Disclaimer

This report has been generated as part of the Living Murray initiative. Its contents do not represent the position of the Murray-Darling Basin Commission. It is presented as a document which informed discussion for improved management of the Basin's natural resources in November 2003.

Preparation of the social impact assessment scoping and profiling studies preceded the Living Murray First Step decision and the signing on 25 June 2004 at the Council of Australian Governments meeting of the *Intergovernmental Agreement on Addressing Water Overallocation and Achieving Environmental Objectives in the Murray-Darling Basin*. The communiqué from this COAG meeting is provided at www.coag.gov.au. These decisions provide the framework under which $500m will be invested by governments over 5 years to begin addressing water overallocation in the Murray-Darling Basin and achieve specific environmental outcomes in the Murray-Darling Basin.

The first priority for this investment will be water recovery for six significant ecological assets first identified by the Murray-Darling Basin Ministerial Council in November 2003: the Barmah-Millewa Forest, Gunbower and Koondrook-Perricoota Forests, Hattah Lakes, Chowilla floodplain, the Lindsay-Wallpolla system, the Murray Mouth, Coorong and Lower Lakes, and the River Murray Channel.

The water will come from a matrix of options with a priority for on-farm initiatives, efficiency gains, infrastructure improvements and rationalisation, and market based approaches, and purchase of water from willing sellers, rather than by way of compulsory acquisition.

Consequently, the assumptions that were made to enable the social impact assessment scoping and profiling studies to be undertaken in mid 2003, while reasonable at the time, have been overtaken by these decisions and the consequential benefits that will flow from them. As such, whilst being an important contribution, this report cannot fully and accurately represent the social issues arising from the Living Murray initiative.

Stage 1 Volume 1

Scoping Study

Social Impact Assessment of Possible Increased Environmental Flow Allocations to the River Murray System

FINAL REPORT

Prepared for

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Ref: AU1-196

August 2003

DISCLAIMER

All description, figures, analyses, forecasts and other details have been prepared in good faith from information furnished to the consultants by other parties. These data are believed to be correct at the date of preparation of this report.

However, it should be noted that predictions, forecasts and calculations are subject to assumptions which may or may not turn out to be correct and Hassall & Associates Pty Ltd expressly disclaim all and any liability to any persons in reliance, in whole or in part, on the report in total or any part of its contents.

It is important to note that little information was available to the consultants on the Environmental Flow Reference Points (EFRP) in terms of the environmental response that would occur, how the water would be recovered for the river system, and the nature of the economic impacts associated with water recovered for the river.

Please cite this report as Hassall and Associates, Helen Ross and Mary Maher and Associates (2003) *Scoping Study: Social Impact Assessment of Possible Increased Environmental Flow Allocations to the River Murray System, Stage 1*, Volumes 1 and 2. Report prepared for Murray Darling Basin Commission. Hassall and Associates, Sydney.

Executive Summary

The Murray-Darling Basin Commission (MDBC) contracted Hassall & Associates Pty Ltd and Professor Helen Ross, University of Queensland, assisted by Mary Maher and Associates, to conduct a scoping study into the potential social effects of the possible return of water to the River Murray System associated with three environmental flow reference points. This is referred to as 'Stage 1' of the Social Impact Assessment (SIA), with 'Stage 2' to be the full SIA.

Stage 1, the 'scoping' stage, consists of two linked parts, which are as follows:

- profiling the social and economic context of communities that may be affected and their dependence on the River Murray and its ecosystems; and
- scoping of the possible impacts from changed flow regimes.

In practical terms, a scoping study involves a strategic level review of various factors and information sources (stakeholders, relevant literature, data bases and methodologies) relating to studying the possible social impacts of a change (eg decision, project, plan or regulation) to:

- identify a broad spectrum of possible impacts of the proposed change;
- refine these into a list of selected key impacts for full assessment in a SIA; and
- refine the methodologies / processes for this comprehensive impact assessment and for proposing any recommendations for managing the effects of the proposed change.

The scoping study must be viewed as a dynamic 'living' process, and as such due recognition is needed of the iterations between steps eg initial profiling, field work design, field work conduct, final profiling and within this process, the essential task of refining the methodology, and assessing the practicality of specific research avenues and processes.

The authors are aware of few previous Australian impact assessments, or impact assessment steps (such as profiling) approaching the geographical scale and complexity of issues involved in this study. Given the scale and complexity of our task, this study has necessarily been pioneering in its approach and highly challenging to conduct.

Volume 1 reports the scoping of the task for SIA and Volume 2 reports the profiles of the eight catchments included in the Study Area. The information in Volume 2 contributed to the development of the scope presented in this Volume.

The report presents information for consideration by the MDBC in two volumes described below.

Volume 1:

- background information on the scoping study, including the approach used;
- an analysis of the potential impacts, areas, industries and stakeholders likely to require detailed consideration in the SIA; and
- advice and options for deciding the 'scope' for further study.

The information presented has been derived from literature, statistics and key informant interviews with some ninety people in all eight catchments in the Study Area. The interviews were conducted during February to March 2003 with local governments, Regional Development Organisations and members of the MDBC's Living Murray initiative Community Reference Panel.

Volume 2 contains a set of profiles of eight catchments making up the Study Area for this project.

Current context

A building block for assessing the social impacts resulting from a change, is a description of the current conditions and ongoing trends in the Study Area (a 'baseline'). This report recognises the current context for the Study Area, and indeed for Australian agriculture more generally, to be highly dynamic as a result of increased exposure to international competition, changes in the nature and extent of government intervention, water resources reforms, and the current severe drought. The baseline, reported in Volume 2, has been prepared in order to:

- identify the dynamic current context for consideration of potential impacts of the Living Murray initiative and options for implementation;
- assist those conducting the proposed SIA to judge where the potential impacts of increases in environmental flows might 'sit' among these other effects;
- record the role of adjustments by individuals, communities and governments, in influencing past impacts, as a guide to potential responses to future water-related impacts; and
- provide for future monitoring to distinguish impacts of water recovery options from the cumulative effects of the many other changes.

Analysis of issues for further study

A vital task of a scoping study is to delineate the most *significant* potential impacts of a proposed change, which are generally those, which will make most difference to a decision or require most mitigation. This is to ensure that study effort is directed to these issues and effort not dissipated on less crucial issues. In order to distinguish potential impacts of Environmental Flow Reference Points (EFRP) from the background of cumulative changes, we have used an analytical tool, influence pathways, to trace where and how specific changes in water allocation would transmit through the economy and social systems.

One set of potential impacts arises from more water remaining in the river, through a set of influences starting with environmental changes and progressing to economic and social effects. The second set arises from reduced availability of water for extraction, transmitted through on-farm effects, farmer decisions in response, and aggregated effects within and beyond an area. Both influence pathways affect employment opportunities and the viability of small businesses, with a set of demographic and social consequences, particularly affecting towns. The issues highlighted as most relevant for further study are:

- employment levels, for those engaged in primary and secondary industries in which water is an input, and in towns whose economies are highly dependent on irrigated produce. A particular emphasis is necessary on the opportunities for young people, and on attraction or loss of professional people from regional towns;
- farm and business viability (this may also include issues related to stranded assets and financial capacity to manage change);
- population levels in small, declining towns, since this affects the viability of small businesses, services, organised recreation opportunities, eg sporting and leisure clubs and social interaction - all important elements of quality of life;
- cultural impacts for Indigenous people and possibly other ethnic and social groups;
- impacts of further change on individual and community coping abilities; and
- other quality of life issues, for instance in lifestyle opportunities, scenic amenity and environmental improvements.

These issues will also have varying degrees of importance in different areas and industries, and for different stakeholders. The scoping study identifies how a reduced set of areas, industries and stakeholders can be delineated as important for further study in the SIA, recognising the interaction among these.

Wherever possible, and within the limits of the methods available, the SIA needs to differentiate increases or decreases in these phenomena due to increases in environmental flows from background effects occurring as a result of a cumulative set of changes within Australian and the Basin's agriculture. We caution however, that neither scoping nor a full SIA can necessarily achieve the precision required to differentiate among the three EFRP, or to distinguish their effects clearly from those of other factors in Australia's rural change process.

Scope of areas for further study

Our analysis focuses on the extent to which the catchments and areas within them:

- are experiencing the cumulative impacts of changes that have occurred or are occurring; and
- could experience further significant impacts from increased allocations to environmental flows. The degree of impact will depend on the quantum recovered, the implementation option eventually chosen and the resilience of those communities to further change.

The analysis takes into account the degree of direct or indirect dependence on water usage (extractive or in-stream), and – so far as this can be judged in a scoping study – indications of the area's resilience to further change.

Interviews and profiling information were synthesised and a classification system developed to show the areas within the catchments studied that are:

- least dependent on water and/or least affected by cumulative impacts of recent changes, with apparent resilience to manage further change;
- somewhat dependent on water, and/or moderately challenged by cumulative impacts, possibly with some features of resilience to past and future change; and
- most dependent on water, strongly challenged by cumulative impacts and showing fewer features of resilience than other areas.

We argue that the first set of areas can reasonably be omitted from further study on the grounds that they are least likely to be impacted by implementation of the EFRPs. The second and third sets of areas should be included for further study in the SIA.

Analysis of industries

Our data collection shows that certain primary industries are particularly vulnerable to possible further restrictions in their access to water. If the primary industry suffers, the secondary industries and towns dependent on their supply chains also suffer through flow on effects, depending of course, on the economic diversity of those towns and their relationships with one other.

The water dependent primary industries that displayed features of vulnerability to a major change in their water access, against a backdrop of current and recent challenges, are:

- dairy;
- rice;
- wine grapes;
- horticulture including stone fruit, citrus, almonds and olives; and
- mixed farming combining irrigated and non-irrigated agriculture in certain areas.

These industries are affected by:

- reliability or quantity of water;
- expense or difficulty of change to alternatives; and
- debt levels, in some cases related to recent restructuring and to drought.

Areas of mixed farming that are dependent on irrigation, where salinisation is occurring, or where opportunities for dryland agriculture is limited due to rainfall, are experiencing difficult economic conditions.

Changes in the viability of particular agricultural industries can be expected to transmit throughout their 'supply chains'. This process affects the businesses providing agricultural inputs, transport, packing and processing industries. It also affects the towns accommodating these activities and their employees, each with businesses and services dependent on the population and its spending power.

Tourism and recreation are potentially in a position to benefit from environmental improvements at each level of water recovery, although variability in water levels may affect some areas negatively at certain times of the year.

Stakeholder analysis

While most stakeholders (people who affect, or are affected by, the issues under consideration) are self-evident from the analysis of areas and industries, we have documented a range of stakeholders to ensure none were overlooked due to relative lack of visibility within the areas or industries analysis.

We have highlighted the potential impacts for a range of stakeholders. We have particularly focused on the implications for Indigenous nations, integrating information from the Indigenous component of the community engagement process. We also distinguish a small set of commercial fishers in the Coorong, and administrative organisations - local and government agencies, and irrigation management bodies – whose workloads may be affected.

Scope of the Social Impact Assessment

A number of questions remain to be determined in the event the MDBC proceeds with a full SIA. These include a set of implementation options and associated timing factors. An SIA can – within the limitations of data and resources - enlighten the development of these options, and test their relative merits.

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Abbreviations used in this Report

ABS	Australian Bureau of Statistics
ANCID	Australian
CARE	Centre for Agricultural and Resource Economics
COAG	Council of Australia Governments
CMU	Catchment Management Unit
CIT	Central Irrigation Trust
DLWC	Department of Land and Water Conservation
EBC	Environment Behaviour Consultants
EFRP	Environmental Flow Reference Point
FMIT	First Mildura Irrigation Trust
GATT	General Agreement on Tariffs and Trades
GL	Gigalitre
G-MW	Goulburn-Murray Water
IREC	Irrigation
Ha	Hectares
Km	Kilometre
MDB	Murray-Darling Basin
MDBC	Murray-Darling Basin Commission
MI (MIA)	Murrumbidgee Irrigation
MIL	Murray Irrigation Limited
ML	Megalitre
MLDRIN	Murray Lower Darling Rivers Indigenous Nations
NSW	New South Wales
RACD	Resource Assessment and Conservation Division
RETS	Rural Economies in Transition Scheme
SA	South Australia
SA MDB	South Australian Murray-Darling Basin
SERP	Social and Economic Reference Panel
SIA	Social Impact Assessment
SLA	Statistical Local Area

1. Introduction

1.1 Scoping

The Murray-Darling Basin Commission (MDBC) has engaged Hassall & Associates Pty Ltd and Professor Helen Ross, University of Queensland, assisted by Mary Maher and Associates, to conduct a scoping study into the potential social and economic effects of the possible return of water to the River Murray System associated with the Environmental Flow Reference Points (EFRP). This profiling report is an important component of the scoping study.

In practical terms, a scoping study involves a strategic level review of various factors and information sources (stakeholders, relevant literature, data bases and methodologies) relating to studying the possible social impacts of a change (eg decision, project, plan or regulation) to:

- identify a broad spectrum of possible impacts of the proposed change;
- refine these into a list of selected key impacts for full assessment in a SIA; and
- refine the methodologies / processes for this comprehensive impact assessment and for proposing any recommendations for managing the effects of the proposed change.

The scoping study must be viewed as a dynamic 'living' process, and as such due recognition is needed of the iterations between steps, eg initial profiling, field work design, field work conduct, final profiling and within this process, the essential task of refining the methodology and assessing the practicality of specific research avenues and processes.

In parallel to this study, a suite of economic analyses (including modelling studies) has been commissioned separately to inform the MDBC. Arrangements have been made for access to this information when available, since much of the social analysis necessary is interdependent with economic information. At the time of writing, the results of these studies were not available however, they will be integrated to assist in defining the scope for the SIA.

The MDBC has also commenced a community engagement process to inform the community of the environmental flow process and gather feedback about potential impacts. Reports from the Stage 1 community meetings, including feedback sheets, have been made available. An Issues Log has been developed by the Commission Office to provide a public record of issues raised throughout the process and responses to these. In addition, the MDBC has already received a short scoping study of economic impacts of alternative environmental flow regimes (Young *et al*, 2002) and survey of stakeholders (Nancarrow and Syme, 2001). The SIA is to be informed by these processes.

1.2 Structure of the Stage 1 Report

The report has been prepared in two volumes. Volume 1 reports the scoping of the task for SIA and Volume 2 reports the profiles of the eight catchments included in the Study Area. Volume 2 has been prepared so that it may be read as a stand-alone report or in conjunction with the scoping study, presented in this volume.

Volume 1

Volume 1 presents:

- background information on the scoping study, including the approach used;
- an analysis of the potential impacts, areas, industries and stakeholders likely to require detailed consideration in the SIA; and
- advice and options for deciding the 'scope' for further study.

The information presented has been derived from literature, statistics and key informant interviews with some ninety people in all eight catchments in the Study Area. The interviews were conducted during February to March 2003 with a local governments, Regional Development Organisations and members of the MDBC's Living Murray initiative Community Reference Panel. In this scoping stage, more detailed interviewing with a wider set of interested parties was neither necessary nor feasible.

Volume 2

Volume 2 provides the set of profiles of eight catchments making up the Study Area for this project and presents an explanation of the descriptors used in the analysis.

2. Context of Social Impact Assessment

2.1 The Living Murray Initiative

In March 2001 the Murray-Darling Basin Ministerial Council agreed to a vision for the River Murray as

.... a healthy River Murray System, sustaining communities and preserving unique values.

The Ministerial Council is now engaged, through the Living Murray initiative, in a process of identifying the best ways of achieving the described vision through community wide discussion and the commissioning of various economic and scientific studies, including a separate Indigenous Engagement Proces and this scoping study as a precursor to a SIA.

To aid the discussion and analysis of costs and benefits, the council chose three EFRPs of varying amounts of water to be transferred from current uses to the environment. The reference points are average annual volumes of 350 gigalitres (GL), 750 GL and 1500 GL.

However, as stated by the Murray-Darling Basin Commission, '*No decision has yet been made on whether additional water will be recovered for environmental flows nor how much - this is the subject of the present community discussion.*'[1]

This scoping study, which began in October 2002, is to outline the scope the potential social and economic effects of the possible return of water to the River Murray System associated with the environmental flow reference points.

The Ministerial Council meeting in May 2003, highlighted that a SIA would not be conducted until further work had been undertaken on the level of water that might be recovered and the options for recovery. Therefore, if the MDBC proceeds with a full SIA based on the work of this scoping study, it would commence after the November 2003 Ministerial Council Meeting.

It is important to note that the scoping study did not have available to it the policy assumptions or options for water recovery, nor the results of the various scientific and economic studies as these studies are being conducted in parallel. However, it has been possible, based on statistics, interviews and other literature to prepare the scope that will assist in guiding the SIA. It is also important to recognise that SIA may not have the precision to distinguish precisely among the effects of three different EFRP, or indeed the potential effects of the EFRP beyond the complex set of background changes occurring (see section 4).

[1] Excepts from the information document located at www.mdbc.gov.au/naturalresources/e-flows/eflow)issues_q-a.htm

2.2 Profiling and Scoping

This section explains the roles of profiling and scoping in SIA, and outlines the logic underlying the choice of methods. In doing so, it explains some theory and accepted procedures concerning SIA, where these are necessary to assist readers who are not familiar with this field. The methods used in the study are then explained in Chapter 3.

2.2.1 The roles of profiling and scoping in social impact assessment

SIA combines research, analytic, and usually participatory processes to identify, describe, and interpret changes in the 'human environment' that result from any of a wide variety of changes - projects, policies, or planning activities (Branch and Ross 2000, p.93). This includes the distributional impacts associated with a change. In this project, the 'change' is the possible return of 'environmental flows' water to the River Murray System. The extent of the change is not yet known, though the three EFRPs are used for discussion purposes. The implementation options, which will clarify the nature of change, are also yet to be decided.

Key stages in a SIA include:

- profiling;
- scoping (in either order);
- the assessment itself (predicting the probable impacts of the proposed change);
- mitigation (actions to ameliorate the impacts); and
- monitoring of the actual effects.

The task for this consultancy involves two discrete, but complementary, SIA steps, namely profiling and scoping. We have chosen to approach the task in ways that anticipate the information needs for monitoring. This section provides an overview of the roles of scoping and profiling in an SIA and highlights some of the challenges.

2.2.2 The roles of scoping and profiling

Scoping is one of the first stages of work in an impact assessment process. It defines the scope of further study, by delineating the issues most important for further study, as well as those, which can safely be left out of further analysis. It may delineate the geographical areas that could be affected. It is particularly valuable for ensuring that effort is devoted to exploring key issues and areas, and

not dissipated on issues (or areas) that are unlikely to be pertinent to environmental or social impacts or to contribute appreciably to decision-making. It ensures transparency about the issues to be investigated, and helps to ensure widespread confidence that all key issues have been considered for study (Branch and Ross, 2000).

Profiling, or describing the existing environment, is another early stage in an impact assessment process, and contributes to the overall scoping. It creates a profile of the environment and communities likely to be affected by the proposed change. It provides a baseline against which to assess what the future will be like with, and without, the proposed change. This baseline is also essential to subsequent monitoring if the change is implemented. Ideally, it should be possible to use the same indicators over time to monitor changes since the initial profile was constructed. *Monitoring* is carried out to assist with both the amelioration of potential adverse impacts and to enhance future impact assessments. Profiling is also very useful to familiarise readers of the SIA with the context of the report, but its primary purpose is the scientific one of providing the baseline.

2.3 The Study Area

In consultation with the MDBC, the defined Study Area for profiling and scoping study includes the catchment management units (CMUs) of the:

- Murrumbidgee, Murray, and Lower Murray-Darling in NSW;
- North East, Goulburn Broken, North Central, and Mallee in Victoria; and
- SA MDB.

More specific definition of areas for analysis would take place in Stage 2 of the SIA, which is likely to take place.

3. Approach and Methods

3.1 Introduction

This chapter sets out the conceptual basis for the approach used in this scoping study, since it links elements from a number of different theoretical bases in the field of SIA, then outlines the methods used to collect the data.

Many overseas scoping studies have used participatory processes to tap the experience of affected parties and build support for the study design, founding agreement as to what issues are significant. Indeed, participatory processes are mandatory under the USA's National Environmental Policy Act. We have had an unusual challenge in that participatory approaches based on meetings of stakeholders (USA), public hearings or appearances before an assessment panel (Canada, see Mulvihill and Jacobs, 2001; Mulvihill and Baker, 2001) could not be used in the context of the organisation of the Living Murray initiative. The Living Murray initiative has the community engagement taking place as a separate process on somewhat separate timelines. It would have created difficulties and unnecessary impacts on communities for a consultancy team also to be conducting a participatory process. Nor could we rely entirely on desk analysis, since statistical data alone is incapable of capturing the dynamism of our context (it is good at describing parts, but not the whole), and there was a lack of reports sufficiently relevant and comprehensive to provide a reliable basis for scoping.

We have had access to some information from the MDBC community engagement process, including the Indigenous engagement process. In addition, the MDBC has already received a short scoping study of economic impacts of alternative environmental flow regimes (Young *et al*, 2002) and survey of stakeholders (Nancarrow and Syme, 2001), and is conducting a further set of economic studies. We have had to manage without a process (other than our round table, see below) in which members of stakeholder categories could interact to discuss the relative importance of potential impacts.

Further, the Study Area is vast, and the populations involved and their activities diverse. The authors are aware of few previous Australian impact assessments, or impact assessment steps (such as profiling) approaching this scale. The SIA for the proposed Coronation Hill mine in 1990 involved three separate consultancies on impacts on Aborigines alone, concerning an area representing a tiny fraction of Kakadu National Park. The SIA was complex and challenging (Ross, 2001), but the numbers of people to be consulted and the areas to be traversed were small. The other major Australian SIA we are aware of, underpinning the mitigation for cessation of logging in the wet tropics was also politically significant, but related to a far smaller geographical area. The social impact assessments associated with the Regional Forest Agreements process

(Coakes and Fenton, 2001) were conducted area by area (eg Tasmania). Perhaps the largest geographical area of study we are aware of is Fenton and Marshall's (2001) profiling study of the commercial fishing industry in coastal Queensland, involving study of some 22 'town resource clusters' on or near the Queensland coast through over a thousand interviews. A few planning studies may approach the scale and complexity of the River Murray System, for instance the current Representative Areas Program process of the Great Barrier Reef World Heritage Area. This scoping study appears to rank in scale and complexity with a number of the most significant northern Canadian scoping studies and subsequent SIAs (Mulvihill and Baker, 2001)

We underline the scale and complexity of our task to point out that this study has necessarily been pioneering in its approach and that it has been highly challenging to conduct.

Throughout the study process we have been guided by the MDBC's Social and Economic Reference Panel (SERP), to which we have reported periodically and received valuable advice and feedback. The methods described below respond in part to the requirements of SERP.

3.2 Conceptual Framework for Scoping

Our approach combines a number of well-established procedures and bodies of theory in SIA. The inability to use the most common method, participatory approaches, in the circumstances of the Living Murray initiative presented a challenge, but we have had access to information from the community engagement process (including the Indigenous engagement process) and were able to draw on some expertise from stakeholders through our round table (see below).

3.2.1 The use of the profile as a baseline

We explained above that baseline information collected before an intervention provides a basis for prediction and monitoring. Impact assessment essentially compares two (or more) forecasts, one with and one without the proposed intervention under study (Burdge, 1998; Burdge and Vanclay, 1995; Branch and Ross, 2000, p.101). Although in practice many profiles are little more than background information and collections of easily accessible statistics, we believe a profile should provide a strong foundation for prediction of impacts, and later monitoring whether and how those impacts occurred. The choice of descriptors of the baseline and subsequently choice of indicators that are *relevant to the predicted change processes* is therefore crucial. Project timelines put us in the somewhat circular position of trying to develop a profile before having sufficient information regarding water recovery options to judge what the potential future

impacts of implementing environmental flows would be, and hence which indicators would be most relevant.

3.2.2 The concept of a dynamic baseline, incorporating cumulative impacts of other events

Neither the human nor the natural environment is static. Although the term baseline sounds static, a baseline needs to be capable of portraying the sometimes very dynamic nature of a social and environmental context, since changes occur continually in environment and society. This is particularly true of Australian agriculture and rural communities at present. The challenge is to recognise and convey this dynamism. We have done so using the SIA concept of cumulative impact. This refers to the way in which different projects, policies and plans have combined effects in time and space. An area can experience the synergistic effects of multiple unrelated interventions (changes) (for instance several new industries combined with downturn in others), or impacts can accumulate through time, as one change compounds the effects of previous ones.

A major challenge in scoping and SIA is to identify the effects of one intervention (in our case, increasing allocations to environmental flows) against the background of all the other ongoing changes contributing to the dynamic baseline and cumulative effects. Then it is necessary to distinguish the additional contribution of mitigation activities to this complex set of trends.

Our summary of the cumulative impacts contributing to the dynamic baseline is given in Chapter 4.

3.2.3 Ethical considerations with the baseline

Given the emphasis in SIA on treating a profile as a baseline or benchmark for the assessment of change, it is tempting to treat the baseline as a status quo - some desirable state in which departures represent 'winners' and 'losers' (deserving special consideration)[2]. This is essentially an a-historical view, neglecting the different positioning of stakeholders with respect to natural resources and economic advantage over time. If the snapshot (profile) was taken at a different point in time, different parties would appear to gain or lose. It is perhaps wiser to regard a profile as a neutral 'snapshot' taken at a particular point in time rather than necessarily a desirable state of affairs (to be protected).

An alternative could be a focus on desired outcomes, so as to shape futures towards specific goals rather than maintenance of this year's status quo[3].

[2] This insight came from participants at the project's Round Table on 4 December 2002.

[3] It is important to note that desired outcomes are also dynamic.

Taken together, these points remind us of the importance of considering positive impacts, or gaining constructive new outcomes, alongside the humane natural tendency to try to avoid negative impacts.

While they appear philosophical when expressed at this level, these questions have great import when it comes to decisions about the nature of possible impacts, the benefits or costs of the EFRPs and mitigation.

3.2.4 Recognising community responses

SIA practitioners recognise that people and areas respond actively to new influences. Far from being passive victims of new interventions, they anticipate the implications of new projects for themselves and their communities and may take action long in advance of decisions being taken as to whether the intervention will go ahead. They may change their personal behaviour (for instance by bringing forward a planned retirement), or perhaps organise politically to resist a change they think will be detrimental to their community. For this reason the very act of making a process such as the Living Murray initiative has impacts, irrespective of whether it goes further.

Further, mitigations and facilitative measures put in place to maximise benefits and ameliorate potentially negative effects combine with these responses in complex and often indirect causal processes, to make outcomes even more difficult to predict.

Perceptions and interpretation are also important dimensions of the experience of social impacts. How individuals and communities perceive a proposed change, for instance as positive or threatening, contribute both to their experience of the unfolding changes and their choices of response. As Vanclay (2002) argues

> ‘an increase in population, or the presence of strangers, are not the ‘felt’ impacts. Instead, the impacts that will likely result from these change processes are changed perceptions about the nature of the community (communityness, community cohesion), changed perceptions about personal attachment to the community, and possibly annoyance and upsetness as a result of the project’ (Vanclay 2002, p. 192).

The concept of community responses is incorporated in our development of influence diagrams (see Section 3.5.4).

3.2.5 The concept of resilience

Individuals and communities also respond quite differently to the same or similar initiatives, and research has shown this corresponds with differences in their characteristics. The theoretical literature in SIA identifies the patterns of response to externally imposed changes as being related to certain social, economic and political characteristics (social vitality, economic viability, and political efficacy. See Bowles, 1981) for which indicators can be derived (Lane *et al*, 1997). Because of the types of study this theory is based on, it neglects to include environmental characteristics such as land capability to recover from negative environmental impacts or support alternate forms of production.

Translating this theory into terms useful for our study, we can consider resilience, the ability to absorb changes or manage changes successfully, in terms of:

- **economic viability** – the versatility of an area's economy, avoiding reliance on any single crop, secondary industry or employer. In an agricultural region, the more viable economies would in theory be those with several primary products, and include primary, secondary and tertiary economic tiers (local value-adding). Thus, when a single primary product suffers a downturn or shock, the economy as a whole can be buffered by participation in multiple enterprises – some of which may be doing well;
- **social vitality** (similar to the now-familiar term social capital – in the literature) - this focuses on social bonds, reflecting people's ability to support one another and manage crises collectively. For this study, we should also consider the social resources to manage change, including the capacity to innovate (partly related to age structures and educational profiles);
- **political efficacy** – the capacity to organise within the community, and to draw on external links, to manage change. In this study we need to be conscious of the availability and skills of organisations (including irrigation bodies, industry and community bodies, local and state governments) to facilitate public discussion and help their populations to manage change. Political efficacy focuses on how effectively people *use* their formal governance and informal networking opportunities to achieve their needs, not just what organizations are available to them; and
- **environmental qualities** – is the land and water in healthy condition, suited to its uses, and does land capability allow alternatives.

While we do not develop these concepts intensively in this scoping report, they have informed the development of our approach and search for descriptors of the cultural importance of the water resource and ecosystems and social and economic context, and will be fundamental in the proposed SIA itself.

To summarise, our conceptual framework:

- follows the widely accepted procedure of making predictions and monitoring from a baseline provided by the profile, but recognizes that this baseline is highly dynamic, and continuously changing in response to a multiplicity of drivers. Our baseline, the situation in the Study Areas in early 2003, thus incorporates the cumulative impacts of many past and concurrent changes in the region. As Chapter 4 and profiles in Volume 2 show, one of these concurrent changes is the severe drought; and
- recognises that individuals and communities respond actively, and differently, to proposed new interventions. This includes psychological responses.

Our method, explained in the following sections, therefore focuses on:

- the need to understand the cumulative effects of past events and actions to portray our dynamic baseline;
- the ways in which the effects of some past events/interventions (eg the Council of Australia Governments (COAG) water reforms) can also inform future impact;
- the need to be able to distinguish what effects could arise from an increase in allocations to environmental flows for the River Murray System, from background noise (other trends happening irrespective of increasing allocations to environmental flows); and
- the need to cater for individuals and communities responding differently.

3.3 Defining the Study Area

Defining a Study Area for scoping purposes posed considerable challenges. The terms of reference outlined eight reaches for the SIA:

- Mitta Mitta River: Dartmouth Dam to Hume Dam
- River Murray: Hume Dam to Yarrawonga Weir
- River Murray: Yarrawonga Weir to Wakool junction
- River Murray: Wakool junction to Darling junction
- River Murray: Darling Junction to Lock 3
- Lower Darling River and the Great Anabranch of the Darling River below Menindee Lakes
- River Murray: Lock 3 to Wellington
- River Murray: The Lower Lakes and Coorong.

Some confusion was experienced with these descriptions of the Study Area, in that the boundaries of almost all other recognised divisions, including local government and statistical areas are different. As a consequence, the data do not fit comfortably and in one case, the boundary sits in the middle of a major town, further confusing the boundaries for data collection and analysis.

Further, examination of the boundaries of irrigation areas using water from the River Murray System and tributaries showed that the Study Area would need to extend a considerable distance each side of the river, but that a bandwidth either side of the river would not capture these areas efficiently. Further, we knew that towns, some further away from the river still, were economically and socially interdependent with the irrigated areas and the tourism and recreation activities associated with the river. For statistical purposes, the ability to use Statistical Local Areas (SLA), as defined by the Australian Bureau of Statistics (ABS), was vital. On balance, it appeared best to use a hydrological unit, the catchment, which clearly encompassed all areas of potential interest and then collect information for SLAs within those catchments, approximating the boundaries.

We were later asked by the SERP to consider use of 'social catchments'. This is a relatively new concept in the literature, tested in few Australian areas. So far as we are aware the primary research has not been conducted to delineate social catchments within our areas of interest, let alone across the entire River Murray System.

After consultation with the MDBC and examination of published information, the Study Area for profiling and scoping was defined to include the catchments of the:

- Murrumbidgee, Murray, and Lower Murray-Darling in NSW;
- North East, Goulburn Broken, North Central, and Mallee in Victoria; and
- SA MDB.

Agriculture, industry and towns within the river zone are the focus for the Study Area, however, we have included a level of detail by exploring the socio-economic profiles and demographics of the SLAs within each of the catchments.

Data collected at the SLA level are aggregated to the catchment level where appropriate, without losing meaningful resolution of information and provides an overview of the Study Area. The irrigation areas within the Study Area, are managed by a mix of irrigation companies, government bodies, and trusts. The irrigation areas are highlighted on Map 1 and listed in Table 1.

There are also areas of riparian irrigation with private diverters. Specific groups include Murrumbidgee Private Irrigators near Wagga Wagga, Hay Irrigators Association, irrigators in the Mitta Mitta River valley and those along the Lower Murray Swamp Lands.

3.4 Approach to Profiling

Profiling is a recommended first step in SIA and also in planning. Its purposes are to familiarise decision-makers and other readers with the social context, and to provide a baseline of information against which future changes can be measured (Branch and Ross 2000). Ideally, a profile would provide descriptors from which indicators can be derived to assist in measuring change directly attributable to the intervention (project, policy or plan). In practice, it is difficult to find descriptors among widely available statistics (eg population census) that measure the particular changes attributable to the intervention under study, and that target the most important impacts. It is even more difficult to acquire qualitative information on an ongoing basis, yet qualitative impacts such as changes in the nature of community social interactions and quality of life may be highly important impacts. It is important that readers recognise the limitations of a profile, and particularly the relevance of particular descriptors within it.

Table 1 Irrigation Areas within each Catchment

State	Catchment	Irrigation Areas
NSW	Murrumbidgee	Murrumbidgee Irrigation (including Wah Wah and Benerenbah) Coleambally Irrigation Hay Irrigation District
	Murray	Murray Irrigation Limited (includes Wakool, Deniboota, Denimein and Berriquin Irrigation Districts) West Corugan
	Lower Murray Darling	Menindee Lakes Tandou Western Murray Irrigation
VIC	North East	NONE
	Goulburn Broken (Each area operates under the auspices of Goulburn-Murray Water)	GMW Central Goulburn GMW Murray Valley GMW Shepparton
	North Central*	GMW Rochester-Campaspe GMW Pyramid-Boort Tresco Irrigation District Nyah Irrigation District
	Mallee	First Mildura Irrigation Trust Sunraysia Irrigation Schemes (including Merbein, Robinvale, and Nyah to the Border)
SA	Lower Murray	Renmark Irrigation Trust Sunlands Irrigation Trust Golden Heights Irrigation Trust Lower Murray Irrigation Central irrigation Trust

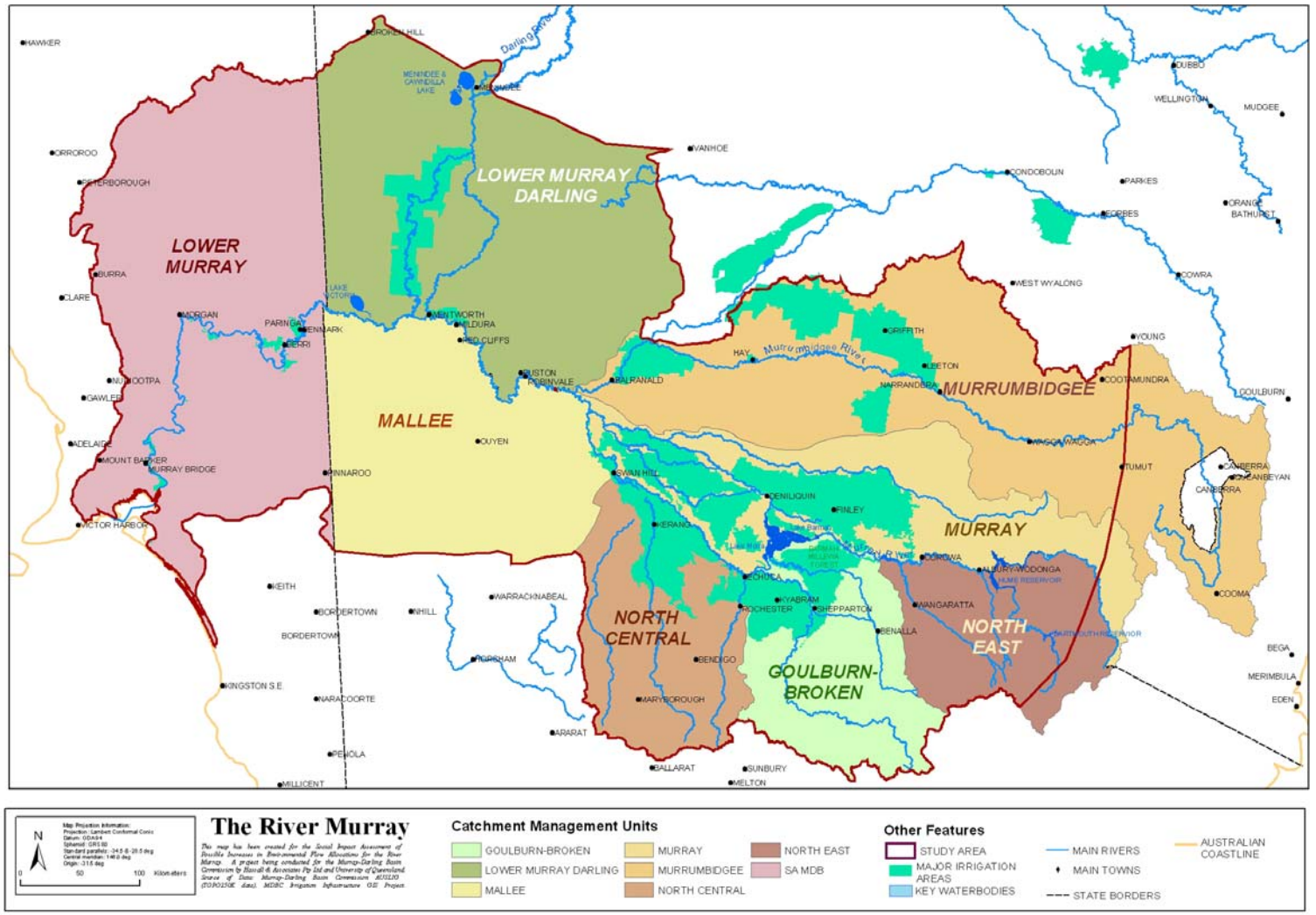


Figure 1 Map 1 – Study Area for the Scoping Study

In profiling the communities within the Study Area, we have included:

- some historical context of ongoing changes;
- an overview of the importance of the river and connections to community; and
- descriptors of demographic and economic context.

Volume 2 provides a detailed description of the descriptors used in the profiling which may be drawn on in the SIA to derive indicators of possible impact associated with the EFRPs.

The descriptors identified have largely been based on the literature and available data with specific relevance to the questions being asked including dependence on water and importance of the water resource.

Fieldwork has also validated and contributed to the profile. As outlined by the Socio-economic Services Unit of DLWC (2000), community profiles are rarely final or complete in the early stages of social and economic assessments. The communities are sources of information about the social and economic characteristics and may provide supplementary information over the course of the assessment as the level of awareness and understanding increases.

3.4.1 Method

The profiling report has been undertaken largely as a desk based investigation, relying on literature including reports completed as part of the Living Murray initiative, telephone interviews and recently published data, particularly from Australian Bureau of Statistics (ABS) and the Australian National Committee on Irrigation and Drainage (ANCID) Australian Irrigation Water Provider Benchmarking Report. Data are collected at SLA level, where appropriate, or at the level of Irrigation Area for irrigation related data. Government agencies, local businesses, and state and local government web sites have also contributed valuable information to the profiling.

The method adopted in preparing the profile of communities is as follows:

- identified stakeholders most likely to be affected based on previous studies for the Living Murray initiative and knowledge of major water extractors;
- compiled a list of descriptors based on best practice SIA literature regarding scoping, previous profiles prepared for rural communities and discussions with an Indigenous representative;
- reviewed a range of literature and data against a range of descriptors developed for the study paying particular regard for cumulative changes taking place;

- facilitated a round table of key informants in December 2002 across a range of stakeholder categories to identify key social, economic and environmental considerations and testing the method of developing influence pathways as part of the scoping component; and
- considered the descriptors for study in light of interviews undertaken for scoping and the social and economic impact monitoring strategy further informing data collection.

3.5 Approach to Scoping

In brief, the process for scoping involved:

- the conduct of a round table with 18 participants from diverse stakeholder groups to draw on their experience concerning the possible impacts of introducing environmental flows, as well as their observations concerning the cumulative impacts of past changes;
- examination of the draft profiling data (collection was underway before the scoping data collection commenced);
- completion of key informant interviews with some 90 people across the eight catchments in the Study Area, focusing on the cumulative impacts of past changes in their areas and within this, effects of water-related changes which could act as examples for the possible impacts of introducing environmental flows;
- development and initial analysis of influence pathways to trace cause and effect relationships from interventions in water availability (more water for the environment, less water available for extraction) to economic and social consequences;
- synthesis of profile and interview information, with information from the round table and the research team's prior experience, to ascertain the cumulative impacts of recent changes in the Study Areas (water related or otherwise), and the potential additional effects of an increase in environmental flow allocations, depending on the level of water recovery (implementation options remain unknown); and
- preliminary consideration of the resilience of different areas, or ability to cope with the potential impacts of environmental flows.

Details on each of these steps follow.

3.5.1 Round table

The round table, held in Canberra on 5 December 2002, brought together eighteen people, familiar with the Living Murray initiative and with different insights and experience to contribute. Thus began the process of identifying the key social and economic impacts that could occur should environmental flow allocations to the River Murray be increased. Participants were chosen with the assistance of MDBC and consultants in the Study Area for their familiarity with a wide range of activities in, and parts of, the River Murray System, to ensure the issues were considered from many different angles.

The climate of discussion was collaborative and relaxed. The consultants and MDBC staff briefed participants about the approach to the scoping study and gave background on the Living Murray initiative. Discussions were then held to identify key possible social and economic impacts, using a variety of techniques to stimulate participants' thinking. Implications of these were discussed for the approach to data collection in the balance of Stage 1. The discussions elicited a very useful initial listing of the cumulative impacts of recent changes in the Murray Darling Basin and in Australian agriculture generally.

3.5.2 Examination of literature and draft profiling data

As part of the profiling step, the team sought literature which might provide useful overviews and the statistics outlined in Volume 2. During preparation and following submission of the draft profiling report, the team examined patterns in the data to identify areas which stood out in terms of variables of interest, such as employment or dependency on water resources. We used these to enlighten our early thinking about possible impacts, and to inform the selection of locations for interviewing. Following the field-work, the team synthesised these data with information emerging from the interviews.

3.5.3 Key informant interviews

In the absence of comprehensive overview reports useful to our task, limited fieldwork was essential to collect information, which was unobtainable through desk analysis. In particular, the statistical data collected for the profiles could not provide an integrated sense of what was happening in the Study Area, either for documentation of a dynamic baseline or to gauge the potential effects of increasing allocations to environmental flows.

Fieldwork had to be conducted selectively and judiciously in recognition of the community engagement process, which was taking place at on or about the same time.

Interviews were restricted to officials of local governments, regional development organisations and members of the MDBC's Community Reference Panel for the Living Murray initiative. These individuals and organisations were able to give a broad overview relevant to their areas of expertise and experience, of sufficient validity for scoping study purposes, and to be approachable without the study process itself creating undue impact on organisations and communities.

Locations for interviews were selected on the basis of information emerging from the profiles, and team members' experience of the region. For instance, we targeted local governments in which agriculture had varying degrees of dependence on irrigated water, and in the towns which have strong economic interdependencies with an agricultural base.

The interviews focused on the cumulative impacts of recent changes, since pilot testing showed this provided an excellent springboard both for documenting the dynamic baseline and for showing the types of change processes that might occur if environmental flows were introduced. This approach also revealed underlying characteristics of communities that would be relevant in coping with further change. The interview approach had to be varied according to the person or organisation interviewed, since not all questions were relevant to some organisations and individuals, and some interviews offered unique opportunities to follow up particular issues such as the impacts of the 2003 fires on the upper parts of the North East catchment. The basic format for each interview was:

- introduction of the purpose of the study, referring to telephone conversation and faxed information in setting up the appointment and a check on the familiarity with the Living Murray initiative;
- an open-ended question to gain an understanding of the major changes that have occurred over the past five to 10 years and the impacts of these changes;
- an open-ended question on how the community has responded to the changes and the outcomes from the community's response; and
- an open-ended question on the possible impacts from the implementation of the proposed EFRPs.

The interview process provided the opportunity to travel throughout the Study Areas, observing the agricultural and town landscapes referred to in our interviews at first hand.

3.5.4 Influence pathways

Given the importance of being able to distinguish the impacts of increases in environmental flows and variability in flow from other parts of the dynamic sets of changes occurring in the Study Area and elsewhere in rural Australia, we are using the concept of 'influence pathways' to trace how and where specific changes in water allocation would transmit through the economy and social systems (this is similar to Coakes and Fenton (2001) use of social impact flow models). Given the multiple choices available to stakeholders in responding to new influences (see Chapter 5), it is analytically important to identify these choice points and their consequences. It is also vital to MDBC and partner governments to be able to delineate impacts arising from any increases in environmental flow allocations from other confounding influences for which it should not be expected to bear responsibility.

This report recognises that impacts may be distributed spatially far beyond the activity generating them (see also Fenton and Marshall, 2001, and Coakes and Fenton, 2001 for the method of Town Cluster Analysis). For instance on-farm impacts related to reduced water for irrigation may cascade well beyond that area to the towns responsible for processing. Decline in population in one area or a small town may impact on the towns where people shop or send their children to school.

We commenced by developing a generic influence diagram (see Figure 2). This traces two basic pathways of influence from a water resource change. The upper pathway shows potential results of having more water remaining in the river, starting with environmental changes and progressing to economic and social effects. The lower pathway shows the potential effects of reduced availability of water for extraction (the other side of the coin), transmitted through on-farm effects, farmer decisions in response and aggregated effects. Both pathways affect employment opportunities and the viability of small businesses. The two pathways link up in a set of demographic and social consequences, particularly affecting towns.

In the SIA itself, we intend customising this approach for particular industries, (eg dairy, horticulture, mixed farming, wine grapes and rice) using field information to enlighten the nature of the choice points and estimate the proportions of people taking each of a set of alternatives. For instance, faced with reduced water availability, farmers' choices might be to sell their business, buy more water, buy more land to enlarge their business, or change crop. The proportions of farmers making particular choices would have different aggregate consequences, for instance if a high proportion of farmers change crop there would be consequences for particular processing industries and the towns they support. Gray and Lawrence (2001, chapter 4) identify a number of the strategies available to farmers in adapting to changed circumstances for farming.

3.5.5 Synthesis

To conclude the scoping study, we synthesised the information we had collected towards two outputs as follows:

- the dynamic baseline, or profile of current conditions in the Study Area with a summary of the cumulative impacts of changes over the past decade or so; and
- the scope of study recommended for the SIA.

Dynamic baseline

The chapter on the dynamic baseline summarises trends in agriculture and rural communities. It is presented in summary form reflecting the wide variation from area to area.

Scope recommended for further study

In a two-day team workshop in April 2003, we synthesised the information available from the interviews and draft profiles.

Our first step was to compile a catchment-by-catchment overview of current conditions influenced by recent major changes. Since there was considerable variation within each of the eight catchments, we subdivided the catchments into subgroups sharing common characteristics, where possible matching the reaches of the River Murray System suggested in our terms of reference. Volume 2 reports the profiles of the catchments against these subgroups.

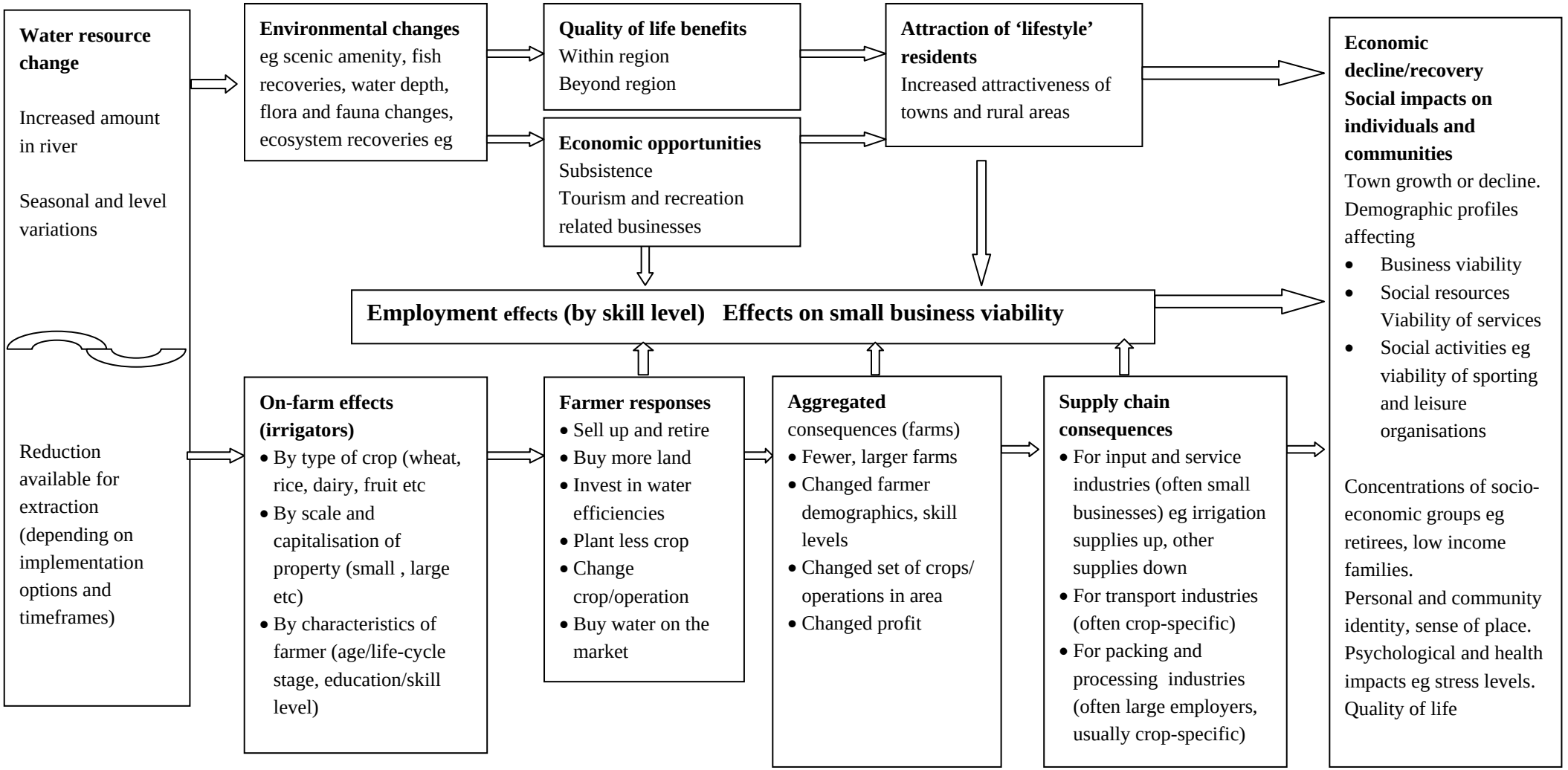
We then rated each subgroup according to the degree they are challenged by current environmental, social and economic conditions. The ratings were adjusted in discussion to reach consensus. The contribution of cumulative impacts of recent changes and preliminary evidence of resilience or otherwise, were also raised in discussion. These factors are confounded, in that the most challenged areas tend also to be low in resilience. We emphasise that this step was a comparative classificatory tool necessary for synthesis purposes, but not intended as a diagnosis. Further investigation is needed in the SIA before judgements can be made with any confidence about the extent of additional impacts from an introduction of increased allocations to environmental flows.

We then cross-checked with profiling data and made any adjustments necessary to the classifications. Then we examined the subgroups given similar ratings, grouping them into three sets and considered what the members of each set had in common.

For instance, the areas with the lowest ratings turned out to have some or all of the following common features:

- water leaving the area (through trading);
- marginal lands in terms of suitability for production, as many of these are naturally drainage areas (floodplain and wetland) that have been drained for production;
- high dependence on water for irrigation;
- smaller communities; and
- a preponderance of non-viable farm sizes.

Figure 2 Generic Influence Diagram – Conceptual Framework



As a separate step, we revisited the theory on impacts and resilience, and considered how our current draft suite of descriptors reflected, or could reflect, the variables of economic viability, social vitality, political efficacy and environmental quality.

We cross-checked with our draft descriptors and noted that the areas with the highest ratings were those which would score highly on the variable 'economic viability', having diversified economies more capable of absorbing shocks and sharp downturns than the other areas. Some areas with high ratings were simply those least dependent on river water for their economies, for instance forested uplands.

Section 5.2 summarises the areas relevant for further study in the SIA. It was not possible to delineate areas distinctly as 'affected' and 'not affected' as would be the case in some less complex impact assessments.

We followed a similar procedure with respect to industries and stakeholders, synthesizing the information available from the desk analysis and interviews then reviewing the industries and stakeholders in terms of their potential impacts from increased allocations to environmental flows. On the basis of the team's experience, discussions at the round table, field and statistical information and advice from SERP, we examined information on rice, dairy, horticulture, wine grapes, and mixed farming, as industries which could particularly be affected by alteration to their water regimes. We examined tourism and recreation activities as potentially benefiting from environmental improvements or affected by river height variability.

Most stakeholders had already been highlighted in examination of areas and industries, but a few, especially Indigenous people, did not show up in these contexts. The stakeholder profiling report for the Living Murray initiative (Nancarrow and Syme, 2001) is not sufficiently fine-grained for our analysis, since it reports survey results drawn from a stakeholder-based sample (from within and beyond the region), but does not profile the stakeholders as entities.

3.6 Concluding Comments

We explained in introducing this chapter that this scoping study may be unprecedented within Australia, in its scale and complexity. It is also one of the few scoping studies actually conducted in Australian impact assessment, and has not had the benefit of participatory methods to assist in the process. We believe we have used an approach that is well informed by SIA theory and is efficient and effective given the time, budget and human resources available. Most importantly, we believe the validity of the information is sufficient for scoping purposes to inform the development of a SIA of the rigour necessary to make the important judgements eventually required of the Living Murray initiative.

4. A Dynamic Baseline – Cumulative Change

4.1 Nature of Cumulative Change

The baseline for studying the potential impacts of increased allocations to environmental flows is a dynamic one, since Australian agriculture, rural communities and regions and Indigenous with non-Indigenous relations are all undergoing significant change. Our challenge is to identify the potential effects of a changed environmental flow regime in addition to the existing changes. It is notoriously difficult to disentangle the causes of cumulative change.

The following provides an overview of key changes taking place within which a change to the environmental flow regime would take place. It draws generally from the literature and interviews.

4.2 Overview of Cumulative Change

4.2.1 National changes affecting agriculture

Australian agriculture, nationally, is experiencing the cumulative effects of globalisation and a number of economic and policy changes influencing the context, costs and logistics of production (see for example Gray and Lawrence, 2001; Campbell and Lawrence, 2003; Cocklin and Alston, 2003; Bourke and Lockie, 2001). Since the 1970's there has been progressive removal of agricultural subsidies and tariffs. Australia has proceeded more decisively than many other western countries and claims its primary producers to be among the most efficient in the world. This has exposed primary producers more strongly than in the past to market forces.

There has been further restructuring in agricultural industries: for some the sales and pricing cushions provided by marketing boards have been reduced or withdrawn, again increasing competitiveness but exposing primary producers more strongly to their markets (Campbell and Lawrence, 2003; Gray and Lawrence, 2001). Some primary industries, notably dairy, have also undergone explicit restructuring programs designed to make them more competitive in the long-term. The academic literature (eg Cocklin and Alston, 2003; Lockie and Bourke, 2001) as well as press reports emphasise the pain suffered by primary producers and their communities; less commonly reported is the strengthening position of those farms that survive the process.

There has also been a change in the role of farming women. Many women work off farm to support farm family living standards. Barr (2002) speculates that the provision of off farm income may have reduced the imperative to increase farm income or farm expansion. However, off farm income is increasingly recognised as an important risk management strategy, whether that be in the form of

property, shares or non-agricultural business interests (Gray and Lawrence, 2001). More important in terms of farming women is the movement away from the traditional role of 'farm wife'. Large numbers of women are now involved equally in farm management decisions and more highly involved in industry or rural community representative groups. Barr (2002) also reports on studies, which identify that marriage stability is more important than farm size or profitability for the success of farm businesses. Communication and partnerships will become increasingly important, especially as the role of women takes up equal importance as the role of men in rural communities.

A detailed analysis of the combined effects of economic policies and agricultural restructuring is beyond the scope of this study. There is a popular belief that they have combined to create a 'rural crisis' marked by declining populations and loss of community services in many areas, and loss of morale (see for example Gray and Lawrence, 2001; Cocklin and Alston, 2003; Lockie and Bourke, 2001). On the other hand, examples of innovation are also common, as local areas meet the new conditions creatively through strategic changes to their economic bases and community development approaches.

4.2.2 Further changes in the Murray-Darling Basin

In addition to these major national and industry-specific adjustments, water users (particularly irrigators) have had to adapt to the COAG water reforms of 1994. These recognized the inefficient use of water arising from its treatment as a 'free' good and introduced property rights and markets for water, restricting overall use while allowing trading among users. In the Murray-Darling Basin, this has been introduced simultaneously with the Cap, a commitment to freeze overall water usage within each State limiting the amount of water extracted from the Basin's rivers. The Cap, introduced in 1997, limited diversions to 1993-94 levels of development.

Water has thus become a higher input cost to agriculture, affecting restructuring of farming activities. Within the Murray-Darling Basin, irrigation can only be expanded through efficiencies (eg through better technology) and purchase of water unused. Irrigation is becoming more efficient throughout the Study Area with many irrigation areas in the Riverland having been converted to pressurised piped systems. Water application has also changed with improvements and increased use of technologies such as soil moisture testing. Water sharing plans in NSW have further reduced the level of entitlement for implementation over a 10 year period resulting in further change for irrigators.

Drought throughout much of eastern and southern Australia during 2002 and 2003 has exacerbated the strain on water resources and farming. It has required primary producers to draw on their cash reserves and financial capacities (either buying water or buying stock feed), change expenditure patterns (eg postponing capital purchases), or de-stock resulting in flow-on effects to other sectors. Drought and its economic impacts have also caused great psychological stress,

potentially affecting people's capacity to cope with further change. With the extended duration of the drought, the added physical demands, of drought feeding for example, and the increasing resultant tiredness for many, capacity to cope with additional change is likely to be further eroded. Stehlik, Gray and Lawrence (1999) provide a comprehensive analysis of the social impacts of drought in central Queensland and western New South Wales in the 1990s.

Environmental changes add to the cumulative effects, with reduced soil capability (due to salinity, acidity etc) and declining water quality affecting land capability and production levels. Declines in regional net agricultural returns, range from 0.2% to 2.1% in the Murray Darling Basin, largely as a result of increased salinity (Young *et al*, 2002). Land and Water Management Planning in Victoria and NSW and Local Action Plans and Salinity Management Plans in South Australia have contributed to improvements in the productivity of areas severely affected by salinity and water logging. In some cases, land that had become unproductive was able to return to productive agricultural uses. Many of these areas however, are reliant on sub-surface drainage to maintain salinity and water table levels.

There are further concerns about the enhanced greenhouse effect altering climatic conditions of the future, and hence conditions for agriculture. However, while the enhanced greenhouse effect may adversely impact some agricultural production there is also potential for positive impacts on others (Hassall & Associates, 2002).

The combined result of these changes has not been thoroughly researched in the Murray-Darling Basin, and their separate effects would be difficult to disentangle. Our field interviews, inputs from the round table, anecdotal evidence, our team's combined experience, and literature suggest the effects include:

- restructuring in farming, so that many smaller, older, less well-capitalised primary producers have left their industries, leaving fewer, larger, better resourced properties (often with more educated primary producers, some residing outside the community);
- an increase in urbanisation and the subsequent decline in the contribution of agriculture to the national economy. This trend is likely to result in changing social values such as an increased demand for non-productivity values from agricultural resources and a decline in the political influence of the farming lobby. The multiple functions of agriculture in the Australian context will include demand for 'improved quality and quantity of water supply, improved health of riverine habitats, 'clean' food and landscape amenity'. For traditional farming these demands will appear 'more and more onerous' (Barr 2002, p.2);
- movement of rural youth to the metropolis and away from farming. Agriculture is not seen as attractive as a career destination for younger rural Australians reflecting 'the impacts of modernity upon the rural youth

population'. Another contributor to this movement is that family farms are no longer capable of providing employment for or supporting children. Many offspring are leaving farming, and seeking other opportunities. The loss of young women to metropolitan areas is noted as a particular contributor to the reduced desirability of rural life for many young men;

- increase in the corporatisation of agriculture (and pastoralism), as corporations develop to operate suites of farms and efficient and well-capitalised family farming operations grow into small corporations. This may reduce employment opportunities for the less skilled. The movement from smaller to larger landholdings has an impact on population and demographics within regions;
- a simultaneous increase in 'lifestyle' farmers, adding another set of buyers for land relinquished by others. In some areas this has the effect of increasing the entry price for farming or putting expansion beyond reach for primary producers needing to increase their size to realize economies of scale;
- changes in crops grown as a result of changes in commodity prices, emerging industries and oversupply of particular commodities. Depending on the nature of the change, this may alter the skill mix, culture, employment opportunities and makeup within a community, especially where opportunities for integration within a region are presented;
- both domestic and international innovation leading to a decline in the terms of trade in the farming community. There is pressure to adopt innovations to improve productivity however, gradual cost pressures affect those least able to adopt the innovations (Barr 2002) and changed practices are undermined by cheap imports;
- alternative communication options maintaining access and expanding resource opportunities. As actual services in rural and regional Australia are diminishing, the provision of on-line services, such as banking, is resulting in time saving efficiencies and filling the void being left by regional bank closures. The internet is also providing a highly efficient information dissemination tool for state agricultural agencies, research and development organizations and privately funded primary producer research groups. Iterative learning opportunities are opened up and 'information hungry' primary producers are becoming more self sufficient in their problem solving;
- increasing market demands leading to changed opportunities for primary producers. As consumers become more quality conscious and health aware, primary producers have become more market responsive. Primary producers are increasingly marketing products with quality specifications and less often selling a 'commodity'. In this instance there are greater opportunities presented to primary producers. On the other hand however, the demands of the health aware public has also lead to production restrictions. Perceived animal disease concerns lead to restricted production opportunities for Johne's zoned sheep and cattle producers, while concerns related to

genetically modified crops limit producers from taking up environmentally friendly production opportunities;

- increasing water efficiency in some irrigation areas due to the Cap and restrictions on development and regulations on drainage. Attention to technical efficiencies in irrigation, links to replacement of aging irrigation infrastructure and requirements for financial resources to implement changes;
- water trading out of irrigation areas resulting in decline in some towns and growth in other towns;
- population losses affecting the viability of essential services. This has a combination of causes: agricultural change; amalgamation of local governments; reduction in government expenditure and hence maintenance of offices in country areas; closure of banks; tighter population thresholds on provision of schools and health services. Growth in car ownership, effectively shrinking distances between towns, also has contributed to decline in the economies of smaller towns;
- private ownership of regional infrastructure. As public entities are increasingly privatised or corporatised, so too are regional infrastructure providers. Reduced freight rail networks in regional areas of Australia limits production and marketing options;
- increasing centralisation of government offices with small offices closed and staff moved to larger regional centres;
- greater integration of primary and secondary industries through vertical integration providing economic resilience and local employment however, in some cases, increasing the dependence of the area on a particular commodity; and
- reductions in the price of irrigable land due to the increase in the cost of water for irrigation or the reduction in productivity due to salinity, have provided Indigenous communities with the opportunity to acquire land.

These changes are highly consistent with recent academic overviews of rural change in Australia, including Gray and Lawrence (2001), Campbell and Lawrence (2003), Cocklin and Alston (2003), Bourke and Lockie (2001), Stehlik, Lawrence and Gray (1999) and Barr (2002).

Participants in our round table summarized these changes as a crisis in confidence in rural Australia, characterised by:

- disenfranchisement of rural communities through lessening political power and decline in people valuing rural communities;
- lack of control over destiny and a sense that no one is in control;
- fast pace of change in the overall economy;
- decreasing proportion of primary producers in rural areas;
- a sense of too many changes; and

- a lack of a clear governance structure, with irrigation development taking place in areas that are not sustainable, changing governance structures, and shifting of money into resource management.

4.2.3 Rural support programs operating in the Murray-Darling Basin

The extent of rural change and recognition of the need for support is indicated by the following Commonwealth and State agriculture and rural support programs operating in the whole or parts of the Study Area. Some are in the initial stages of set up:

- *Regional Assistance Program*: employment generation, providing seed money for innovative projects of value to the community (22 of the 43 projects funded in NSW in 2001-2002 coincided with Rural Economies in Transition Scheme (RETS) regions (Department of State and Regional Development).
- *Dairy Regional Assistance Package*: employment generation and support for services in communities economically dependent on the dairy industry, affected by deregulation of the industry (NSW received $16.2 million in 2001-2002).
- *Regional Solutions Program*: aims to work with rural and regional communities facing social and economic challenges. Only a small number of partnerships have been trialled, no focus areas as yet nominated.
- *Regional and Rural Development Grant*: provide better understanding of socio-economic change in regional Australia.
- *Understanding Rural Australia Program*: initiatives aim to progress the techniques and processes that foster sustainable community development. Eligibility criteria are being developed.

4.2.4 Speed of change

The level of impact that is being experienced by communities within the Study Area is affected by the speed of change. Barr (2002) writes that there is a direct trade off between social cost and speed of change. In his paper he raises the questions 'At what rate of implementation will the benefits of proposed changes justify the difficulty they may cause some sectors of the community? and can we agree on a fair way to alleviate the negative impacts? (p.7)'.

These questions are important to consider, particularly in the assessment of implementation scenarios for increasing water allocated for environmental flows given the social and economic effects of the EFRPs do not exist on their own but within the context of rural social change and the cumulative impacts of a range of policies and regulations.

4.3 Conclusion

The influences described will affect farming and rural communities to varying degrees and in different ways depending on their characteristics. For instance Barr (2002) suggests that for regions characterised as broadacre agricultural landscapes, farm incomes will remain unstable although relatively prosperous and there will be continued adoption of innovation. However, terms of trade and adoption of productivity innovations will be crucial determinants of farm family's well-being in these areas. He suggests that the small town and population decline will continue and include a migration of young people to urban centres. Labour availability will represent a constraint on expansion of farm size and implementation of environmental works. However, depending on complementary policies and training, opportunities may arise for the unemployed in the regions.

Therefore, the introduction of increased allocations of water to environmental flows will take place within, and may add to, an already turbulent rural context. Because a number of different drivers affect the same trend (for instance population decline in many rural areas, increasing farm sizes), it becomes extremely difficult to trace which drivers are most active in a particular instance, especially from aggregated published statistics. It becomes even more difficult to anticipate how a further change, increasing water allocations to environmental flows, will add quantitatively and experientially to these trends.

For the purposes of scoping, we need to test the possibility that increasing allocations to environmental flows could have additional impacts, unless there are moderating factors. For instance, some landholders could choose to stabilise their operating environments and reduce uncertainty by exchanging their low security licence for a high security water entitlement. Its impacts may be of much the same type as are already occurring and it will be a challenge for the SIA to assess the order of magnitude of the additional effects. Would they add a small or large order of magnitude, and if small, is this unremarkable or a potential 'straw that breaks the camel's back'? Will communities that have rallied to cope well with the changes so far be well-positioned to cope with additional change, or could they be change-weary? These are questions for consideration in a full SIA.

5. Recommended Scope for the Social Impact Assessment

5.1 Possible Social and Economic Impacts

5.1.1 Introduction

As described in Chapter 1, a scoping study prior to a SIA aims to identify the social impacts likely to be associated with a change and their significance. The most significant impacts, those likely to make a difference to the decisions, or to require amelioration in the event of a proposal going ahead, are then selected for further study in the SIA. This chapter provides an initial overview of the possible social impacts that may result from an increase in environmental flow allocations to the River Murray System, prior to a judgement as to the most significant for further study. Identifying possible impacts is also useful as a focus for collecting and analysing relevant descriptors while profiling the social and economic context of the Study Area.

The information presented draws primarily on interviews conducted in February and March 2003 by the team, using influence pathways (see Chapter 3) to aid the analysis. The log of issues raised during community engagement meetings maintained by the MDBC and associated reports prepared by social scientists, have also contributed to this distillation of possible social impacts.

As discussed in Chapter 3, specific questioning regarding the impacts of the EFRPs was not possible, so we relied on exploration of recent changes contributing to the dynamic baseline as a guide to further impacts that might arise from implementation of the EFRPs.

It is important to note that the key drivers and mediating factors that precipitate change and associated impacts will differ throughout the Study Area (RACD, CARE and EBC, 2000). These are likely to be the level of dependence on water[4], existing and potential land capability, income in the irrigation industry, irrigators' financial capacity to adapt, changes in agricultural commodities produced and changes in employment levels in all sectors of a community.

[4] Water resource use dependence varies between irrigators, with some irrigators having a larger entitlement and allocation in some instances than what they use during an irrigation season. Non-consumptive users are also dependent on the resource whether it be in terms of the level of the river and weirs, or flood events resulting in fish and bird breeding, etc.

Further, the possible social and economic impacts presented here would manifest themselves to a lesser or greater degree in different parts of the Study Area. This is due to the different ways in which any recovery of water for environmental flows would play out at household, local and regional levels, and the different capabilities and abilities of institutions, individuals, families and communities to adapt to change given their various circumstances (social and economic resilience). These can influence the magnitude and nature of impact as a result of changes to environmental condition and water resource availability. The existence of these factors has been recognised in preparing this scoping study, but systematic study and interpretation of their contributions to impacts must await the SIA.

5.1.2 Description of possible social impacts

Social impacts result either directly from a change, or from the ways in which individuals and communities react to those changes and associated effects (see Chapter 3). This section provides a review of the types of responses consumptive and non-consumptive users of water may make as a result of increased allocations of water to environmental flows in the River Murray system.

5.1.3 Possible impacts of reduced allocations of water for irrigation

The generic influence diagram shown in Figure 2 Chapter 3, illustrates a set of farmer responses that may occur with reductions in their water entitlements to increase environmental flow allocations (see also Gray and Lawrence, 2001 chapter 4).

The following provides a more comprehensive listing of some of the options consumptive users (irrigators in particular) consider available to them in the event that their entitlement is reduced. Individuals and groups interviewed and those present at the round table held in December 2002 raised the options presented here. These are as follows:

- improve water use efficiency through technology (use less water) where possible thereby maintaining or expanding production[5];
- buy additional land and associated water entitlement (this results in a decrease in wealth and/or increase in debt) to maintain production levels (assuming water use efficiency is maintained at current levels);
- sell water entitlement on the permanent market or their water allocation on the temporary market, maintaining dryland activities where possible or investing funds elsewhere;

[5] The irrigation industry over the last 10 –15 years has been improving water use efficiency.

- older farmers may sell their water entitlement and their land to retire (locally or outside of the region);
- younger farmers with significant debt levels may sell their water entitlement and land and leave the industry entirely;
- plant water efficient varieties of crops thereby maintaining or improving production levels;
- change production to a less water intensive crop. Flexibility to do this may be limited in some areas due to land capability or the high capitalisation in some agricultural industries such as horticulture and milk production. Some irrigators may already be growing crops that use less water than traditional crops;[6]
- irrigate a reduced proportion of the irrigable land focussing on favourable varieties, trees etc;
- increase off-farm employment to supplement income;
- invest in value-adding or processing on farm or beyond the farm gate;
- reduce employment of permanent and seasonal farm labour and increase personal workload. This could lead to loss of skills from the area as seasonal workers leave to find work elsewhere, often not returning;
- family farms make lifestyle and quality of life choices if income falls, such as sending children to public as compared to private schools, not upgrading vehicles etc; and
- as a result of long-term improvements in water quality and river levels, downstream irrigators have greater access to water levels and an improved chance of maintaining production levels.

The choices preferred by farmers in different areas and industries would be studied in more detail in the SIA. It will be necessary to distinguish the extent to which actions may be taken in direct response to the anticipated or implemented level of water recovery as part of the Living Murray initiative, beyond those actions already being taken by irrigators in response to existing market and policy influences or the drought for example.

Cumulative changes will result from irrigators activating the various pathways of action open to them. Some of these cumulative changes are already taking place as part of the current context. Increasing the level of water allocated to the environment may lead to a deceleration or acceleration in these trends, or may have negligible additional effects.

[6] This team understands that the wine grape growers are concerned that they use approximately 6ML/ha and are using it at 85% efficiency and are at the maximum level of production. They may have little surplus and if economics force growers to change to citrus for example (10ML/ha) they will not have the flexibility.

The cumulative changes as a result of combined irrigator actions may include:

- fewer and potentially larger farms;
- changes in the demographic profile of farmers with potential retirement of older farmers and younger farmers choosing not to enter the industry due to high start up costs;
- changed farming landscapes with the areas remaining in production being the most profitable, while those that are currently marginal financially can be expected to go out of production or move to alternative enterprises;
- potential for property values of marginal lands to decline and potential for rises in property values for highly productive land;
- change in product available for some processing industries, potentially resulting in restructure and changes in employment opportunities;
- possible additional or reallocated funding for research and development as industries strive to increase water efficiency and yields[7];
- further expansion of business for irrigation equipment suppliers, and work for engineers to design more water efficient, cost effective irrigation systems;
- potential reduction in permanent farm hand and seasonal work should irrigation seasons alter, crops change or as farmers reduce costs to remain financially viable;
- an irrigation industry that is more efficient in its water use, land and business management however, having fewer farmers remaining in some irrigation districts may increase the cost per irrigator of maintenance and refurbishment (the issue of 'stranded assets'). This potentially reduces the viability of irrigation districts. There would be significant pressure on irrigation systems to refurbish, reducing or eliminating leaks and losses to evaporation;
- potential shortage of off-farm employment due to changes in the quantity of agricultural product produced initially, and higher demand for such off-farm work by the local farming families;
- potential for alternative water sources to be used more broadly, such as effluent reuse;
- acceleration in the trend of land being purchased for the water rights and being left unproductive. This is an issue for local governments and small businesses with a subsequent reduction in population and associated spending no longer contributing to the economy; and/or
- potential limitation of irrigation industry development in some areas as efficiency gains are returned to the environment rather than into expansion of production. This affects expectations of future opportunities for expansion and subsequent uncertainty of proposed large investment projects.

[7] The time period for implementing the water recovery options may need to take into consideration the time it takes to breed new varieties and develop new methods of irrigation.

5.1.4 Possible impacts arising from non-consumptive uses of water

Non-consumptive users of water, some of whom may be beneficiaries of environmental change, would also be affected either directly or indirectly. The following provides a summary of some of the options non-consumptive users may consider available to them in the event that water recovery options produce changes to the condition of the river and floodplain environment. Individuals and groups interviewed and those present at the round table held in December 2002 raised the actions presented here.

- Improvements in water quality, flow levels and aquatic ecology leading to increases in fish numbers, bird life, biodiversity providing:
  - increased opportunities for recreational fishers and ecotourism such as bird watching and river tours;
  - improvements in the cultural and subsistence asset for Indigenous peoples and associated community physical and spiritual health;
  - improved environmental values with communities and individuals feeling they are contributing to an improved environment;
  - enhanced aesthetic and amenity values associated with recreational activity for residents and visitors and leading to the attraction of new residents; and
  - increased opportunities for education and research.
- Improvements in river and lake levels providing opportunities for:
  - improved commercial fishing in the Coorong, with improved levels, flow and access to the Coorong; and
  - boating with improved access to backwaters and water bodies.
- Reduced risk of Murray Mouth closure thereby maintaining ecological and cultural values associated with the Coorong, a Ramsar listed wetland.
- Reduced economic impacts on tourism from bad publicity which is currently presenting the images of a 'dead or dying river', which also affects community impressions of the place where they live.

Note that variability in water levels is also likely to be a feature of implementation options to increase water allocations to environmental flows, and emulation of natural seasonal variation could result in artificial storages having lower levels in summer than in winter. Participants in community engagement meetings throughout the Study Area appear to recognise the importance of variability to improving the health of the River Murray (Tim Cummins & Associates 2002). It is therefore possible that some areas that rely on artificially high water levels for boating recreation would suffer in the peak summer holiday period, as has happened in the current drought. Those interviewed in local government and the boating industry however reported that recreational fishers

or campers and houseboat operators would not necessarily be negatively affected, particularly if the health of the riverine environment improved.

The combined result of these actions in response to the various changes associated with increased environmental flows could not be researched thoroughly in this scoping study. However, the SIA and associated monitoring will endeavour to separate the effects.

5.1.5 Summary of possible impacts

Table 2 provides a summary of the possible positive and negative social and economic impacts at the *Individual and Household Level* and at the *Community and Institutional Level*, considered likely to take place as a result of consumptive and non-consumptive users of water responding to changes associated with increased allocations to environmental flows for the River Murray System. Whilst an effort has been made to match the description of impact across the two levels within the one row, there are overlaps between an impact at the *Individual and Household Level* and an associated result at the *Community and Institutional Level.*

It is for the SIA to identify and evaluate how these impacts may occur by area or over time. As discussed above, the nature and extent of the social impacts listed in Table 2 will differ depending on the extent of local economic and social dependence on the water resources, the community responses, the resilience of the economy and community and interactions with other drivers of change. Further, as some interviewees suggested, the resulting impacts will manifest themselves (if at all) to a greater or lesser degree depending upon the method of recovering water for the environment, and the level of water recovery chosen.

Many of these trends are already taking place as part of the baseline situation, which currently includes the pronounced effects of a severe drought. We need to consider how increased environmental flow allocations could potentially vary these trends. A SIA will contribute to answering this question.

The extent to which negative and positive social impacts may be experienced can be moderated or heightened by a number of factors. Those related to the process of considering and developing implementation options are described further in Section 5.1.6 below. The factors presented here have been drawn from interview responses and issues raised during the community engagement process.

Moderating factors

The following factors may moderate the impacts:

- sufficient available wealth among a sizeable proportion of those who may be negatively affected to maintain or alter production and remain viable;
- a sizeable group of farmers who are adaptive to change and have the capability to alter farming enterprises;
- a possible shift in land use from less to more labour intensive enterprises, creating jobs in the farming sector;
- improvements in river health taking place in line with implementation of water recovery options proving a potential economic buffer with various enterprise opportunities;
- trends in the movement of retirees and families to river towns providing sufficient increase in population and disposable income entering the local economies to counter reductions in disposable income from the farming community;
- public awareness and public confidence through dissemination and collaborative consideration of scientific evidence of the environmental improvements associated with particular levels of environmental flow allocations; providing individuals and communities an understanding of the tangible trade-offs;
- a proactive and positive local government. Throughout the Study Area we heard numerous examples of the important role that local government can play in change management. In particular, local government can tap regional resources, lobby, protest, assume responsibility for a range of social services and even business development, playing a crucial role in how communities adapt to challenges;
- community and government recognition of the improvements irrigators have already made in achieving water efficiency. Promotion of the gains and achievements is important for the morale and motivation of the irrigation community; and/or
- inclusion of all affected individuals, communities and institutions in a partnership approach to improving the environmental condition of the River Murray System, leading to greater public influence over and sense of 'ownership' of outcomes. This might build upon the Land and Water Management Planning[8] (LWMPs) and Salinity Management planning activities, Local Action Planning Groups and extension officers directly related to the Living Murray initiative.

[8] LWMPs are considered to be owned by the community, however there is concern regarding ongoing funding for LWMPs. LWMPs are viewed as triggers for major change in community awareness and irrigation practices.

Public confidence built through an inclusive process and information sharing may help to ameliorate psychological impacts such as stress and anxiety (see below).

Table 2 List of Possible Social Impacts

Individual and Household Level	Community and Institutional Level
Increased stress and anxiety generated by uncertainty about future impacts, and consideration of personal and family options (note high current stress levels due to the drought and ongoing restructuring)	Increased workload on welfare services and local government
Uncertainty about impacts, development possibilities, about own life as a result of social change and of children's future	Alteration in community cohesion and stress
Decline in some property values where the viability of enterprises declines, and population decline.	Reduction in rate income to local governments and associated reductions in service provision
Rise in water values advantaging enterprises selling water, and possibly leading to an increase in value of such properties	Increased spending ability or debt reduction for some.
Some farmers leaving their industries as a result of the weakened economic situation or increased uncertainty about the future of farming	Disruption to local networks with decline in population, reduced ability to support voluntary organizations, clubs, and community activities
Change in crop, agricultural land use, and possible need for skill and capacity development for alternate enterprises	Change in occupational opportunities, business opportunities, potential diversity and flexibility in employment
Reduced disposable income, financial capacity and reduced investment confidence; leading to a change in personal quality of life	Change in the economic viability and social vitality[9] of the community; potential effects on equity and associated social relationships
Workload, amount of work needed to be undertaken to survive / live reasonably; risk of breakdown in some families	Alterations in family stability, divorce rates, family structures.
Job loss, or change in status or type of employment	Decrease in number and diversity of occupational opportunities, loss of population from area. Possible change in the cultural composition, diversity and social vitality of the community. Challenges for survival of community social infrastructure in health, welfare, education, libraries etc
Gender relations within the household with increased reliance on off farm income	Gender relations in the community, participation rates in voluntary activities
Disruption to local social networks	Change in social resilience of a community
Support for or distress about upsetness	Social tensions, conflict or serious divisions

[9] "Will [Community name] still be [Community name], ie retain its character ?"

Individual and Household Level	Community and Institutional Level
(objection to the proposal, participation in protest activities or making formal objections)	within the community; pressure on the credibility and integrity of government
Potential for support for or opposition to the project, or participation in implementation, to become a unifying activity for individuals and organizations, encouraging individual resourcefulness	Enhanced capacity and resourcefulness of the community to manage change and seek to realise opportunities; changed level of community participation in decision making
Shift in the perceived quality of life and subjective well-being (including improved water quality, biodiversity, reduced income, stress)	Change in community well-being and health; implications for local and state government expenditure.
Improved connection to place and spiritual health, enhancing quality of life	Reduced inequity and improved social justice in relation to minority or Indigenous groups
Disruption to daily living, way of life (having to do things differently)	Change in rights over and access to resources
Improved environmental amenity value and aesthetic qualities enhancing quality of life	Cultural integrity – continuation, improvement or decline of local cultural tradition, connection to place
Improved environmental health leading to educational and tourism offerings	Attraction of people and enhancement of services, infrastructure and employment opportunities
Improved aesthetic qualities and outlook, benefits for property values	Increase in population attracted to the area influencing community culture and cohesion, service delivery, viability of businesses and social activities
Increase in pride in the enhanced river condition, including enhanced bequest values as a result of contributing to a healthy environment for future generations to enjoy and experience.	Social values about biodiversity and heritage, affecting community morale
Greater alignment of land use with land capability, improving productivity and income	Environmental benefits and economic benefits should water be traded to viable agricultural industries, opportunities opening for others

Note: After Vanclay (1999).

Heightening Factors

The following factors may exacerbate the impacts:

- existence of small pockets of non-English speaking growers currently having difficulty understanding and implementing water efficient technologies;
- areas where irrigators have made significant efficiency gains over the last ten years, investing in technology and expanding production where their water use is close to their water entitlement;

- areas where the township, processing and tertiary industries are dependent on irrigated agriculture and where there is a reliance on one particular activity, for example wine grape production or rice production;
- retail, secondary and tertiary sectors already affected severely by the decline in cash flow as a result of the drought and ongoing decline in small rural towns;
- irrigators with limited skills in growing alterative crops, partly due to traditional lack of know-how and lack of marketing infrastructure for alternate products;
- 'change weariness' among irrigators and other sectors of the population (the ability to cope with changes may inspire further coping, or may result in a reduced capacity to handle further changes);
- other psychological factors including fear of the unknown, and the effects of existing stress levels; and/or
- significantly depleted resources due to drought – this includes natural, financial and social resources[10].

5.1.6 The effects of the process adopted

An additional complexity in the unfolding of any major initiatives such as the Living Murray initiative is that the way in which the public is informed and their involvement in shaping implementation. Then involvement in its implementation is a significant contributor to outcomes. For instance, the quality, quantity and timing of information and degree of trust in it, will affect individual and public reactions, thereby setting some socio-economic impacts in train through anticipatory behaviour such as bringing forward retirement plans. Depending on the quality and acceptance of the process, sections of the public may take 'ownership of solutions, enhancing their own and others' adaptation processes. Alternately, psychological impacts connected with uncertainty, background stress levels and change weariness, if coupled with a poor process, could jeopardize successful adaptation.

Our interviews showed there is clear public interest in being involved in the shaping of the form of implementation of increasing allocations to environmental flows. Individuals and groups interviewed as part of the scoping study and community members attending public meetings held as part of the MDBC community engagement process and in press articles, have voiced various suggestions regarding the process of developing options for water recovery and their implementation. In essence, more in-depth consultation and community education is requested, and a cooperative and collaborative, extended and

[10] There are reports of some families being placed on suicide watch as a result of the pressures associated with severe drought. Volume 2 provides a brief overview of the effects of the drought for areas within each of the catchments.

transparent approach[11] to design and implementation of any increase in environmental flow allocation (Tim Cummins & Associates 2002). The community seeks substantiated scientific evidence that environmental improvements will indeed occur; and an assessment of the social and economic impacts of changes associated with increases in environmental flow allocations.

A summary of those suggestions is as follows:

- engage the community and local institutions (including local government) in design/management and implementation. They must be involved in education in order to foster understanding of the objectives of increasing environmental flows and what is required to achieve them[12];
- identify the environmental outcomes that the community and government in partnership consider need to be achieved and the time frame. Community consultation and understanding of the Living Murray initiative objectives is required from the outset and stakeholders in the entire Murray-Darling Basin need to work together;
- consider the flow and flooding regime necessary to achieve those outcomes and how this affects delivery for irrigators, navigability for tourism and recreation, and non-consumptive users and the effective change in water that can be delivered with a degree of certainty and associated flow regime;
- consider options for recovering the water including the government purchasing the water on the market[13], updating infrastructure to reduce evaporation and improve irrigation efficiency etc;
- ensure allocation changes should be fair and equitable across the states and take into account investment and efficiencies achieved by individual water users. Urban water users should also be involved and take responsibility. Compensation, cost sharing or other resources may be required to minimise social impacts;

[11] Fleetwood, E (2003) "Living Murray Anger", The Pastoral Times, 11/04/03.

[12] Nancarrow and Syme (2001) reported in their study of the views of rural and urban residents of the environmental health of the River Murray, that while 95 per cent of stakeholders surveyed agreed with the principle of an environmental allocation for the Murray River, support decreased to 40 per cent absolute support if 'all water users and interested people did not have a change to have a say on how much and how' and if 'local people were not involved in making decisions' (p.19).

[13] Comment was made in interviews that prior to implementation of market based mechanisms such as additional changes to the water trading market, local governments should be given the opportunity and assistance in preparing development plans for irrigation. Salinity risk in some locations is extremely high and development in some areas is taking place without consideration of the future implications for salinity, particularly in South Australia in the Riverland and around the Lakes. Water trading and expansion in areas that are not suitable will exacerbate salinity issues and associated management. Further, Voluntary buy-back should be implemented prior to compulsory acquisition.

- consider security of access to water resources needs (industry and community acceptance of water recovery is tied to the question of resource security and property rights[14]). Consideration for Aboriginal communities is also necessary – as dispossessed peoples they largely missed out on access to water because they were not landholders under national or state law at the times water rights were allocated;
- consider the impacts on irrigation, secondary and tertiary industries and communities;
- refine the options to capitalise on opportunities and minimize significant impacts to the extent possible. Assistance may be required to create an environment where diversification and innovation is obvious and achievable;
- clearly define timelines and decision-making responsibility required. Timing should consider other water user demand and cumulative impacts; and
- consider implementation of small scale or trial changes initially to facilitate a desire for change, perhaps drawing on the drought for examples.

5.1.7 Issues for the scope of the social impact assessment

The discussion above illustrates a complex of inter-related issues, many of which may be relevant should an increase in allocations to environmental flows proceed. The types of social impacts and triggers of change that stand out for consideration in the SIA are summarised in Table 3.

[14] See also Austin, P. (2003) "The Murray: the disputed river", The Land, 3/4/03, p11-12.

Table 3 Summaries of the Types of Social Impacts for Consideration in a SIA

Type of Social Impact
Employment levels, for those engaged in primary and secondary industries in which water is an input, and in towns whose economies are highly dependent on irrigated produce[15]. A particular emphasis is necessary on the opportunities for young people, and on attraction or loss of professional people from regional towns.
Farm business viability (this may also include issues related to stranded assets and financial capacity to manage change).
Maintaining adequate population in small, declining towns, since this affects the viability of small businesses, services, organised recreation opportunities eg sporting and leisure clubs, and social interaction, all important elements of quality of life.
Cultural impacts, for Indigenous people and possibly other ethnic and social groups.
Psychological impacts, and impacts of further change on individual and community coping abilities.
Quality of life, beyond the factors listed above, for instance in lifestyle, scenic amenity and environmental improvements.

Having identified the issues which stand out as most important for inclusion in the SIA, we will discuss in the next sections a narrowing of the Study Areas to those most likely to be affected by implementation of increased allocations to environment flows (depending on the implementation options to be considered), and industries and stakeholders requiring further consideration.

5.2 Analysis by Areas of Cumulative and Potential Impact

In conjunction with the analysis of issues for further study in the SIA, we have examined the extent to which the original Study Area can be reduced to focus the SIA on those areas most likely to be affected by implementation of increased allocations to environmental flows and most relevant to decisions about whether, and how, to recover water for allocations to the environment. The aim is to provide a guide to the areas which should clearly be included for further study in the SIA, areas which may well require further study, and areas which could reasonably be omitted from further study on the grounds that they are less likely to be impacted by water recovered for the environment. It is important that the scale chosen for analysis in the SIA allows differentiation of social effects among different parts of the community, as well as between areas.

[15] Secondary processing businesses and tertiary services business viability: The townships where businesses are dependent on one or two irrigated primary products need to be studied and the effect of changes in irrigation on the economic strength and community cohesion of these townships and businesses.

This analysis recognises that the hydrological and ecological effects of the proposed EFRPs are difficult to identify at present, and therefore difficult to communicate to the public in terms they can relate clearly to their own activities. For example how much more or less navigable would the river be? what improvement in fish population is likely? how much less water would be available for irrigation? how much might water prices rise? etc. It equally recognises that implementation options are not yet available for discussion, and that these would affect areas differently.

The method for synthesising interview and profile information to reach the classification of areas provided here is described in Chapter 3.

Our analysis focuses on the extent to which the study catchments, and areas within them:

- are experiencing the cumulative impacts of the changes that have occurred or are occurring; and
- could experience further significant impacts from increased allocation to environmental flows, with the degree of impact depending on the particular implementation option eventually chosen, its timing, and the community's own responses.

The analysis takes into account the degree of direct or indirect dependence on water usage (extractive or in-stream), and – so far as this can be judged in a scoping study – indications of the area's resilience to further change.

These factors have been synthesised to classify areas within the catchments studied into those:

- least relevant for further study – those least dependent on water from the River Murray System for their economic and social activities, and/or least affected by cumulative impacts of recent changes, with apparent resilience to further change;
- relevant for further study – those moderately dependent on water from the River Murray System for their economic and social activities, and/or moderately challenged by cumulative impacts, and possibly with some features of resilience to past and future change; and;
- of highest priority for further study – those most dependent on water from the River Murray System for their economic and social activities, strongly challenged by cumulative impacts and currently showing fewer features of resilience than other areas.

We emphasise to readers that these categories are formed on limited information (since this is a scoping, not a full SIA study), and that some areas we have placed in the first category differ only from some in the second category in having made successful adaptations to past changes, or having more complex economies to ride out difficult periods in some of their agricultural industries.

Decisions as to the scope of further study in the SIA will be made with the MDBC. Table 4 summarises the areas for further study by catchment subgroups.

The areas in the first category, those considered least at risk of significant negative impacts from increases in allocations to environmental flows and are in a position to benefit, have several or all of the following features:

- forested upper catchments,
- a diverse economy;
- reliance on a mixture of dryland and irrigated agriculture rather than a predominance of irrigated agriculture;
- a major town or regional centre playing a strong economic and social role;
- a unique tourism feature;
- a strong transport network, and/ or
- a tertiary education centre.

The areas in the second category considered relevant for further study include:

- irrigation areas with single crops or enterprises,
- less secondary industry than the areas in the first category or secondary industry that is dependent on single crops;
- areas experiencing environmental degradation such as salinity, although this may be managed in some of the areas;
- areas with small farms that struggle for financial viability;
- areas with diverse agriculture including a high proportion of dryland; and/or
- multiple tiers of economic activity.

The areas considered highest priority for further study share additional features to the previous set, making them more vulnerable to a change in their water regime or less able to adapt to further change. In some cases, water is being traded out of these areas. They are more highly dependent on consumptive uses of water and some have marginal lands. These areas also tend to have smaller communities and a higher proportion of small farms.

The colour and pattern scheme presented in Table 4 provides a slightly more detailed classification of the above three categories by subgroup. Diagonal stripes highlight those areas least relevant to study further. They exhibit low dependence on water, in the primary and secondary sectors, have a diverse economic base and have generally responded well or have the capacity to respond well to cumulative changes. Grey shading highlights those areas that are relevant for further study and the grid pattern highlights areas that are the highest priority for further study. The Riverland and the Murrumbidgee Irrigation subgroup (which includes Griffith), whilst having the capacity to respond well to change in a general sense are highly dependent on irrigation and as such are considered relevant for further study.

Table 4 Classifications of areas according to relevance for further study

Catchment	Catchment Subgroup	Water Dependence Primary (Consumptive)	Water Dependence Secondary/Tertiary (Consumptive)	Cumulative impacts and resilience
Areas least relevant for further study				
North East	Darmouth to Hume			
Murrumbidgee	Burrunjuck to Narrandera			
Murray	Upper Catchment (Hume to Mulwala)			
Lower Murray Darling	Lower Murray Darling			
Goulburn Broken	Upper Goulburn			
North Central	Upper North Central			
Areas relevant for further study				
Murrumbidgee	Murrumbidgee Irrigation			
Murrumbidgee	Lower Murrumbidgee			
Lower Darling	Wentworth (Greater Anabranch)			
North East	Hume toYarrawonga			
Goulburn Broken	Lower Goulburn (Campaspe – Echuca)			
Mallee	Swan Hill			
Mallee	Mildura			
South Australia	Murraylands (excl Murray Bridge and the Swamps)			
South Australia	Murraylands (Murray Bridge)			
North Central	Campaspe (Rochester and South)			
North Central	Bendigo			
South Australia	Riverland			
South Australia	Murraylands (Strathalbyn, Goolwa)			
South Australia	Murraylands (The Coorong)			
Areas of highest priority for further study				
Goulburn Broken	Lower Goulburn			
Murrumbidgee	Coleambally Irrigation			
Murray	Mid Catchment			
Lower Darling	Menindee Lakes			
North Central	Loddon			
Murray	Lower Catchment			
Murrumbidgee	Murrumbidgee Irrigation (Wah Wah)			
South Australia	Lower Murray Swamps			
South Australia	Adelaide water supply			

5.3 Industry Analysis

Our data collection and background information show that certain primary industries are particularly vulnerable to possible further restrictions in their water access. If the primary industry suffers, the secondary industries and towns dependent on their supply chains also suffer through flow on effects, depending of course on the economic diversity of those towns and their relationships with one other. This is an important contributor to the discussion of areas above.

The water dependent primary industries that displayed features of vulnerability are:

- **dairy** because of its high dependence on reliability of water supply; high transaction costs in changing land use owing to the high investment in herds, machinery and infrastructure; and high financial gearing on many farms due to the trend to scale-up and producers' stages of transition into a new financial environment following industry restructuring. Areas of importance include Shepparton Irrigation Area, Bendigo, Campaspe, Echuca, Murray Irrigation Ltd (MIL), and the Lower Murray Swamps;
- **rice** because of its relatively high water consumption and predominance in certain areas lacking alternate industries, the inflexibility of substantial processing infrastructure, and many producers' view that rice is a comparatively simple crop to grow. Rice producers focus on production, while all post-gate matters are dealt with by others within the industry. For these producers change would require more demanding technology, effort and risk. Further, on farm infrastructure is developed specifically for rice production. Areas of importance include MIL, Murrumbidgee Irrigation and Coleambally Irrigation, and private diverters on the Murrumbidgee (IREC 2003).

Off-farm, the role played by wine grape, rice and dairy processing enterprises is particularly critical where townships are dependent on single crops and have little diversification.

- **wine grapes** which are derived from a perennial crop demanding high on-farm infrastructure costs, a perishable output and a generally weak market position. Further, many of the grape-growing areas have established efficient irrigation systems and have developed to the extent of using much of their available water allocation. This reduces the ability to diversify. In addition, the wine industry will come under increasing competition as other wine-making countries reach full production. Areas of importance include Alexandrina (Langhorne Creek and Currency Creek), Murraylands north of Murray Bridge, Riverland, Mildura, Swan Hill and Shepparton;

- **horticulture** including stone fruit, citrus, almonds and olives because of the requirement for high security in water supply, early plantings requiring more water as they reach full production potential, high on-farm infrastructure costs, perishable outputs and ongoing price sensitivities due to competition from cheaper imports. Areas of importance include Sunraysia, Swan Hill, Riverland, Loddon (Boort-west of Loddon), Murrumbidgee Irrigation and the MIL; and
- **mixed farming** combining irrigated and non-irrigated production. Examples in the Study Area include combinations of sheep grazing, potatoes and dryland wheat. Where there is high dependence on income from the irrigated crops, farmers are very active in temporary water trading to import for their needs particularly where they have supply contracts to fill (dairy, potatoes, lucerne, pigs). Debt levels may be high for this group of mixed farmers. Generally these areas have small water allocations, heavily supplemented by water purchase. Reduced water access will mean reduced reliability of supply, affecting the amounts available and purchase costs for water trading. Where income is mainly generated from dryland production, farmers demonstrate they retain income though at a reduced level when water access is reduced. Those farmers with high debt levels are least flexible. For instance, drought in West Corrugan has seen 250 landholders move to just stock, domestic and household use. Other areas of importance for mixed farming include MIL, Loddon, Swan Hill, Murrumbidgee Irrigation, and private diverters along the Murrumbidgee.

The effects of the 2002/03 drought and consequent water supply shortfall even in conservatively managed water supply systems has exacerbated the vulnerability of the dairy industry in particular and exposed the rice industry to challenges involving higher levels of risk.

Tourism and recreation are anticipated to be impacted and warrant further study since these industries potentially will benefit from environmental improvements associated with increases in environmental flow allocations.

We used influence diagrams (see Figure 2) in our analysis to trace the complexity of drivers, responses and further consequences that could arise from a reduction in water availability to the primary industries, or environmental improvement in the case of tourism.

These illustrate the complex possibilities arising from a single intervention and hence, the difficulties of predicting outcomes reliably (see also Gray and Lawrence, 2001). As we explained in Chapter 3, reduced water access can have different effects on different types of farm and farmer, even within the same primary industry. Their choices of responses and the aggregate effects of their responses, will differ depending on characteristics of the regions and industries concerned. A severe downturn in availability of a product, for example, will have different socio-economic impacts depending on whether it is the sole or dominant industry, or one of several industries which might have compensatory effects.

5.4 Analysis of Stakeholders

While many stakeholders and their interests are self-evident in the impacts noted for issues, areas and industries, we have conducted a brief overview of all stakeholders to ensure that none that might experience significant positive or negative impacts resulting from increased environmental flows escape attention. This particularly applies to the first of the stakeholder groups described below, Indigenous people.

5.4.1 Indigenous peoples

The interests and impacts of Indigenous peoples are covered in some detail here and in Appendix A: Indigenous Impacts since they are not described in other parts of this report. We have had the benefit of considerable information through the MILDRN component of the Indigenous engagement process.

Given the strong spiritual, cultural, social and psychological linkages for Aboriginal people between a healthy environment and healthy people, the Indigenous nations look forward to environmental recovery or improvements from increased allocations to environmental flows having a range of positive cultural, social and individual impacts, though the current set of EFRPs appears insufficient to ensure a healthy river system (MILDRN, in preparation; Jones and Cartwright, 2002).

Even at this stage of the Living Murray initiative process, the Indigenous nations are experiencing positive benefits, through the strength of their engagement in the MLDRIN process. The engagement process has provided an opportunity for Traditional Owner groups to voice their opinions, and is an indication that the MDBC has recognised that Indigenous nations have a legitimate right to have a 'say' and be involved the management of natural resources throughout the basin.

In recovered environments, Indigenous nations look forward to a general strengthening of culture related to recovery of the river ecosystems. This includes greater psychological well-being resulting from their interactions with more healthy local environments. We can also expect to see a strengthening of inter-generational teaching of environmental knowledge in healthier, more complex ecosystems.

The protection of significant and sacred sites such as burial and ceremonial sites is a key concern of the Indigenous nations. Current threats to such places include uncovering of burials due to low water levels in lakes, and damage due to works such as installation of irrigation equipment and dredging. It is essential for future generations that the cultural heritage within the MDB Region be recognised for its national significance (see Lourandos, 1997; Mulvaney and Kamminga, 1999).

Positive psychological and physical health impacts are envisaged to arise from significant recovery in the river's ecosystems, given the close association between Indigenous people's well-being and that of their 'country'. This includes the benefits of healthy water, the restoration of native wildlife and other bush tucker for healthier diets and natural medicines. Some South Australian communities living close to the river hope for a reduction in skin and gastric complaints arising from physical contact (eg in swimming) with currently polluted water.

Traditional uses of healthy ecosystems also have clear economic value by reducing reliance on purchased food and medicines. Future economic development opportunities for the Indigenous nations could lie in recovered ecosystems, given Indigenous interest in developing businesses in cultural tourism, sustainable agriculture, fishing, 'bush tucker' and bush medicine, seed collection and propagation. The economic development opportunities connected to the river's resources are as yet unrealised by Indigenous people, but were clearly identified during the MLDRIN community engagement process. Implementing the highest EFRP level would not be sufficient to realise this potential, but improvement to the natural resources is an essential component.

The Indigenous nations are equally interested in deriving employment from the management of cultural and natural heritage, such as holding ranger positions and involvement in the implementation of one of their aspirations expressed in the MLDRIN process, 'Cultural Heritage Management Plans'. Another economic opportunity sought by Indigenous nations are royalties for the use of Traditional Ecological Knowledge such as bush medicines, assuming eventual recognition of and protection for their intellectual property in this knowledge.

Indigenous people reject the concept of compensation for any loss of water allocations by industry as inequitable, given the legislative history of Australia that prevents Indigenous nations from having any rights to water. They argue that if the river system is prevented from supporting their spiritual, cultural, economic and social health there is a basis for compensation for loss of traditional values.

Many of these potential impacts require complementary steps to the improvement of natural ecosystems in order to be realised. These steps are consistent with other arenas of government and social policy designed to achieve equity for Indigenous people, including the Reconciliation movement. A range of suggestions brought up in the MILDRN series of community meetings are listed in Appendix A: Indigenous Impacts.

5.4.2 Extractive water-using primary producers

This includes the first site of water use, farms, and the businesses linked economically to these farms. As our generic influence diagram shows, key characteristics differentiating within this stakeholder category are:

- **the type of crop or product**, for example wheat, rice, dairy, fruit. Our fieldwork results show key differences between products that require high water supply security, especially dairy and perennial crops, and the annual cropping businesses. The latter can switch crops more easily and have the option of planting out less area, behaving as dryland, or sitting out an annual cycle (drawing on financial reserves) when water is scarce or highly priced. The other feature of those stakeholders relying on annual crops is the greater capacity for recovery;
- **the scale and capitalisation of the property.** Farm sizes have had to increase over a number of years to remain viable and in many industries, farms have had to improve their technology (eg rotary milking in dairy, drip irrigation in wine grape production). Size and wealth of properties, provided they are not too highly geared, now appears an important distinguishing feature among farms; and
- **characteristics of the farmers.** Age and stage in the life-cycle, eg young, middle-aged or of retirement age are important in predicting farmer behaviour and ability to remain financially viable. This appears to correlate with educational levels, as well as property size and capitalisation.

These subsets of the farmer population are all stakeholders who may be affected differently by the same event, or choose to respond differently. For instance, a rise in water price to the point of threatening farm viability may lead some farmers to retire and others to buy their land in order to grow their businesses. On the other hand, some may improve cash flow by selling higher-priced water on the temporary market. It is thus impossible to generalise about the stakeholder category of 'irrigators', other than to observe that all those who face severe changes to their water access will have choices to make.

Our interviews did point out a distinction between irrigators and dryland farmers. The latter are far more used to dealing with climatic risk and most prepare accordingly.

5.4.3 Processing industries

Processing industries, their distribution, their level of dependence on local, single-crop farm products and their degree of primacy in terms of local employment, are highly influential in defining a township and district's resilience. Changes to production levels will affect investment and regional development, with reductions possible in skilled and unskilled workforces in

towns, reduction in property values and tertiary services, and an increase in welfare needs. The flow-on of impacts in townships is greatest in dependent townships.

Matters to be considered in terms of the EFRPs and changes to processing industries include:

- the effects on dependent, specialised townships and their districts, particularly those dependent on the production of one or two agricultural products; and
- processes of industry and low community adjustment.

5.4.4 Commercial fishers

Commercial fishers in South Australia and NSW have strong social and psychological linkages to a healthy aquatic and marine environment which many have fished for three to four generations. There is a strong view that they should manage the resource for future generations and this view transfers to the whole system in terms of long-term health and sustainability.

The Murray-Darling Basin is the only area in Australia where commercial freshwater fishing is undertaken. The waterways involved are much more restricted than previously, with the main ones being the Coorong, Lakes Alexandrina and Albert. On a state basis, commercial fishing is virtually limited to South Australia.

There are approximately 30 commercial fishers in the Lakes and Coorong area, where commercial fishing remains an important industry following successful restructuring five years ago. The industry has coped with the current closure of the River Murray Mouth, but there is a risk of fishery collapse without increases in environmental flows due to declines in water quality and access to the Coorong. Comments made in interviews however, suggest benefits at the Murray Mouth, Lakes and Coorong are unlikely to arise below 1,000 GL.

Commercial fishers in the South Australian section of the Murray River, some of whom rely on fishing as their sole source of income, are in the process of being phased out (28 in total).

5.4.5 Recreational fishers

This category, and the many small businesses supplying them with equipment, bait, accommodation and food, stand to gain in the long term from improved fish availability in the river. Jones and Cartwright's work (2002) suggests improvements in fish numbers by species will occur.

5.4.6 Businesses related to non-extractive water uses and healthy environments

The types of businesses – generally small – include visitor accommodation of all standards, food outlets and retail businesses, specialist equipment businesses (eg for fishing), and tours (eg ecotourism). There is also a general economic spin-off, for example through retail trade and services, in the lifestyle residents attracted by scenic environments offering popular recreation opportunities.

It is particularly difficult to estimate the effects of the three EFRPs on this set of stakeholders. Such businesses currently exist, and we assume the number of ecotourism businesses such as bird-watching could increase with environmental improvements. Businesses dependent on lake levels however, are prone to severe downturn when levels fall below those suitable for boating and views, affecting accommodation and food businesses as well as whole towns.

Two factors complicate the picture for this type of business. Local government and regional development officers typically look to create events to attract visitors. This is a common mitigation for declining towns. Currently events increase the base level of tourism and recreational visitation, but withdrawal of such stimuli when no longer needed could alter that trend. Another factor is the extent of visitation and activity based on agricultural attractions, such as wine and food tasting, alongside enjoyment of agricultural scenery. This also interacts with historical attractions, many of which are associated with the history of the river.

These businesses are an important set of stakeholders who stand mostly to benefit from improved river environmental quality, but there are some risks for them associated with variability in water levels and the seasonality of flows.

5.4.7 Tertiary enterprise and population servicing

We distinguish these from the industry sectors, since by this point in our influence pathways they are supported by multiple connections. In general, given the importance of irrigated agriculture for much of the River Murray regional economy, the fortunes of these enterprises and of area and town populations fluctuate with agricultural prosperity. Those in the more complex economies are more resilient, since different agricultural sectors can compensate for one another's downturns.

5.4.8 Environmental interests

This is a broad constituency, both within and outside the region (see Nancarrow and Syme, 2001). Viewed separately it can be assumed to favour environmental flows on account of predicted environmental improvements, but it is important to recognise an extent of overlap among stakeholders within the region. This includes farmer and local townspeople's sensitivity to their local environments. Farmers and residents also overlap with recreational fishers. The Land and Water Management Planning process in Victoria and New South Wales, and Salinity Management and Local Action Planning process in SA, have been driven by primary producers and government in a collaborative effort. Significant changes in practices for an improved environment have taken place as a result of this process.

5.4.9 Domestic and urban water users

We have not studied this category specifically. Urban and domestic extractions, though important in principle, are small in volume compared with irrigation water extractions although the number of individuals affected is large. Our interviews showed an interest in major towns such as Albury-Wodonga being allowed sufficient water allocations for future growth. The rising cost of water was considered affordable for urban areas. We anticipate some inconvenience if demand management is implemented, but the experience at Canberra where consumers elected to pay for the highest of three standards of water treatment offered, suggests great willingness to cooperate with measures to meet river needs.

We did not consider water quality issues specifically, considering ourselves short of the necessary biophysical background information, but learnt through our interviews of concerns about the more dangerous blue-green algae entering the system in periods (such as the current drought) of low water levels. With this, came the hopes for higher urban, domestic and stock water quality under a regime of increased and enhanced environmental flows due to dilution effects and to general environmental improvements including addressing salinity.

Without improved water quality associated with increased environmental flows, Adelaide's water supply in the short term may require increased treatment costs to cope with a range of pollutants particularly rising salt levels. In the longer term, treatment costs are likely to be prohibitive. All options involve cost to consumers as well as costs of alternative sources. While cost impacts are readily identifiable, detailed investigation of the social effects of both a deteriorating water quality and the response options is recommended.

An outline of considerations for Adelaide's water supply is included in the SA MDB Catchment summary in Volume 2.

5.4.10 Water authorities

Urban water authorities will have to contend with a different supply environment including more complexity in river flow with seasonal and inter-seasonal fluctuations, and differing cost structures, if environmental flow increases proceed. Irrigation area water authorities may be significantly affected, due to a reduction in revenue from water sales, straining the ability to upgrade infrastructure.

Water may be cleaner as a result of improved catchment management and drainage to the river, reducing processing costs and the quality of water to consumers. This is a particularly important consideration for downstream water authorities, especially SA Water and Adelaide water users.

5.4.11 Governance bodies

State and local governments, and partnership bodies especially catchment management organisations, can well expect altered workloads arising from implementation of a new environmental flow regime. Roles suggested in our interviews include:

- catchment management bodies and both levels of government having roles in assisting areas and stakeholders to adapt to change. This includes incorporation of components of the Living Murray initiative into catchment plans (requiring some re-planning), and community facilitation roles. These bodies may well have roles in designing and implementing structural adjustments, with associated workload; and
- roles for regional development offices, and development staff in local governments, in stimulating economic growth to compensate for changes arising from increases in environmental flows, or capitalising on emerging opportunities. Areas currently lacking in such organisations and staff may benefit from their introduction (Victoria, for instance, is more active in this field than NSW).

5.4.12 Hydroelectricity

Hydroelectricity is produced at Dartmouth, Hume and Yarrawonga Weir. Increases in environmental flows and associated changes in seasonality of water flow may impact on the capability of the generators to generate electricity. There may possibly be an improvement in generation capacity with year round flows and possibly more water moving through these systems.

5.4.13 General public

The broad support for the Living Murray initiative from within and outside the region, has been documented by Nancarrow and Syme (2001) and confirmed through interviews. We note their qualifications that the public sought far reaching involvement in deciding environmental flows. Support for an environmental allocation reduced if water users and local people were to have little say in the decisions (Nancarrow and Syme, 2001, p.iii, 22; see also Tim Cummins & Associates, 2002).

5.5 Scoping Considerations

The overview of stakeholder interests provides a different perspective to the area and industry analysis, although the degree of overlap is quite high. Our conclusions are that:

- impacts for Indigenous nations could be significant, especially at or well above EFRP of 1,500 GL, or where increases in environmental flows achieve significant environmental recovery in particular ecosystems. Economic impacts on the Indigenous labour force, currently highly marginalised from the regional economy, are hard to quantify. The Indigenous nations will probably wish their predicted positive impacts to be considered in an equitable manner with the negative impacts related to reduced irrigation;
- impacts on particular subsets of farmers will need to be tested. These should be included adequately in the SIA through area and industry analyses however, it will be necessary to ensure that these are sufficiently fine-tuned to differentiate the effects according to the age of farmer, farm size and capitalisation, and agricultural enterprise. The flow-on impacts to secondary industries will also need to be tested;
- if positive impacts are to be studied in the SIA, businesses associated with non-extractive uses of water will be important. Information about this stakeholder group is also important for managing the as-yet unknown effects of variability in flows. Many of these should be included under an area analysis, although there are some water features in areas, which are low priorities for study in the SIA; and
- processing and tertiary enterprises in towns, particularly declining towns, stand to receive significant impacts under certain conditions. Small retail businesses have been hard-hit by farmers tightening their belts and population losses during the current drought. Small businesses servicing agriculture suffer with farmer fortunes, although some (such as those supplying improved irrigation equipment) will benefit from a change in the environmental flow regime, such as irrigation and drainage specialists and irrigation equipment suppliers.

The SIA needs to determine whether any of these would experience significant impacts at one or more levels of EFRP. In designing the SIA, we will need to consider whether the information would be sufficiently well gathered through an area and/or an industry approach.

5.6 Synthesis: Scope of the Social Impact Assessment

The information brought together in this chapter suggests that the SIA can concentrate on a key set of socio-economic and social impacts, within a reduced set of areas to those included in the scoping study.

The issues highlighted as most relevant for further study are:

- employment levels, for those engaged in primary and secondary industries in which water is an input, and in towns whose economies are highly dependent on irrigated produce. A particular emphasis is necessary on the opportunities for young people, and on attraction or loss of professional people from regional towns;
- farm and business viability (this may also include issues related to stranded assets and financial capacity to manage change);
- maintaining adequate population in small, declining towns, since this affects the viability of small businesses, services, organised recreation opportunities eg sporting and leisure clubs, and social interaction, all important elements of quality of life;
- cultural impacts, for Indigenous people and possibly other ethnic and social groups;
- psychological impacts, and impacts of further change on individual and community coping abilities; and
- other quality of life issues, for instance in lifestyle opportunities, scenic amenity and environmental improvements.

Meanwhile, we note that the extent and success of community engagement will also affect social outcomes.

Wherever possible the SIA should differentiate increases or decreases in these phenomena due to the change in water allocations to the environment and for consumptive use from background effects occurring as a result of a cumulative set of changes within Australian and the Basin's agriculture.

If the Commission decides to proceed with an SIA, we recommend it should continue in eight catchments, in a reduced set of areas concentrating on those with strong social and economic reliance on water usage, both extractive and non-extractive. It is important that the scale of analysis be capable of identifying distributional effects, within and between areas.

Within the reduced Study Area, research should be particularly alert to impacts on the following industries and to townships where primary, secondary and tertiary activities are reliant on one or two agricultural products:

- dairy;
- rice;
- wine grapes;
- horticulture including stone fruit, citrus, almonds and olives;
- mixed farming combining irrigated and non-irrigated agriculture in certain areas; and
- tourism and recreation.

While the majority of stakeholders within the Study Area are evident from the study of issues and industries, we believe it is important to take note of the impacts on Indigenous people, a small set of commercial fishers in the Coorong, and administrative organisations - local and government agencies, and irrigation management bodies – whose workloads may be affected.

A number of questions remain to be determined in the event the MDBC proceeds with a full SIA. These include a set of implementation options and timing factors in implementation. A SIA can – within the limitations of data and resources - enlighten the development of these options, and test their relative merits. It can also make important contributions to the development of water sharing policy.

6. References

Barr, N. (2002) '"Social sustainability", "triple bottom line", "capacity to change" and the future of rural landscapes', proceedings of the "*Getting it right: what are the guiding principles for resource management in the 21st century"* conference, PIRSA, Adelaide, http://www.plevin.on.net/GIR/Barr.pdf

Bourke, L. and Lockie, S. (2001) 'Rural Australia: an introduction', in Lockie, S. and Bourke, L. (eds), *Rurality bites: the social and environmental transformation of rural Australia*, Pluto Press, NSW

Branch, K. and Ross, H. (2000) 'Scoping for Social Impact Assessment', in L.R. Goldman (eds.), *Social Impact Assessment: an Anthropological Manual*, Berg, UK

Burdge, R. (1998) *A Conceptual Approach to Social Impact Assessment*, Social Ecology Press, Middleton, Wisconsin

Burdge, R. and Vanclay, F. (1995) 'Social Impact Assessment', in Vanclay, F. and Bronstein, D.A.(eds.), *Environmental and Social Impact Assessment*, Wiley, Chichester

Campbell, H. and Lawrence, G. (2003) 'Assessing the neoliberal experiment in Antipodean agriculture', in Almas, R. and Lawrence, G. eds., *Globalization, localization and sustainable livelihoods*, Ashgate, UK

Coakes, S. and Fenton, M. (2001) 'Social Assessment In The Australian Forest Sector', in Dale, A., Taylor, N. and Lane, M., (eds.), *Social Assessment In Natural Resource Management Institutions*, Victoria, CSIRO Publishing, P255-265

Cocklin, C. and Alston, M. eds (2003), *Community sustainability in rural Australia: a question of capital?* Centre for Rural Social Research, Charles Sturt University, Wagga Wagga NSW

Fenton, D.M. and Marshall, N.A. (2001) *A Guide To The Fishers Of Queensland, Part A: TRC – Analysis And Social Profiles Of Queensland's Commercial Fishing Industry,* CRC Reef Research Centre Technical Report no. 36., CRC Reef Research Centre, Townsville

Gray, I. and Lawrence, G. (2001) *A future for regional Australia: escaping global misfortune*, Cambridge University Press, UK

Hassall & Associates (2002) *Cotton Rivers & Climate Change*, Hassall & Associates, CSIRO, NSW Department of Land & Water Conservation and Queensland Department of Natural Resources and Mining (eds.), 'Cotton Research & Development Corporation'

Jones, G. and Cartwright, S. (2002) *Future Visions for the River Murray*, Murray-Darling Basin Commission and the Cooperative Research Centre for Freshwater Ecology.

Lane, M.B., Ross, H and Dale, A.P. (1997) 'Social Impact Research: Integrating The Technical, Political And Planning Paradigms', *Human Organization*, 56, pp.302-310

Lockie, S. and Bourke, L. eds. (2001), *Rurality bites: the social and environmental transformation of rural Australia*, Pluto Press, NSW

Lourandos, H. (1997) *Continent Of Hunter-Gatherers: New Perspectives In Australian Prehistory*, Cambridge University Press, Cambridge UK

Mulvaney, J. and Kamminga, J. (1999) *Prehistory of Australia*., Allen and Unwin, Sydney

Mulvihill, P.R. and Jacobs, P. (1998) 'Using Scoping As A Design Process,' *Environmental Impact Assessment Review*, 18(4), pp.351-369

Mulvihill, P.R. and Baker, D.D. (2001) 'Ambitious and restrictive scoping: case studies from Northern Canada', *Environmental Impact Assessment Review*, 21(4), pp.363-384.

Ross, H. (2001) 'Social Impact Assessment: Coronation Hill', in Baker, R., Davies, J. and Young, E. (eds.), *Working On Country: Contemporary Indigenous Management Of Australia's Lands And Coastal Regions*., Oxford University Press, Melbourne

RACD, CARE, EBC (2000) *Economic & Social Assessment for the Brigalow Belt South*, NSW Western Regional Assessments, for Resource and Conservation Council

Socio-economic Services Unit (2000) *Information to assist the preparation of Regional Vegetation Management Plans, Western Riverina Region*, Department of Land and Water Conservation

Stehlik, D., Lawrence, G. and Gray, I. (1999), *Drought in the 1990s: Australian farm families' experiences*, Rural Industries Research and Development Corporation Publication no.99/14, RIRDC, Canberra

Tim Cummins & Associates (2002) Reports interpreting the workshop discussion of the participants present at the 'Living Murray' workshops held at Albury-Wodonga, Deniliquin, Mildura, and Shepparton

Vanclay, F. (1999) 'Social impact assessment', in Petts, J. (ed.) *Handbook of Environmental Impact Assessment* (Volume 1), Oxford: Blackwell Science, pp.301-326

Vanclay, F. (2002) 'Conceptualising social impacts', *Environmental Impact Assessment Review*, 22(3), pp.183-211

7. Appendix A: Indigenous Impacts

7.1 Introduction

This attachment provides more detail on the 'scoping' considerations concerning Indigenous people.

The detail presented here draws on information received through the Murray Lower Darling Rivers Indigenous Nations (MILDRN) process of community engagement, attendance at a MLDRIN meeting, and limited interviews and visits. We are grateful for Derek Walker's assistance with these and his contributions to this text.

7.2 Background

The Murray River has always been of very high economic and cultural importance to Indigenous peoples, given the rich food resources of the river and floodplain ecosystems, and reliability of water. Mulvaney and Kamminga (1999, p.302) describe it as Australia's Nile. The areas of Australia's oldest proven Indigenous habitation are in the north of the Study Area, in the Willandra and Menindee Lakes (Mulvaney and Kamminga, 1999, pp.194-199; Lourandos, 1997). The largest cemetery, at Lake Victoria, is estimated to contain 10,000 burials, and its middens show a peak population around 18 to 15,000 years ago[16]. In the 19th century the central and lower Murray and lower Darling may have had the most densely populated parts of Aboriginal Australia (Mulvaney and Kamminga 1999, p.303 and p.307), sustaining 20 to 40 times greater population density than nearby areas of the Mallee. This population was decimated by the foreign diseases that spread before British exploration and settlement.

7.3 Scoping Considerations

Given the strong spiritual, cultural, social and psychological linkages for Aboriginal people between a healthy environment and healthy people, the Indigenous nations look forward to environmental recovery or improvements from activities of the Living Murray initiative having a range of positive cultural, social and individual impacts. Reference to Future Visions for the River Murray (Jones and Cartwright, 2002) suggests the 1500 GL water recovery level will be necessary to realise the extent of ecological recovery required, though some of the impacts can occur at lesser recovery levels particularly where targeted to particular ecosystems. Indeed, the Indigenous nations believe that the current EFRPs determined by the Ministerial Council are unsatisfactory, with the highest reference point (1,500GL) having only a low to moderate probability of

[16] This cemetery is disturbed by the conversion of the lake into an irrigation reservoir.

improving the health of the river system. They recommend that the EFRP be extended to a level sufficient to bring about a healthy river system (MILDRN, in preparation).

Engagement benefits

Even at this stage of the Living Murray initiative, the Indigenous nations are experiencing positive benefits, through the strength of their engagement in the MLDRIN process. For perhaps the first time they are being taken seriously in a major national environmental policy process, and have been resourced to meet as nations, articulate a vision and propose agendas. Despite remaining scepticism, their sense of marginalisation in non-Indigenous decision-making processes has partly been addressed. The engagement process has provided an opportunity for Traditional Owner groups to voice their opinions, and is an indication that the MDBC has recognised that Indigenous nations have a legitimate right to have a 'say' and be involved the management of natural resources throughout the basin.

While we perceive that this recognition and process will lead to Indigenous nations being empowered to be actively involved in basin issues, it is important that the MDBC protect against losing this positive start of inclusive engagement by continuing to be proactive in providing direction and resources that build on the foundation that has been set.

Cultural impacts

In recovered environments, Indigenous nations look forward to a general strengthening of culture related to recovery of the river ecosystems. One element of this is greater psychological well-being resulting from their interactions with more healthy local environments. We can also expect to see a strengthening of inter-generational teaching of environmental knowledge in healthier, more complex ecosystems. To give a simplistic example, species and their habitats need to be present in order to teach younger people the relevant ecological knowledge and care, since Aboriginal teaching methods rely on observation and experience *in country*. If species are absent, it is difficult to teach about them. For this positive impact to be realised, problems of access to the river frontages (alienated by private property rights and fencing right to the water) also need to be addressed in many areas throughout the River Murray System.

The protection of significant and sacred sites such as burial and ceremonial sites is a key concern of the Indigenous nations. Current threats to such places include uncovering of burials due to low water levels in lakes, and damage due to works such as installation of irrigation equipment and dredging. The Indigenous Nations consider it essential for future generations that the Cultural Heritage within the MDB Region be regarded as knowledge of National Significance. Much of this heritage is of great antiquity (Mulvaney and Kamminga, 1999; Lourandos, 1997) has been recognised as of national importance through the declaration of protected areas over a number of ancient settlement areas.

While an increase in environmental flows will possibly have some effect on these concerns, continuation of the strong engagement commenced through the MLDRIN process is more likely to enable these concerns to be addressed.

Health impacts

It is important to recognise that the Indigenous nations have experienced physical and psychological health problems since colonisation, related to dispossession from land and access to healthy natural resources, and loss of independent living. We envisage positive psychological and physical health impacts arising from significant recovery in the river's ecosystems, given the close association between Indigenous people's well-being and that of their 'country'.

We are already seeing a sense of empowerment among traditional owners and their nations through new roles in governance, the increasing respect of non-Indigenous people, and recognition of cultural values and traditional knowledge, expressed in engagement in the MLDRIN process.

The health impact envisaged from the increase flows will be derived from healthy water, the restoration of native wildlife and other bush tucker. The ability to fish and hunt traditional food and collect natural resources for medicinal purposes could also contribute to improved physical and psychological health. Given the high dependency on welfare benefits and the increasing price of living in regional Australia, Indigenous communities need supplementary sources of nutrition, and there is no better and more suitable remedy than traditional food and diets.

For communities living close to the river, there should be a reduction in skin and gastric complaints arising from physical contact (eg in swimming) with currently polluted water.

Economic impacts

Participants in the MLDRIN process have coined the expression 'cultural economy' to express how traditional uses of healthy ecosystems have clear economic value, by reducing reliance on purchased food and medicines. The ability to go down to the river and return with the main ingredients for a meal is part of living memory for middle-aged adults. They are keenly aware of the loss of this food security and economic and health benefit, due to the current poor health of the river system.

Future economic development opportunities for the Indigenous nations could lie in recovered ecosystems, given Indigenous interest in developing businesses in cultural tourism, sustainable agriculture, fishing, 'bush tucker' and bush medicine, seed collection and propagation. Indigenous communities understand the importance of economic development and independence from government reliance. The economic development opportunities connected to the river's resources are as yet unrealised by Indigenous people, but were clearly identified by Indigenous communities during the MLDRIN community engagement process. Implementing the EFRP would not be sufficient to realise this potential,

but improvement to the natural resources is an essential component. Collaborative efforts and joint ventures were seen by MLDRN participants as an important component in economic development within communities throughout the Basin.

The Indigenous nations are equally interested in deriving employment from the management of cultural and natural heritage, such as holding ranger positions and involvement in the implementation of one of their aspirations expressed in the MLDRIN process, 'Cultural Heritage Management Plans'. This again requires other interventions besides improvement to the natural environment, but is complementary to the Living Murray initiative.

Another economic opportunity sought by Indigenous nations, are royalties for the use of Traditional Ecological Knowledge, assuming eventual recognition of and protection for their intellectual property in this knowledge. Bush medicines are an example cited in the MLDRIN process.

The Indigenous nations reject the concept of compensation for any loss of water allocations by industry as inequitable, given the legislative history of Australia that prevents Indigenous nations from having any rights to water. They believe there is a basis for compensation for loss of traditional values if the river system is unable to provide the spiritual, cultural, economic and social support their health depends upon.

On the other hand, current employment opportunities for Indigenous people are very limited. There is a risk that implementation of increased allocations to environmental flows would impact more severely than at present on the already scarce employment and economic opportunities of the Indigenous labour force.

Realisation

Many of these are not direct impacts of implementation of a level of allocation to environmental flows, but require complementary steps to the improvement of natural ecosystems. These steps are consistent with other arenas of government and social policy designed to achieve equity for Indigenous people, including the Reconciliation movement. Many suggestions were brought up in the MLDRIN series of community meetings, which would help to realise positive impacts for the Indigenous nations. These are:

- that the issues, concerns, values and aspirations of Indigenous people be placed on the Issues Log of the broad community engagement process; and be considered by the MDBC and the Ministerial Council;
- that the Ministerial Council and the MDBC receive a delegation from Indigenous nations to allow discussion of the issues;
- that the MDBC proceed with the three-stage Indigenous Engagement Project detailed in the Feasibility Study and provide necessary resources;

- that the MDBC provide a forum for Indigenous nations to come together to determine their position on natural resource management issues and continue to provide support for MLDRIN in this respect;
- that the MDBC and the Ministerial Council develop legally binding agreements/protocols with Indigenous nations, according to their traditional boundaries. The agreements/protocols should establish a framework for involvement by the nations in management of the Basin's natural resources;
- that the MDBC and the Ministerial Council ensure Indigenous nations are represented on all natural resource management bodies in the Basin and centrally involved in their policy and management decisions;
- that the MDBC and the Ministerial Council ensure that cultural, environmental and social values are given equal weight with economic values in policy and management decisions and water pricing in the Basin;
- that the MDBC and the Ministerial Council develop Cultural Heritage Management Plans (CHMPs) with Indigenous nations, according to their traditional boundaries;
- the CHMPs should be incorporated into all relevant natural resource plans and local council development plans;
- the CHMPs must be implemented by the respective Indigenous nations, according to their boundaries, and provide employment for Indigenous people. They also should provide access for traditional owners to sites and areas of significance and for hunting and fishing;
- that the MDBC and the Ministerial Council provide a water allocation for each Indigenous nation;
- that the MDBC and the Ministerial Council extend the current reference points for environmental flows so healthier outcomes for the river are possible;
- resources are essential to enable equitable engagement by traditional owners in natural resource management. Resources will be necessary for negotiation, training, capacity building, and support for traditional owner representatives; and
- cross-cultural training should be undertaken at all levels of government and by natural resource management bodies.

We refer readers to the forthcoming MLDRIN report for further detail on these actions to realise the potential positive impacts for Indigenous nations of increasing environmental flows to the River Murray. This report is also expected to canvass a range of recommendations made at MLDRIN community meetings for whole-of-government approaches to working with the Indigenous community to realise the potential benefits.

The SIA which is proposed to take place following the Ministerial Council meeting in November will again incorporate the results of the Discrete Indigenous Engagement process.

8. Appendix B: Stakeholder Categories Contacted

The individuals interviewed that fell within the organizations possible for interview could be categorized according to the following interests:

- Indigenous Irrigators
- Private Diverters
- Irrigation companies
- Irrigators who are members of Irrigation Trusts or Companies
- Local Government
- Catchment Management Authorities
- Regional Development Officers
- Small Business Advisors
- Industrial Processors
- Tourism Boards/Operators