8
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40-60 years	18
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60 years +	19
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Gender

Male	28
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Female	17
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Location

Lakeside	21
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Town	13
------	----

Farm	10
------	----

Other	1
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Appendix 2:

Interview Schedule

The Full Lake

1. How long have you lived in Lake Boga?

Xx years

All my life/since childhood

What were the reasons for coming to Lake Boga?

How long were your family here for?
What brought them here originally?

2. In the time you have been here what have been the best things about living in Lake Boga?

3. Have there been any disadvantages of living in Lake Boga?

4. Thinking about the time that you've lived here how important was the lake to the town?

The Dry Lake

Turning now to the events of last summer ...

5. Had the lake been drying up for a long period?

6. Did local people expect the lake to dry up or did it take people by surprise?

7. How did people in Lake Boga explain this event?

8. Have you noticed any other environmental changes in the town or in the surrounding area?

Reactions and Responses

9. In terms of people's response to the lake drying out, how did the community feel or react? What was the range of emotions?

10. What were some of the specific actions that people took in response to the lake being dry?

11. I have read about the Dry Lake Dinner that was held here in April. Did that help the community? In what ways? Were you involved in organising it? Did you attend?

Impacts

12. Do you think there has been an impact on the sense of community wellbeing in Lake Boga since the lake dried?

13. What about you personally? Have the changes affected your personal wellbeing?

14. The Lake has clearly been a defining feature of the town. Do you think the lake drying up has affected the 'identity' of Lake Boga?

15. Has it affected tourism and visitor numbers?

16. Has there been an impact on the quality or availability of services in Lake Boga?

17. What about industry and employment?

18. Did anyone actually leave the town in response to the lake drying?

What types of people? *Families, business people, holiday home owners?*

What made them leave? What was the tipping point?

Where did they go?

What made others stay? Are the choices constrained?

19. At that time did you consider leaving the town?

Where did you consider going?

If no, what keeps you here?

Are your choices constrained?

Would there be a tipping point for you to consider leaving?

The Future

21. Thinking about the future – if the lake fills up in the next year what do you think the effect would be on the town?

22. Lake Hindmarsh (Jeparit) used to have water but has now been dry for 10 years. How do you think Lake Boga would cope if this occurred?

23. Has anyone talked about the lake in terms of climate change? Do you see it this way?

24. Do you think there is a lot of uncertainty around the future of the lake?

Finally – On Reflection

25. Thinking back on what we've discussed, can you tell me how you would compare Lake Boga today to the Lake Boga of 10 years ago?

26. Is there anything else that you would like to add that we may not have covered?



Department of Planning
and Community Development