Effects of changes in water availability on Indigenous people of the Murray-Darling Basin: a scoping study

Sue Jackson, Brad Moggridge and Cathy Robinson

June 2010

Report to Murray Darling Basin Authority
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The Murray-Darling Basin Authority commissioned this report, amongst a number of consultancy reports, to examine a range of different aspects of the socio-economic implications of reducing current diversion limits. These studies were conducted at specific points in time during the development of the proposed Basin Plan and aimed to analyse the likely implications of a range of potential scenarios for reducing long-term average diversion limits in order to inform the MDBA on options for setting Sustainable Diversion Limits and other aspects of the proposed Basin Plan.

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Cover Photograph:
Description: Toogimbie wetland under Indigenous watering regime, Nari Nari country, Hay, NSW.
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1. EXECUTIVE SUMMARY

The Murray Darling Basin (MDB) covers in excess of 1 million square kilometres and is one seventh of the Australian mainland (Murray Darling Basin Authority 2009). Widespread environmental degradation, as a result of past water-allocation decisions, prolonged drought, natural climate variability and emerging climate change, has necessitated significant changes to the management of the Basin's water resources.

A key element of the Water Act 2007 (Cwth) is the requirement that the Murray Darling Basin Authority (MDBA) prepare a Basin Plan. The Basin Plan is required to set enforceable limits, referred to as sustainable diversion limits (SDLs), on the quantities of surface water and groundwater that can be taken from the Basin water resources.

In fulfilling its obligations to assess the social and economic impacts of the Basin Plan under the Water Act 2007, the MDBA will have regard for the social, cultural, Indigenous and other public benefit issues. In January 2010 the MDBA engaged CSIRO to undertake a scoping study of the impacts of changes in water availability on Indigenous communities of the MDB. The MDBA requested a review and synthesis of the current knowledge of Indigenous cultural, social, economic and environmental values of water to complement other social and economic contextual report and assessments designed to optimise the outcomes of the Basin Plan.

The report presents the following information for consideration by the MDBA:

- background information to the scoping study, including the approach used;
- a review of literature;
- case study rationale, description and analysis;
- a draft descriptive characterisation of the potential impacts, areas, industries and Indigenous groups based on the case studies and the literature;
- preliminary advice and recommendations to enhance and mitigate impacts arising from the Basin Plan, including issues requiring further research.

Consistency in Indigenous aspirations emerges from the literature review: Indigenous people stress the critical importance of the Basin’s river systems to social, cultural and economic life and the need for balance in meeting the needs of other stakeholders. The desire for restoration of environmental systems and the relationships Indigenous people have maintained with their countries is a key motivation behind Indigenous participation; indeed it is compelling obligation within Indigenous value systems and law.

Indigenous people have diverse and interrelated interests in water and are responding in varied ways to address water management issues within their
customary estates. Reduced inflows and over-allocation of water have stressed the Basin’s environment and intensified the competition for water. The Basin’s water resources are now so tightly constrained that Indigenous people find it extremely difficult to compete with those accessing water for either consumptive or non-consumptive uses. Indigenous water requirements have not been ascertained in any systematic or comprehensive manner at a catchment scale in any of the cases drawn here from the Murrumbidgee, Barwon-Darling or Murray River regions.

Across all three case studies Indigenous groups have met significant barriers to accessing water and satisfying their water management objectives. These barriers are of a legal, administrative, economic, institutional and epistemological nature. To overcome these barriers Indigenous groups are engaging with a multitude of government agencies and funding programs, and are also investing their own resources.

The case studies described in this report show that in some situations Indigenous groups are using water as an economic asset to meet social, environmental and cultural objectives. An exclusive focus on ‘cultural values’, if construed as non-commercial and non-consumptive, might preclude consideration of the economic impacts on Indigenous communities from changes to sustainable diversion limits (SDLs) and the consequent indirect effects on holistic land management aspirations. Although economic dependence on water-based agriculture appears from the socio-economic literature to be relatively low, the disadvantaged status of Indigenous populations generally suggests that they are particularly vulnerable to negative impacts on Indigenous businesses or employment rates.

Social impact assessment of changes in water availability, including SDLs, is seriously constrained by the lack of knowledge and technical capacity as well as the diversity of Indigenous interests in water across this vast region. It is not possible to measure the impacts of SDLs because of the severe lack of quantitative data on Indigenous water uses and values. In the absence of sufficient information on Indigenous water use and sensitivity to changes in SDLs a precautionary approach should be adopted. To mitigate the final impacts of the Basin Plan on Indigenous enterprises and communities, further research and monitoring is required during the life of the Plan. Baseline socio-economic and demographic data should be collected and a monitoring program designed to track the effects of changes in SDLs on Indigenous access to water and economic participation.

The Scoping Study finds that the Basin Plan and the Government’s response to implementation and mitigation present a significant opportunity to address the long standing neglect of Indigenous interests in water planning and to markedly improve the extent to which Indigenous people benefit from water reforms, particularly from environmental water management. Because the final impacts are contingent on Government policies and Plan implementation, there is substantial scope to exacerbate some impacts as well as the potential to forego opportunities to maximise benefits. Again, lack of information has created uncertainty in this area.

Quantification of Indigenous water use and the specification of Indigenous water requirements lags behind other uses in the scientific development of socio-economic assessment methods for estimating relative benefits of water use and resolving
tensions between competing allocations, and environmental flow methods continue to manifest an exclusive focus on ecological objectives.

General improvements to the environmental condition of the Basin will be viewed positively by many Indigenous people. The benefits accruing to Indigenous people, however, could be greatly enhanced if reforms are made to Basin State water planning processes and environmental water governance. Changes will need to be made to environmental water management, particularly flow assessment methods, so that they are more inclusive of Indigenous values, use and priorities. Secondly, state management of environmental water, no matter how adequate it is at meeting ecological water requirements, does not currently recognise Indigenous resource governance systems, nor allow for co-management with Indigenous people. Indigenous people have expressed a strong desire to exercise authority, responsibility and control in the determination of allocations to meet their water requirements, through for example a separate ‘cultural flow’ and a strong say in the setting of environmental flows. According to reports in the literature, environmental flow improvements alone would not address the full range of Indigenous water requirements and the further exclusion of Indigenous people from water sharing decisions could potentially weaken the religious basis of culture and affect social cohesion. There is still further work to be directed towards the development of water governance systems that can integrate Indigenous water management aspirations and institutions.

Investing in Indigenous capacity to contribute knowledge and manage environmental water offers one means of enhancing the potential benefits from greater access to water under the Basin Plan. This capacity could also spill-over into other areas of land and water management (national park, Indigenous protected area management) and bring broader social and economic benefits.

The study finds that there is considerable potential for structural change to open up new opportunities for Indigenous people in emerging cultural and natural resource based industries, such as payment for environmental services, stewardship arrangements, small scale bush foods businesses, and tourism.
2. BACKGROUND

2.1 Introduction

The MDB covers in excess of 1 million square kms and is one seventh of the Australian mainland (Murray Darling Basin Authority 2009). It encompasses parts of the States of New South Wales, Queensland, South Australia and Victoria, and includes the Australian Capital Territory (Figure 1 below). Approximately two million people live within the MDB region. This region provides over a third of Australia’s food supply from a large and varied agriculture sector. Many environmental features of ecological and cultural significance to both Indigenous and non-Indigenous Australians are located within the Basin. The international significance of a number of the Basin’s wetlands is recognised under the Convention on Wetlands of International Importance (the Ramsar Convention).

Widespread environmental degradation, as a result of past water-allocation decisions, prolonged drought, natural climate variability and emerging climate change, has necessitated significant changes to the management of the Basin’s water resources.

A key element of the recent reforms to water management in the Murray Darling Basin is the requirement for the Murray Darling Basin Authority (the MDBA) to prepare a Basin Plan for adoption by the Commonwealth Minister for Climate Change and Water (Murray Darling Basin Authority 2009). The Plan is expected to provide for integrated and sustainable management of water resources in the Basin. The first Basin Plan will be drafted during 2010 and finalised in 2011.

The Basin Plan will remove water from the consumptive pool to meet the watering requirements of Key Environmental Assets, defined by the Water Act to include water-dependent ecosystems and sites with ecological significance. In so doing, it will set SDLs for the consumptive pool. These SDLs will be defined as the ‘level at which water in the Basin can be taken from a water resource without compromising the key environmental assets, key ecosystem functions, the productive base or key environmental outcomes of the water resource’ (Murray Darling Basin Authority 2009). Social and economic information on potential impacts will contribute to the determination of SDLs. The Basin Plan will also identify risks to the condition or continued availability of Basin water resources and provide strategies for managing those risks.
A stakeholder engagement strategy has been developed to guide the public’s input to the Basin Plan. Socio-economic studies will assist the MDBA to determine the level of impact of changes in diversion limits and these findings are to be included in products associated with the development of the Basin Plan, including the assessment of implications to be provided to the Ministerial Council and the assessment of impacts of the Basin Plan after five years (Murray Darling Basin Authority 2009).

A draft of the Plan will be open for public comment before it is finalised.

### 2.2 Project need

Indigenous people have significant interests in the water resources of the MDB. Indigenous interests are recognised by the legislative requirement for Indigenous representation on the Basin Community Committee and the establishment of an Indigenous Water Sub-committee to that Committee, sitting alongside an Irrigation Sub-committee and an Environmental Water Sub-committee (s. 202 Water Act 2007).

According to the *Water Act 2007*, the Basin Plan must contain a description of the Basin water resources and the context in which those resources are used. This description will include the uses to which the Basin water resources are put by Indigenous people. The Plan is required to describe the social and economic circumstances of Basin communities dependent on its water resources.
In fulfilling its obligations to assess the social and economic impacts of the Basin Plan under the *Water Act 2007*, the MDBA will have regard for the social, cultural, Indigenous and other public benefit issues. Consideration of Indigenous interests is one of many objectives of the Plan alongside requirements that the Plan implement international agreements, conserve Ramsar sites and meet the ecological requirements of ecological assets. One of the most influential international agreements is the Biodiversity Convention and this agreement obliges signatories to involve Indigenous people in biodiversity conservation and recognise their distinct values and knowledge systems. Australia’s Biodiversity Strategies have sought to give effect to these international obligations. There are also international human and Indigenous rights instruments to which Australia is a signatory, including the United Nations Declaration on the Rights of Indigenous Peoples (see section 4.3 below on Indigenous water rights.

The Basin Plan may have significant impacts on regional communities. Communities may be affected by the reduction in consumptive water, particularly those reliant on irrigation activity, and by the increase in environmental water allocations. Communities, including Indigenous groups, may also be affected by the way in which the Plan is developed, the consultative approach taken and the degree to which governments respond to their concerns, potential impacts during Plan implementation and on-going evaluation.

### 2.3 Indigenous people and water reform in the Murray Darling Basin

The Murray-Darling Basin is occupied by numerous Indigenous groups, such as the Barkindji, Nari Nari, Muthi Muthi, Kamilaroi and Yorta Yorta. It is the catchment for the Murray and Darling rivers and covers an area of 1,061,469 square kilometres (14% of Australia’s total area). According to Ward (2010), the Murray-Darling Basin has a population of just over two million people, of which approximately 70,000 are Indigenous, representing 15% of the national Indigenous population.

Ward (2010) estimates that Indigenous people have ownership or rights to less than 0.2% of the area of the Basin. He describes the water use issues:

> The history of European settlement of the Murray-Darling Basin and the emphasis on water use for increasingly intensive agricultural production has resulted in the chronic over-allocation of water, and the river system has become very seriously degraded. Consequently, the ability of Indigenous people to enjoy and exercise their strong relationship with land and water has been severely compromised. The reality for Indigenous people is that the Basin is now a place where virtually all the water is allocated for consumptive purposes (e.g., water extracted for irrigation of crops, drinking water for farm animals and domestic use for people living along the River Murray and in adjacent towns and cities) and the land is owned or controlled by others (Ward 2010: 105).
Since 2002 the Murray Darling Basin Commission (MDBC), and its successor the Murray Darling Basin Authority, have been formally engaging with Indigenous communities to elicit and understand Indigenous responses to environmental flows policy, water access rights and trading of entitlements (Anon 2003). The Commission has acknowledged the ‘spiritual and cultural connections’ maintained by Indigenous groups in the Basin and stated that Indigenous groups should be actively involved in all levels of NRM and work towards protection of cultural heritage and beneficial social and economic outcomes (MLDRIN & MDBC Memorandum of Understanding, 2006).

The Indigenous Action Plan and a Memorandum of Understanding was signed by the MDBC and a confederation of Indigenous nations called the Murray Lower Darling Rivers Indigenous Nations (MLDRIN). More recently greater attention has been given to the needs of Indigenous groups in the Basin’s north and a representative group, the Northern Murray Basin Aboriginal Nations, has been formed. These developments have been studied by Weir (2009), Ward (2010) and Morgan, Strelein et al. (2003), who describe the range of issues, concerns, values and aspirations of Indigenous people, the legal framework within which claims are made to water and aquatic resources, and mechanisms to protect and recognise these rights. The latter study include agreements between Indigenous Nations and the MDBC (or state governments and local government), Cultural Heritage Management Plans providing employment for Indigenous people, co-management arrangements with conservation agencies, and provision of access to traditional owners to sites of significance and for hunting and fishing. All are conducted outside native title processes (Morgan, Strelein et al. 2003).

The case studies in this report focus on the Indigenous water management efforts of three Aboriginal groups in the Basin: the Nari Nari at Hay on the Murrumbidgee River, the Ngemba at Brewarrina on the Barwon-Darling River and the Yorta Yorta at the Barmah-Millewa forest on the Murray River which forms the border between New South Wales and Victoria (see Figure 2 below). These three cases reveal the significant barriers to Indigenous access to water and participation in water use decisions and the complexity of water management institutions that a number of groups are interacting with in their efforts to restore the health of their customary estates.

Indigenous systems of resource management co-exist alongside the relatively recently introduced and rapidly transforming institutional systems of states. These latter systems encompass a mix of regulatory and market-based allocation mechanisms, incorporate scientific methods of resource assessment and management, and increasingly involve efforts to achieve transparency in water planning procedures, including opportunities for public participation in water management decisions. Indigenous groups in the case study sites are accessing environmental programs designed to address their cultural prerogatives, such as Indigenous Protected Areas, the River Restoration Program, and in NSW, specific purpose licences under the *Water Management Act 2000*. 
A number of commentators have observed that until recently Indigenous rights and interests in water management and reforms to water institutions were not addressed (Jackson and Altman 2009; Jackson, Tan and Altman 2009; Behrendt and Thompson 2004; MacFarlane 2004). The National Water Initiative (NWI) of 2004 for the first time explicitly recognised Indigenous rights and interests in national water policy. The NWI acknowledges the special character of Indigenous interests in water. Parties to the NWI have agreed that water access entitlements and planning frameworks should recognise Indigenous needs ‘in relation to access and management’ (paragraph 25(ix)). Indigenous access is to be achieved through planning processes that:

- include Indigenous representation in water planning, wherever possible;
- incorporate Indigenous social, spiritual and customary objectives and strategies for achieving these objectives, wherever they can be developed;
- take account of the possible existence of native title rights to water in the catchment or aquifer area;
- potentially allocate water to native title holders; and
- account for any water allocated to native title holders for ‘traditional cultural purposes’ (paragraphs 52–54).
A recent review of Indigenous access to water and participation in water planning found that progress in implementing the Indigenous specific provisions of the NWI was very slow (Jackson 2009). Rarely, for example, do water plans determine Indigenous water use requirements. This finding is confirmed by the National Water Commission’s *Second Biennial assessment of progress in implementation of the National Water Initiative* (September 2009), which indicates that there has been little improvement in the inclusion of Indigenous values and needs in Australian water planning. This threshold requirement remains a challenge for the Basin Plan, and for Basin State water resource planning at the catchment scale. Jackson and Altman (2009) have described the risks from this neglect:

*In the absence of information and knowledge about the implications of national water reforms for Indigenous people, there is a considerable risk that Indigenous interests will be poorly considered, if not totally neglected, in future development debates and proposals. This has the potential to give rise to stakeholder conflicts, further socioeconomic marginalisation of Indigenous people, and inefficiencies in water use. For example, for future water resource markets to function efficiently Indigenous property rights in water, even if of a customary (non-market) nature, will need to be recognised or else there is likely to be conflict over water use (2009: 33).*

### 2.4 Project scope and approach

Given time constraints, it was agreed that CSIRO would undertake a staged review and scoping exercise to inform the development of the Basin Plan. A scoping study typically involves a strategic level review of various factors and information sources (stakeholders, relevant literature, databases and methodologies) relating to studying the possible social impacts of a change (e.g. 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 potential impacts, areas, industries and stakeholders for further consideration, (e.g. full assessment in a Social Impact Assessment); and
- refine the methodologies / processes for this comprehensive impact assessment and for proposing any recommendations for managing the effects of the proposed change (Hassall and Associates and Ross and Associates 2003).

The scoping phase in a Social Impact Assessment (SIA) involves a number of preliminary tasks:

- information gathering and analysis;
- proposed action consideration: impacts and alternatives;
- ensure affected communities participation; and
• develop terms of reference for assessment process (Goldman and Baum 2000).

An important task of a scoping study is to identify the most significant potential impacts of a proposed change, generally those which will make greatest difference to a decision or require mitigation, to ensure that effort is directed to these issues.

It cannot be stressed too strongly that this review is preliminary, designed to assist in scoping issues and quickly explore opportunities for addressing Indigenous interests in the Basin Plan.

Socio-economic analyses (including modelling studies) have been commissioned separately to inform the MDBA. Arrangements were made for access to this information as available.

2.5 Project deliverables

The contract anticipated the following project deliverables:

1. A report that provides:
   • a literature review and synthesis of the current knowledge of Indigenous interests in and cultural values of water in the Murray Darling Basin;
   • identification of Indigenous stakeholders and communities and their cultural values, rights, responsibilities and interests in the waters of the Basin;
   • draft assessment of the likely impacts (positive and negative) of potential reductions in SDLs on those cultural values and interests; and
   • three brief and indicative case studies illustrating the potential impacts of reductions in SDLs on selected regions and communities.

2. A workshop with Indigenous representatives from across the Basin to consider and contribute to the proposed report and its assessments and case studies.


The following scope for the literature review and preliminary impact assessment was provided by MDBA staff during February 2010:

• focus on the literature relevant to Indigenous interests in the Murray Darling Basin (and include comparison with national and international experience where directly relevant);
• identify Indigenous needs and interests in water and any particular qualities that require specific attention in natural resource management (NRM) decisions - in particular an outline of the concept of ‘cultural flows’ in a water planning context (especially for the setting of SDLs);

• characterise Indigenous communities’ interests in water including, where relevant, identification and comparison of differing Indigenous interests across the Basin;

• describe and comment on current methods for describing the way Indigenous people ‘use’ water in terms of
  o quantitative and/or qualitative description
  o description of the socio-economic circumstances of Indigenous communities
  o capturing differences across the Basin

• an initial description of likely impacts from a reduction in SDLs on Indigenous communities and prioritisation of those impacts, including
  o threats and opportunities
  o participation in traditional agricultural industries (cotton, grain, horticulture)
  o new dryland opportunities
  o social support services
  o mobility/internal migration trends; and

• review methods of integrating Indigenous use/requirements into a water planning context in a manner that equitably reflects Indigenous interests (noting that consideration of Indigenous water values is a requirement for accreditation of Water Resource Plans under the Basin Plan).

• the review should also include some outline of the difficulties (if any) for Indigenous people of the proposed approach to setting SDLs

• provide comment on government actions to mitigate or enhance (if the impacts are positive) those impacts.

MDBA staff and Indigenous representative input was sought at various stages throughout the project to refine our approach and validate recommendations or advice. A draft literature review was provided to the MDBA in late February 2010 and the final review is found in Section 4. The draft was circulated to a number of Indigenous communities and comments are summarised in Section 3.

This scoping study report will be made available to Indigenous communities prior to the release of the draft Basin Plan.
It must be stressed at the outset that whilst the work outlined above will achieve the anticipated outcome of an improved understanding of Indigenous interests in the water resources of the MDB, the time-frame and resources did not allow a comprehensive assessment across the entire Basin, nor a full examination of the different approaches to understanding the effects of changes to water availability on Indigenous peoples. Additional time and funding would be required to enable deeper case study analyses serving as both examples of possible methodological approaches to the assessment of Indigenous water use and requirements (with critical evaluation). It is also recognised that these case studies may, or may not, be representative of the many different Indigenous groups within the Basin. Significantly, more intensive empirical research should integrate with other economic, social and hydrological modelling studies, providing a more rigorous assessment of impacts across numerous social, cultural and economic dimensions.

2.6 Project constraints

The study relied on four sources of information:

1. literature including published articles, plans and unpublished reports;

2. interviews with Indigenous people and natural resource managers (including water) in three case study locations;

3. consultations with the major Indigenous organisations interacting with the MDBA

4. a description of land tenure and water licences held by Indigenous people undertaken by Dr Bill Arthur (in prep).

The synthesis of literature contained in Section 4 reviews the knowledge base available in the social science, legal and policy literature. It provides a starting point from which to characterise potential social, cultural and economic impacts found in Section 6. Patterns in the data assisted in identifying variables of interest, such as employment or dependency on water resources. The review contributed to early thinking about possible impacts, and informed the selection of locations for case study sites for further exploratory analysis (see Section 5).

Branch and Ross (2000) describe Social Impact Assessment (SIA) as a process that combines research, analytic, and usually participatory methods to identify, describe, and interpret changes in the social environment that result from any of a wide variety of changes – industrial projects, government policies, or planning activities. SIAs are clearly related to wider processes of social change, and are an important part of the planning and, in this case, the NRM framework (Goldman and Baum 2000) which has been changing significantly in response to water scarcity and environmental degradation.

Notwithstanding time constraints, this preliminary evaluation of the ways in which regional Indigenous communities may be affected by, and respond to, the
introduction of SDLs relies on well-established procedures for impact assessment. The project is further constrained in the following ways:

- The ‘change’ under consideration is the reduction in water availability brought about by the introduction of SDLs. SDLs are being designed to increase allocations to the environment of the Murray Darling River system. The extent of the change and the likely spatial distribution of impacts are not known to the authors.

- The implication of various Basin Plan implementation options is also not yet well understood at the time of writing.

- Conventional SIA follows a set of procedural tasks from the identification of specific assessment objectives, an assessment phase, design of mitigation options and completion of monitoring and auditing tasks (Fenton, Coakes et al. 2006). Assessment includes two substages of scoping and profiling, which can be undertaken in any order (Hassall and Associates and Ross and Associates et al. 2003). This project has relied largely on socio-economic profiling conducted in the complementary SIA projects commissioned by the MDBA and previous studies by the MDBC. Gaps in the ‘baseline’ generated by these parallel projects pertaining to Indigenous people and their circumstances may seriously limit the accurate assessment of impacts.

- Comprehensive SIA would allow decision-makers to delineate the impacts of changes in the SDLs from other confounding influences on communities and businesses, both in the SIA and in subsequent monitoring (Hassall and Associates and Ross 2003). According to a SIA report on increases to environmental flows in the MDB (ibid), this would require an understanding of the dynamic context for consideration of changes to SDLs and options for implementation, an ability to judge the relative significance of the likely impacts vis-a-vis other effects, insight into the vulnerability of the community to change and their adaptive capacity, and allow future monitoring to distinguish impacts of water recovery options from the cumulative effects of the many other changes (Hassall and Associates and Ross 2003: v).

- There are other sources of knowledge about the topics of interest to the MDBA that have not been framed by the methods, approaches and disciplinary perspectives employed by largely non-Indigenous researchers. Indigenous traditions, beliefs, hydrological knowledge and rules governing water use and management are little known to water policy makers and managers, and this project is unable to devote sufficient time to include this knowledge during the short period provided for scoping. It has been difficult to find Indigenous commentary of explicit relevance to the task, although organisations such as MLDRIN have contributed their perspectives to many NRM processes and water management discussions.

- A further constraint arose from the tight project timelines. At the commencement of the project the SDLs had not been finalised although, through a series of iterations, the MDB Board will take account of impacts of various SDLs and their social, economic and cultural costs and benefits. Nor
had the final list of environmental assets been released. As a result of this somewhat circular process, a definitive assessment of the impacts of changes to water availability in the absence of a clear understanding of the SDLs was not possible.

Fundamental to the Plan will be an understanding of Indigenous and non-Indigenous population numbers in the Basin, their characteristics, distribution and trajectory of change, as well as a measure of their relative socioeconomic status. Assessments of need, social vulnerability, and adaptive capacity to changes in environmental policy and water availability require demographic and socio-economic information. The literature relevant to measuring social and economic impacts in the MDB identifies the need for indicators to assist in developing an understanding of community structure and process, e.g. (Herreria, Byron et al. 2008).

Indicators such as social vitality, economic viability and political efficacy are considered by Lane, Ross et al. (1997) to be particularly useful in cross-cultural contexts to develop an understanding as to whether a community is likely to be prone or resilient to adverse impact, and whether it may be receptive to positive impacts associated with a development (Herreria, Byron et al. 2008). For instance, poor integration of an Indigenous group with mainstream society presents an opportunity to withstand the forces of acculturation, however, it also represents an impediment to individual and group adjustments and adaptation to structural changes in the regional economy (Lane et al. 1997). At this stage of the review the project team has not tried to measure these or other variables relating to vulnerability or resilience.

Given more time and socio-economic data, a more comprehensive vulnerability and adaptive capacity assessment could have been undertaken, as done by the Marsden Jacobs and Associates socio-economic study (2010). Vulnerability and adaptive capacity frameworks are increasingly employed to evaluate community adaptive capacity to climate change and changes in the agricultural sector (Marsden Jacob and Associates 2010). The core premise of these frameworks is that the vulnerability of a community to a change event can be understood in terms of the level of exposure, the sensitivity of the community to the change event, and the community’s adaptive capacity. Lack of information on sensitivity to change (e.g. the extent of Indigenous community reliance on irrigation water) was a particular constraint, although an attempt was made by the MDBA to improve the understanding of Indigenous land and water entitlements through a parallel study (Arthur in prep).

### 2.7 The study area

The Murray–Darling Basin is the catchment for the Murray and Darling rivers and their many tributaries. Extending from north of Roma in Queensland to Goolwa in South Australia, it includes three-quarters of New South Wales and half of Victoria.

In total there are 23 river basins in the Basin, covering over 1 million square kilometres, or 14% of Australia. The Darling (2740 km), the Murray (2530 km) and the Murrumbidgee (1690 km) are Australia’s three longest rivers. The Basin also contains important groundwater systems that interact with surface water.
The study’s focus is on the Indigenous residents of the Murray Darling Basin. There are of course Indigenous people in the Adelaide region that rely on water for domestic uses and there may be still others who are economically and socially interested in the irrigated areas and/or the tourism and recreation activities associated with the Basin’s river systems. However, for the purposes of this scoping project it was necessary to focus on those Indigenous people most directly affected by water use and management decisions.

2.8 Acknowledgements

First, CSIRO wishes to acknowledge the support of the MDBA, in particular, Kirsten Henderson, Jim Davidson and Nadeem Samnakay of the Socio-Economic Unit, and Neil Ward, Roger Davis, Liz McNiven and Charmain McDonald of the Indigenous Liaison Unit.

MLDRIN and the Northern Murray Darling Basin Aboriginal Nations (NBAN) provided key input in the project’s early stages and assisted with case study development. We are particularly grateful for the assistance provided by Steven Ross and Cheryl Buchanan and the groups’ respective Chairpersons – Matthew Rigney (MLDRIN) and Fred Hooper (NBAN).

Notwithstanding some concerns about the tight timeframe for this project, Indigenous groups across the case study regions were very helpful in participating in the research and generous with their time: Nari Nari Tribal Council, Yorta Yorta Nation Aboriginal Corporation and the Ngemba Landcare Group at Brewarrina. Individuals from those groups who deserve special mention and thanks include Mr Ian Woods (Chairperson, Nari Nari Tribal Council), Ms Irene Schneider (Hay Local Aboriginal Land Council), Mr Feli McHughes (Ngemba Elder), Mr Jason Ford (Ngemba Community Leader), Councillor Jenny Barker (Brewarrina - Northern Star), Neville Atkinson, Henry Atkinson, Rochell Patten (Yorta Yorta Nation Aboriginal Corporation), and Lee Joachim (The Living Murray Indigenous Coordinator).

A number of staff from water resource agencies, Aboriginal corporations, including Land Councils, and regional catchment management authorities (CMAs) assisted by contributing their perspectives on Indigenous water management, particularly issues relating to environmental water management and management of protected areas. These people include Mr Peter Terrill (NSW Department of Environment, Climate Change and Water, DECCW), James Maguire (DECCW), Gary Currey (DECCW), Phil Duncan (NSW Aboriginal Land Council), Geoff Simpson (Murrumbidgee CMA), Erlina Compton (Western CMA), Blackie Gordon (Western CMA), Linda Broekman (NSW Forestry and Icon Site Manager), Tracy Brownbill (Murray CMA), Wayne Tennant (Goulburn - Broken CMA), Kevin Ritchie (Victorian Department of Sustainability and Environment), Tony English and Kane Weeks (Parks Victoria) and Kate Auty (Commissioner for Environmental Sustainability Victoria). Kath Bowmer of Charles Sturt University also provided insights into Murrumbidgee water issues and Jessica Weir of the Australian Institute of Aboriginal and Torres Strait Islanders Studies assisted with information relevant to the Yorta Yorta case, for which we are thankful.
Bill Arthur (Australian National University), Richard Cresswell (CSIRO), Pippa Featherston (CSIRO) and Kirsten Maclean (CSIRO) were also of assistance in commenting on aspects of the report.

2.9 Outline of this report

The following section provides an outline of the consultation steps taken during the course of this study, including feedback from Indigenous communities on the development of the Basin Plan. Section 4 contains the review of literature, followed by the case study descriptions and analysis in Section 5. Section 6 contains the preliminary characterisation of potential impacts and Section 7 offers advice on mitigation strategies and further research. References and Appendices follow this last section.
3. STAKEHOLDER ANALYSIS AND INDIGENOUS PARTICIPATION

CSIRO sought to engage with Indigenous stakeholders and communities to gain their input and responses to the potential impacts of the Basin Plan on Indigenous rights, responsibilities and interests in water of the Basin.

Time constraints limited the extent to which Indigenous participation could be built into the project design, although the project team drew on Indigenous input and expertise at key points prior to and during commencement of the project, including at a meeting of Indigenous representatives in Canberra in February 2010, and during case studies consultations. A member of the project team attended a series of meetings to determine the level of interest and to scope whether Indigenous people would be willing to be engaged in such a project. This occurred through meetings with a representative from NSW Aboriginal Land Council on 3 February 2010 in Parramatta and in Albury with the MLDRIN Working Group on 5 February 2010. The feedback received was both critical and positive: representative organisations expressed strong dissatisfaction with lack of time available to conduct a comprehensive study that would advance the specification of Indigenous water requirements for inclusion in the Basin Plan. These organisations also expressed the view that engaging with the Authority presented an opportunity to influence the Basin Plan. However, a number of people argued that there was insufficient time to do the project justice as the following comments attest:

| We are not very happy with the project having to conform to an unrealistic timeframe (Field Notes, 5 February 2010). |
| We run the risk if we don't engage, we miss out again (Field Notes, 5 February 2010). |

Given the shortage of time and preferred Indigenous modes of representation it was determined that the most effective and efficient way to consult with Indigenous groups was through case study settings where the assessment can be more easily targeted around specific concerns and issues at a local level. Indigenous input to case study determination is discussed in Section 5 to follow. Two visits were undertaken for the Yorta Yorta case study (undertaken by Cathy Robinson) and one visit each for the Nari Nari (by Sue Jackson and Brad Moggridge) and the Ngemba cases (by Brad Moggridge).

A draft of the literature review contained below was tabled at one consultation meeting in February and then circulated to key Indigenous groups in early March for comment\(^1\). A short pamphlet describing project aims and methods was produced and circulated to case study community organisations, government agencies and

\(^1\) It was sent to MLDRIN, Northern Murray Darling Basin Aboriginal Nations (NBAN), four CMA’s, DECCW, and Queensland’s Murray Darling Committee which has an Aboriginal Unit.
people interviewed (see Appendix 1). The project conformed to the ethics clearance granted by CSIRO’s Human Research Ethics Guidelines.

The project team relied heavily on the existing knowledge of Indigenous interests held by the staff of the MDBA’s Indigenous Engagement section. An Indigenous interests database that identifies key Indigenous groups and organisations across MDB who have an interest in water was provided to the project team. The relevant bodies identified included the Murray Lower Darling Rivers Indigenous Nations (MLDRIN), and the newly formed Northern Murray-Darling Basin Aboriginal Nations (NBAN).

During the course of the study the MDBA ran an engagement process to inform the community of the Basin planning process and gather feedback about potential impacts from changes to SDLs. A program of consultations with Indigenous communities was undertaken by the Authority’s Indigenous Liaison Unit. Efforts were made by MDBA and CSIRO staff to ensure that this scoping project did not generate confusion or duplicate consultations, and in a number of cases, CSIRO staff attended consultations to inform the groups present about this study e.g. at Albury (NSW), Canberra (ACT), Roma (Qld) and Moree (NSW). The entire CSIRO project team attended the meeting of MLDRIN and NBAN in Canberra on 17 February, at which the following comments were made:

State Land Council owns significant properties that have water licences. All Aboriginal interests should be addressed. The SDLs could have an alarming impact on Indigenous employment. Aboriginal organisations are leasing their water to other parties.

Aboriginal entitlement holders should be secure in their access to water. There shouldn’t be any change to their licences until more is known about their interests.

The Basin Plan’s regional descriptions need to include Aboriginal land holdings and water licences.

Your study doesn’t give enough attention to culture. Our relationship with water is the most significant thing. There is not a group that has more of a stake than Aboriginal people. We’re not going, we’re staying – we have a vested interest.

Cultural flows are nowhere to be seen in that planning.

We need to get the science around cultural flows. We need a science strategy for meeting Indigenous cultural requirements. You can look to the Native Fish Strategy for cultural demonstration projects.

The method for doing the research has to be negotiated, not just the science of assessment and hydrology but negotiated with Nations.

We need a mechanism like the NSW Aboriginal Water Trust to fund infrastructure and research, we need it at the Federal level.

Suicide rates are directly linked to water problems. People can’t go fishing - it affects our spirituality (Notes, 17 February 2010).
Brad Moggridge of CSIRO presented the findings of the literature review to the Roma meeting of NBAN on 21-22 April 2010. Reports from these and other community meetings were made available to CSIRO. At that meeting the following comments were made by Indigenous representatives:

A number of members suggested adding in a historical account of Aboriginal water use in the MDB for the case studies, this could come from anthropologists, surveyors, missionaries who engaged and observed Indigenous people of the Basin during invasion.

Concerns were raised of the timing of the project and limited sites for case studies.

There were questions around why only 3 case study sites were chosen and why they were all in NSW?

NBAN members were happy that an Aboriginal person was employed with CSIRO and engaged in the MDBA to look at their water use.

On 6 May 2010 Brad Moggridge travelled to Canberra to meet with and present to the full MLDRIN Working Party on the key findings of the literature review and to seek further comments on any gaps and the project more generally. The elected representatives of the identified 10 Nations within the Murray Lower Darling Basin attended the Canberra meeting. The following comments were made at that meeting:

Aboriginal people have had a long association with water and this needs to be reflected in the report. Adding to this there were issues raised about protecting Intellectual Property of Aboriginal people, and that a lot of stories and knowledge is going to the grave as Elders do not pass on the their information as they have lost trust in the system.

Delegates showed concern that the project was too short and too fast: Aboriginal people should not be required to advise on such an important project in such a short time.

Delegates suggested that having only one Aboriginal person working on Aboriginal water was not an ideal situation.

In its proposal CSIRO also undertook to consult with the Authority’s Basin Community Committee’s - Indigenous Water Sub-Committee (through members Matthew Rigney and Cheryl Buchanan) upon the completion of the Draft Report in June.

It is hoped that the content of this report and its recommendations will be of assistance to Indigenous groups and others as they respond to the draft Basin Plan during the period of public comment and revision.
3.1 Feedback on draft literature review

As mentioned above, a draft of the literature review was distributed during late February – early March to key Indigenous organisations. Three email responses were provided and are included below:

NSWALC is the largest Aboriginal Member organisation in Australia with upwards of 22,000 Members.

MDBA need to understand and recognise that the NSWALC and the LALC Networks are the largest land holder within the whole Basin, across the four (4) States, Aboriginal or non-Aboriginal, there is no other single land owner that owns the same volume of land than the NSWALC and the LALC networks.

The NSWALC and the LALC Networks were established under the 1983 Aboriginal Land Rights Act and own at least 16.23% of the State of NSW, that is deeds and title. The NSWALC and the LALC Network also own Water Licences with significant volumes of water allocated to each licence.

I also want to point out that within the Basin in NSW there are eighty eight (88) Local Aboriginal land Councils that represent upwards of 18,000 members.

Within the Basin the 88 LALC’s have over forty + former Missions and Reserves with significant populations that still live on these sites. These sites are not connected to town water and rely on the current water licences allocated to each site for clean fresh water for living standards and day to day usage.

Community Based Facilities & Organisations
These former missions and reserves have facilities on the sites that rely heavily on water, some of these are Child Care organisations, schools, health posts and market gardens just to name a few. Fishing is a core activity for each of these communities and with employment opportunities rare, fish are a vital food source as well as for health reasons.

Aboriginal people have a basic human right to maintain their current living standards and any decrease in water allocations will seriously impact on these basic human rights. Serious community health issues could result in any decrease of water access for these communities.

Aboriginal Employment in Local Communities
Some also have CDEP programs that employ large numbers of local people and their enterprises are usually reliant on water for the sustainability. The rural properties that are owned by both the NSWALC and the LALC networks are a vital opportunity for sustainable employment in the rural sector for Aboriginal people and these rural properties also allow for economic independence and ownership of viable businesses and again any decrease in water allocations will jeopardise the long term viability of these enterprises and the employment opportunities they afford local Aboriginal people.
Emergency Management

Case Study – if a house or a community based facility caught fire in one of the former missions or reserves, due to their location, usually 10-20kms away from vital emergency services, how would a community be able to stem the damage until the emergency services arrive if they don’t have any access to water or a decrease in water allocations? “Are we asking communities to make decisions between saving the facility and keeping water for day to day living standards? This would certainly be a human rights issue”.

In summary, we the NSWALC DO NOT support a reduction of the current water allocations to each of the eighty eight (88) LALC in the Basin, nor do we support any reduction of the current allocations to any of the former “missions and reserves”. It is the basic human rights to maintain the current standards and allocations.

Coordinated response from the 88 Local Aboriginal Land Councils within the Basin, supplied by NSW Aboriginal Land Council email (23 February 2010).

The major “Aboriginal areas” are all on the Murray or the Lower Murray and generally the whole document is written like a scientific paper being presented to a mob of PhD researchers. I think most Murris would find this really hard to understand. Otherwise it’s thorough and shows the lack of intent for us Murris in the Northern part of the Basin.

Putting values on Water is hard, maintaining water to provide an area a drink in theory should be quantifiably straight forward, it’s the extrapolation of the methodology of identification of the fishing stories and arranging categories layers of information of the area exact needs cultural connection both physically, scientifically and most importantly spiritually to obtain social, economical and religious enlightenment, this concept is vast and I don’t know if there is the will in Government financially to wear this burden, and is there the depth in the Aboriginal People in relation to information! The real sensitive intermit knowledge that has been eroded over two hundred years of occupation is still there.

Jason Wilson (Gomilaroi/Yoularoi Murri) by email (1 March 2010).

I have some concerns on how this scoping study will come together. The lit review is very worrying with red flags flying everywhere. My major concern is:

1. the commercial use of water being included in a cultural context.

2. are we to include economic development options in this where people have chosen to enter these agricultural industries or other water dependant commercial activities.

3. climatic change will effect water availability also.

2 Aboriginal people from northern NSW and Queensland.
This project is a very much, “policy on the run” approach. Not to have a role in this would not be wise either. At the moment Yorta Yorta Nation are developing a paper on Cultural Flow for Country and the enterprise where culture protection and cultural economy are one in the same which considers climate change also.

Yorta Yorta community representative, by email (11 March 2010).
4. LITERATURE REVIEW

This synthesis of literature reviews the knowledge base available in the social science, legal and policy literature. A search of grey literature included materials from:

- MDBA’s Indigenous Liaison Unit
- Universities
- CSIRO
- Relevant local, State (Basin States) and Commonwealth government agencies
- Relevant local, State and regional non-government agencies e.g. Indigenous Land Corporation (ILC) and Indigenous organisations
- Research centres (i.e. Commonwealth Environment Research Facilities (CERF), Australian Bureau of Statistics (ABS), Land and Water Australia and Bureau of Rural Sciences (BRS)
- Professional and research consultancies.

4.1 Indigenous demography and socio-economic status

Fundamental to the Plan will be an understanding of Indigenous and non-Indigenous population numbers in the Basin, their characteristics, distribution and trajectory of change, as well as a measure of their relative socioeconomic status. Assessments of need, social vulnerability, and adaptive capacity to changes in environmental policy and water availability require demographic and socio-economic information. The literature relevant to measuring social and economic impacts in the MDB identifies the need for indicators to assist in developing an understanding of community structure and process (Herreria, Byron et al. 2008).

Available demographic and socio-economic status data have important implications for Basin planning. The following features provide an insight into the several important ways in which the Indigenous population is vulnerable to impact from major changes in water availability:

- The Indigenous population forms a distinct component of the general population, with markedly different demographic and socio-economic characteristics.
- The highest proportions of Indigenous people live in the more remote areas of the Basin’s north and west, although these are smaller in number, and more Indigenous people (in number) live in larger urban centres.
• The largest share of the Basin’s total Indigenous population is resident within New South Wales (40%) followed by Victoria with 29 per cent. Almost 35% of the Basin’s Indigenous population lives in two NSW Sustainable Yield Regions: Macquarie-Castlereagh and Murrumbidgee.

• Of the 22 centres with more than 20% of the population Indigenous, 20 are in central and western NSW and most are in remote or very remote areas.

• 35 discrete Indigenous communities can be identified. They are most numerous in NSW and in the Murray lands of South Australia.

• The population has grown rapidly in recent years (faster than the non-Indigenous population by a factor of five from 2001-06) and represents an increasing share of the total.

• The prospects for the Indigenous share of the population to continue to rise over time appear high.

• The Indigenous population of the Basin has a much younger age profile than that of the non-Indigenous population. The profile reflects a population with relatively high fertility and potential for further expansion due to natural increase.

• There is evidence to support a regional urbanisation trend within the Basin, with a shift in population from rural areas to larger urban centres. The Indigenous population in very remote areas declined by 33.5% from 2001-2006 consistent with declines in the non-Indigenous population.

• A pattern of youthful outmigration of Indigenous population to towns and cities in response to employment opportunities can be observed, with a corresponding movement back again in later years in response to lower housing costs.

• Indigenous labour force and income status remain relatively poor. Indigenous unemployment rates were much higher than that experienced by non-Indigenous people.

• Agriculture is relatively less important in the employment by industry profile for the Indigenous population than for the non-Indigenous population. Only one area of agricultural employment (sheep farming) was listed in the Indigenous top 20 sectors (although meat processing might also be added).

• Indigenous workers were over-represented in government administration, education, health and community services, and personal and other services.

• The absence of Indigenous people from pastoral and agricultural jobs suggests that natural resource management programs also by-pass Indigenous interests.

• Occupational segregation is also high within the Basin with Indigenous people absent from professional and managerial positions.
- Many of the disadvantaged postcode areas within the Basin have very high Indigenous populations, and all are in NSW and Victoria.

- Twelve Statistical Local Areas fall into the bottom decile for Australia in terms of relative level of advantage and disadvantage. At least four of these are areas identified as having high Indigenous populations.

- A jobs needs scenario indicates that closing the gap in employment differences between Indigenous and non-Indigenous residents would require a total of up to 34,257 Indigenous people would need to be in work by 2016—more than double the number employed in 2001, including in CDEP.

- The data that is readily available is aggregated at the regional scale (e.g. in one source by Sustainable Yield Regions), and Basin scale. Smaller scale analysis (e.g Indigenous Nation) is not available. This makes differentiating the impacts likely to be felt by differing components of local population difficult, if not impossible.

- The literature notes that Nation-scale analysis of a full range of social and economic data will be of assistance in regional planning of resource use and management.

- Current data does not adequately identify and record the sorts of activities that constitute Indigenous customary practices in regard to natural resource management. These activities may be defined as legitimate forms of work by many Indigenous people.

The Basin’s socio-economic baseline has been described in the report by the ABS, ABARE and BRS (Anon 2009). ANU’s Centre for Aboriginal Economic Policy Research also undertook demographic analyses for the MDB Indigenous Action Plan of 2004 (Taylor and Biddle 2004). Indeed the latter study was undertaken in response to an articulated need for a Baseline Regional Profile. Its impetus arose from the findings of regional forums held by the Commission with Indigenous nations around the Basin to identify local priority issues. The focus of that profile is on population size, change, distribution and age structure, as well as on labour force and income status—these indicators being the most amenable using public access ABS data (ibid).

According to Taylor and Biddle (2004), the Indigenous population constitutes a sizeable and distinct component of the overall contemporary Basin population. Despite decline and dispersal of the Basin’s Indigenous population over many decades, Indigenous people represent an increasing share of the population with particularly high proportions in the north and west. As for Indigenous socio-economic status, they conclude that:

As with many other parts of the country, their labour force and income status remain relatively poor creating a challenge to COAG partners to ensure increased Indigenous participation in regional development planning and activity (2004: vi).
In 2006, there were approximately 70,000 Indigenous people living in the Basin, comprising 3.5% of the total Basin population, and approximately 15% of the national Indigenous population. Reflecting in part the much younger age profile, the region’s Indigenous population grew by 17% between 2001 and 2006, faster than the non-Indigenous population by a factor of five (Taylor and Biddle 2004). This change represents a 13% increase in the proportional share of the Basin’s total population from the figure of 3.0% recorded in 1996 (ibid). Taylor and Biddle (2004) conclude that the prospects for the Indigenous share of the population to continue to rise over time appears high.

A clear difference emerges in population distribution whereby Indigenous people are far less likely to reside in large regional centres such as Albury and Queanbeyan and instead tend to be more widely scattered in smaller localities across the Basin (Taylor and Biddle 2004).

*Exactly half of non-Indigenous residents of the Basin are resident in these towns and cities of over 10,000 persons compared to only 37 per cent of Indigenous residents. Accordingly, the overall Indigenous share of the region’s population rises to 4.2 per cent away from these centres compared to just 2.5 per cent within them* (2004: 5).

The largest share of the Basin’s total Indigenous population is resident within New South Wales (40%) followed by Victoria with 29 per cent. A more recent study (ABS/ABARE and BRS 2009) found that the largest concentrations of Indigenous people reside in the Macquarie-Castlereagh Sustainable Yield region (12,400) in central NSW, and another 11,500 lived in the Murrumbidgee Yield region. Almost 35% of the Basin’s Indigenous population lives in these two regions.

Particular areas of the Basin, and particular localities within it, are predominantly comprised of Indigenous people (Taylor and Biddle 2004). For example, two-thirds (64%) of the population of Wilcannia is Indigenous, and increasingly so—a phenomenon reported for other centres along the Darling River. In very remote and remote areas of the Basin there are relatively high proportions of Indigenous persons (14.5% and 21.5% respectively) (ABS/ABARE and BRS 2009). Cotter *et al* report that within cotton catchment communities a significant proportion of the population is Aboriginal and that this proportion is increasing, within a wider community trend towards depopulation of rural Australia (Cotter, Iain Davidson *et al*. 2006). The following table is extracted from their report:
Table 1 Aboriginal population statistics for cotton catchments, Source: Cotter et al. 2006

<table>
<thead>
<tr>
<th>Catchment Town</th>
<th>Aboriginal Population</th>
<th>% of Town Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dalby</td>
<td>506</td>
<td>5.4</td>
</tr>
<tr>
<td>St George</td>
<td>448</td>
<td>17.3</td>
</tr>
<tr>
<td>Dirranbandi</td>
<td>128</td>
<td>23.6</td>
</tr>
<tr>
<td>Moree(^1)</td>
<td>1977</td>
<td>22.3</td>
</tr>
<tr>
<td>Narrabri(^2)</td>
<td>544</td>
<td>8.8</td>
</tr>
<tr>
<td>Warren</td>
<td>375</td>
<td>12.2</td>
</tr>
</tbody>
</table>

\(^1\) Within Moree Plains Shire the town of Mungindi had 164 Aboriginal residents (25.2% of pop.), Boggabilla had 280 residents (43% of pop.) and the nearby community of Toomelah has 241 residents (70.7% of pop.) at the 2001 census.

\(^2\) The nearby town of Wee Waa had 255 residents (14.4% of pop.).

A number of large centres have relatively high proportion of Indigenous people, including: Moree, Bourke, Lightning Ridge, Condoblin and Wellington. Of the 22 centres with more than 20% of the population Indigenous, 20 are in central and western NSW and most are in remote or very remote areas (Taylor and Biddle 2004).

Taylor and Biddle (2004) also identified 35 discrete Indigenous communities\(^3\) within the Basin. Among those identified by the ABS in the 2001 Community Housing and Infrastructure Needs Survey (CHINS) are Balranald Reserve, Gerard, Willow Bend, Boona Road (Condobolin), Gunnedah Hill, Erambah, Namatjira, New Merinee (Daretton), Moonacullah, Cummerangunga, Boggabilla, Toomelah, Three Ways, Gulargambone, Maclean, Mehi Crescent, Stanley Village, Kalparrin, Camp Coorong, Raukkang (Point Mcleay), Grong Grong, Peak Hill Mission, Walhallow Reserve, Wamba Reserve, Brungle, Summervale, Minnon, Nanima Reserve, Warrali Mission, and Mallee. However, many other communities on Aboriginal freehold and leasehold land also exist such as Enngonia, Namoi, Gingie, Goodooga, Murrin Bridge, Boorowa, Robinvale, Cummerangunga, and Ngarrinyaerri (2004: 6). All of these communities represent Indigenous living areas formerly constituted as government and mission settlements, or reserves. They are most numerous in New South Wales and in the Murray lands of South Australia.

Within the Basin, the total rural population (in rural localities and rural living) declined by 1.7% between 2001 and 2006, while populations in large and medium sized urban centres (with more than 5,000 people) grew by 8%, as shown in the figure above. There have been substantial shifts in the remote regions’ populations with the Indigenous population in very remote areas declining by 33.5% from 2001 to 2006, consistent with the 31.7% decline in non-Indigenous populations for these areas. In all other areas of the Basin, Indigenous populations increased. This suggests that there is a regional urbanisation trend within the Basin, with a shift in population to larger urban centres, from rural areas. Taylor and Biddle (2004: 12) describe the pattern of internal Indigenous migration:

\(^3\) Discrete communities are defined in the Taylor and Biddle study as geographic locations that are bounded by physical or cadastral boundaries, and inhabited or intended to be inhabited predominantly by Indigenous people (more than 50%), with housing and infrastructure that is either owned or managed on a community basis (2004: 31).
The overall exchange of Indigenous population between the Basin and the rest of Australia was negative but only slightly, with some 6,100 Indigenous people moving in and around 6,500 moving out, leading to a net loss of 400 persons. The pattern of net gains and losses between different regions of the Basin is quite striking (Fig. 5). All the net gains in Indigenous population were confined to Victorian regions of the Basin, along the Murray Lands in South Australia and in south east New South Wales, while all the regions to the north of the Murray in New South Wales and Queensland experienced net migration loss... this pattern of net migration loss did not impair Indigenous population growth, except perhaps along the New South Wales side of the Murray valley.

A pattern of youthful outmigration of Indigenous population to towns and cities in response to employment opportunities, with a corresponding movement back again in later years in response to lower housing costs, can be observed in the Basin’s Indigenous demographic data (Taylor and Biddle 2004). Taylor and Biddle (2004: 13) compare these life cycles to those exhibited by the non-indigenous population and highlight the implications for natural resource management policy:

For the non-Indigenous population of the Basin the substantial movement of younger people out of the region is no doubt associated with education, training and job search, but what is interesting in terms of long-term population replacement is the general lack of reciprocal movement back into the Basin in later years leading to the prospect of progressive decline in the non-Indigenous population. This is significant in terms of the sustainability of natural resource management programs and the need to enhance Indigenous participation as it suggests that Indigenous people are the more likely to retain a long-term residence in the Basin, at least trend-wise.

Estimates and projections of the Indigenous population suffer a number of limitations outlined by Taylor and Biddle (2004). Notwithstanding the considerable uncertainty inherent in the task, they undertook two projections and calculated that:

Using the low series projections, the Indigenous population rises from 3.4 per cent in 2001 to 4.2 per cent of the total Basin population by 2016. Using the high series, the share increases to 5.8 per cent. Clearly, considerable uncertainty surrounds the projection of future Indigenous and non-Indigenous population levels in the Basin (2004: 19)

Relying on these projections Hunter and Taylor (2004) have highlighted the implications for social and economic policy directed towards generating employment opportunities in the Basin:

As for the future, if we take the low series population projection as a preliminary measure of future numbers, it can be conservatively estimated that the Indigenous population of working-age in the Murray–Darling Basin will increase by 44 per cent from 40,467 in 2001 to 58,260 in 2016. Because of this expansion, just to keep the employment to population ratio at its currently reported low level of 37.6 per cent would require an increase in the
numbers employed from 15,216 in 2001 to 21,381 by 2016—an extra 6,165 jobs. However, if the aim is to move beyond the status quo and actually close the gap between Indigenous and non-Indigenous employment status in the region then a total of up to 34,257 Indigenous people would need to be in work by 2016—more than double the number employed in 2001, including in CDEP. This job needs scenario is consistent with that estimated for Indigenous people generally in Australia.

The Socio-Economic Context Study argues that, given the levels of disadvantage experienced by Indigenous people in general, it is very likely that areas with more Indigenous people will show high levels of disadvantage relative to other areas of the Basin. Life expectancy rates for example reflect national patterns, with a marked difference in persons over the age of 55 between Indigenous and non-Indigenous Basin residents (8.7% compared to 26.7% respectively) (Anon 2009: 27).

One indicator, unemployment, reinforces this observation. Indigenous unemployment rates were much higher (20.1% in 2006) than that experienced by non-Indigenous people in the Basin (4.7% in 2006) (Anon 2009: 72). The Basin’s Indigenous unemployment rate was higher than the Indigenous population for the rest of Australia (14.7%). Taylor and Biddle (2004) emphasise another dimension to the region’s pattern of socio-economic disadvantage, economic dependency. They found a substantial difference in the proportions of the adult Indigenous population that lie outside of the labour force (50% of Indigenous adults compared to 37% of non-Indigenous adults). Taylor and Biddle’s (2004: 21) calculations suggest that in 2004 there were ‘almost 5,000 Indigenous people unemployed, and a staggering 20,274 outside of the labour force - a figure far greater than for those employed’.

Another measure of disadvantage, access to internet services, revealed disparity between Indigenous and non-Indigenous households across all geographic types (urban remote, regional etc) within the Basin.

Only 1.6 per cent of gross person income accruing to adult residents in the Basin in 2001 went to Indigenous people despite the fact that they represented 2.9 per cent of the adult population up to the age of 65 (Taylor and Biddle 2004). Only 1.2 per cent of the total regional employment income went to the same group. This is because approximately 38 per cent of total Indigenous income is attributable to ‘welfare’ sources such as the Community Development Employment Projects (CDEP), compared to only 19 per cent for non Indigenous income (Dyack and Greiner 2006). (p6). It is not known what effect changes to the CDEP scheme has since had on these and other socio-economic measures.

Leaving aside the social costs of sustained social disadvantage, Taylor and Biddle raise the economic cost of the Basin’s employment situation:

… in aggregate, Indigenous residents of the Basin are clearly losing out on substantial gross potential employment income, while government is clearly

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4 In 2004, Taylor and Biddle estimated the unemployment rate to be 12%. It is not clear whether the difference can be attributed to changes to the CDEP program or other factors, including different measurement methods.
outlaying citizen entitlements beyond expectation if the norm were to apply (2004: 22).

The ABS/ABARE and BRS Report (Anon 2008) covers a range of other measures of disadvantage which may be of use in future case study work.

A historical perspective is taken by a number of commentators in their analysis of the status of Indigenous people in NSW (Goodall 2004; Behrendt and Thompson 2004; Taylor and Biddle 2004). In making the case for greater consideration of the economic impacts of changes to water availability on Indigenous interests, Behrendt and Thompson observe that Indigenous labour underpinned the success of the pastoral industry and that with mechanisation and other economic changes, they were marginalised from new agricultural industries, such as cotton (see also Goodall 2004; Cotter et al). As a consequence:

Many rural Aboriginal people now live on Aboriginal community lands on the edge of various towns. Aboriginal people are marginalised from decision making structures and lack a fair share in the regional economic resource base, the land (2004: 54).

In 2004, Indigenous workers were over-represented in government administration, education and community services, and personal and other services. This partly reflected the nature of CDEP work, but it also underlined the importance of customised services to Indigenous communities (Taylor and Biddle 2004). Indigenous people are substantially underrepresented in the two major industries in the Basin: agriculture and retailing:

As a statistical measure of industry segregation, almost one-fifth (18%) of Indigenous workers would have to change their industry of employment in order to achieve a distribution equivalent to that of non-Indigenous workers (2004: 23).

In a scoping study conducted for the Cotton Catchment Communities CRC, Cotter et al (2006) sought qualitative information from approximately 40 Indigenous participants on engagement with the cotton industry. Aboriginal people were asked to identify strengths, weaknesses, opportunities and threats to/of their particular communities’ involvement with the cotton industry. The results relating to employment issues include:

Some Aboriginal people had secured permanent employment in the industry and while this was well-regarded and recognised as a significant personal achievement for the individuals employed, the number of murris with permanent jobs in the industry was considered to be too low. A lack of capital was also seen as a significant deterrent for the murri community to take up any ancillary enterprises such as share-framing or contract machinery operation, and this despite a committed belief that there were murris in the community with a thorough knowledge of all aspects of the cotton industry. Another more recent focus of discontent for murris in the southwest Queensland region was the growing trend to bring overseas backpackers and other workers from places such as Sudan to work on cotton properties,
diminishing still further the availability of limited seasonal work for local community members. Diminishing work options for Aboriginal people within the industry should not, however, be considered universal. At Dirranbandi, for example, collaboration between large-scale cotton growers, the local Aboriginal community and state government business development agencies is moving forward with the development of an Aboriginal firewood enterprise (Cotter et al 2006).

The study also identifies a range of environmental and health concerns held by those surveyed relating to cotton farming, particularly water and chemical use. It recommends that cotton industry research seeks novel approaches to Aboriginal employment on cotton farms through the integration of Aboriginal ecological knowledge, ecotourism and participatory partnerships, concluding that:

Aboriginal people are an underused human capital resource within the cotton catchment communities in which they live. With the increasing recognition of the lack of a skilled labour force to service the rural sector training, incentives and collaborative partnerships that can enable Aboriginal people - particularly the significant proportion of them that are young - to become active participants in the skilled labour market. This must be a viable long term strategy for the social and economic sustainability of these cotton communities. There is strong Aboriginal community concern about, and aspirations for, educational opportunities and employment outcomes identified in this study. These suggest that cotton industry programmes that support education, training and mentoring of Aboriginal students on pathways to employment both within the industry and allied services are the most readily identifiable "Win-win options…

Whether or not direct participation in the cotton industry is achievable opportunities for the targeted development of Aboriginal skills in a range of businesses ancillary to cotton may also be developed for increased community well-being and sustainability (2006).

Taylor and Biddle’s (2004) study notes that occupational segregation is also high within the wider Basin with Indigenous people absent from professional and managerial positions. The distribution of employment in the Basin, for both Indigenous and non-Indigenous workers, is highly concentrated into relatively few industries and occupations,

For example, various major agricultural industries (mixed farming, beef, dairy, grain and viticulture) dominate non-Indigenous employment with only one area of agricultural employment (sheep farming) listed in the Indigenous top 20 (although meat processing might also be added). At a stroke, this indicates that a significant contribution to the relatively poor labour force status of Indigenous people is their failure to achieve parity participation in the Basin’s key economic sector (2004: 24).
Taylor and Biddle (2004) provide a rank ordering of top 20 industries for Indigenous employment and list the total number employed:

1. Local Government Administration  757
2. Non-Residential Care Services    478
3. Primary Education               379
4. Supermarket and Grocery Stores  269
5. Hospitals                      263
6. Central Government Administration 253
7. State Government Administration 232
8. Road Freight Transport          196
9. Employment Placement Services   192
10. Gardening Services             192
11. Accommodation                  191
12. Takeaway Food Retailing        186
13. Secondary Education            180
14. Meat Processing                168
15. Cleaning Services              157
16. Sheep Farming                  156
17. Cafes and Restaurants          143
18. Community Services, undefined  143
19. Interest Groups                141
20. Child Care Services            134

Although the labour market figures do not enable precise delineation of the role of natural resource management programs, Taylor and Biddle (2004) argue that the absence of Indigenous people from pastoral and agricultural jobs suggests that natural resource management programs might also by-pass Indigenous interests:

The census is ill-equipped to identify and record the sorts of activities that constitute Indigenous customary practices in regard to natural resource management, and which may be defined as legitimate forms of work by many Indigenous people. There is a need, therefore, for such data to be gathered at the local, nation-level, and then presented as part of a potential profile of the regional labour market.
More recently, Hunt, Altman et al. (2009) have conducted research on the social benefits of Indigenous engagement in natural resource management in NSW, and found that the sector engages approximately 5% of employed Aboriginal people in that state.

A number of other studies have promoted the value of natural resource management in a livelihoods framework. For example, in the 2003 scoping study of social impacts of increased environmental flows prepared for the MDBC, Hassall and Associates and Ross argued that

> 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 (2003: 55).

Another 2003 Scoping Study prepared for the MDBA, one focused exclusively on Indigenous interests (Forward NRM and Arrilla – Aboriginal Training & Development 2003), argued that the economic and social conditions facing many Indigenous people inhibited their ability to become involved in natural resource management.

Taylor and Biddle’s report (2004), prepared to assist in the implementation of the Basin Indigenous Action Plan, made the following recommendation to improve regional natural resource management planning:

> In the realm of natural resource management on Aboriginal country in the Murray–Darling Basin, the pressing need is to customise available data as far as possible to match the geography of the basin, and ultimately that of Indigenous nations, at the very least in terms of the relevant catchments that they occupy. Consideration of the full range of social and economic data required for regional and Indigenous nation planning is also required (2004: 29).

In a similar vein, Morgan, Strelein et al. (2003) identified a list of projects that could be pursued by MDLRIN over coming years. All the potential activities would now be of value to the Basin planning exercise e.g. nation profiles, skills and governance audits, development of cultural maps and plans of management for each nation (Morgan, Strelein et al. 2003). No doubt the Liaison Unit of the MDBA will be contributing information to the planning process, and where publicly available and relevant, this may be of value to the next stage of the scoping project.

## 4.2 Indigenous water values

Water is vested with great cultural and symbolic significance as well as economic importance in Australian Indigenous societies. Indigenous people hold distinct cultural perspectives on water relating to identity and religious attachment to place, environmental knowledge and the exercise of custodial responsibilities to manage inter-related parts of customary estates. In Indigenous belief systems, water is a sacred and elemental source and symbol of life and aquatic resources constitute a vital part of the customary economy. The pursuit of livelihoods derived from water-
based enterprises on Indigenous lands, such as pastoralism, horticulture, natural resource management services and sport fishing, expand the range of interests Aboriginal people have in water to include a commercial element (Jackson 2008; Jackson and Altman 2009).

Over the past ten years the significance of water and rivers to Indigenous societies has grown as a topic of interest to researchers, lawyers engaged in native title claim processes, community-based NRM groups and to water resource managers. Land claims processes, including native title, have also generated a considerable body of knowledge, although access to this information may be restricted. There are now a number of detailed studies analysing the ways in which Indigenous societies attribute meaning to water and the place of water in their formalised systems of knowledge and social institutions (Langton 2002; 2006; Strang 2001a; 2001b; Toussaint, Sullivan and Yu 2005; Barber and Rumley 2003; Rose 2004; Jackson 2005; Jackson and Altman 2009; Weir 2007). Within these predominantly northern Australian studies, water is examined as a feature of the Indigenous cultural landscape with significant attention devoted to the holistic quality of Indigenous knowledge and the symbolic dimension of water values. These studies describe and interpret the stories relating to water represented in myth, painting, film and dance, and the local customary practices, beliefs and ideas associated with water. As well as examining this ‘intellectual use’ of water, as Trigger (1985) describes the symbolic and conceptual significance of water, these same studies also reveal the behavioural or material use of water according to Aboriginal custom.

4.3 River Systems – the ecological foundations of Indigenous livelihoods

It has been estimated that prior to British colonisation of New South Wales in 1788 there were between 300,000 to 750,000 Aboriginal people speaking approximately 250 languages across the Australian continent (Neate 2004). Aboriginal people settled all parts of the landscape for tens of thousands of years – the earliest human remains found in western NSW suggest original settlement at 60,000 BP (Crase 2008). Today the Aboriginal population represents between 0.7 and 1.7% of the Australian population. In Australia's rural and remote regions, the proportions are much higher and growing. Australia's Aboriginal population lives in relative poverty and Aboriginal people suffer multiple sources of disadvantage, as evident in the greater burden of ill-health and markedly shorter life expectancies.

In any given catchment there may be numerous Aboriginal groups with rights and interests in particular river locales, and a high reliance on riverine environments (Langton 2002: 46). Social organisation and resource management institutions are heterogeneous, but in general Aboriginal people share ‘a desire to retain their identity, a belief in their right to their land, a desire to control their own affairs, and desire to remove the economic and social disadvantages of Aboriginal people generally’ (Horton 1994: xx).
Jackson (2008) describes Aboriginal Australians’ historical reliance on and attachment to water (see also Langton 2002; Humphries 2007; Jackson and Altman 2009). River valleys have been the main focus in the landscape for Aboriginal populations for tens of thousands of years. Aboriginal groups lived amongst a complex network of rivers and creeks on south-east Australia’s Murray-Darling riverine plains for more than 35,000 years (Lloyd 1988), during which time they widely exploited aquatic resources (Humphries 2007). Examples of early association with riparian environments includes fossils, middens and the sophisticated in-stream fish traps constructed with rock found on the Darling River in NSW (Humphries 2007). The beach dunes that formed around inland lakes between 45,000 and 25,000 years ago contain many campsites and some of the world’s oldest graves (Behrendt and Thompson 2004).

The impact of colonisation on the Basin’s Indigenous population as the agricultural frontier moved west towards and beyond the Darling River, north and south from the colony of Sydney is described by Behrendt and Thompson’s survey of NSW Indigenous water rights (2004) and in the work of historian Heather Goodall (Goodall 1982; Goodall 2002):

> The floodplain of the northern Darling … is the country of grasslands people speaking a series of related languages. In the area centred on the Narran River in New South Wales, the major language is Yawalarraay, bordered by the Kamilaraay on the east, the Ngiyampaa of the Barwon River on the south, and the Murawarri on the Culgoa to the west. Their traditional land management regime of burning to foster rich pasture was disrupted with the British invasion of their area during the 1840s and intensive European sheep grazing in the last 150 years has undermined the pastures. The Yuwalaraay and their neighbours are nevertheless still living there, on or close to their own country. For many decades after the invasion they formed the backbone of the labour force in the pastoral industry, but mechanisation after the 1940s eroded their employment opportunities almost entirely (2002: 32).

Many commentators refer to water’s economic significance as a vital element underpinning the Indigenous harvest and intra-community distribution of aquatic life (see for example, Behrendt and Thompson 2004; Altman 2004; Strang 2001a). Historically Indigenous interventions improved rates of harvest of certain species, for example, river flows were manipulated with the construction of fish traps, weirs and small dams in numerous Australian river systems (Tan 1997). Njarrindjeri elder Matt Rigney reveals to Weir (2007b) his ancestor’s history of innovation in constructing fish traps in his country:

> The fish traps, they were built by our old people, often we refer to them as our ancient ones. We are proud of them. I think it is a form of technical innovation, I suppose you could call it. I suppose they got tired of standing on the shores, like a rock in the water, waiting for a fish to come by and spear it. They thought they would become more commercial, so they built fish traps (2007: 135).

Few studies have attempted to determine the relative importance of food derived from aquatic environments prior to contact, however, one study in the lower Murray
River suggested that 30-40% of dietary protein was sourced from freshwater fish and shellfish (Pate cited in Humphries 2007). Fishing remains a very important cultural practice that is documented in the literature (Behrendt and Thompson 2004). The many dimensions to this practice are similarly noted: subsistence activity, education process, cultural reinforcement, social activity e.g. ‘it is a time when the young people can admire the skills, knowledge and wisdom of their elders’ (Behrendt and Thompson 2004: 49). Hunting and collecting riparian plants remain important cultural and social activities for the Basin’s Indigenous population (ibid; Weir 2007b).

It is of course a precondition to the enjoyment of those activities that healthy populations of a range of animal species exist and that access to lands is adequate to enable those activities to occur (Behrendt and Thompson 2004: 51).

For these reasons, the fertility and productivity of the Basin’s river systems and their related floodplains is of profound concern to Indigenous people of the Darling River interviewed by Goodall (2002). Goodall found that access to the floodplains produced game and fruits as well as educated and cultured young people (2002). Successful resource use strategies of course depend on ecological knowledge of the river system, the flow regime and its variability (Goodall 2002). In the words of one Yuwalaray man, Tex Scuthorpe: ‘the water shows us the country’ (Goodall 2002: 41; emphasis in original). Goodall recounts the cultural role of this knowledge of flow:

But more than the shape of the country, the flow is important for the meanings it reveals. Tex explains that an important site in his country is a series of rocks within a river bed. Only when the level of the river reaches a certain depth does the water flowing over the rocks make the shape of the mythical being whose spirit is embodied within the rock, allowing the story not only to be told but to be seen. Again, Tex repeats, ‘the water shows us’ (2002: 41).

Availability of water shaped the movement of Aboriginal groups and rich, complex cultural landscapes were constructed around spiritually powerful water bodies, such as rock-holes and billabongs, created by ancestral beings. Each language group has their own creation stories describing the actions of creator beings, tying people’s identity to the river ‘in a potent, spiritual way’ (Weir 2002: 59). The centrality of river systems to the identity of many Indigenous people is exemplified by group names linking people to place, especially in western NSW e.g. Paakantji people take their name from Paaka, the Darling River and a western Wiradjuri group is the Galiyarrgiyalung, from Galiyarr, the Lachland River (Behrendt and Thompson 2004: 51).

Behrendt and Thomson (2004) describe NSW’s cultural water places as special, sacred sanctuaries. For example, Rainbow Serpent sites in the river may have restriction on their use, and the deepest holes in the river so they provide a refuge for fish and other life (2004: 47). According to McFarland, across the continent there are common cultural beliefs about water places and their creation by ancestral beings:
The presence and nature of such water beings, and the relationship with people of their country, is a key to understanding the relationship of Indigenous people and water places, and therefore to understanding the cultural basis of Indigenous rights in water. Water sites are sources of life, and the regeneration of life in all its forms. They are often at the centre, or the heart of a person or group’s country and are frequently conception sites. An association with a particular water source provides one of the prime markers of individual identity; and the collective identities of Indigenous groups, and the relationships and links between them (2004: 4).

McFarlane exemplifies this understanding through the experience of the Ngarrindjeri people of the Coorong:

… the Ngarrindjeri lands – in particular the River, the Lakes and the Coorong are crucial for the survival of the Njarrindjeri people. They have a spiritual and religious connection with the land and the living things associated with it. The fish, the birds and other living things are the Ngartjis (totems) of the Ngarrindjeri people. Many Ngarrindjeri people have a strong spiritual connection to the Ngartjis and a responsibility to protect them. Without their Ngartjis they believe they cannot survive (2004: 4).

Trade systems developed along networks of rivers and creeks to the extent that these routes ‘criss-crossed the whole continent’, usually following waterholes (Berndt cited in Tan 1997). Aquatic resource use still plays a very strong role in the customary economy and there are many and varied uses of water bodies and wetlands, including commercial uses (Morgan, Strelein and Weir 2004; Altman and Branchut 2008; Jackson and Altman 2009; Altman and Arthur 2009; Weir 2007a).

4.4 The diversity of Indigenous interests

Diversity exists across river basins in Indigenous land use, population and social priorities, as well as in forms of social organisation and resource management institutions. Traditional systems of land tenure and the nature of customary rights and interests in land and waters are complex and vary from region to region (Behrendt and Thompson 2004). Similarities can be distilled, however, with Indigenous people sharing ‘a desire to retain their identity, a belief in their right to their land, a desire to control their own affairs, and a desire to remove economic and social disadvantages’, although the strategies employed to achieve those aims vary (Horton 1994: xx).

In the context of water resource management, Behrendt and Thompson (2004) provide the following general observation of the systems of social organisation in NSW, the jurisdiction with the greatest proportion of the Basin’s Indigenous population:

Many Aboriginal groups in NSW are best identified by reference to a focus area of country. This can include rivers, creeks, lakes and swamps, with these features often important in marking out and naming the stretch of country. Group identity is a set of practices that recruit people to a sense of
belonging to kin and country. ‘Tribal’ names have often been used as a form of collective identity but can be misleading in some cases....The social totem⁵ system and kinship system are similar over much of inland NSW and southern inland Queensland. These systems increase the interconnectedness of Aboriginal people over a wide region (2004: 46).

Diversity in this context can also be conceived of as multiple and interrelated interests and sources of attachment to rivers, water and riverine environments. In commenting on particular aspects of Indigenous interests in river systems, Behrendt and Thompson argue that is necessary to take account of the inter-related nature of many of the features:

Understanding the variety of ways in which Aboriginal relationships in river systems manifest themselves also assists in understanding the broad manner in which those relationships are impacted upon and the manner in which actions affecting those river systems can cause distress to Aboriginal people (2004: 47)

The tendency in Australian NRM to establish separate categories of value—described as economic, social, environmental, and sometimes cultural—as a means of encompassing ‘triple-bottom-line’ evaluations can have deleterious effects on the recognition of diverse Indigenous interests (Jackson 2006; Robinson, Jackson et al. 2009). It is common for Indigenous interests to be treated as a cultural issue instead of a more fulsome recognition of the array of interests Indigenous people hold in any given area or resource use situation (see Weir 2007b; Hunt et al. 2009). A number of commentators have referred to the limiting impact that the ‘cultural heritage approach’ has had on the range of concerns of the Basin’s Indigenous people in the health of inland rivers (Ward 2010; Weir 2007b).

Morgan et al (2004; 2006) highlight the diversity of Indigenous interests in the Murray Darling Basin’s water and land resources, arguing that:

- Indigenous people are part of the broader community and share an interest in social outcomes relating to healthy waterways for recreation, sustenance and community life;
- Indigenous people utilise water for economic purposes – the rivers have long supported customary lifestyles
- Indigenous people have a shared interest with the environmental community to restore ecological functions, and
- Indigenous people assert rights to be engaged and involved at all levels of river management (2004: 5).

These authors estimate the presence of more than thirty Indigenous ‘nations’ within the Basin:

⁵ Defined as an identificatory totem such as an eagle, dingo, bony bream etc usually obtained through descent.
Each indigenous nation occupies core areas of land on either one or both sides of each major watercourse and across catchments, sometimes overlapping with and sharing the country of an adjoining indigenous nation’ (2004: 7).

According to Morgan, the Murray and Lower Darling is occupied by Indigenous nations at every reach of the system (2002). Weir describes the formation of MLDREN as a:

…challenge by traditional owners to the portrayal of Indigenous identities as homogenous…The ‘historical people’ hold important historical ties where they live. The ‘stolen generations’ are people who were taken from their families as children, and who now may or may know where their traditional country is. There are also people who live physically apart from their traditional country but maintain a strong sense of connection and knowledge of their country’ (2007: 168).

It is apparent from the early literature from the MDBC that a considerable effort has been made to draw an analytical distinction between two different constructs of Indigenous ‘community’ (Forward NRM and Arrilla – Aboriginal Training & Development 2003):

1. the local Indigenous community, and
2. traditional owner groups.

The 2003 Scoping Study delineates the different interests held by these two groups, relying on work by anthropologist Peter Sutton, who draws a very useful distinction between Indigenous people who hold

‘core rights’ over Country in terms of Indigenous customary law, and those who hold ‘contingent rights’ as a result, for example, of their relationship to the people who hold core rights, or due to their long standing attachment to an area that has developed through historical circumstances (2003: 40).

Morgan et al (2004; 2006) support the use of this distinction in natural resource management matters, arguing that

with respect to questions of land and natural resource management, indigenous nations/traditional owners hold a particular interest in the governance structures of land and waters management, while the local Indigenous community has an interest in social and economic aspects of the Basin management, particularly in relation to the continued disadvantage and inequitable access to programs and services experienced by indigenous people throughout Australia (2004: 6).

The 2003 Scoping Study briefly describes the types and functions of various Basin Indigenous groups, including traditional owner groups, elders’ councils, and Land Councils.
It is difficult to further analyse the diversity of interests and values in water from the available literature. Weir’s PhD thesis and more recent book provides a large scale description of Indigenous perspectives on water management throughout the Basin (2007a: 2009), as does other literature produced for the MDBC during the development of the Indigenous Action Plan and the inception of the Living Murray Initiative. These reports detail Indigenous perspectives on water management revealed during extensive periods of consultation. More locally specific work focused on the Icon Sites is described in Appendix 2 and in the case study on the Barmah-Millewa Forest in the following chapter.

Commonalities between the perspectives and value systems of Indigenous groups are drawn in this material. One significant piece of work undertaken by Farley (2003) found that Indigenous people (traditional owners and other Indigenous people and organisations) across the region showed ‘remarkable’ consistency in their shared vision for the Basin (Morgan et al 2004). The vision for River Murray ‘is one of a healthy, living river system with natural flows and cycles’ (ibid: 68) According to the aggregated responses management needs to address a range of outcomes directed towards ‘sustainable use with the core values of the river system preserved as a legacy for future generations’, including:

- Healthy, free flowing, alive, natural cycles, restocked, revegetated
- Access rights for Indigenous people so they can move freely to continue cultural practice, traditional hunting and fishing
- Indigenous people and Nations recognised and respected for what and who we are
- The rivers and tributaries are respected and cared for
- Indigenous Nation recognised as sovereign entities in their own country (Morgan et al 2004: 69).

According to Weir’s interpretation:

_The river system must be treated with respect, as it is the lifeblood of the country. If the river is in poor health, it cannot provide spiritual, cultural, economic and social benefits to all those who depend on it (2007a: 28)._ 

Weir distils three central themes from the consultations undertaken during this period of MDBC engagement: respect, mutuality and connections (2007a: 28). Socio-ecological relationships are revealed as important for culture, healing, eating, and living next to the river. The life-giving quality of water is manifest in the comments made during the consultations.

The consultations undertaken during this period emphasised balance between economic, environmental and cultural objectives:

_There was a clear view that cultural, environmental and social values should be given equal status with economic values when policy and management decisions are made… It was also very clear that Indigenous Nations believe_
they have rights to be engaged and involved, and wish to be engaged and involved, at all levels in the management of the river system (Morgan et al. 2004: 71).

According to Weir, the objectification and utilisation of resources is part of Indigenous value systems, but these associations ‘do not dominate to the exclusion of all other values’ (2007a: 30; see also Behrendt and Thompson 2004). McFarlane (2004) argues that the holistic nature of Indigenous people’s relationship to ‘their land, their water, their whole environment is something that non-Indigenous Australians find difficult to conceptualise and understand’ (2004: 2).

The published literature relating to the local scale is patchy. Attention has been given to the particular interests of the Yorta Yorta who have claimed strong cultural continuity to the rivers of the Murray – Goulburn area through native title process and many other mechanisms, see for example (Finlayson 1997).

Finlayson’s account describes the opposition Yorta Yorta people have faced from rural elites intent on questioning the legitimacy of Yorta Yorta efforts to ensure the protection of cultural sites (1997). In contests over heritage and native title, dominant groups sought to severely limit Indigenous control of resources and participation in contemporary natural resource management, including heritage management:

Views like this deny any notion of a ‘cultural landscape’ by which contemporary Aboriginal people read and make sense of themselves as a social group. They deny incorporation of the ancestral past in their contemporary lives or as evidence of continuity in terms of how Yorta Yorta people see particular actions relating to their landscape or country. The reify culture as a museum artefact for which there can be reverence, but no articulation with contemporary Aboriginal lifestyles, stories or social values. By promoting protection of the past solely in terms of archaeological relics, there is an effective denial of cultural continuities and native title claims based on continuity of custom and law (1997: 12).

A number of published papers have described the values held by the Ngarrindjeri. According to Birckhead, Greiner et al. (2008) Ngarrindjeri conceptualisation of lands and waters and the relationship between people, land, culture and economy has been communicated to non-Indigenous researchers for over 150 years. A number of NRM planning exercises have sought to understand Ngarrindjeri values and associations with water, not least Ramsar site management. In the context of Ramsar planning, in the 1990s, the Ngarrindjeri leadership explained the importance of the lower Murray, lakes and Coorong to Ngarrindjeri people. Birckhead, Greiner et al. (2008) cite an important, community-endorsed statement that sums up the centrality and meaning of water and its relationship to Ngarrindjeri wellbeing – the ‘Ngarrindjeri/Ramsar Working Group document (1998):

Through culture, history and spirituality the Ngarrindjeri are bounded with, in fact are part of, the river, Lower Murray Lakes and Coorong.

Maintaining (looking after) the environment is something that Ngarrindjeri must do. It is the same as, or an extension of, looking after oneself.
Ngarrindjeri have responsibilities to their Elders and ancestors to look after the country and the burial sites and other culturally significant places that still exist.

Ngarrindjeri, through multi-generational association with particular camping and fishing sites, have an ongoing, living association with the planning area, including the Coorong National Park.

Certain families have connection to specific places.

The sense of feeling, sense of belonging, sense of responsibility for the River, Lakes and Coorong experienced by Ngarrindjeri people has survived occupation, dispersal and attempted assimilation. It continues to exist irrespective of where Ngarrindjeri people currently live...

Many Ngarrindjeri people still retain a special spiritual relationship with specific wildlife species occurring within the planning area. This totemic relationship is deeply embedded in Ngarrindjeri culture and spirituality (2008:10).

The study of Ngarrindjeri non-market uses of water by Birckhead, Greiner et al. (2008) will be described in section 4.7.2 below.

4.5 The special character of Indigenous interests in water

Indigenous systems of customary law dictate that traditional land-owners have a substantive role in land and water management and resource regulation, and hence a particularly unique interest in environmental governance structures. There are therefore moral and legal precedents for Indigenous customary use that can be distinguished from the interests in water resources held by non-Indigenous people. Indigenous people have a particular stake in water management arising from their long traditions of water management, customary land and resource rights, some of which are recognised by the common law. River valleys have been the main focus of Indigenous life for tens of thousands of years and water maintains a significant symbolic part in Indigenous social life, including contemporary identity. Widespread Indigenous disadvantage provides further cause for consideration of the socio-economic impacts of water reform on regional economies (Jackson and Morrison 2007).

The unique systems of law, custom and spirituality regulate land and water use in Indigenous resource governance (Morgan et al 2004). In current debates over water sharing, Indigenous people pay special attention to resource governance, seek to assert their rights, and create inclusive processes and collaborative relationships based on recognition of cultural difference, including Indigenous law and custom. Morgan et al further argue that as the first peoples

... their primary and permanent relationship with the area places the Indigenous Nations in a unique situation as interest holders whose strong intergenerational connection to the country is central to their identity as
distinct peoples and to their spiritual, cultural, social, and economic survival (2004: 7).

Weir’s doctoral thesis and subsequent book describes fully the profound importance of ‘country’ to the Basin’s Indigenous people:

Country is profoundly important to traditional owners, who … are generally the people have inherited country from their ancestors and ancestral beings. For them, these are innate ties, between particular people, land, law and language. Their is a knowledge system based on relationships and connections with country, so it is often characterised as ‘holistic’ knowledge (2007a:26)

Demographic analysis by Taylor and Biddle (2004) reinforces the differences manifest in Basin Indigenous social and economic life:

From the perspective of Aboriginal incorporation into wider social and economic structures, much of the Basin (especially in the northern half), has intermediate status. It was, and remains, sufficiently remote from mainstream social and economic life as to enable the retention and development of wholly Aboriginal institutions and domains. At the same time Aboriginal people have long been drawn into the wider world through a mix of mechanisms including child removals, resettlement schemes, employment and social mobility.

The definition used by the UN Working Group on Indigenous Populations in 1986 highlights the key features of indigeneity:

Indigenous communities, peoples and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies ..., consider themselves distinct from other sectors of the societies now prevailing in those territories ... They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal systems (Chris Cunneen, and Terry Libesman, Indigenous People and the Law in Australia, Butterworths’ Legal Studies Series, Sydney, 1995, p. 238.)

The 2008 Native Title Report prepared a chapter on water issues and confirmed that Indigenous peoples’

special connection to land and waters is protected under international law which provides for the right to practice, revitalise, teach and develop culture, customs and spiritual practices and to utilise natural resources (2008: 174).

The full range of international instruments to protect Indigenous rights is described in that chapter. Jackson and Morrison have also described the character of Indigenous interests in water as special (Jackson and Morrison 2007). Parties to the NWI have agreed that water access entitlements and planning frameworks should recognise Indigenous needs ‘in relation to access and management’ (paragraph 25(ix)). The unique character is reflected in terms used in the NWI such as ‘incorporate
Indigenous social, spiritual and customary objectives’ and account for any water allocated to native title holders for ‘traditional cultural purposes’ (paragraphs 52–54), indicating that particular attention should be given to addressing these dimensions of Indigenous value systems.

4.6 The impact of water resource development on Indigenous peoples

The literature contains many accounts of detrimental socio-economic impacts arising from the environmental and socio-political changes that have occurred with Basin water resource development. Other literature relevant to impacts on Indigenous people outside the Basin is also available (Strang 2001; Langton 2002). Modifications to Basin stream flow through river regulation, over-allocation of water, salinity problems and land use change are all cited as causes of significant environmental degradation and subsequent loss of access and enjoyment of water (see for example, McFarlane 2004; Weir 2007a; 2007b; Forward NRM and Arilla-Aboriginal Training and Development). Further negative effects can be attributed to the loss of control expressed by Indigenous land owners who consistently express distress over their inability to manage their country holistically, exercise custodial responsibility and authority and to prevent further ecological degradation (Weir 2007). For example, Weir makes the following comment:

Today, in order to have a voice in the water debates, the traditional owners must contend with a range of actors and a long history of being excluded from modern water management. They are engaging in an extremely fraught context: their claims are among a large number of competing claims to increasingly scarce, increasingly degraded and increasingly economically valuable water (Weir 2007) (p.53).

A scoping study prepared for the MDBC in 2003 observed that:

Indigenous people are concerned and angry about the decline in health of the Murray-Darling Basin and see much of the cause of the current situation as being due to the lack of a holistic and respectful approach to the land and its resources (Forward NRM and Arilla-Aboriginal Training and Development 2003: 21).

MLDRIN has criticised the research community for failing to identify Indigenous cultural values within their studies of wetlands, floodplains and forest systems (Morgan 2002). It is described as a ‘continual problem’ and one that has led to the marginalisation of Indigenous perspectives and knowledge of these environments (ibid: 4).

The table below provides an indication of the types of direct environmental impacts observed in the literature, the reported consequences, the region in which it occurs (if that information was provided), the group concerned and the source.

It is not surprising given the weight of material devoted to recounting these impacts that there is a very strong direction expressed by Indigenous people in the literature
reviewed towards restoring the values of water sources, their surrounding
landscapes and the dependent relationships so highly valued in Indigenous culture
to establish relationships of repair and restoration that will contribute to a much
healthier and more culturally rich basin’ (p. 21). The 2004 vision for the River Murray
developed in response the Living Murray Initiative shows clearly the exclusive
attention given to environmental quality and the restoration and regeneration of
cultural and social life. Of the 21 consolidated responses given in the Morgan et al
(2004:83) report the ability of the river system to provide for Indigenous needs and to
provide ‘life to all’ was the dominant theme. Economic benefits were raised as a
significant issue within the concept of a ‘cultural economy’ (ibid). Changes to the
river system had eroded its capacity to provide for Indigenous people and it is this
capacity that needs to be restored, according to the responses recorded in Morgan
(2004).
Table 2  Indicative list of environmental impacts and reported consequences for Indigenous people

<table>
<thead>
<tr>
<th>Environmental Impact Issue</th>
<th>Reported Consequences</th>
<th>Region and Group</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closure of the Murray Mouth from siltation, loss of biodiversity</td>
<td>Narrindjeri identity through loss of stories and spiritual strength</td>
<td>Ngarrindjeri</td>
<td>McFarlane 2004</td>
</tr>
<tr>
<td>Damage to floodplains from pastoralism and cotton farming</td>
<td></td>
<td>Darling River</td>
<td>Goodall 2002</td>
</tr>
<tr>
<td>Water quality - pollution of waterways and the occurrence of blue–green algae</td>
<td>Concerns about human health (river water drinking quality) and environmental impact</td>
<td>Moree and Bourke, Many other communities</td>
<td>Forward 2003; Behrednt and Thompson 2004</td>
</tr>
<tr>
<td>Changes to water levels in Lake Victoria</td>
<td>Impact on burials</td>
<td>Barkindji</td>
<td>Behrendt and Thompson 2004</td>
</tr>
<tr>
<td>Construction of weirs</td>
<td>Loss of variability of flows affecting sacred sites and other significant places</td>
<td>Barwon and Darling Rivers</td>
<td>Behrendt and Thompson 2004</td>
</tr>
<tr>
<td>Health of the wetlands</td>
<td>Deep concerns about the current health and decline of the Ecological Wetlands due to</td>
<td>Macquarie Marshes - Wailwan</td>
<td>Macquarie Marshes Aboriginal Cultural Heritage Values Newsletter Nov 2007. pg 5</td>
</tr>
<tr>
<td>The wellbeing of Aboriginal people is linked to water</td>
<td>Some communities in the Basin are currently being severely impacted by the drought and</td>
<td>Northern Murray Darling Aboriginal Nations</td>
<td>Love, compassion, connection, sharing stories, dance. MDBA. Pg 2 Northern Basin Aboriginal Gathering - Meeting held by MDBA at Moree 9-10 December 2009</td>
</tr>
<tr>
<td>Reduced access to the Marshes</td>
<td>Many Aboriginal people have reported that in trying to access favoured areas of the</td>
<td>Macquarie Marshes - Wailwan</td>
<td>NSW DECC (2009)</td>
</tr>
</tbody>
</table>
The mouth of the River Murray should be open
This can only occur if the needs of the river are respected – which effectively means increasing natural flows, bringing back native fauna and flora and eradicating introduced species.
Ngarrindjeri Morgan et al 2004

Cultural economy affected
This cultural economy now has been diminished by the poor health of the river system that has decimated traditional sources of food and medicines.

The decline in the health of the river system therefore has led to a decline in the economic position of Indigenous people.
There are less cod, yabbies, mussels, eggs, plants and animals. Less traditional food sources and reduced commercial opportunities mean a fall in the standard of living and greater reliance on welfare.

Erosion of river banks has increased
Contributing factors include land clearing, artificially high flows, artificially high river levels, carp and wash from boats. In some areas, the river is twice as wide as it used to be.

The 5 Barrages were built
For the last 65 years we have witnessed the decline in the health, wildlife and other resources of the lakes and the river, made worse by the deliberate introduction of exotic species, such as the European Carp and destructive farming practices such as dairy farming, irrigation, land clearing and cattle and sheep grazing.
Lake Alexandrina - Ngarrindjeri
Ngarrindjeri Tendi, Ngarrindjeri Heritage Committee, Ngarrindjeri Native Title Management Committee (2006)

Climate change and over allocation of water has hit the river’s birds, fish and water quality.
"It’s meant that the natural flow of the river has been flipped around and it’s not getting the appropriate floods."
Deniliquin, MLDRIIN

### 4.7 Indigenous water uses

#### 4.7.1 Introduction

The first step in developing the Basin Plan is to quantify the Basin’s water resources. A description of these water resources and the context in which those resources are used is required by the *Water Act 2007* (Murray Darling Basin Authority 2009). The description is to include:
- The size, extent, connectivity, variability and condition of the Basin water resources;
- The uses to which the Basin water resources are put (including by Indigenous people);
- The users of the Basin water resources; and
- The social and economic circumstances of Basin communities dependent on the Basin water resources.

Water is necessary to produce food, to ensure environmental hygiene, for securing livelihoods and to enjoy certain cultural practices. The United Nations has recognised the key role of water in agriculture, energy, health, biodiversity and ecosystems as well as in combating poverty (Scanlon, Cassar et al. 2004). Reductions in water availability and an increasing Indigenous population characterised by existing levels of socio-economic disadvantage requires that critical human needs, social well-being and environmental health are taken into account in Basin planning. Indeed, lack of access to water is noted as a source of social disadvantage and a health risk in the Productivity Commission’s recent evaluation of the status of Australian Indigenous people (Steering Committee for the Review of Government Service Provision 2009). In that study, drinking water quality is identified as a major contributor to health and quality of life, along with food safety, disease control and housing conditions.

As described in the Socio-Economic Context Study (Anon 2009), water is used by the Basin population (and other non-residents) for a wide range of purposes: drinking, bathing and cooking through to irrigating crops and generating electricity. In water planning, a distinction is often made between water for consumptive uses (where water is withdrawn from a source e.g. irrigation, stock water and human consumption) and non-consumptive uses (where withdrawal is not required to obtain a benefit and the water is not consumed e.g. navigation, fishing, swimming, recreation, and other customary uses). In much economic research, direct use values tend to attract most attention, specifically those of a consumptive nature, as they are most easily quantified, costed and measured (Birckhead, Greiner et al. 2008).

There is little known about the pattern of Indigenous water use in the Basin, although a preliminary report on Indigenous access to commercial licences provides some insight into consumptive use rates (Altman and Arthur 2009). More recently, the MDBA has commissioned a study of Indigenous land and water holdings across the Basin (Arthur in prep).

Basin states are likely to have a clear understanding of the problems facing Indigenous communities in accessing drinking water, although this information does not appear to be aggregated at the Basin level. As described above, Indigenous people place great importance on the instream values that sustain customary life-ways, and it is this interest that has motivated some Indigenous people to develop their own strategies for adapting concepts like environmental flows to meet their
water requirements (Weir 2007a). These strategies will be discussed in section 5.2 below.

Much of the literature in this area has been driven by the implementation challenges of the *National Water Initiative*, which envisages the situation in which water may need to be allocated to meet certain Indigenous requirements: Indigenous use, landscape features of value and native title (Jackson 2009; McFarlane 2004; Rural Solutions 2008). Such allocations will need to be quantitatively defined in water allocation plans. However, Indigenous values associated with rivers and water are presently poorly understood by decision-makers, and some are difficult to relate explicitly to particular river flow regimes, and therefore to quantify or otherwise articulate in allocation decisions (Jackson 2008). Progress made in South African environmental flow assessments reveals that various riverine uses can be satisfactorily incorporated. In contrast to the neglect of this issue within Australia, the New Zealand experience demonstrates considerable awareness of the problem and interest in experimenting to improve current approaches (Jackson 2009). Further analysis of this international literature on scientific techniques may be of interest to the MDBA.

One of the ongoing challenges is to improve water plans to incorporate Indigenous issues more effectively (National Water Commission 2008). A recent national review of Indigenous access to water (Rural Solutions 2008) confirmed that governments across Australia are in the early stages of formally recognising Indigenous peoples’ relationships with water for spiritual, cultural and economic purposes (see also Behrendt and Thompson (2004). To date, each jurisdiction has implemented the reform package in a different way and with varying rates of progress (Tan 2009).

Jackson (2009: 4) has reviewed NWI progress on Indigenous access to water and concludes the following:

*Although there is now a policy framework in place to engage with Indigenous people and meet Indigenous customary water requirements, the ‘infrastructure’ to guarantee outcomes of a high standard and positive effect is poorly developed. There is a lack of consistent definitions, standards, effective mechanisms, skills and know-how, agency leadership, community networks, and rigorous performance evaluation and monitoring. There is also an inadequate information-base upon which to evaluate NWI implementation, including an absence of empirical evidence of the impact of various water reforms on rates of Indigenous participation in either economic or environmental water-based activity (Jackson 2009).*

Despite the existence of the NWI guidelines for water plans to include consideration of Indigenous water use, it is rare to see a water plan that *specifically addresses Indigenous water requirements*, despite the existence of the NWI Guidelines for Water Plans and Planning Processes which state that plans should include consideration of Indigenous water use (NWC 2008). In many jurisdictions water plans implicitly assume that environmental flows will serve as a surrogate for a mechanism to meet Indigenous social, cultural or spiritual requirements. In these cases, ‘non-consumptive’ uses, or instream values, are protected by limits on water extraction, rather than by an entitlement (Jackson 2009). A major issue articulated by
some Indigenous groups in the MDB is the environmental impact of over-allocation of water and their perception that the ecological criteria upon which environmental flows or instream values are determined are too narrow (Weir 2007a; Jackson, Tan and Altman 2009). The intangible values that Indigenous people regard as critical to their sense of identity, cultural practices, spiritual beliefs, customary management practices and livelihoods, are consistently raised as a challenge to the quantitative and competitive methods of resource allocation currently favoured market-based reform programs.

Indigenous nations in the southern MDB further argue that environmental water management processes do not allow them to fulfil their responsibilities to manage country and determine priorities for flow objectives, thereby undermining their political efficacy (Neil Ward pers comm.). The expectations for reform expressed by Indigenous people therefore relate to the adequacy of current water management institutions as well as techniques for specifying water needs.

The literature on Indigenous water values from the Basin has sought to convey the significance of water and rivers within Indigenous belief systems and cultural practice, and to analyse Indigenous water management institutions, including customary rights. Studies have relied on case material, policy analysis at the level of jurisdictions and interpretation of qualitative interviews and surveys. The bulk of the literature has focused on matters of Indigenous engagement and governance, including the need for a rights-based approach to the involvement of traditional owners of country. It is clear from the literature that matters of resource use assessment technique are presently less important to Indigenous people than the establishment of appropriate terms of engagement for partnerships. Foremost attention has been given to resource governance as Indigenous groups seek to assert their rights and create inclusive processes and collaborative relationships based on recognition of cultural difference, including Indigenous law and custom, equity and trust.

There are no systematic studies of water use within or across Nation groups, nor is there a comprehensive, aggregated picture of the water requirements of the many distinct Indigenous communities where identification of critical human needs is reported to be an issue (Liz McNiven pers comm.). Although some Indigenous people express an interest in conducting feasibility studies of ‘cultural flows’ and measuring the benefits that may ensue, the literature does not contain a clear direction on appropriate or preferred methods and approaches to advance our understanding of the implications of separate allocations to meet Indigenous customary requirements.

### 4.7.2 Approaches to defining and addressing Indigenous water requirements

Available methods for describing the ways Indigenous people use water have largely focused on certain instream or in situ values, also referred to as cultural values. This small yet growing body of work has focused on documenting the role of water in Indigenous livelihoods, including the cultural significance of access to water sites, the value of cultural group associations with rivers and water in forming identity and
generating a sense of well-being and belonging, and the provisioning role of wetlands and water sources in sustaining wild food resources. Weir's (2009) qualitative analysis of Indigenous perspectives on water adds to the multiple of Indigenous led forums held in the MDB on Indigenous water issues, where the richness of Indigenous identity and religious attachment to many water places has been described, and the requirement for Indigenous people to exercise custodial responsibilities to manage their customary estates, and collaborate with neighbouring groups, have been forcibly made.

Much of this work highlights that the articulation and management of Indigenous water use is complex, in part because of the multiple values motivating water use strategies (Jackson 2006; Birckhead, Greiner et al. 2008). Many Indigenous led forums and academic studies, for example, have pointed to the multiple dimensions associated with the term ‘Indigenous water’, places and flows (e.g. MDB Indigenous Engagement December 2009 Forum; Weir 2009). Complexity also arises because of the institutional and capacity barriers that have made it difficult for Indigenous people to pursue their rights, interests and use in water (see for example, Morgan et al. 2004; Weir 2007a and Jackson and Altman 2009).

Birckhead, Greiner et al. (2009) contend that the value of water to Indigenous people of the Murray-Darling River Basin and its significance to their present-day economic and social development imperatives has been neglected in recent political and media debates about Australia’s deepening water crisis. To redress the neglect of Indigenous values, Birckhead, Greiner et al. (2009) undertook a subjective wellbeing approach to consider the social, cultural and economic values that Ngarrindjeri people derive from water and water-based ecosystems (Ruwe) in the Lower Lakes, Coorong and Murray Mouth. In this literature the term ‘economic’ tends to refer to the non-commercial customary uses of water, for example, use of water-dependent resources such as fish, swan eggs and medicinal plants.

Using the Murray-Darling Basin as a case study, Venn and Quiggan (2007) contend that price-based valuations of Indigenous cultural heritage are severely limited for a range of reasons relating to disparities in socio-economic standing. Incorporating information about Indigenous cultural heritage in the form of quantitative goals and constraints may be preferable when policy makers seek to evaluate competing policy options for water allocation (Venn and Quiggan 2007).

According to Jackson and Morrison (2007), there are substantial conceptual and technical difficulties facing water resource managers seeking to calculate and allocate water to meet Indigenous customary requirements. We are aware of a few attempts to identify an Indigenous share in an allocation process, and some preliminary consideration has been given to defining the problem from an Indigenous perspective and critically examining the culture of water administration (Jackson 2005, 2006; Weir 2007a). Only Queensland and New South Wales legislation provides for an Indigenous share in an allocation process, for either cultural, social or economic purposes. The current mechanisms for specific purpose water licences (NSW; see Appendix 3) and Indigenous reservations (Queensland’s Cape York Peninsula) do not appear to be popular with Indigenous groups, although in the latter case, the reservations have only recently been introduced. It is clear that there is a need for greater clarity in conceptualising the nature of Indigenous water uses or
needs, as well as techniques for elucidating the relationship between flow and values, and assessing the costs and benefits of strategies to meet Indigenous requirements.

To that end, there have been calls for interdisciplinary environmental flows research that incorporates Indigenous knowledge into assessments and modelling (Jackson 2008). For example, in the context of assessing the social and economic impacts of environmental flow changes in the MDB in 2002, Young et al recommended that an approach to assess the value to Indigenous people of improvements in river health be developed (Young, Young et al. 2002) (p.42).

Some of these issues have been raised in the negotiation and development of environmental water within water sharing plans. Water sharing plans allows licensed water to be committed for environmental purposes – described as adaptive environmental water which can arise from water recovery projects or by buying back water licenses. How adaptive environmental water processes are to be developed and improved remains uncertain, although CSIRO research conducted under the TRaCK CERF Hub is seeking answers to this question in three tropical river catchments. Approaches that have applied adaptive environmental water processes for other water planning contexts may prove useful (e.g. Eberhard et al. 2009 in Great Barrier Reef catchments); including processes that incorporate mechanisms to negotiate cultural values through country-based planning mechanisms in the adaptive planning process (Robinson et al 2005).

A further comment should be made on the sources of knowledge relevant to water planning. In a review of water planning, Jackson (2009) observed that Indigenous knowledge is currently under-utilised in water resource assessments, especially environmental flows research. Instead of adequately resourcing Indigenous participation in water assessments and ongoing monitoring of plan implementation, it is common to see agencies rely on Indigenous representatives on water allocation committees for Indigenous engagement and values assessment. There are numerous problems associated with this representative model of consultation (e.g. the difficulties facing one or two individuals in representing numerous land owner groups).

The cultural mapping activities of the MDBA’s Indigenous Partnerships Program are trying to overcome the limitations of conventional approaches in a systematic exercise to collect information on Indigenous use and values. The approach is described more fully in Section 4.9.2 below.

The following section will briefly describe the literature available on particular Indigenous uses in the Basin and where possible, provide a synthesis of the approaches taken to estimating Indigenous use for these purposes. There is likely to be some overlap between the purposes.

*Critical human needs*

Australian literature relating to remote Indigenous communities reveals that many rural and remote communities rely on local water, sewerage and electricity systems
that have not achieved the basic level of service that has been achieved for the rest of the population. Henderson and Wade (1996) have drawn on population health statistics and data to observe that the prevalence of water-related diseases among the metropolitan Australia is low, in contrast to that experienced by a majority of Indigenous Australians living in smaller urban, rural and remote population centres. In such situations, access to and availability of water may be a higher priority than water quality for many Indigenous people. This echoes statements made at Indigenous engagement forums in the MDB where participants emphasised that water poverty and service delivery considerations should be part of water sharing and allocation plans (cf. (Jackson and Robinson 2010).

The incidence of water supply shortfalls or disruptions across the Basin’s Indigenous communities is not known. A report from NSW confirms that drinking water and sewerage services are known to be poor in some discrete Aboriginal communities in that state (NSW Aboriginal Community Water and Sewerage Working Group 2007). According to that report, the status of water and sewerage systems in discrete Aboriginal communities has been well documented in NSW at least, where available data indicates that all discrete Aboriginal communities have access to water for drinking. Although in most communities the water quality remains in doubt due to lack of monitoring. Australian governments have agreed that the improvement of Indigenous data is a priority, and with respect to water supplies, the Productivity Commission recommends collecting regular data allowing comparison between services in Indigenous communities and those delivered by major utilities as a matter of priority (2009).

Little is known about Indigenous attitudes towards water conservation, efficiency or methods of cost recovery in either the domestic water supply context (Willis et al. 2004) or the context of industrial consumptive water use. Behrendt and Thompson (2004) report that, in NSW at least, Aboriginal people aspire to a standard of water quality that allows people to drink directly from rivers. Consultations for the Living Murray Initiative (Morgan et al 2004) revealed consistency in the view that ‘the first priority should be to ensure sufficient quantities and quality of water for human consumption’ (p. 88).

At this stage the team has assumed that methods for estimating personal domestic water consumption will be the same for the Indigenous population as for the non-Indigenous population. The literature does not indicate that critical human needs within the context of Basin scale water planning are a high priority issue. According to reports in the literature, there are differences in perspectives on water quality between Indigenous and non-Indigenous people e.g. Aboriginal people expect to be able drink directly from the rivers. The MLDRIN submission to the WSP for the NSW Murray Lower Darling Regulated River Water Source recommends that secured town water supplies deserves more attention. The NSW Aboriginal Land Council’s email to the project team indicated that water supply was a concern on the many former Missions and Reserves within the Basin. In the case of NSW, these former Missions and Reserves do not tend to be connected to town water supplies.
Commercial access

Jackson and Morrison (2007) have argued that more needs to be known about the size of the Indigenous agricultural sector and the nature of its demand for water, and the rules and norms likely to influence its valuation of options, preferences and trading choices. The Basin’s literature gives less attention to the economic implications of water scarcity to Indigenous people, although both McAvoy (McAvoy 2002; McAvoy 2006), and Behrendt and Thompson (2004) describe the NSW situation from a social justice perspective and include resource rights within their scope of analysis. From a reading of the consultation reports prepared for the MDBC it does not appear that there is a very strong Indigenous desire to participate in the irrigation sector. We cannot be sure that this omission in the largely NRM literature reflects accurately the perspectives across the entire Basin. Indeed the existence of numerous Indigenous businesses reliant on commercial use of water suggests that the economic dimension is nonetheless a very important one, perhaps more so in some regions than others. In all three of the cases described below Indigenous organisations have a commercial entitlement and in two cases they are trading their water allocations in order to underwrite their social, cultural and environmental activities.

Currently we do not know how changes to property rights may affect behaviour in Indigenous societies, particularly with respect to land and water use decisions. There is a lack of empirical data with which to properly evaluate the expectation or belief that the individual pursuit of self-interest will allocate water to the highest value and result in efficiencies in Indigenous contexts. The particularities of Indigenous property rights are not yet sufficiently understood nor accommodated in studies of market-based instruments, for example, the collective and indivisible nature of the title (Altman 2004a; Sheehan 2001; Langton 2006). Campbell (2002) discusses some of these theoretical and institutional issues in relation to Indigenous fisheries, arguing that ignorance of the economic characteristics of Indigenous rights hampers the valuation of benefits arising from those rights, as does the availability of appropriate measures of Indigenous value.

Drawing on arguments that link the Indigenous customary economy with the market and state sectors in a hybrid economy model, Altman (2004) suggest a livelihoods approach to Indigenous development offers a useful framework to consider Indigenous rights and interest in water. They argue that such an approach would allow Indigenous communities to pursue multiple (customary and commercial) objectives that can be directed through customary decision-making processes and priorities.

For the first time, the status of water licenses and allocations to Indigenous people for commercial purposes was assessed in a preliminary investigation for the National Water Commission (Altman and Arthur 2009). This report documented actual allocations of water licences and entitlements to identified Indigenous users on a state-by-state jurisdictional basis. Altman and Arthur (2009) scrutinised ABS data and property holdings although numerous problems were encountered in accessing accurate data. Estimates were provided for each state and revealed that:
Indigenous people are statistically underrepresented in the allocation of water for commercial purposes, suggesting that Indigenous businesses are less likely to be involved in commercial activities that use water than non-Indigenous businesses.

Most commercial licences were held by Aboriginal enterprises in NSW, reflecting higher demand for water for irrigation than other states.

In NSW there were 54 users holding some 122 licences.

None of the nineteen potential users initially identified by the researchers were in fact water licence-holders highlighting how little is known about commercial use of water.

In NSW most water is allocated to General Security licences, as opposed to High Security Licences, the latter being less vulnerable to reductions during times of water stress.

No State or Territory has an administrative Indigenous identifier in their databases for water.

It is important to recognise that Indigenous economic development aspirations are diverse and do not correlate with commercial development in all contexts.

The table below shows the results for all Australian states:

Table 3 Estimate of indigenous users of water for commercial purposes from Altman and Arthur 2009

<table>
<thead>
<tr>
<th>State/Territory</th>
<th>Column A: Number of potential users, from Indigenous agencies etc.</th>
<th>Column B: Number of potential users, after consultation with NWC</th>
<th>Column C: Number of licences identified by jurisdictions</th>
<th>Column D: Column C as % of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Australia</td>
<td>123</td>
<td>89</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>90</td>
<td>39</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Victoria</td>
<td>49</td>
<td>17</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Queensland</td>
<td>48</td>
<td>29</td>
<td>23</td>
<td>14</td>
</tr>
<tr>
<td>New South Wales</td>
<td>27</td>
<td>19</td>
<td>122</td>
<td>75</td>
</tr>
<tr>
<td>South Australia</td>
<td>25</td>
<td>21</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Tasmania</td>
<td>9</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>371</td>
<td>219</td>
<td>162</td>
<td>100</td>
</tr>
</tbody>
</table>

Sources: As indicated in the text.

Notes:
- a) As noted in the text this total tended to represent all of the Indigenous entities and programs that might conceivably use water; i.e. it was compiled to be as inclusive as possible.
- b) Excludes Goulburn Murray Water region, as noted in the text.

Altman and Arthur examined the type of licence available to the NSW water holders and found a bias towards general security licences, as shown in the table below:
Altman and Arthur (2009) suggest that a comprehensive database on Indigenous commercial and customary use of water would assist in monitoring changes in Indigenous access to commercial water. An Indigenous identifier in licences would facilitate the efficient collection of the necessary data, although the confidentiality issues may require more consideration and discussion.

Another important observation from this work was that while Aboriginal specific purpose licenses exist in NSW, none have yet been granted even though there is demand for commercial water allocation from Indigenous enterprises in this state. Both authors conclude that ‘this low uptake may be because Indigenous people have not been involved in the macro water sharing planning process’ (Altman and Arthur 2009: 7).

The authors conclude that in the absence of ‘good knowledge of present or future water allocation and use, it is difficult to see how Indigenous users can be properly incorporated into planning or allocation processes’ (2009: 9).

It is interesting to reflect on the number of licences held by Aboriginal people in NSW and to consider the role of NSW water policy in accounting for the relatively high number. The NSW water policy framework is described fully by Behrendt and Thompson (2004); Tan (2009) and Jackson (2009) and a summary is provided in Appendix 3. The framework includes objects in legislation designed to provide benefits to Aboriginal people in relation to their spiritual, social, customary and economic use of land and water. The NSW Water Management Act 2000 provides for the grant of specific purpose licences to be accessed by Aboriginal people or communities for either cultural or commercial purposes. These are to be determined in accordance with macro water sharing plans that apply to areas that are generally characterised by low water usage. Cultural purpose licences will be discussed in the following section.

Coastal Water Sharing Plans (WSPs) make provision for Aboriginal community development licences. According to Jackson (2009), these licences can be used for commercial enterprises owned by Aboriginal people and could include:

- Irrigated cropping, such as maize;
- Horticulture, such as fruit, vegetables, flowers or ornamental plants;

Table 2. Allocations of water in New South Wales

<table>
<thead>
<tr>
<th></th>
<th>Allocation to Indigenous licensees (Megalitres)</th>
<th>Allocation to all licensees (Megalitres)</th>
<th>Indigenous allocation as a percentage of all allocations</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Security Licences</td>
<td>13,341</td>
<td>5,800,000</td>
<td>0.2%</td>
</tr>
<tr>
<td>High Security Licences</td>
<td>3,030</td>
<td>580,000</td>
<td>0.5%</td>
</tr>
<tr>
<td>Irrigation Licences</td>
<td>7,366</td>
<td>No data</td>
<td>No data</td>
</tr>
</tbody>
</table>

Source: New South Wales Department of Natural Resources
- Irrigated pasture, such as lucerne for a dairy farm;
- Aquaculture, such as oyster growing or prawn farms; and
- Non-agricultural activities, such as manufacturing or crafts.

These commercial licences are only available under restricted terms in the coastal river areas not affected by the Murray Darling Basin ‘Cap’. They will be permitted in coastal areas provided this additional extraction would not negatively impact on ecological values that are dependent on high flows. They are not to exceed 500 ML p.a. and are non-tradeable (Rural Solutions 2008). Future coastal WSPs will provide for Aboriginal commercial access licences. In addition, there may be opportunities in some groundwater systems to grant Aboriginal commercial licences. This will occur in areas where licensed entitlement is less than the sustainable yield of the aquifer. In northern NSW, commercial licences to groundwater sources may prove to be of greater economic value to certain Aboriginal communities holding land and in localities where the costs of extracting water from the aquifer are not prohibitive (Miller pers. comm.).

To date no commercial licences have been granted. Further information is required to explain the poor uptake of this provision, which could be attributable to unattractive terms, low awareness or lack of interest in irrigated agriculture amongst the Aboriginal population. The commercial licences require water storage and infrastructure capacity to utilise efficiently, for water must be pumped from rivers during higher flows and stored for use as needed. It is possible that this costly requirement precludes many Aboriginal people.

Future Indigenous commercial needs have been provided for in the form of a reservation in a limited number of north Australian jurisdictions. Although these instances apply to regions outside the Basin, where water is not nearly as constrained as it is in the Basin, they reveal a significant shift in water policy towards addressing commercial water use and social justice in regional economic development objectives.

Indigenous Reserves on Cape York

A mechanism for allocating water for the purpose of helping Indigenous communities to meet their social and economic aspirations was developed in response to criticism of aspects of the Wild Rivers policy from Indigenous groups on Cape York. The *Cape York Peninsula Heritage Act 2007* was passed in October 2007. The Act specifies that any water resource plan or a Wild River declaration that applies to the Cape York Peninsula must set aside an amount of water (a reserve) for the purpose of enabling Indigenous communities. Interviews with Queensland officials (Rural Solutions 2008) suggest that Aboriginal groups will have access to the larger part of

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6 The cap limits the total extraction amount to the 1994 level of development, effectively preventing the issuing of any new water licences on inland rivers.

7 The macro sharing plan will not limit the volume assigned to each individual Aboriginal commercial licence, only the total volume per water source.

8 Tan’s (2009) study shows that there conflicting information on this aspect and therefore some doubt about whether they can be traded.
the unallocated water available on the Cape. Interested groups or individuals will need to apply for a licence and demonstrate that the use will benefit local communities in achieving their social and/or economic goals. There are no limits to the size of allocation per licence, but the allocation would be based on efficient use for the stated purpose. The details of these policies are still being negotiated. According to the proposed Archer River Basin Wild River Area, a wild river declaration will not regulate or restrict traditional Indigenous activities, such as camping, fishing, hunting and conducting traditional ceremonies and fire management practices, nor does it limit a person's rights to the exercise or enjoyment of native title or the native title process. Wild river requirements only apply to certain types of new activities once a wild river area is declared.

As defined by the Cape York Peninsula Heritage Act 2007, the Cape York Peninsula region included the Staaten River, a declared Wild River located within the area covered by the Gulf Water Resource Plan. An Indigenous reserve of 1,000 ML has since been allocated the Staaten River in the Gulf plan but not for any other rivers within that vast region. According to the Gulf Plan (s. 33), the 1,000 ML constitutes the ‘total of the annual volumetric limits for all water licences to take indigenous unallocated water from the Cape York Peninsula Region’ (in this case the Staaten River). Establishing this reserve does not limit Indigenous people from accessing other unallocated water. An Indigenous Reserve of 5000 ML was also provided under the Mitchell Water Resource Plan for the purposes outlined in the Cape York legislation.

**Indigenous reservations in the Northern Territory**

Although the Northern Territory Water Act does not specifically recognise the appropriateness and need for an Indigenous specific allocation from the consumptive pool for commercial purposes, a reservation has recently been declared for a groundwater resource in the Katherine region. An objective of the Tindal Aquifer water plan is to provide for economic development opportunities on Indigenous land (Northern Territory Government 2009). Indigenous people comprise 20% of the region’s population and a native title application has been lodged over part of the Plan area. The Plan mandates 680 ML for Indigenous commercial development if the existence of native title is recognised within five years of the commencement of the Plan.

**Customary access and native title**

A Yorta Yorta delegate to MLDRIN (Atkinson 2009) has described the range of Indigenous uses of water under the phrase ‘cultural practices’:

- **Propagation and harvesting of plant species for medicine, timber, food sources, and material for manufacture of tools, clothing and housing;**

- **Protecting, hunting and killing animal species for food, medicine, clothing and all other cultural uses;**

- **Use of the water for drinking, hygiene, recreation, spiritual and ceremonial purposes;**
- **Use of the whole of the environment for educational purposes including the recording and transmission of Indigenous science and knowledge.**

The day-to-day activities and practices of Aboriginal people in relation to water are carried out within the context of broader social arrangements and cultural practices. These cultural practices and social institutions, in turn, reveal the importance of water in Aboriginal cosmology and belief systems (Cooper and Jackson 2008). Thus, as Cooper and Jackson explain:

> While there exists distinct and, indeed, profoundly-important aspects of cultural practices and beliefs relating to water, it is impossible to abstract such practices and beliefs from the broader processes and institutions that shape and give meaning to Indigenous cultures and to the social arrangements, lived experience and relationships to land of Indigenous people (2008: 4).

Cultural practices relating to water include talking to country, ‘watering’ strangers and others, restrictions on behaviour and activities, protecting others from harm and management and protection of sites. Many, if not all these activities, would be encompassed by a native title right to water. Cases establish that where native title exists, there is a *limited, non-exclusive and non-commercial* right to use water without the need for a licence (Tan 2009). According to Tan (2009), generally a right to take water for drinking and domestic use accompanies other rights such as access, camping, hunting and foraging. Section 211 allows native title holders to exercise these rights of fishing, gathering or spiritual and cultural activities without the need for a licence.

The NWI requires that water plans take account of the possibility of native title. The wording in the NWI, where water allocated to native holders for *traditional cultural purposes* should be accounted for (cl. 54; emphasis added), suggests an intention to preclude commercial uses under the definition of native title rights, although the absence of definition leaves doubt as to what was intended. Jurisdictions appear to be waiting for native title claims to be proven in the Courts or resolved by negotiation before addressing the likely water requirements. There are a few instances where attempts have been made to meet potential native title requirements with specific volumetric allocations (Apsley, NSW and Katherine, NT). The basis for determining the volume of water differs markedly in each instance, highlighting the need for further consideration of transparent, robust and equitable mechanisms for making such assessments.

According to the NSW implementation plan for the NWI, there is provision for allocations to meet native title requirements, should they be determined:

> Each of the WSPs recognises that extractions as part of a native title right may increase over the term of the WSP, in the event that native title is granted in NSW. In addition, applications for consents under the WMA (in relation to a new grant of water, or an approval) are notified to native title
Jackson’s report on water planning to the National Water Commission (2009) argued that the extent to which a native title entitlement will satisfy native title requirements can only be determined on a case by case assessment. Looking at the NSW experience, Jackson (2009) highlighted that of the 35 water sharing plans in operation, only 2 provided an allocation for native title.

The Apsley Water Sharing Plan of NSW is an interesting case of such an instance. It is one of very few existing plans that provides an allocation for native title purposes to an Aboriginal community residing on the Apsley River (0.01 ML/per day). This amount was determined using a formula based on per capita residential water use, not any other considerations relating to spiritual or cultural objectives or aspirations. According to an officer of the Department of Natural Resources there was considerable discussion about the nature of this right, both in-house and with the affected Aboriginal community (Miller pers. comm.). In this case the community had a water frontage and was therefore entitled to a basic landholder right to water for domestic and stock purposes, making articulation of the difference between the basic right and the native title right difficult (ibid). This landholder ‘riparian’ right is available to Indigenous Australians, if they or a community group owns or leases land, in all Australian jurisdictions (McKay 2002a).

There are other mechanisms to address Indigenous requirements in the NSW water management system. For example, a number of NSW Water Sharing Plans, such as the Gwydir Regulated River Water Source Plan (2002), state that the water supply system shall be managed ‘so that it would be capable of maintaining supply to those exercising native title rights through a repeat of the worst period of low inflows to those water sources’. In the Gwydir case, achieving this clause would require that sufficient volumes of water must be set aside from assured inflows into this source and in reserves held in the Copeton Dam. The limitations of the native title system are also widely canvassed in the literature sourced here (see for example McFarlane 2004; Behrendt and Thompson 2004; Tan 2009; Jackson and Altman 2009).

As mentioned above, each of the Water Sharing Plans provide for access to water for cultural purposes by Indigenous communities and persons. The range of uses supported by these licences include: ‘personal, domestic and communal purposes including the purposes of drinking, food preparation, washing, manufacturing traditional artefacts, watering domestic gardens, cultural teaching, hunting, fishing, and gathering, and for recreational, cultural and ceremonial purpose’ (Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2003, Section 59 (9)). Cultural access licences are capped at up to 10 ML per licence per year and are not to be traded.

The first and only Aboriginal cultural access licence was allocated to an Indigenous group, the Nari Nari Tribal Council near Hay in 2005 (NSW Department of Natural Resources 2006).

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9 In NSW a native title holder means a person who holds native title rights pursuant to a determination under the Native Title Act 1993 (Cwth) (McKay 2002). As there are so few determinations to date this level of proof may continue to limit substantially, and for some time, the number of instances in which water is allocated for native title purposes.
Resources 2006). The Nari Nari case is explored in greater depth in the following chapter. It is a very interesting case given its overlapping environmental, cultural and economic dimensions. The Tribal Council is leasing some of its water entitlement to support employment of Indigenous staff for its land management activities and is engaged in an environmental watering exercise (see Section 5.2.1).

**Water benefits project – the Ngarrindjeri Values Study**

A number of years ago CSIRO initiated research into measuring benefits that flow from water with the goal of supporting management changes. A range of options to measure and understand how multiple forms of benefits could be increased for regional sectors, groups and the environment was undertaken. One component of this initiative examined the issue from the perspective of the Indigenous communities of the Coorong in South Australia (Dyack and Greiner 2006). The goal of the CSIRO collaboration between researchers and Indigenous people in the Coorong was to delineate benefits that derive from water for Indigenous people in support of more informed water resource management. Dyack and Greiner describe the approach:

*Benefits are assumed here to include the sum of values attached to resources and the outcomes deriving from them. Values are both for use and non-use. Values also derive from market and non-market returns from the resource. Hence, water is used directly in a market sense for drinking where the alternative is bottled water, and water supports fish, a further consumable with a market value. Water also supports nonmonetary non-use values attached to a sense of place, importance of living on ‘country’ as ancestors had done and a sense of well-being from being attached and responsible for country. Non-use values can incorporate non-monetary bequeath values to future generations as well. If the resource declines in value, through quality reductions or introduction of predator species or pollution, then the use and non-use values decline.*

*To the extent that these changes in value are measurable and subject to management discretion, the value (or cost) of management decisions can be estimated (2006: 6).*

The focus of the research strategy was on improving Ngarrindjeri wellbeing predominantly through non-consumptive use benefits. Specifically, the two objectives of the project were to:

- quantify and value in welfare economics terms the uses of water, wetlands and floodplains by the Ngarrindjeri People; and to

- document the cultural values of water, wetlands and floodplains to the Ngarrindjeri people.

Ngarrindjeri leaders want to see benchmarks established that identify the costs of running programs that seek to achieve levels of access to water and water related resources that were experienced by Ngarrindjeri people in the 1960s, 1970s and 1980s. This research adds further to the understanding of the physical and spiritual
connection of Ngarrindjeri people to country (Birckhead, Greiner et al. 2008). The report illustrates:

- the variety of social, cultural and economic values, which Ngarrindjeri people derive from water and water-based ecosystem;
- how these values have changed over time;
- why these values have changed over time;
- how Ngarrindjeri wellbeing and survival in the environment of the Lower Murray is inextricably linked with water flows of sufficient quantity and quality to provide a basis for future economic and social development;
- how detrimental changes to water quality and quantity in the Lower Lakes, Coorong and Murray Mouth have negatively affected Ngarrindjeri wellbeing;

The researchers decided against an orthodox approach to investigate the economic value of water in favour of a wellbeing framework, after negotiations with the Ngarrindjeri Leadership Team. The framework is described as one that ‘integrates many aspects of human life such as economic opportunity (employment/income), health (mental/physical), country and culture, among others’ (Birckhead, Greiner et al. 2008: 25). The report provides a draft conceptual model of well-being and a qualitative description of the value of particular water values, including wild resources.

Studies referred to in section 3 above describe Indigenous interests in water and values associated with water as distinct, diverse, wide-ranging, elemental, holistic in perspective, interconnected (see for example, Toussaint et al 2005; Jackson 2005). What is readily apparent when one seeks to address such values in a water resource management context is how intangible, subjective, and hence, difficult some of these values are to translate given the prevalent conceptualisation of water as a resource and the utility-based definition of environmental value in contemporary water resource management (Jackson 2005; Gibbs 2006; Langton 2005). NSW’s Healthy Rivers Commission encountered a similar problem when seeking the views of the Indigenous community about appropriate river health goals and strategies for achieving them during its inquiries into all major coastal rivers, as Douglas explains:

*The Inquiries have demonstrated just how difficult it is for both local Aboriginal communities and the Commission to engage in dialogue over river health issues in terms meaningful to Aboriginal people’s physical, spiritual and cultural needs. This question of ongoing effective dialogue must be further addressed in all facets of natural resource management (2004: 12).*

A thorough understanding of social and economic impacts on Indigenous people will require greater knowledge of water’s value to the customary economy, to Indigenous social and cultural life, the threats to continued realisation of this benefit, and greater capacity to highlight such considerations in trade-offs over water use and river management (Jackson & Morrison 2007). Empirical and theoretical studies of Indigenous resource use and socio-economic systems undertaken over many years
by the Centre for Aboriginal Economic Policy Research (e.g. Altman 1987), and more recently by CSIRO, provide a valuable basis for this field of inquiry.

International experiences may offer insights. In New Zealand, for example, the Ministry for the Environment has developed Flow Guidelines for Instream Values (Ministry for the Environment 1998). Instream values are defined as ‘those associated with the river’s natural environment, its traditional uses for Maori, and its recreational and aesthetic values’ (1998). Out-of-stream uses are ones that we, in Australia, might describe as consumptive uses. Examples of out-of-stream uses include abstraction, diversion of water from or into a river, damming, and changing land-use patterns (for example, by urbanisation or converting pasture into pines). In the New Zealand guidelines there is an extensive discussion of Maori and landscape values, provided ‘in the hope that this discussion will have wide applicability and will assist water managers to address a range of water-related landscape and Maori issues, including flow management issues’ (1998).

**4.7.3 Cultural flows**

A number of concepts have been adapted or designed to recognise Indigenous cultural values, most notably the ‘cultural flow’ concept emerging from contributions by Indigenous Nations to the Living Murray Initiative (Morgan et al 2004; Weir 2007a). There is also the ‘cultural value’ concept or beneficial use under the National Water Quality Management Strategy (Jackson 2005). Cultural and spiritual values can be taken into account through the process of establishing the specific water quality objectives for a particular water resource (ARMCANZ/ANZECC 2000).

Some traditional owner groups in the Basin are making a case for water rights on the basis of cultural differences (Weir 2007a), and over the past few years, interest has grown in distinguishing a flow regime separate to the environmental flow (see for example, Native Title Report 2008) to meet cultural purposes. The case being advocated is for a ‘cultural flow’ to ‘express how their interests compare and contrast with the priorities of others’ (Morgan et al. 2004: 18). The Annual Report (2005-06) of the MDBC Community Advisory Committee noted in 2005 the need for ‘further development and commitment to cultural flows and the rights and responsibilities of Indigenous people’ [http://www2.mdbc.gov.au/subs/annual_reports/AR_2005-06/cac3.htm](http://www2.mdbc.gov.au/subs/annual_reports/AR_2005-06/cac3.htm), accessed 6 February 2010). Indigenous responses to environmental flows policy, water access rights and trading of entitlements in the Murray-Darling Basin have been observed by Weir (2007; 2009) and Morgan et al. (2004; 2006).

In a report to the NSW Healthy Rivers Commission, Behrendt and Thompson 2003 state that:

*Cultural flows should be an essential component of river management. A ‘cultural flow’ can be set and monitored as sufficient flow in a suitable pattern to ensure the maintenance of Aboriginal cultural practices and connections with the rivers (Behrendt and Thompson 2003).*

According to Birckhead, Greiner et al. (2008), Indigenous nations in the MDB have begun to refer to ‘Indigenous flows’ rather than ‘cultural flows’:
This re-naming has been considered important because the term ‘cultural flow’ carries with it old-fashioned and potentially limiting understandings of culture that lead to poor decisions from Governments relating to Indigenous engagement.

Definitions offered by MLDRIN for example, indicate that a ‘cultural flow’ ought to be available to meet and advance economic needs. A MLDRIN delegate from the Yorta Yorta nation, Henry Atkinson, reports on the MLDRIN definition:

‘Cultural Flows’ are water entitlements that are legally and beneficially owned by the Indigenous Nations of a sufficient and adequate quantity and quality to improve the spiritual, cultural, environmental, social and economic conditions of those Indigenous Nations (Atkinson 2009).

Atkinson lists the expected outcomes from a cultural flow:

- Survival and sustainable health of the rivers and waterways through the restoration of natural flow regimes;
- Improved and strengthened spiritual, physical and mental health of the Indigenous people whose beliefs, cultures, identities, prosperity and physical wellbeing are inseparable from the environment and whose lifeblood is the waterways;
- To protect and restore ecosystems such that native plants and animals and their habitats are able to be used and managed in accordance with the cultural practices of the Indigenous Nations.

Atkinson further raises ‘implementation issues’, such as:

- Adhere to the principle that the free and fully informed prior consent of the Indigenous Nations is necessary, desirable and best practice;
- Seek the consent of the Indigenous Nations in respect of the water acquisition for cultural flows;
- Seek the consent of the Indigenous Nations in respect of any proposed restriction on cultural flow outcomes;
- Transfer water entitlements to such incorporated body as the Indigenous Nations may nominate.
- With respect to the management and decision making in respect of releases of cultural flows the Commonwealth and States of Australia, the Murray Darling Basin Authority, the National Water Commission and their successors should ensure that the Indigenous Nations have access to technical and scientific support as and when required and that proposed cultural flow releases are able to be co-ordinated with other releases and events so as to achieve maximum efficiency and effectiveness and implementation of cultural flow outcomes.
The overriding objective in determining the type and location of water entitlements acquired and transferred to the Indigenous Nations for cultural flows must be sufficient to ensure that the Indigenous Nations, through their legal and beneficial ownership of the water entitlements, can achieve substantial and measurable cultural flow outcomes.

According to the Social Justice Commissioner’s 2008 report, Indigenous groups in the MDB make the following distinction between environmental and cultural water:

The difference between environmental and cultural water is that it is the Indigenous peoples themselves deciding where and when water should be delivered based on traditional knowledge and their aspirations. This ensures Indigenous peoples are empowered to fulfil their responsibilities to care for country (2008: 184).

A separate cultural flow may be a way of encouraging governments and the wider community to enhance their efforts to satisfy Indigenous water requirements. It could further serve to increase the pressure to translate the requirements of the NWI and the Basin Plan into specific legal obligations and responsibilities, and to focus attention on the need to resolve conflict between Indigenous people and other water uses over the use of shared water.

4.8 Indigenous water rights

The neglect of Indigenous water rights has been noted in the literature (Tan 1997; Altman 2004; McFarlane 2004). McFarlane commented on this matter in 2004 when the NWI was finalised:

At the time that State and Territory governments developed plans to manage the nation’s water resources and recognise access rights to it, the majority of Indigenous people missed out. They were not landholders or irrigators. As a result, their involvement in the commercial water industry was minor at best (McFarlane 2004: 3).

Prior to the introduction of the NWI, the former Indigenous representative body, ATSIC, commissioned a series of papers on Indigenous water rights (Lingiari Foundation 2002). In 2004, ATSIC produced another publication on Aboriginal water and fishing rights, comparing the legal and policy approaches of Australia and Canada (Kaufmann 2004). With the surge in activity in native title law, a number of lawyers have sought to describe the extent to which current domestic law and policy recognises and protects Indigenous interests, especially their property rights in water, as well as the bearing international legal principles may have on such matters (e.g. Behrendt and Thompson 2004; Tan 1997; Craig 2006; Collings 2002). More recently the Social Justice Commissioner dedicated a chapter of his annual native title report to water issues (2008).

Compared to other colonised countries, including the United States of America, Canada and New Zealand, Australia has the least formal recognition of Indigenous water rights (see Durette 2008).
Following recognition provided by the Australian High Court’s *Mabo* decision and the *Native Title Act 1993*, legal rights to inland waters exist in Australia and there are now in excess of 600 native title claims Australia-wide (McFarlane 2004). Rights of hunting, gathering and fishing for the purposes of satisfying the personal, domestic or non-commercial needs of native title holders have been legislatively recognised as included in legal rights and interests comprising native title. As discussed above, to date native title determinations have recognised non-exclusive rights to access water for personal and domestic purposes, including customary pursuits, and there is yet to be a determination which allows water extraction for commercial purposes (Rural Solutions 2008).

At the same time that native title law was developing in Australia there were profound shifts in water law and policy. It was not until 2004 however that Indigenous interests were formally considered in national water policy. The NWI explicitly recognises the special character of Indigenous interests in water, particularly native title rights. Parties to the NWI have agreed to an over-arching objective: water access entitlement and planning frameworks should recognise Indigenous needs in relation to access and management. Aboriginal and Torres Strait Islander people are to be included in water planning processes and water plans are to incorporate their objectives.

Jackson (in press) argues that, despite the existence of Aboriginal legal rights to water, in regions where the water resource is fully developed, such as parts of the MDB, the priority of chronological possession of land and water rights has affected both the capacity of Aboriginal people to retain customary connection and attain recognition of legal rights to water bodies. It is a poignant coincidence that the peak of water resource development in the Murray Darling Basin occurred when extractions were capped at 1993/94 levels, and that this point marks the moment the *Native Title Act* came into effect. Subsequent legislative amendments have further narrowed the scope of native title rights to water. In 1998 native title holders lost the short-lived right to negotiate over water resource developments. De-coupling of land and water rights since 2000 has restricted the economic development potential of land recently claimed under statutory land rights regimes in NSW, unless claimants purchase water on the open-market. Reductions in water availability may further impact on the economic development potential of the Indigenous land-base. In combination, these factors restrict the number of Aboriginal groups which have water rights recognised as a matter of law, the nature and extent of those legal rights, how much effective control any legal rights gives Aboriginal rights holders and the quantum of benefit derived from water-based enterprises on Aboriginal land (Jackson and Altman 2009).

The 2003 Scoping Study for the MDBC described the likely outcome of native title processes for the Basin:

*Recognition of native title, to the extent that it eventually occurs at all in the Basin, will undoubtedly be confined to very small parcels of land and to requirements that native title holders be informed or consulted about ‘mainstream’ natural resource management decisions (2003:26).*
One of the objects of the *Water Act* is to ‘give effect to relevant international agreements’. The relevant international agreements include:

- the Ramsar Convention
- the Convention on Biological Diversity
- any other international convention to which Australia is a party. That is:
  - relevant to the use and management of the Basin water resources
  - prescribed by the regulations of the *Water Act*.

According to the Social Justice Commissioner’s Report of 2008, international agreements had not then been prescribed by the regulations. The Commissioner concludes that:

> In the absence of water ethics or principles derived from the various international mechanisms, any negotiations the Australian Government are involved in regarding water, should ensure that as a minimum the rights of Indigenous peoples’ enshrined in the Declaration on the Rights of Indigenous Peoples are fully considered. This also applies to the Basin Plan (2008: 183).

Comment is made on the adequacy of the *Water Act* for its ability to address Indigenous requirements:

> Provisions of the Water Act, requires the Murray-Darling Basin Authority to consult widely when developing, amending and reviewing the Basin Plan, including with Indigenous communities. The Act also provides for the mandatory consideration of the uses of Basin water resources, including by Indigenous peoples. However, the distinct rights and interests of Indigenous peoples to water are not adequately provided for by this legislation. For example, the Water Act should have a distinct category that provides for ‘Indigenous cultural water use’ and access entitlements (2008: 183).

### 4.9 Indigenous engagement in planning and management under the MDBC/MDBA

#### 4.9.1 Synthesis of MDBC reports

Since 2002 the Murray Darling Basin Commission has been formally engaging with Indigenous communities to elicit and understand Indigenous responses to environmental flows policy, water access rights and trading of entitlements (Anon 2003). These developments have been studied by Weir (Weir 2006; Weir 2006; Weir 2007; Weir 2007) and Morgan, Strelein and Weir (2004; 2006), who describe the range of issues, concerns, values and aspirations of Indigenous people, the legal framework within which claims are made to water and aquatic resources, and mechanisms to protect and recognise these rights. The latter include agreements
between Indigenous Nations and the Murray Darling Basin Commission (or state governments and local government), Cultural Heritage Management Plans providing employment for Indigenous people, co-management arrangements with conservation agencies, and provision of access to traditional owners to sites of significance and for hunting and fishing.

A number of reports were commissioned by the MDBC to improve the agency’s understanding of Indigenous interests in the Basin and to provide Indigenous responses to various initiatives, such as the Living Murray Initiative and the Indigenous Action Plan. These include:

- Scoping Study of Indigenous involvement in NRM (Forward NRM and Arrilla – Aboriginal Training & Development 2003);
- Indigenous Response to the Living Murray Initiative (Farley Consulting Group 2003);

The results from the latter report listed above were later published (Morgan, Strelein et al. 2004; Morgan, Strelein et al. 2004; Morgan, Strelein et al. 2006). Morgan et al (2004a; 2004b; 2006) focus their attention on the efforts of the Basin’s traditional owners, particular those in the southern half of the region, to organise and establish their authority in collaborating with the Murray Darling Basin Commission. A significant feature of the engagement they describe is the fact that the Indigenous alliance, Murray Lower Darling Rivers Indigenous Nations (MLDRIN), has operated outside the structures provided by the *Native Title Act*. According to the Manager of the Indigenous Liaison Unit of the newly formed MDBA, Neil Ward:

> MLDRIN have worked with the Commission over a number of years and have persistently been part of the evolution of the MDBC’s approach to indigenous engagement.

The geographic focus of the above studies has been the southern region of the Basin, although a report by Connolly and Connolly-Wiseman (no date) describes Indigenous interests in the Queensland portion of the Basin. In that report, the following issues were identified as the key management issues that the community would like to see addressed:

- maintenance of water quality in wetlands and catchment areas;
- Indigenous people have little access to resources to facilitate on-going sustainable land management practices;
- co-ordinated management between traditional owner groups;
- clear need for increased cross cultural awareness for non-Indigenous people involved in NRM;
- break down existing barriers to Indigenous participation in NRM;
• determine impact from chemical run-off into waterways and soil;
• determine impact from chemicals accumulating in the fatty tissue of native aquatic species;
• conserve wetlands and habitat for significant species;
• recognise Aboriginal Council jurisdictions;
• recognise Indigenous community-based Land/Catchment management organisations;
• identify and protect cultural heritage areas;
• need for cultural surveys in each catchment area, this will result in inventories of all flora/fauna species;
• re-vegetate native flora including traditional bush tucker.

More recent formal efforts to assist the northern Basin Indigenous groups have resulted in the formation of NBAN, a new consultative structure to complement MLDRIN.

The 2003 Scoping Study

This report is a key source of information on Indigenous values and perspectives on water management. Its aim was to identify:

• key natural resource management issues and concerns of Indigenous people;
• existing barriers inhibiting or preventing Indigenous peoples’ involvement in natural resource management decision making;
• options to help overcome those barriers which reflect and address Indigenous needs; and
• appropriate processes and mechanisms to facilitate and/or improve meaningful Indigenous involvement.

The issues raised by Indigenous people during the study included:

• the quality of the environment
• the health and functioning of ecosystems
• the human health consequences of the current management of natural resources.

The authors convey the depth of feeling expressed by the Basin’s Indigenous people:

Fundamentally Indigenous concern, extending to deep-seated stress and anger, is about the environmental degradation that has occurred, its direct
and indirect impacts on the Murray-Darling Basin ecosystems and landscapes including resources of special cultural value to Indigenous people. This is exacerbated by the fact that this degradation has occurred with no benefit, indeed with huge destructive impact on Indigenous peoples’ cultural and economic health and wealth (p.21).

After surveying and analysing a large number of Indigenous people, this report reinforced high expectations amongst the Indigenous population for a meaningful and influential role in Basin NRM activities (Forward NRM and Arrilla – Aboriginal Training & Development 2003). The Scoping Study found that: there is a ‘chasm between the perceptions of the available opportunities for involvement and the reality experienced by Indigenous people’ (2003).

Although the ecological issues that Indigenous people raised in consultations for the 2003 Scoping Study were found to be similar to those elsewhere raised by many non-Indigenous community members, the authors identified differences that they attributed to the interrelationship between natural resources, culture and health in Indigenous philosophy and worldview. In 2003, the ecological issue that was most commonly raised by Indigenous people in consultations was water quality - pollution of waterways and the occurrence of blue–green algae. Bourke and Moree residents present at consultation workshops were concerned about personal and environmental contamination from agricultural chemicals.

Another issue then raised as important was the flow regime of many rivers:

*Indigenous people said that irrigation takes too much water from the rivers. The consultations did not distinguish between the irrigation impact of various cropping types or regimes – with cotton, rice, vines and fruit orchards all being implicated (p.24).*

The decline in size and abundance of native fish was raised at all the Workshops, with particular references to sores on some fish, indicating sickness, being made by participants at Cunnamulla and Bourke. Declines in fish and other aquatic life were perceived by workshop participants to be undermining a distinct and highly valued culture and previously sustainable economy.

Positive responses from government agency staff combined to generate a very strong case for integrated and inclusive NRM throughout the Basin. For example, many agency representatives recognised a positive contribution to natural resource management outcomes from Indigenous knowledge.

Indigenous respondents were critical of a narrow focus on Indigenous cultural heritage matters at the expense of wider landscape scale engagement. This is a commonly reported criticism in the literature on Indigenous engagement in environmental management (Byrne, Brayshaw et al. 2003; Jackson 2006). A NSW respondent’s views illustrated the point:

*Lake Victoria is considered a ‘hot spot’ so Indigenous participation is sought out. Other water and land issues are just as important in this area, but get overlooked and our participation is not sought nor welcomed (2003::25).*
The authors were careful to highlight, however, that notwithstanding this criticism of the scope of engagement, heritage management remained a source of concern for many of those interviewed. Sites along rivers include canoe trees, middens, ovens, fish traps, and burial grounds. The management impacts are listed in the Study and included:

- damage to sand hills in Cunnamulla;
- scarred trees, burial grounds, and artefacts in Bourke;
- suspected removal of topsoil revealing burials in Moree;

The Scoping Study notes that ‘much of this destruction occurred due to land users not recognising or identifying the sites during project planning’ (p.25).

In 2003, the Scoping Study identified severe limits to Indigenous participation in water management. This conclusion was drawn from the workshops conducted through the Basin:

At all of the Workshops, Indigenous people said that no formal mechanisms operated to involve the broad Indigenous community in ‘working together’ with governments on natural resource management issues...The vast majority (77%) of the Indigenous people participating in the Workshops said they had not been involved with Murray-Darling Basin Commission activities or any of its partner governments on natural resource issues, despite all of the Workshops being held in Basin communities where water resource management was a significant economic and environmental issue (2003: 45).

Ward (2010) described the conventional approach to Indigenous engagement in the Basin, prior to the intensification of effort brought about by the Living Murray Program. He highlights a significant consequence arising from superficial and misdirected engagement processes:

Both the — ‘committee engagement’ and — ‘broader consultative’ approaches that are currently the default approach for indigenous consultation tend to result in high-level abstracted environmental aspirations being expressed by indigenous participants. Examples are —‘requiring a healthy environment with clear waters, so that we can spear fish’ or — ‘the River Murray being like it was 50 years ago, when we could tell it was time to collect swan eggs from the lakes because the duck weed was coming down the River’.

As a result, engagement efforts could not make any substantial advances in integrating Indigenous knowledge into management objectives and implementation strategies (ibid). More recently, greater effort has been made by the MDB Council to incorporate Indigenous values in environmental water planning and management, as explained by Ward:
In focusing on the creation of environmental flows to benefit the health of the river system, governments have in recent years understood the requirement to take into account the needs of a multitude of resource users, and considerable effort has been directed towards involving the Basin’s communities in the decision-making process, with particular emphasis on the indigenous communities (2010).

4.9.2 Indigenous Partnerships Program – Incorporating Indigenous Values into management of the Living Murray Icon Sites

Recognition of the degraded state of the river system has led to an extensive effort to restore environmental flows to the river. In 2002, The Living Murray was initiated to return the river system to good health. An inter-governmental agreement was signed and the ‘first step’ announced: to recover 500 GL (500,000 ML) of water to improve environment flows and achieve ecological objectives at six iconic sites along the River Murray. The six Icon sites which will benefit from the First Step are:

- Barmah-Millewa Forests
- Gunbower Koondrook-Perricoota Forests
- Hattah Lakes
- Chowilla Floodplain including Lindsay-Wallpolla,
- Lower Lakes, Murray Mouth including the Coorong; and
- The main River Murray Channel.

Weir notes that MLDREN delegates developed an Indigenous Partnerships Project in response to the Living Murray Initiative, which then became part of the Ministerial Council’s First Step decision (2007a: 177). The Indigenous Partnerships Project Plan outlines a process for Indigenous involvement in environmental watering plans at the icon sites based on the employment of local Indigenous facilitators, documentation of Indigenous values and mapping of sites. As a traditional owner representative organisation, MLDREN will provide strategic advice with regard to Indigenous perspectives for the Watering Plan for the Living Murray providing environmental allocations to these icon sites. In Appendix 1 we have summarised the Indigenous values listed in the Icon Site planning documents.

The Indigenous Partnerships Project has been exploring different models for Indigenous engagement and assessment of values and significant places. It has been undertaking cultural mapping, which is a very broad term for spatially representing Indigenous values and places of importance, combined with recording of oral histories. In Australia, cultural mapping has usually referred specifically to the mapping of archaeological sites. MLDREN is pursuing cultural mapping methods developed in Canadian land claims as a means of training Indigenous community members in monitoring and evaluation of impacts.
Land use and occupancy mapping is combined with recording of oral histories. The aim is to improve the general understanding of current relationships to country and use of resources. Mapping is considered to help Indigenous leaders articulate how they would like to see land and water managed to meet their current and future social, cultural, spiritual and economic aspirations (Ward 2010).

Neil Ward, who is responsible for managing the IPP on behalf of the MDBC/MDBA, describes how the Canadian use-and-occupancy mapping is being employed to fill gaps in understanding and better explaining Indigenous people’s contemporary connection to land:

*It was felt that because this type of map survey uses a rigorous, well-considered social-science methodology that has been widely implemented in Canada, it is an environmentally and politically defensible technique that could help fill the indigenous engagement void between specific archaeological site management on the one hand, and the frequently espoused committee engagement and broader consultative approaches on the other. It was thought that, in a practical way, use-and-occupancy mapping could firmly establish indigenous people in the contemporary landscape by documenting in tangible terms the many ways in which indigenous communities currently use the land, legal constraints aside. The potential for use-and-occupancy mapping to help indigenous leaders articulate how they would like to see land and water managed to meet their future social, environmental, spiritual and economic aspirations was also recognized during these early discussions (ibid).*

The information collected during these processes will be of value to Basin planning and implementation.
5. PRELIMINARY CASE STUDIES: ANALYSIS OF POTENTIAL IMPACTS OF CHANGES TO SDLs IN THREE BASIN REGIONS

5.1 Case study methods

The three brief case studies aimed to ‘illustrate the potential impacts of reductions in SDLs on selected regions and communities’ (MDBA Terms of Reference).

5.1.1 Case study selection

The MDB is comprised of 19 regions. Case studies were selected from three of those regions: the Murrumbidgee, the Murray and the Barwon-Darling. Case study selection was guided by the following aims:

- to reveal the diversity of Indigenous interests (e.g. environmental, cultural, social and economic). For example, case study sites were selected to explore these issues in situations where there may be:
  1. opportunities and constraints for Indigenous people to pursue economic interests in water and possible changes in water allocations from reduced SDLs.
  2. opportunities and constraints facing Indigenous people to protect water sites and flows of cultural and environmental significance.
  3. opportunities to meet multiple benefits from changes to water management, particularly for increased environmental flows and co-management of environmental water.

- to maximise the rigour of the assessment, thereby choosing sites where accessible knowledge of Indigenous values is greatest and where ecological and hydrological data may also be strong.

- as far as possible given project resource constraints, to maximise the relevance of the findings to similar situations and circumstances throughout the Basin, and

- to reveal the value of Indigenous knowledge to Plan development.

CSIRO developed a background paper on four case study options (sites, methodologies, and participating communities) through a coordinated series of emails and follow-up phone conversations with relevant parties to determine the level of community interest, interactions in the water market and whether the site meets the above rationale.
The CSIRO project team discussed the case study objectives, selection rationale, and methodology at a targeted workshop in Canberra on 17 February 2010 attended by key MDBA staff, Indigenous representatives from the newly formed NBAN interim working party (7 elected members) and 2 MLDRIN delegates. It was advised that the sites chosen may be subject to further input from potential participating communities. More than three locations were initially short listed to ensure that the project was not jeopardised should there be a lack of interest from Indigenous stakeholders in any particular region.

The short list of potential cases (Brewarrina Fish Traps, Barmah-Millewa Forest, Werai Forest, Boobera Lagoon, Nari Nari wetlands) and the rationale for case study selection was discussed with members of MLDRIN and NBAN. Further cases were nominated for the northern region (including Brewarrina Mission Billabong and Murra Murra in the Cunumulla region). At this consultation it was decided that cases should be drawn from across the southern, central and northern parts of the Basin. Participants considered that strong Indigenous interest in water management was a more important criterion for case study eligibility than the need to profile Indigenous water management experiences from a cross-section of jurisdictions.

Following this meeting, further background information was collected for the potential northern region sites and MLDRIN soon after confirmed that the Barmah - Millewa Forest was the preferred southern case. In March the final three cases were decided upon:

- Toogimbie Property at Hay (Nari Nari case)
- Brewarrina Mission Billabong (Ngemba case)
- Barmah-Millewa Forest (Yorta Yorta).

5.1.2 Context reports and framework for case descriptions

Once the case study sites were selected a set of three context reports were generated to provide consistency in the information collected and assist in the identification of issues to address during field visits and interviews. Each report provided a description of:

1. the case study context (geographic and hydrological features, socio-economic characteristics, water use trends and management arrangements) and reasons for selection (based on criteria above)

2. the status quo i.e. extent of Indigenous participation in water management and access to water resources (e.g. any licenses).

3. Indigenous efforts to improve access to water resources (for either consumptive or non-consumptive purposes) and to contribute to water management, including three aspects:
   a. efforts to participate in the identification, specification and determination of Indigenous water requirements e.g. through environmental flow assessments, environmental flow rules, water
sharing plans generally, or other means such as Water Trust in NSW, for example.

b. whether environmental flows are considered adequate? Are they sufficient in volume, direction, purpose, timing, for example, to meet Indigenous requirements. Are there non-flow related issues such as water temperature?

c. current thoughts and approaches to environmental water governance and water management institutions e.g. consideration of concepts such as cultural flows and their management. In what ways do current approaches recognise and advance Indigenous interests in water, are there ways/approaches that are working, what is not working?

4. Indigenous water management efforts within the context of broader social, cultural, economic and environmental aspirations (e.g. Indigenous Protected Area (IPA) plans, tourism enterprises, co-management of protected areas) and any interconnections between these sectors (e.g. water sales underpin cultural water licence and IPA management).

5. Insights into the possible ways in which decreased commercial water use and increased environmental flows may impact on Indigenous people. What are people’s relative priorities given that people are likely to have multiple development goals?

6. Suggestions for ways to enhance positive benefits from reduced SDLs and reduce/mitigate negative impacts.

Material from these reports is included in the case descriptions and analysis below.

5.1.3 Case study data collection

Open ended interviews were conducted with nominated representatives during field visits and via telephone. A set of questions was drawn up to guide the collection of information during interviews with Indigenous people and natural resource managers, including water agency staff. The questions asked of the particular Indigenous community engaging in water management included:

1. Are parts of your country (e.g. wetlands) recognised for their conservation or ecological significance? If so, what are the size, features of value and their condition?

2. Are they recognised for their cultural significance, if so, how?

3. If so, does this recognition provide them with sufficient water? For example, how do IPA goals and management responsibilities align with water management goals?

4. Do you know what their water requirements are? (e.g. floodwater overfill)

5. How did you or would you work out how much water (or the flow regime) these places need to sustain your values?
6. Do environmental flows address your needs, if so, in what ways?

7. Were/are you involved in setting the environmental flows?
   a. Were you involved in the Environmental Water Account Reference Group or any other environmental water management process?

8. Do you get any support to monitor the health of your wetlands?

9. Is groundwater extraction an issue?

10. How might a change in commercial water use affect you and your community?
    a. Might it result in changes to your asset base
    b. Might the crop mix change, or might there be more efficient use of water
    c. Might you consider alternative land uses such as tourism

11. How might an increase in environmental water affect you and your community?

12. Do you have any suggestions for the ways in which Governments may reduce any potential negative impacts from the Basin Plan and increase any positive impacts?

### 5.2 Case study descriptions

Interpretation of the case study material below may benefit from a fuller understanding of the water management frameworks in the respective jurisdictions, and in NSW particularly, the Indigenous specific water access mechanisms available under that states’ water legislation. Appendix 3 provides an overview of Indigenous participation in water planning and management in New South Wales and Victoria, the jurisdictions in which all three case studies are located. The sections are taken from Jackson’s report to the National Water Commission on Indigenous participation in water planning (2009).

Each of the following case study descriptions follows a common format providing an overview of the water management issues, a description of the water management efforts of Indigenous organisations, their entitlements and their interaction with environmental water management activities under water allocation planning.

The Nari Nari and Ngemba cases describe the specific efforts of two local Aboriginal groups to access water under NSW’s water sharing plans and special mechanisms to deliver water to Aboriginal people. In both cases Aboriginal groups are pursuing conservation and restoration efforts within the model of protected area management referred to as Indigenous Protected Areas. The Barmah - Millewa Forest case reveals the complexity of many inter-related environmental planning frameworks and co-management agreements that have a bearing on the Yorta Yorta’s engagement in water management in a cross-border Icon Site, managed under The Living Murray Initiative.
5.2.1  Nari Nari interests in water and land at Hay in the Murrumbidgee River region, NSW

Nari Nari people have interests in land and water in the vicinity of Hay in the Murrumbidgee catchment within the Riverina - Murray region of NSW. The region's terrain is largely a flat, almost treeless saltbush plain. The town of Hay is located on the Murrumbidgee River, about halfway between Sydney and Adelaide and just over 400 kilometres from Melbourne. The Nari Nari currently access water under four categories of licence in accordance with the Murrumbidgee Regulated River Water Sharing Plan and their watering activities are contributing to biodiversity and cultural heritage management within the region.

Water use and management in the Murrumbidgee River region

The Murrumbidgee is a region of considerable importance for water resources (see MDBA Region Description). The catchment is 84,000 ha in size (Murray 2006) and represents approximately 8% of the MDB. The region's population is approximately 595,000, representing 27% of the Basin's total (MDBA Region Description). Major urban centres within the catchment include Canberra and Wagga Wagga, NSW's largest inland city. The major water users are the Snowy Hydroelectric Scheme, Murrumbidgee Irrigation Area, Coleambally Irrigation Area, Canberra, Wagga Wagga, Griffith, and Leeton.

The Murrumbidgee River is the third longest river in the Basin. It is highly regulated with two major storages in its headwaters and major irrigation enterprises downstream (Bowmer 2002). The Murrumbidgee has one of the longest histories of development of any river in the Basin (Kingsford and Thomas 2004). Highly variable flow led to the construction of 15 large regulation structures on the Murrumbidgee including the Blowering Dam which forms part of the Snowy Hydroelectric Scheme which diverts water from the Snowy River and the upper Murrumbidgee River into the Lake Eucumbene Hydro electricity development. As a result the water has become more available for consumptive use, with large irrigation areas developed downstream: the Coleambally, Murrumbidgee, and Wah Wah (Murray 2006). About 1200 kms of its 1600 km length is regulated (DIPNR 2004). Agriculture is the main base of the community with significant irrigated (cereals, horticulture and viticulture) and dryland farming (cereals and grazing including pastoralism and mixed farming systems). Rivers within the entire region supply water to more than 2,300 irrigation farms with the majority of irrigation occurring on the flat plains (MDBA Region Description). While irrigated land accounted for 5% of total agricultural land area, the value of production from irrigated areas accounted for about 37% of total gross value of agricultural production. There is little mining and tourism is reported to be of growing interest.

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10 Written by Sue Jackson
Water is supplied to farms via an extensive network of channels and canals, with much of the landscape being gravity fed (see Figure 3 below). Progressive reforms have reduced the amount of water available for extraction. The Murray Darling Cap decision of 1993/94 set an upper limit on diversions and the introduction of environmental flow rules in 1999/2000 further restricted water supply to irrigators (Khan 2004). Average allocations for general security have decreased by 30% since 1995, a reduction Khan attributes to the following factors: the Cap, environmental flow rules, activation of sleeper and dozer licences, increased water trading and drier than average seasonal conditions (ibid). Expansion of irrigation can only occur through improved water use efficiency or purchasing water from an existing water user.

With growth in the region’s population and a decline in inflows, increasing pressure has been placed on the aquatic ecology and on water users within the region and downstream. In 2000 the Murrumbidgee Catchment was included in the 21 nominated priority catchments in the Prime Minister’s National Action Plan for Salinity and Water Quality. Khan (2004) describes the major hydrological issues facing this catchment:

*altered flow regimes and their impacts on river and wetlands ecosystems, water quality, dryland and irrigation salinity, and erosion in both regulated reaches (due to bank slumping) and in tributaries due to perennial tree removal (land clearing) and some poor grazing and cropping practices. There is a considerable level of concern about the need for increased water to be used to rehabilitate and maintain the health of river ecosystems, especially wetlands. Many irrigators are fearful of losing valuable entitlement and access to water supplies. There is also concern about groundwater depletion and the risk of contamination of these groundwaters (p.415).*
Environmental water issues

The region has a very diverse climate and includes alpine areas and shrublands of the semi-arid western Riverina. Several systems of high ecological importance are found within the region, including the Tumut and Murrumbidgee Rivers. The river provides water for wetlands and native fisheries of national and international importance (Bowmer 2002). Wetlands cover approx 4% of the catchment area (Murray 2006). Key ecological features include the Fivebough and Tuckerbill Swamps Ramsar sites and Lowbidgee Floodplain as well as the nationally significant Mid Murrumbidgee wetlands (MDBA 2010).

The Murrumbidgee CMA identified 25 key threatening processes confronting the region (MDBA 2010) with consequent effects on 130 species, 48 of which are classified as endangered. A 1999 assessment of river health found the health of the river to be poor, showing ‘considerable signs of degradation and disruption of ecological processes that compromise the long-term viability of the river’ (Wright and Murray 2006: 15). Nearly all the water resource development on the Murrumbidgee River lies upstream of the river’s major wetland system, the Lowbidgee floodplain. Kingsford and Thomas (2004) describe the Lowbidgee as one that is showing signs of ecological collapse from water resource development. The wetlands were among the highest ranked 4 out of 10 wetlands for water bird abundance and diversity in 10% of eastern Australia in 1983-1993 and 1995 (Kingsford and Thomas 2004). According to Kingsford and Thomas (2004), few Australian wetlands have been so adversely affected: 76% of the area was lost or degraded over 140 years 1855-1998.

Prior to rapid water resource development and damming in the post-war period, most water in the Murrumbidgee River from Wagga Wagga reached Hay each year (76% median) then flooded the Lowbidgee floodplain (Kingsford and Thomas 2004). Since the major damming efforts water flows have been estimated to have been reduced by 60%. Dry years have been occurring in 57% of years compared to a natural frequency of only 5%. Kingsford and Thomas (2004) further found that there was a 10% reduction in annual frequency of flooding post 1940 with floods occurring about once every three years compared to every 1 or 2 years. Similarly, waterbird numbers collapsed by 90% and by 1998-2001 the number of species were reduced by 21%. River flows used to have a strong seasonal pattern from winter and spring rainfall and snow melt. This pattern was changed to serve the irrigation sector which required more water in summer (MDBA 2010).

Inflows over the last 10 years have been 25% less than the long term average (MDBA 2010). According to the MDBA:

*This period of limited inflows has impacted on all water users including the environment, with historic diversions being progressively more limited as the volume in storage declines, and the modelled outflows from the basin, which are an indicator of the amount of flow in the river and so are linked to environmental health, being 64% less than the long term average (MDBA 2010: 17).*
Native fish populations have also suffered considerable declines. The Lowbidgee and other adjacent parts of the river have been listed as an endangered fish community under NSW’s *Fisheries Management Act 1994*.

On the floodplain a number of areas have protection: Yanga Nature Reserve for its black box community, the adjacent Yanga National Park with a significant redgum community and 23,800 ha of lignum protected from clearing. In 2004 the long term prospects for these flood-dependent communities were poor due to lack of flooding (Kingsford and Thomas 2004). Terrestrial vegetation will eventually take over these areas, with much of the lignum or black box either dead or in poor condition (2004). Flood causing flows have not occurred in the last decade (MDBA 2010). In some areas, engineering works have resulted in greater frequency of inundation.

*Environmental water management*

In this region, as with many Basin regions, the factors driving water resource development ‘have evolved from a focus primarily on agricultural development to ones that seek to redress over-allocation’ (MDBA 2010). Water extractions from the Murrumbidgee River are subject to the cap on diversions that applies to most Basin rivers. The long-term modelled cap on diversions is 2341 GL for the Murrumbidgee River in NSW.

There is groundwater use within the catchment, managed as a series of seven units. As the Indigenous uses under consideration here are from surface sources, this case study will not address groundwater management.

River management committees were established in 1998 for regulated river systems to develop flow sharing rules between the environment and extractive use. In late 2000 the Murrumbidgee Regulated River Management Committee was asked to prepare advice on recommendations for a draft WSP to be delivered by 2001 (Bowmer 2002). The Management Committee members were appointed by the NSW Minister for the Environment and represented user groups, local government, government agencies and environmental groups. In April 2002, the NSW Minister for Land and Water Conservation placed the draft WSP for the Murrumbidgee River on public display (Bowmer 2002). The vision was ‘to provide the equitable sharing of limited water resources to sustain a healthy and productive river and the welfare and well-being of Murrumbidgee regional communities’ (DIPNR 2004). The Plan commenced on 1 July 2004 and was to apply for a period of 10 years.

The Plan provides water to support the ecological processes and environmental needs of the river and direct how the water available for extraction is to be shared. The Plan also sets rules that affect the management of water access licences, water allocation accounts, the trading of or dealings in licences and water allocations, the extraction of water, the operation of dams and the management of water flows (DIPNR 2004).

In November 2006 WSPs such as the Murrumbidgee’s were suspended because of extreme drought conditions. Since then, the Department of Water and Energy (now the Department of Environment, Climate Change and Water, DECCW) has put in
place measures aimed at meeting critical water needs of towns, domestic and stock and industry.

The WSP sets out the rules for environmental water including the long term target of 56% of annual river flow being protected for environmental health. In the regulated Murrumbidgee WSP (2004) the environmental water rules are designed to:

1. ensure that there is no erosion of the long-term average volume of water available to the environment during the life of the Plan
2. protect the low flows in the upper reaches of the river immediately below Blowering and Burrinjuck Dams
3. provide variable flows during the winter months
4. provide a volume of water in the dams that can be released when needed for environmental purposes, such as to assist with water-bird breeding, flooding of wetlands, fish passage or breeding, or to restore water quality (Wright and Murray 2008).

An Environmental Water Management Plan is in preparation for the Lowbidgee Wetlands.

Decisions about the use of Environmental Water Allowances (EWAs) in the Murrumbidgee Catchment are made by DECCW, assisted by the advice of the Murrumbidgee Water Allowance Reference Group (EWAG). DECCW recently reviewed the process for community involvement in environmental watering decisions as part of a state wide review of the operations of the various EWAGs (James Maguiere, pers comm). As part of this review it was recommended that Indigenous representatives will be selected to sit on the EWAG.

The Nari Nari properties rely on overbank flow and one property, Toogimbie, relies on extra water sourced under their cultural access licence. There is no weir to service their property and so their property’s water requirements must be met by directly pumping water from the river.

*Indigenous community and description of participating group*

The Murrumbidgee River Region Basin Description provides an overview of pre-colonisation Indigenous occupation and use of the area (MDBA 2010). It notes that there is evidence of occupation of the Lake Mungo area, in the neighbouring Lachlan catchment, dating back more than 30,000 years. Prior to European occupation, Aboriginal people were known to rely heavily on aquatic resources. During flood episodes, people sought higher ground, and over thousands of years of occupation, mounds were formed. Evidence for past occupation can be seen at numerous places in the region, including on the property now owned by the Nari Nari. Indigenous people of the region protect these sites within the constraints of current land tenure and access and several hundred sites have recently been recorded on Crown land and privately owned holdings under a project entitled ‘Recording Aboriginal Use &
In 2006 the region’s population included just over 11,500 Indigenous Australians, which is 16.6% of the Basin’s Indigenous population (MDBA 2010). A large proportion of this total lived in Canberra-Queanbeyan (41%) and another 19% lived in Wagga Wagga. Aboriginal people in the region are represented by Local Aboriginal Land Councils (LALCs), such as the Hay Land Council, and other associations such as incorporated bodies and reference groups associated with CMAs. For instance, both the Lachlan and Murrumbidgee CMAs have Aboriginal Reference Groups. The Murrumbidgee CMA invests $6 million in Aboriginal programs across the catchment (Geoff Simpson, Field Notes, 12 May 2010). The CMA’s indigenous activities have a strong focus on employment with 8 Green Teams comprising 65 people, all developing skills to work in NRM and local government services (see also Hunt et al. 2010).

This case study is primarily concerned with the water management issues experienced by the Nari Nari people of the Hay Plain. Traditionally the Hay Plains and the banks of the Murrumbidgee River were inhabited by the Nari Nari people, a clan group of the larger Wiradjuri Nation (Hay Local Aboriginal Land Council and Schade 2008). According to the Hay Shire website, the Nari Nari Tribe are the local Aboriginal group believed by historians to be an amalgamation of tribes from the surrounding areas, possibly including the Waradjuri from the east or the Muthi Muthi found in the west, where Balranald is now situated.

During the summers the Nari Nari made their homes along the banks of the Murrumbidgee River, where food, such as fish, kangaroo, native fowl and freshwater mussels were abundant. When the river flooded, however, the tribe moved out onto the plains in search of slightly higher ground.

In 2000, the Nari Nari Tribal Council (NNTC) was formed. The NNTC is a not-for-profit Indigenous environmental conservation organisation, committed to the protection and restoration of Aboriginal culture and heritage, and country (http://www.lanrmc.com.au/). The NNTC manages 11,300 ha of riverine land 35km west of Hay (see Figure 4 below).
In 2001, the ILC purchased Toogimbie, Lorenzo and Glenhope Stations, situated 40km west of Hay, on behalf of NNTC (see Figure 5). This purchase was designed to ensure the continued protection of sites on the properties, and to also provide employment and recreational opportunities for the community. Conservation projects commenced in 2002 and are expected to remain a priority for the NNCT. The properties encompass several regionally important environments: plains rangelands, seasonal floodplain wetlands and the riparian zone along the Murrumbidgee River. Many Indigenous sites, including occupational and burial sites have been recorded and protected across the lands. In 2007 skeletal remains from the Australian Museum were buried on Toogimbie http://www.environment.gov.au/indigenous/ipa/declared/toogimbie.html. In addition, a heritage walking trail has been constructed along the riverbank to educate visitors to Toogimbie on the natural and cultural aspects of the property, both Indigenous and European.
NNTC has acquitted projects of over $1.2 million in value since 2000, in the areas of cultural site protection, revegetation, bank stabilisation and water efficiency. Other funding bodies included Environmental Trust, ANZ Seeds of Renewal, Envirolfund, ILC, Community Water Trust, NSW Fisheries, NSW Heritage Office, Aboriginal Water Trust, NSW Arts and the Lachlan CMA. More recently the NNTC has received funding under the Working on Country program for employment of Aboriginal staff as rangers.

In 2004, almost 5000ha of Nari Nari land on Toogimbie Station was declared an Indigenous Protected Area (IPA), which is a classification of conservation land recognised as part of the National Reserve System. The declaration was made under International Union for Conservation of Nature (IUCN) Category IV – Habitat/Species Management Area: Protected Area managed mainly for conservation through management intervention. The Indigenous Protected Areas program of the Department of Environment, Water, Heritage and the Arts (DEWHA) provides incentives for Aboriginal people to participate in the National Reserves System through voluntary declaration of protected areas on their lands, and provides support for greater involvement of Indigenous people in the management of existing statutory protected areas (Nari Nari Tribal Council 2008).

Toogimbie Station is a former pastoral property dating from the introduction of farming to the region in the late 1800s. The IPA covers around 460 square kilometres of the property which abuts the Murrumbidgee River for 18 kms. A portion of Toogimbie (outside the declared IPA) is leased to a local farmer and ‘despite the drought and challenges facing the rural industry, some farming is undertaken (see Figure 6 and 7). Income from this agreement allows NNTC to meet all financial
responsibilities and help support the local economy’ (Nari Nari Tribal Council 2008: 4).

Figure 6 Toogimbie IPA. Note that a portion west and south of the Toogimbie label is not included in the IPA. Source: Nari Nari Tribal Council, 2008

Figure 7 Farm sub-lease, Toogimbie Station. Image: CSIRO 2010
The IPA designation, funded by the Natural Heritage Trust, requires management planning to be undertaken, a project manager to be engaged, and specific environmental works. This funding is allocated annually to Toogimbie and other declared properties across Australia, and allows NNTC to concentrate on restoring the landscape whilst retaining economic independence. According to the DEWHA IPA website, Nari Nari’s vision is to:

Protect and enhance our culture and history, while encouraging and protecting the natural environment and conserving biodiversity… Toogimbie IPA represents both a visual and spiritual link between the health of the land, its water systems and its people.

Indigenous trainees are working on the property, and there are plans to develop a program with Juvenile Justice in the future.

Upon divestment of Toogimbie, the environmentally degraded and fragile wetlands were adopted as the main focus of land management activities. The properties were destocked in December 2002, and since then much regrowth has been observed in species such as Lignum, Box and Gum species, native grasses and shrubs such as saltbush. Figures 8 and 9 show the effects of Nari Nari restoration efforts.

![Figure 8](image1.jpg)  ![Figure 9](image2.jpg)


Water management is a key management tool on the properties. Watering from the Murrumbidgee River has allowed significant re-growth in the wetland area adjacent to the river. To date, over 25,000 individual native seedlings have been planted across the properties, predominately low shrub and smaller tree species, and 50000 clay seed balls distributed. In the nursery, NNTC staff and volunteers have propagated tree and shrub species, and experimented with different seeding methods, including seed balls and direct seeding. Management targets were set in the initial Toogimbie Plan of Management, several of which have been exceeded (Nari Nari Tribal Council 2008).

The current Plan of Management (2008-13) includes a number of priority management actions, including a set under the key priority area of wetland regeneration:

Objective: Deliver environmental flows to wetland areas.

Actions:

(1) Lobby Murrumbidgee CMA for streamlined Aboriginal Cultural Access Licence process

(2) Continue and enhance relationship with leaseholder to improve water delivery techniques

(3) Improve water delivery infrastructure, as funding available.

Revegetation, monitoring and evaluation activities are also outlined in the Plan of Management, including continued photo point monitoring and annual fauna surveys to observe the effects of inundation.

According to DEHWA, the NNTC has also erected bird hides in the wetlands, and constructed a bush tucker garden to improve community access to native foods and medicinal plants. A successful partnership has been formed with DECCWA and the Riverina Livestock Health and Pest Authority, to carry out feral animal control. The Culture & Heritage Division of DECCW also funds cultural site protection works, repatriation and education programs.

Nari Nari Tribal Council’s Chairperson is a member of the Murrumbidgee and the Lachlan CMAs’ Aboriginal Reference Groups.

Current status of Indigenous participation in water (and land) management and access to water resources

Currently there are no extractions to satisfy native title rights. However, there is provision for native title rights and basic landholder rights to increase during the ten year term of the WSP. The water supply system is managed to ensure sufficient water is set aside to supply these rights (DIPNR 2004).
Nari Nari Tribal Council accesses water under five categories of licence under the Murrumbidgee Regulated WSP as shown in Table 5 below:

Table 5 Nari Nari Water Entitlements (Source: Arthur *in prep*)

<table>
<thead>
<tr>
<th>License/Approval</th>
<th>Primary Holder</th>
<th>Category</th>
<th>Share Component (ML)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40AL402433</td>
<td>Nari Nari Tribal Council Inc</td>
<td>Domestic and Stock</td>
<td>58</td>
</tr>
<tr>
<td>40AL403234</td>
<td>Nari Nari Tribal Council Inc</td>
<td>Regulated River (High Security)</td>
<td>3</td>
</tr>
<tr>
<td>40AL403235</td>
<td>Nari Nari Tribal Council Inc</td>
<td>Regulated River (General Security)</td>
<td>1944</td>
</tr>
<tr>
<td>40AL403236</td>
<td>Nari Nari Tribal Council Inc</td>
<td>Domestic and Stock</td>
<td>171</td>
</tr>
<tr>
<td>40AL40323</td>
<td>Nari Nari Tribal Council Inc</td>
<td>Regulated River (High Security)(Aboriginal Cultural)</td>
<td>500</td>
</tr>
</tbody>
</table>

A bore licence for 1200 ML had been granted to the property, however, it has since expired (Nari Nari Tribal Council 2008). This case study focuses on the irrigation licences (General and High Security Regulated River) and the Cultural Access Licence. Nari Nari’s entitlements are regarded as consumptive uses as the flow passes into a wetland or onto a farmed area and cannot later be diverted.

**Aboriginal Cultural Access Licence**

The WSP for the Murrumbidgee Regulated River Water Source specifies that Aboriginal Cultural Access Licences (CAL) are available for use each water year. The combined volume used on these licences cannot exceed 2,150 ML per year. The CAL is a high security licence. High security licences receive 95% allocation (2,042.5 ML against a 2,150 ML share) before any general security allocation is made. The use of the CAL is limited to specific cultural purposes that do not permit commercial gain. Water allocation can be traded between licences, but only for uses that are consistent with the definition below.

The WSP allows for the use of CAL water to be applied to sites and wetlands and is to be ordered and managed by Aboriginal people or communities. The mandatory licence conditions in the WSP state that CAL water use must be for purposes such as recreational or cultural activities or features, including cultural teaching (James Maguire, pers comm.). Part 11 of the WSP describes these and other mandatory conditions:
All regulated river (high security) (Aboriginal cultural) access licences shall have mandatory conditions that only allow the taking of water by Aboriginal persons or communities for personal, domestic and communal purposes including the purposes of drinking, food preparation, washing, manufacturing traditional artefacts, watering domestic gardens, cultural teaching, hunting, fishing, and gathering, and for recreational, cultural and ceremonial purposes.

Nari Nari was the first group to receive water under the NSW Water Management Act 2000 through a Cultural Access Licence (CAL) in 2005. A number of CALs have been held by NNTC over the past 5 years and allocated volumes have varied from approximately 300 ML up to 1900 ML per year. There has also been some very minor usage by Muthi Muthi people nearby (30 ML) on a property near Balranald (James Maguire pers comm.).

Nari Nari received 500 ML this water year to water a lignum wetland on their Toogimbie IPA (Figure 10). For reasons explained below, the current Murrumbidgee CAL allocation is not completely used each season and cannot be carried over into the next water season. There is currently no formal process for distributing the water allocated under the CAL and to date there has tended to be only one applicant.

Figure 10 Toogimbie wetland receiving water delivered under cultural access licence. Image: CSIRO.

Toogimbie's lignum wetlands are part of the region’s first lignum floodplains to be set aside for conservation purposes:

These freshwater seasonal wetlands support many local plants and animals—a 2002 fauna survey found 86 different species including 55 bird, 18 mammal, 11 reptile and two frog species. Tree and shrub species include river red gum, black box and smaller species such as boree or weeping myall, cooba, dillon bush and nitre goosefoot (http://www.environment.gov.au/indigenous/publications/pubs/fs-toogimbie.pdf page 1, accessed 15 May 2010).
Toogimbie IPA is generally flat land, comprising the three land systems - riparian zone, floodplain wetlands, and rangelands. The Plan of Management describes the water management objective for the floodplain system:

*The floodplain wetlands travels (sic) across Toogimbie in an ancient system of creeks which filter nutrients and debris when the Murrumbidgee River is in flood. The area is also an important habitat area, and is the only Aboriginal managed wetland area in the region. The area is dominated by Lignum (Muellenbeckia florulenta) a regionally threatened species, and provides habitat and feeding grounds to water fowl and smaller mammals, such as the Giles Plannigale. NNTC works closely with the Murrumbidgee CMA to provide a cyclical water allocation (Aboriginal Cultural Usage/ Cultural Access Licence), pumped from the river onto the floodplain, to mimic natural flows. Given the regulations of the river system, natural flooding has not occurred since 1994, therefore NNTC has undertaken to restore this area with artificial flows (Nari Nari Tribal Council 2008: 11).*

It is important to appreciate that the Nari Nari were able to order and deliver the water because of the existence of property infrastructure. Some of the floodplain can be watered with an existing river pump and channel system (Figure 11). A NNTC representative comments that ‘if that drainage channel wasn’t there they would have had to go around a long way and probably waste water’ (Field notes, 10 May 2010).

![Figure 11 Pump on Murrumbidgee River, Toogimbie Station. Image: CSIRO 2010](image)

Delivery of water ordered from the licence incurs standard water charges. The costs associated with this form of allocation warrant further attention when one considers that in 2006 the Nari Nari Tribal Council paid $9,000 per annum and has for a number of years devoted a significant amount of time to conforming to the demands of a complex regulatory system (Jackson 2009). The licence is free but the water is charged at the rates paid by all other users, according to the NNTC. Elsewhere, the NNTC has argued that their allocation should be available free of charge and ‘that the outcomes of their wetland watering is the same as the government’s
‘environmental water’ (Rural Solutions 2008: 12). A similar view was recorded during the field research for this case study:

That water was put in the valley for Aboriginal people. But now we’ve got user pays in the community you can’t use all that water (Field Notes 10 May 2010).

Applications must be filed every 3 months and there are other administrative burdens that are placed on the group for it to access water, as explained by a NNTC representative:

The first year we weren’t aware we had to pay for it. It cost us $10,000. For two years it cost us $16,000 for 900 ML…If you haven’t pumped it all by June 30 (end of the water year) you’ll still pay for it.

We’ve got to go to Sydney in person to lodge the licence. At the Department they don’t know anything about it. It’s all new. It’s got no reference, but we’ve been using it for five years (Field Notes 10 May 2010).

Other delivery costs include the requirement for a licence for levees to control the movement of water on the floodplain. A pumping site fee is also required. These fees are in the order of a few hundred dollars each. According to Ian Woods, it is possible to apply to DECCW to have the water costs waived, providing they can demonstrate key environmental outcomes. The NNTC has not taken this course of action.

Three factors appear to be limiting Indigenous access to the entire allocation of water available under the CAL:

(1) the need for infrastructure to water features and places of importance;

(2) the cost of the water and the administration and delivery costs and effort (complexity of application process); and

(3) the lack of awareness of the program amongst the region’s Indigenous community.

One DECCW officer said that he was aware of at least one community group that were interested in accessing the water but couldn’t because they didn’t have a pump (Field Notes, 12 May 2010).

DECCW and all groups consulted during the case study see more widespread usage of the CAL as desirable. The Murrumbidgee CMA’s Catchment Officer Aboriginal Communities has said that the procedures need to be simpler and faster (Rural Solutions 2008) and, as discussed below, greater attention needs to be given to ensuring equality of access and transparency in the assessment of proposals from Indigenous groups. It appears that these matters of equal access and cost are now being considered by DECCW (see discussion below) and the model under consideration could alleviate tensions between various Indigenous water users, the CMA and the water agency. Infrastructure requirements may continue to impede access although it has been suggested that mobile pumps could assist. NNTC would
also like to see the current decision-making process for the intra-Aboriginal sharing of water improved:

_If someone applies for water we don’t see any paperwork. The CMA only call the majority of the Reference Group. We need a better way of getting us together to evaluate the benefits and outcomes…Aboriginal interests need to be identified and the cultural significance should be clear (Field Notes, 10 May 2010)._ 

A further consideration is the extent to which the allocation meets the group’s cultural objectives. The allocation does not mimic a flood event and is therefore ineffective in terms of fish breeding, although ‘a huge response from mammals, birds and smaller reptiles’ has been noticed (K. Hay cited in Rural Solutions 2008: 11). According to the NNTC, the allocation they receive is insufficient and that more water and improvements to infrastructure could bring about further benefit:

_If we had infrastructure and water we could regenerate that country real good… If you go down there you can get old man weed, swans, ducks, frogs… We can’t afford to buy what we want. The IPA won’t fund us to pay for water or land rates on the IPA. We can’t afford the purchase price and the pumping costs. We’d love all the water. We used the whole 2150 ML for two years but it got too expensive (Field Notes, 10 May 2010)._ 

DECCW stated that if Indigenous people regarded the 2,100 ML as insufficient then more could be requested via a submission to the review of the Murrumbidgee Water Sharing Plan or via the development of the new Basin Plan (James Maguire, telephone interview, 3 May 2010). It is plausible, says James Maguire that Indigenous people may well consider that every wetland needs ‘cultural water’ and therefore more is in fact needed for the entire catchment. Currently environmental water is being directed to some known culturally significant sites, primarily for environmental purposes, however in dry years it is unlikely that there will be enough environmental water to meet all cultural and environmental water requirements. 

Water provided under a CAL cannot be traded beyond the cultural purposes outlined above. A representative from the NNCTC perceives the current practice of charge for these water allocations as inequitable:

_With the Cultural Access Licence we can’t make any economic gain but with environmental water you can. Once the water has dried up on a private property, the stock can be put back on the land. Where’s the environmental outcome in that? Other landowners get all that environmental water for nothing… we have to pay for ‘cultural water’ (obtained under the CAL) (Field Notes, 10 May 2010)._ 

According to DECCW, the initial water allocation delivered to the Toogimbie lignum wetlands was a 307 ML Adaptive Environmental Water (AEW) license managed on behalf of the Murrumbidgee Wetlands Working Group (James Maguire pers comm.). Since then water has been pumped to the site under the CAL.
The category of AEW licence wasn’t well understood at the time, indeed it was considered to be experimental (ibid). James Maguire describes how the entitlement classification affects evaluation efforts:

The first time the Working Group transferred the water there were bird counts, photo points, vegetation surveys, all to monitor the response. There is now less monitoring because the primary benefit is cultural, therefore the watering doesn’t trigger the typical environmental management response. The onus is on the user to demonstrate a cultural benefit under the mandatory conditions of the Water Sharing Plan (pers comm.).

As stated above, DECCW would like to facilitate improved access to the water available under the licence. It has encouraged a range of Indigenous groups to apply for an allocation under the CAL, as well as assisting Indigenous groups to benefit from environmental watering. According to James Maguire, the types of environmental features valued by Aboriginal people vary throughout the catchment. DECCW is watering a small culturally significant site near Hay. It is a wetland that is isolated from the river and previously received 30 ML of EWA in 2005. Other sites have been identified for future watering: two swamps on the property Talpee (non-Indigenous private property). This area may receive environmental water if there is a likelihood of a good environmental response. Maguire acknowledges that water allocations of this kind will face competition from allocations to areas where there is a good knowledge base showing environmental responses. More information is needed on the ecological responses to particular water regimes, although he suggests that a cultural benefit might be more immediate, albeit harder to measure.

Another proposal for environmental water to be directed to cultural purposes can be seen in the case of the Coonancoocabil Swamps in MIA State Forest near Yanco. More recently an environmental water allowance from the WSP has directed water to that area. Within the Lowbidgee wetlands there is an Indigenous owned property ‘Auley’ that has recently received some environmental water. James Maguire is confident that there would have also been a cultural benefit to this allocation and describes the potential for co-benefits if environmental and cultural water could be used in concert:

8,200 ML of environmental water went through seven connected parcels of private property which form a wetland complex in the Lowbidgee this year during late March and April. One of these properties, ‘Auley’, is owned by the Balranald Local Aboriginal Land Council. We might have been able to direct water further into this property had there been some CAL allocated on top of the 8,200 ML. We had levee banks and other structures to help achieve wider inundation. Perhaps the existing levee banks would not have been breached if we had extra water from the CAL, and water levels could have been maintained longer. We are looking for the best bang for the buck with limited volumes of water and getting water to many culturally significant sites may only be achieved by piggybacking on environmental releases (pers comm.).

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11 Soon to become part of the National Park estate.
Synergies between differing watering strategies (for cultural and environmental benefit) such as ‘piggy backing’ on environmental water are essential in the Murrumbidgee because of the limited opportunities environmental water managers have to water wetlands:

*Environmental water releases are made to maximise ecological responses to wetland watering. That said, the nature of ecosystems in the Murrumbidgee provide a limited window of opportunity to get water on to wetlands. These factors relate to wetland condition and seasonality.... In this way timing of release is critical, and emphasises the importance of well timed dam release (Murray and Wright 2006: 20).*

A proposal is now before the Murrumbidgee CMA to establish a process for engaging a representative group of Indigenous people in the allocation process, ensuring that prioritisation and management decisions are transparent, that the entire allocation can be put to most effective use, and that there are linkages between management of ‘cultural water’ and management of environmental water (Simpson, pers comm. 12 May 2010). The CMA’s Aboriginal Reference Group would be responsible for developing a Cultural Watering Plan under the proposal and for endorsing annual watering recommendations. The proposal would also see the CMA holding the CAL on behalf of Aboriginal people throughout the regulated part of the Murrumbidgee River – downstream from Gundagai. It is proposed that two representatives from the CMA Aboriginal Reference Group would serve on the Environmental Water Advisory Group. DECCW’s Culture & Heritage Division and Water for the Environment would provide support to the Reference Group to get endorsement of the annual recommendations for use of the CAL.

Although the Murrumbidgee CAL is unique, the lessons learnt from this ‘experiment’ in providing access to Indigenous people are of considerable value to this study. The existence of an Indigenous share of water entitlement has given Aboriginal people a ‘seat at the table’ according to Gary Currey, Far West Regional Manager of Culture & Heritage at DECCW. Geoff Simpson of the Murrumbidgee CMA stated that he sees it as ‘a good way of gaining access and entering into partnerships... it should provide us with an economic opportunity too’ (Field Notes, 12 May 2010). Although Indigenous access to this water is currently limited, in part because of the cost of purchase and delivery of water, there is a consensus emerging on ways to improve the utility and equity of allocations under the CAL. The legitimacy of a policy of charging Indigenous people for applying water for public benefit outcomes is also widely questioned by those aware of the circumstances. The development of a Murrumbidgee Cultural Watering Plan offers a more systematic, strategic and integrated approach that should enable greater Indigenous influence over both the cultural water entitlement and environmental water management and provide Indigenous people and government resource agencies with the means of transparently evaluating competing proposals for scarce water. The proposed governance model for enhanced access to the CAL should be considered by the MDBA and DEWHA in efforts to improve Indigenous water management.

*How well do environmental flows address Indigenous water values?*
According to James Maguire of DECCW, there was no Aboriginal representation in the original membership for the EWAG specified in the WSP. Since that time CMAs have also been formed and the Murrumbidgee EWAG has been established. DECCW has recognised the need for Aboriginal representation on EWAG. James Maguire describes this form of participation as the main mechanism for Indigenous people to influence environmental flow decisions.

The NNTC argues that DECCW should extend its consultation and look more closely at other areas in the catchment:

DECCW should consult from Maude to Tumut. They’re only concerned about the Lowbidgee. They’ve prioritised the Yanga National Park. There would 30-40 wetlands in that area above Maude... All the water coming down is DECCW water. DECCW has bought it from General Security Licences (Field Notes, 10 May 2010).

However DECCW can confirm that at least 8 wetlands have either recently been or are soon to be watered in the reach between Narrandera to Hay. Further sites that could potentially be watered are identified in the draft annual Environmental Watering Plan 2011. This draft Plan also specifies an intent to piggyback environmental water releases onto tributary flows following rainfall events. This is aimed at inundating hundreds of mid Murrumbidgee wetlands between Gundagai to Hay (James Maguire pers comm.).

The WSP has been suspended since 2006. However in 2009 the Minister approved the use of up to 10 GL of EWA to assist the survival of the endangered Southern Bell Frog populations found in the Lowbidgee wetlands. The objectives for environmental water use for 2008/09 were:

1. to flood Southern Bell Frog wetlands in the Lowbidgee (Yanga National Park and private property wetlands in the Redbank and Maude systems)

2. to flood the southern section of red gum forest in Yanga National Park using the channel systems from Maude Weir – the forest condition is critical and declining

3. to flood sections of privately owned red gum forests in the Lowbidgee from both Redbank and Maude weirs. Target sites would be prioritised for watering using an independent assessment program to inform the EWAG or DECCW decision making process.

4. to flood the northern section of red gum forest in Yanga National Park so as to allow for Southern Bell frog dispersal and maintenance of red gum forest health.

5. to inundate the Nimmie Carie system of Lowbidgee wetlands creating and sustaining a water bird breeding event similar in extent to that of 2005

6. use infrastructure to flood prioritised mid-catchment wetlands in the Murrumbidgee Irrigation area e.g. Coonancoocabil Swamps and MIA State Forest wetlands.
The Lowbidgee initiative delivered by DECCW through the Aboriginal Use and Values Project of the Rivers Environmental Restoration Program (RERP) warrants closer attention. Riverbank and DEWHA have contributed substantial funds to the $181 million Environmental Restoration Program which has as its initial focus, the Macquarie Marshes, Gwydir Wetlands, Lowbidgee Wetlands and Narran Lakes (http://www.environment.gov.au/water/policy-programs/water-smart/projects/nsw10.html, accessed 19 May 2010).

RERP’s target ecological features are considered by the e-Water Cooperative Research Centre as among the most important wetlands nationally for bird breeding and bird species diversity (D’Arcy and Weeraratne no date).

The primary activity is the planned acquisition of environmental water through the purchase of entitlements from willing sellers. When the water is not required for the environment it can be traded back to irrigators on the temporary market. The program has five elements, including ‘recording Aboriginal culturally significant wetland activities’ so as to ‘provide opportunities for Aboriginal communities to undertake cultural pursuits in important wetlands’ (ibid). The Aboriginal subprogram has researched people’s use of and values relating to wetlands and is undertaking cultural heritage training programs. A total of around $500,000 has been provided to the Aboriginal subprogram over two years (D’Arcy and Weeraratne no date).

The Program’s first environmental water allocations for spring 2009 occurred in October at Yanga National Park near Balranald. Several threatened and endangered species benefited from the watering of 1.9 GL.

According to the Gary Currey, significant effort has been given to the community development element of the Aboriginal program (Field Notes, 12 May 2010). Over a two year period there has been extensive consultation through meetings, workshops and field visits to engage Indigenous people and non-Indigenous land owners. Effort has been devoted to archival and social research to document the historical use of wetlands. Indigenous and non-Indigenous people have identified places of significance and their archaeological value. Archaeological and cultural landscape mapping has included specialist botanical uses. A socio-economic component was included. Future opportunities around wetlands were identified e.g. outdoor education centre, cultural eco-tourism, craft products and other sustainable use opportunities. Gary Currey reports that access to cultural water sites was ‘a big issue and we have talked extensively with land owners about access through the development of access and use agreements’ (Field Notes, 12 May 2010).

Fulfilling the aims of this program gave the team involved the chance to revisit the cultural water allocation, which Currey states had ‘historically been under-utilised’ (Field Notes, 12 May 2010). Currey sees merit in the proposal to develop a Cultural Watering Plan because it would overcome the current ‘ad hoc approach and replace it with a strategic assessment of receiving nominations, looking at where the water should be delivered, and articulate the benefits, both cultural and environmental’ (Field Notes, 12 May 2010).

The Nari Nari participants interviewed regard this program as very worthy:
They’ve done surveys recording sites and places. This has opened things up. It’s leading to access agreements with land owners. One farmer couldn’t do enough for us. This is all coming out of the restoration project. They are doing oral histories and site surveys… Access to wetlands is a priority (Field Notes 10 May 2010).

Although RERP has not attempted to specify the water requirements of features and places identified as important, the information collected will be of value to future efforts to more comprehensively evaluate the benefits of environmental watering plans.

Potential impacts of changes in water availability on the Nari Nari people

A reduction in water availability may have a deleterious impact on the Nari Nari community. According to Anderson-Smith, water scarcity (or the drought) was listed by the Nari Nari Tribal Council as one of the three key threats to the future of Toogimbie (Anderson-Smith 2008). As described above, the Nari Nari are utilising their irrigation entitlement to underwrite their ecological restoration and cultural heritage management activities. They currently receive more income from the farm lease (inc. water) than they do from the IPA program. IPA funding does not cover the employment of Aboriginal Rangers, this funding is sourced from the DEWHA Working on Country Program (1 Ranger position) and from other income, including the farm lease. Any threat to that asset could undermine their IPA objectives and broader development strategies for their lands. Representatives of the Nari Nari are clear that access to water is critical to their enterprise and that they do not want to permanently sell their water: ‘it is needed for the IPA’ (Field Notes 10 May 2010). The NNTC even sought advice from the ILC on the ways of protecting the value of that asset. The ILC has a caveat on the land but not on the buildings and the licence and it is therefore not possible to tie the licence to the land tenure.

The NNTC’s ‘cultural water’ share is provided under a High Security licence, however, its irrigation water share is almost entirely provided under a General Security licence, which is the most vulnerable category of entitlement. In a given year, depending on storage levels in the dams and inflows, water allocations adhere to the following hierarchy:

- Environmental water provisions;
- Basic rights requirements (including native title);
- Licensed domestic and stock requirements;
- Local water utility requirements;
- Any water carried forward in water accounts
- High security, and
- General security (Khan 2004).
General security allocations vary from year-to-year depending on the amount of water held in the dams; they are allocated what is left after other needs are met, and in drought years this may be extremely low (Murray and Wright 2006).

Marsden Jacob and Associates (2010) found that the drought had severely impacted on broadacre mixed rice and non-rice irrigation farms in the Murrumbidgee since 2002, with General Security allocations falling from an average of 83% prior to the drought to 32% over the period 2002 – 2009. As a result, over 30% of farms are accessing Exceptional Circumstances provisions (Marsden Jacob and Associates 2010). They assessed the impact of a number of scenarios: 20%, 40% and 60% reductions in water availability on each region, finding that in the Murrumbidgee:

A uniform long term water availability reduction of up to 20% would result in some farm businesses becoming unviable and many other businesses not able to maintain the business growth required to address the long term cost/price squeeze. Some larger businesses would attempt to restructure their businesses, and purchase water entitlements or annual allocated water to maintain productivity. Many smaller businesses would be expected to cease operation (2010: 163).

The NNTC reported that the farmer leasing part of Toogimbie did not grow any crops last year because of the drought (Field Notes, 10 May 2010).

Although the Nari Nari argue that the environmental water ‘flows straight past them’ on the way to the Lowbidgee, reductions in SDLs may increase the amount of water available to the wetlands in the mid sections of the catchment. Under the new arrangements proposed for a Cultural Water Management Plan, there could be greater opportunities for the Nari Nari and other interested Indigenous groups throughout the catchment to access environmental water for their needs. In late May 2010, the Nari Nari applied to the Commonwealth Water Holder to supplement their wetland watering activities on their IPA. Assistance from this program would set a precedent for improved Indigenous access to environmental water.

Recent research has identified livelihood opportunities from Nari Nari IPA management that could conceivably be enhanced by improved environmental condition and additional investments in NRM (Anderson-Smith 2008). Nari Nari people interviewed for this study perceive numerous economic development opportunities from improved management of their lands, including greater access to cultural sites and wild resources such as fish. Increased environmental flows can help restore landscape health and enable traditional owners to undertake activities to preserve their heritage values and generate livelihoods from environmental service provision to other land management agencies such as National Parks. Nari Nari report that there are increasing employment opportunities from environmental restoration programs and from the increase in protected area management activity. Assuming that reductions in SDLs contribute to wide-scale environmental improvements in the Murrumbidgee, the opportunities for significant Indigenous benefit to be derived from natural and cultural resource management may multiple.
5.2.2 Ngemba interests in water and land at Brewarrina, Barwon-Darling River, NSW\textsuperscript{12}

The Billabong is the kidney's of the system, and what they aim to achieve through a Cultural Access Licence and IPA is fill the Billabong with unhealthy river water, run it through the Billabong, which injects natural antibiotics to clean the water up and put it back into the Barwon Darling River. The important thing is that this process can also provide healthy water to the downstream Brewarrina Aboriginal Fish Traps (Ngemba participant, December 2009).

The Ngemba people have an interest in rehabilitating and protecting land and water at the Old Brewarrina Mission Billabong, situated within the Barwon-Darling River catchment north western NSW. The Brewarrina Shire Council describes the town of Brewarrina as a small but progressive remote town located on the Barwon-Darling River, one which also boasts a high Aboriginal population (http://www.breshire.com/about/1007.html). Brewarrina is 808 kms by road from Sydney and is situated on the southern bank of the Barwon-Darling River, 100kms east of Bourke on the Kamilaroi Highway. The Old Brewarrina Mission Billabong is currently located on three parcels of land with different owners and managers. The nationally significant Brewarrina fish traps are approximately 8 kms from the Old Mission Billabong (Figure 12).

\textsuperscript{12} Written by Brad Moggridge
Water-use and Management in the Barwon-Darling River System

The Barwon River flows south-west from Collarenebri in the north-east of NSW to Wilcannia in the south-west. The Barwon River becomes the Darling River at the confluence of the Culgoa River. At the confluence, approximately halfway between Brewarrina and Bourke, the Darling River is unregulated to the Menindee Lakes. Below Menindee Lakes it is called the Lower Darling until it reaches the confluence of the Murray River at Wentworth. The unregulated part of the Darling River in NSW (from Mungindi to Menindee) is managed as one river system as far as water access and the Murray Darling Cap compliance rules are concerned.

Water resource development has had a major impact on the hydrology of the Barwon–Darling River system (Thoms and Sheldon, 2000 in MDBA, 2010). Flows in the Barwon–Darling system are modified with 9 headwater dams, and 15 main channel weirs (Thoms and Sheldon 2000 in MDBA, 2010).
The major land use is dry-land pasture used for broad-acre livestock grazing. Almost one-third of the land area remains as native vegetation. Crops are irrigated by supplementary water from large on-farm storages along the river system. The water is harvested from upstream tributary flows in preceding months. Approximately 25,000 ha is irrigated land and over 90 percent was cotton (see below Figure 13). Hot summer temperatures and generally low but erratic rainfall in the region supports less intensive dry-land agricultural production than in the rest of New South Wales (CSIRO 2008).

![Harvested cotton ready for transportation, Brewarrina. Image: CSIRO 2010.](image)

The Barwon-Darling region contributes about 2.8% of the total runoff in the MDB. Average annual modelled runoff over the region for the 111-year period is 6 mm and is higher in summer and early autumn. The average annual modelled runoff over the ten-year period 1997 to 2006 was 8 percent higher but not significantly different to the long-term average values. The runoff estimates for the Barwon-Darling region are based on gauged catchments from outside the region so there is less confidence in the modelled outputs, particularly in the drier western half of the region. Water availability in the Barwon–Darling largely depends upon how much water flows into the region from the catchments upstream. The region’s private off-river storages, which store water for irrigation via pumping during high river flows, floodplain capture or irrigation tailwater retention, offer some insurance from year to year variability in water availability. However, irrigated agriculture is still subject to high variability in water availability. Runoff generated within the region below Bourke is not considered to be sufficiently significant to be included in any modelling of the river system (CSIRO 2008b).

The Barwon–Darling valley is considered to have poor ecosystem health for macro-invertebrate and fish species and poor hydrological conditions (Davies et al. 2008). This is considered to be a result of marked changes in the Darling’s hydrological regime over the last 100 years (Thoms and Sheldon 2000). The Barwon-Darling River within this catchment receives water from sources outside the catchment. Consequently, water quality depends on both the quality and quantity (for dilution or
flushing purposes), of water delivered from upstream sources and retained from extraction (Western CMA 2006). Nationally and internationally significant wetlands are found in the Barwon–Darling catchment including the Talyawalka wetlands. The area comprises the wetlands of the Talyawalka Anabranch of the Darling River and its tributary, Teryawynia Creek. It is representative of a semi-arid inland floodplain wetland system fringed by Black Box woodland (CSIRO 2008a).

Groundwater management is not an issue for the site or valley, as regional groundwater tends to be saline. However there would be many stock and domestic bores into the shallow alluvial aquifers close to the river. These are very useful in times of drought (Peter Terrill pers comm.).

*Indigenous Community and Description of Participating Group*

The *Draft Barwon-Darling Region Basin Description* provides a brief overview of Indigenous occupation, referring to archaeological evidence of Aboriginal occupation in the Barwon–Darling region that dates as far back as 50,000 years before present (MDBA 2010).

In western NSW many distinct Aboriginal groups can be clearly identified from the historical record and from contemporary patterns of social organisation. Most of these groups lived along the waterways that make up the Darling catchment. For these people the river was the centre of their existence and they have lived with its constant changes over 50,000 years. The Warrego, Paroo and Darling Rivers and their floodplains provided not only a source of cultural inspiration but also sustained life by providing food, water, medicines, shelter and transport.

Fish was a favourite food of Aboriginal communities living near the river with people using spears, nets, plant material and traps to catch fish. When the rivers were full, big nets were used to catch large numbers of fish for ceremonial gatherings. Fish weirs and stone traps were also built to catch fish returning from the wetlands into the main stream as river levels fell. There is a number of sites that reveal the extent of Aboriginal fishing on the Darling. Several of these are at Lake Tandou (south of Menindee) and are approximately 24,000 years old. They reveal the remains of large fish, turtles, yabbies and even platypus at such sizes to indicate that there were large numbers of people reliant on the harvest. The stone fish traps at Brewarrina are not only significant but were by far the largest and most complex of these types of fish traps in existence. Like elsewhere in the Murray-Darling Basin, the arrival of Europeans had a significant impact on the people of the Darling River. The first contact with white settlers occurred in the 1820s. Guns, axes, fences and disease all had a major impact and by the late 1830s, Aboriginal groups were rapidly losing access to waterways, land and sacred sites (Source: http://www.discoveringthedarling.com.au/index.php?pgid=16).

The Brewarrina Shire Council states that Brewarrina is situated where the Barwon-Darling River flows through what is thought to be the oldest human-made structure on earth. The Brewarrina Aboriginal fish traps (Baiame’s Ngunnhu) are estimated to be 40,000 years old and are a great example of human ingenuity. Brewarrina was one of the largest inter-tribal meeting places of Eastern Australia for Aboriginal people and the Shire is home to the Ngemba, Muwarrari and Yualwarri peoples. Baiame’s Ngunnhu, sustained thousands of Aboriginal people during the tribal
gatherings held prior to European settlement. The Statement of Significance from the NSW Heritage Register provides further historical information:

In traditional Aboriginal accounts the fish traps (ngunnhu) were built by Baiame and his two sons Booma-ooma-nowi and Ghinda-inda-mui during drought times when the Ngemba people faced famine as Gurrungga (the water hole at Brewarrina) had dried up. Use of fish traps was first documented by European settlers in the 1850s. By all accounts the fish traps were already solidly in place and were created by Aboriginal people present before them. Publications in the early 1900s were the first to have detailed descriptions of the site and these descriptions are similar to the way the site looks now.

Old Brewarrina Mission

In 1850, Governor Fitzroy created 20 Aboriginal reserves in the headwaters of the Darling. Between 1885 and 1894, the Aborigines Protection Board established additional reserves, one of which was at Pooncarie. Their creation marked the end of shared occupation and the beginning of severe restriction on Aboriginal access to land (Source: http://www.discoveringthedarling.com.au/index.php?pgid=16; see also Jackson in press; (Goodall 1982)).

Brewarrina Mission was the first institution formally established by the Aborigines Protection Board as part of its policy to segregate Aboriginal people. Over the years, the Brewarrina Mission was used to house other Aboriginal people from Tibooburra, Angledool, Goodooga and Culgoa to form the reserve which operated between the years 1886 - 1967 and was one of the longest running reserve stations in NSW (see Figure 14 and 15). It is therefore of considerable heritage significance to traditional owners of the Barwon-Darling region.
Aboriginal people from Brewarrina and many other areas were forced to live there after colonisation as their traditional lands were taken up for grazing. The original Mission area was almost 1200 ha of land and associated billabongs. During the ‘reserve period’ of institutional control, many Aboriginal people died and were buried in the reserve cemetery. The cemetery is no longer used by the community but its integrity is of importance to local Aboriginal people. The entire site of Brewarrina Mission including its cemetery is a significant place to the many Aboriginal tribes including Ngemba and Murrawarri tribe as a ‘place of belonging’. The place retains its high integrity for its cultural, spiritual, social and historical value to many Aboriginal people across NSW and was gazetted on the State Heritage Register in 2006 http://www.heritage.nsw.gov.au/07_subnav_01_2.cfm?itemid=5053415.
Following closure of the mission in 1967, some of the land was bought by neighbours and other groups for grazing and other agricultural activities (B. Gordon, NSW DPI 2008, pers comm.). An archaeological survey was undertaken in 2002 on the adjacent Moonbi property for the new property owners. Significant Aboriginal heritage was identified throughout the property and surrounding grazing lease (Mapoga) including: artefacts, middens, canoe trees, carved trees, scarred trees, campsites, hearths, grindstones, and a quarry (on Mapoga). A scraper may date some 25,000 to 30,000 years before present (J. Burnet pers comm.).

Demographic profile

The Barwon Darling River region’s population is approximately 50,000 which is 2.5% of the MDB’s total. The largest towns include Collarenebri and Walgett in the east, Brewarrina, Bourke and Cobar in the central area, and Wilcannia in the south-west (CSIRO 2008). The Barwon–Darling’s Indigenous population makes up a significant proportion of the overall population of the region, and, unlike the total population, is growing. For comparison, the Indigenous population in the Barwon–Darling region (analysed in the Murray – Darling Sustainable Yields Project) in 2006 was 4,872 (ABS 2006 in MDBA 2010). The Indigenous population has seen an increase of 9.1% since 2001 (ibid).

Brewarrina is a small but remote town is 808km by road from Sydney and is situated on the southern bank of the Barwon-Darling River. Brewarrina is 136 kms west of Walgett and 100 kms east of Bourke on the Kamilaroi Highway. The district around Brewarrina relies principally on the pastoral industry and due to the low average annual rainfall (381mm), properties are necessarily large and holdings of 20,000 acres are common (Source: http://www.breshire.com/about/1007.html).

From the 2006 Census, Brewarrina had a population of 1,998 and is one of the smaller towns in Australia. Out of the total population in Brewarrina, 63.5% identify as Indigenous (Source:http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/LGA11200Population/People12002-2006?opendocument&tabname=Summary&prodno=LGA11200&issue=2002-2006).

Geographic Context

Brewarrina lies at that point where it is generally accepted that the Barwon River ends and the Darling River commences. The Old Brewarrina Mission Billabong is located 8 kilometres east upstream of the Brewarrina township on the Barwon-Darling River, (see Figure 12), just north of the Old Brewarrina Mission site which is approximately 261 ha in size.

As Figure 12 above shows, the Mission Billabong is a cut off meander oxbow of the Barwon River representing an old river path. It fills from rainfall (the Mission Billabong site receives an average rainfall of 275mm) or when the Barwon-Darling River experiences high river flows. As the Barwon-Darling River backs up in flood, the Billabong fills from the lowest point, and the levels fall as the river level recedes.
However, as stated in the NSW DPI 2008 Wetlands Management Plan for the Mission Billabong, it is now largely fed by rainfall events as a result of increases in water extraction upstream. The Mission Billabong has had permanent water within it even during the recent 8 year long drought. The Mission Billabong is classified as an arid wetland and has the ability to hold water for long periods of time, even through drought affected conditions. The following extract from the Wetlands Management Plan for the Mission Billabong, described the condition of the Billabong in 2008:

The Old Mission billabong, receives its flows usually during the summer months from localised falls but it will fill from large flows from the Barwon River. The billabong has a maximum water depth of 3-5 m when fully inundated but averages about 3 m. The size of the billabong has not changed in recent history (past 15-20 years) but its fringing billabong plants and canopy vegetation have thinned considerably due to over-grazing and lack of flooding. The owners believe the billabong may be getting shallower due to sedimentation from grazing influences on and around the billabong. No acid sulphate soils or signs of salinity have been recorded at the billabong.

Water in the billabong historically was always clear, but with stock having regular access for the past 10 years, the water is turbid and of poor quality. The Old Mission billabong has recorded algal blooms only once or twice in the last 10 years due to a lack of fresh inflow water and high nutrification. There are no water regulatory structures in place to hold or capture water for the billabong and no water is extracted for domestic or stock watering purposes, other than neighbouring cattle accessing it currently.

The existing canopy vegetation is in good condition and extends for approximately 50% around the perimeter and provides up to 20% of actual shading for the billabong edges. The average width of natural vegetation is 20 m from the waters edge, consisting mainly of river red gums (Eucalyptus camaldulensis), coolibah (Eucalyptus microtheca) and river cooba (Acacia
stenophylla). As a result of unmanaged grazing over recent years, very little natural canopy species recruitment is evident. Once fencing is completed to stop stock access, natural regeneration should begin to occur. Lack of flooding or good rainfalls in recent years is still the main contributing factor affecting the health of this billabong (DPI, 2008: 8).

**Mission Billabong Land Holdings**

The Mission Billabong case study site includes three separate (see Figure 17) land holdings and different managers:

1. The Old Brewarrina Mission property is 261 ha in size and its title is held by the Brewarrina LALC. It was purchased through the Aboriginal and Torres Strait Islander Commission (ATSIC) in 1993.

2. The Moonbi property is 487 ha and is owned by Ngemba Aboriginal Housing and contains Moonbi Lagoon. ATSIC also purchased this property in 1992; and

3. Mapoga is a pastoral lease that consists of most of the Billabong and has been owned by the same grazier since 1974.
Figure 17 Brewarrina Mission Billabong Land Tenure. Source: Erlina Compton, Western CMA received 16/3/10)
Environmental Water Management

The Barwon-Darling catchment is recognisable as a large Australian dryland river system. Key characteristics of the region include its low gradient and large floodplains, climatic variability, and arid to semi-arid conditions. Approximately 30% of the catchment is covered with open woodlands, timbered areas, shrublands and native pastures.

Environmental assets within the region (see Figure 18) include: Talyawalka Anabranch & Teryawynia Creek wetlands (listed as nationally important in the Directory of Important Wetlands in Australia), Wongalara Lake, Poopelloe Lake, Lake Woytchugga, Acres Billabong, and Barwon-Darling River channel and associated riparian habitats (Source: http://www.environment.gov.au/water/policy-programs/cewh/watering/barwon-darling/catchment-profile.html).

Figure 18 Environmental watering sites, Barwon - Darling catchment. Source: DEWHA website. Note: DIWA stands for Directory of Important Wetlands in Australia.

NSW environmental water requirements have not been determined for the unregulated section of the Barwon-Darling River. However, NSW has embarked on a process of allocating water to the environment. One mechanism is the purchase of water for environmental purposes. NSW RiverBank is a $105 million environmental fund set up by the NSW Government to buy water for the state's most stressed and valued inland rivers and wetlands for five years up until 2011. NSW RiverBank will buy water for the environment from willing sellers designed to improve and sustain the condition of rivers and wetlands (Source: http://www.environment.nsw.gov.au/environmentalwater/).
Relationship to CMAs and State Water Agencies and Water Sharing Plans

At the time of writing the draft WSP is being prepared by the NSW Office of Water through an established Reference Group comprised predominately of NSW Government representatives. There is currently no Indigenous representative on the Group.

Areas without a WSP, such as the Barwon–Darling, are still managed under the Water Act 1912 (NSW) (Peter Terrill, pers. comm.). The proposed Draft WSP Plan for the Barwon-Darling is due December 2010 and a final due by 1 July 2011 to coincide with the release of the MDBA Basin Plan.

An Indigenous reference group currently coordinates input from Aboriginal communities for the Western CMA. This input includes advice on sustainable land management, cultural values and natural resource management planning (Western CMA 2006).

There appears to be some consensus amongst water managers in the region that environmental flows should be directed towards meeting the requirements of the Billabong (Peter Terrill, DECCW). The water requirements of the Billabong were raised in the 2008 DPI Wetland Management Plan:

The opportunity to provide environmental water flows for billabongs like the Old Mission Billabong should be considered when formulating a new water sharing plan. It would be a valuable exercise for the Ngemb a Landcare Group to initiate discussions with the Department of Water and Energy (DWE) to discuss the Group’s needs on this site. The process should also provide an opportunity for the LALC or the landcare group to have input into the Barwon-Darling Water Sharing plan development (2008: 11).

The Western CMA’s Aboriginal Community Support Officer Blackie Gordon advised that although he has not been engaged in the developing the Barwon-Darling WSP, he is aware of members of the Indigenous community attending some Macro Water Sharing workshops in the past.

The MDBA Draft Descriptive document for the Barwon-Darling Region suggests that:

When developed, the Water Sharing Plan for the Barwon–Darling may provide water to meet Aboriginal cultural values (MDBA 2010).

An embargo on development was introduced in January 2001 as an interim measure to prevent growth in diversions until a long-term Cap Management Strategy was implemented. This embargo continues to be in place for the Barwon-Darling system (MDBC 2005). The Murray-Darling Basin Cap was established on water use at 1993/94 levels of development.

An agreement to implement the Murray Darling Basin Cap (set at 173GL) on the Barwon Darling River was reached in July 2005 at a meeting between key stakeholder groups including the NSW Irrigators Council, the Murray Darling Basin Commission, industry representatives and members of Federal, NSW and local government. (http://www.western.cma.nsw.gov.au/Pages/Marowatersharingplans.html)
There is also the *Interim Unregulated Flow Management Plan* for the North-West which continues to operate. This plan covers the major regulated rivers in the north-west of NSW as well as the Barwon-Darling River. It seeks to ensure minimum flows for the protection of basic river health as well as protecting high flows for algal suppression and fish migration. The Rules below apply to the unregulated section of the Barwon-Darling River and are stated in the Border Rivers s.46(9) water sharing plan and Namoi s.49(6) water sharing plan, the Rules state:

The requirements of the Interim Unregulated Flow Management Plan for the North West are:

(a) a flow of 14,000 ML/day in the Barwon River at Brewarrina for 5 consecutive days, or 10,000 ML/day in the Darling River at Bourke for 5 consecutive days, during the period September to February inclusive, providing two such flow events have not already occurred during that period in that water year.

(b) a flow of 2,000 ML/day in the Darling River at Wilcannia for 5 consecutive days during October to April, inclusive, providing flows of this quantity have not already been reached during the preceding three months within the October to April period, and

   Note. This subclause is intended to protect flows needed to suppress blue-green algae blooms.

(c) a flow of:
   (i) 150 ML/day in the Darling River at Wilcannia,
   (ii) 280 ML/day in the Darling River at Louth,
   (iii) 390 ML/day in the Darling River at Bourke,
   (iv) 550 ML/day in the Barwon River at Brewarrina, and
   (v) 700 ML/day in the Barwon River at Walgett.

   Note. This subclause is intended to protect flows needed to meet basic landholder rights requirements along the Barwon-Darling River.

Current status of Indigenous participation in water (and land) management and access to water resources

The Ngemba people want to rehabilitate and protect land and water at the Old Brewarrina Mission Billabong. Their efforts are channelled through the Ngemba Billabong Restoration and Landcare Group.

The Old Mission property was and is a large Indigenous recreation area with significant pre-European history including evidence of multiple living sites, hearth sites and scar and carved trees. During consultations the importance of the area was made clear:

   *Many Aboriginal people and their descendants today have fond memories of catching yabbies and shrimps in this billabong. We, the Aboriginal people know and understand the importance billabongs are to our fresh water ecosystems health and we want the next generations of Aboriginal people to enjoy and be part of this very important area (B.Gordon and F. McHughes in DPI 2008).*

The Ngemba people intend to manage the Old Mission property as an Indigenous Protected Area (IPA). A Plan of Management has been prepared for the Old Mission Billabong site in a step towards IPA declaration in June 2010. The community has also prepared a Scope of Works to allow for the IPA declaration. A primary source of information for the Plan of Management will be the information contained in the *Old Mission Billabong - Brewarrina Wetland Management Plan from Dec 2008*, a report
The proposed IPA is for 261 ha which includes the Old Brewarrina Mission Site only and a portion of the Billbung. The Brewarrina LALC is considering purchasing the Mapaga property through the NSW Aboriginal Land Council or ILC to ensure the entire Billabong is managed by Ngemba people.

Ngemba Billabong Restoration and Landcare Group was formed in mid 2008 by a group of young men and women from Brewarrina, some of whom wished to address juvenile justice problems by working on their country. A total of 17 young men and women completed the relevant tickets and certificates at TAFE to work on country with some completing Certificate II in Land Management. The men and women hold places with elders on the Landcare Group’s Board advising where needed. Only 5 of the group are currently working on the Billabong site as it waits for IPA declaration to receive the funding to engage the whole group (Field notes, 31 May 2010). Once the IPA funding is received the whole group may have the opportunity to be engaged in rehabilitating the Mission Billabong (Ngemba participant). The future plan for the Landcare Group is to seek more capital to invest and to build partnerships with landowners who have billabongs on their property within Ngemba Country.

Blackie Gordon (Western CMA) advised that the Ngemba Billabong Restoration and Landcare Group received $60,000 Western CMA funding in 2008/2009 to:

- Fence the billabong area to exclude domestic stock (only on the land managed by the LALC, see Figure 19)
- Revegetate with approximately 2,500 native plants
- Remove domestic rubbish
- Control pest animals
- Control weeds
- Retain dead and fallen timber as animal habitat
- Conduct a baseline survey of all plants and animals
- Establish a herbarium of weeds and native plants
- Conduct an educational campaign about the wetland’s importance
- Undertake ongoing monitoring of the site, including 4 photo monitoring points.

The efforts of the Ngemba Billabong Restoration and Landcare Group were recognised at the 2009 Indigenous National Landcare Awards.
Indigenous Values and Interests in Water

The Old Brewarrina Mission Billabong and surrounds is of high cultural significance, with evidence of multiple living sites, burials, hearth sites, grinding dishes with surrounding grinding grooves, stone quarry and many scarred/carved trees some of significant age. The community is looking forward to being able to better manage these sites.

Prior to the Brewarrina weir, billabongs may have played a larger role in providing water and sustenance to Ngemba people than today’s drier conditions. Many Indigenous nations and camps would have had their own billabong along the river to supplement river water in dry times (Ngemba participant).

People interviewed believe that the Old Mission Billabong has an important part to play in the health of the entire Barwon-Darling River. According to local knowledge and stories, the Billabong has never run dry and at times is aqua in colour:

... the Billabong is the kidneys of the system, and what they aim to achieve through a Cultural Access Licence is fill the Billabong with unhealthy river water, run it through the Billabong, clean the water up and allow it to get back into the Barwon Darling River. The important thing is that this process can also provide healthy water to the downstream Brewarrina Aboriginal Fish Traps (Ngemba participant, pers comm.).

The Ngemba Billabong Restoration and Landcare Group would like to test the role of the Billabong in improving water quality for the Barwon-Darling River, in an effort to gain ‘credible evidence’ (Field Notes, 31 May 2010) of the advantages of their water management practices. One elder interviewed is working on a model he has termed ‘Natural Development’, based on what he regards as the oldest living model, ‘relating back to their traditional knowledge of caring for country’ (Field Notes, 31 May 2010). According to this person:

my urge and drive to care for the Billabong and to ensure it is functioning naturally is the same as my great-grandmother’s and Ngemba ancestors before me. My drive is seeing and feeling the health of country and the indicators
suggest that country is in poor health. I am also concerned that future
generations will not be as fortunate in natural resources …

my excitement for the project is also felt through the next generations who are
engaged in the Ngemba Billabong Restoration and Landcare Group. It is an
excitement that is different to say the excitement when playing a game a
football, which is very important to the Brewarrina community. The young men
know it is meaningful work they are undertaken, again it is instinctive as a
cultural obligation, they see the project and opportunity through today’s eyes
(Field Notes, 31 May 2010).

The ‘natural development’ model works on rehabilitating the Billabong to function as it
did prior to the development of the river’s water resources. Once rehabilitated, the
Billabong will, according to this model, supply clean water for commercial development
along the river (see Figure 20). Aboriginal people have the ability to ‘see through both
eyes – commercial and natural developments’, according to the Ngemba elder
interviewed for this study. In his view, ‘natural development creates natural wealth’
(Field Notes, 31 May 2010).

Figure 20 Recovering riparian vegetation at the Mission Billabong following the exclusion of cattle. Image: CSIRO 2010.

As previously mentioned, the Landcare Group wants to improve water quality to
sustain the values of the downstream Brewarrina Aboriginal fish traps known as the
Ngunnhu to the local Ngemba people (Figure 21). The mythology associated with the
site reveals how an ancestral creation became an important fishing venture that
supported many groups in the Brewarrina area. This venture relied on Aboriginal
cultural practices, as described in the Aboriginal history of this very significant place.
The Ngemba people were facing famine after a major drought had dried the river.
Baiame a cultural hero, designed a gift for them - an intricate series of fish traps in the
dry riverbed - and then cast his net over the river. Baiame then showed the old men of
the Ngemba how to call the rain using dance and song. Days of rain followed and the
river flooded, bringing with it thousands of fish. The old men rushed to block the entry
of the stone traps, herding fish through the pens.
The Brewarrina Aboriginal fish traps continue to be visible in the Barwon-Darling River today and were included on the NSW State Heritage Register in 2000 and on the National Heritage List in 2005.

Figure 21 Brewarrina Aboriginal fish traps, Barwon - Darling River. Image: CSIRO 2010.

Indigenous water use and access – priority water management issues

An Ngemba community organisation has a commercial water licence. The Moonbi property (adjacent to the Old Mission property) was purchased with a 2916 ML water access licence in 1993 through ATSIC, however following the introduction of the Murray Darling Cap, the water access licence was converted to 655 ML long term extraction limit issued in perpetuity. The water access licence is managed by the Ngemba Aboriginal Housing Company.

Moonbi property has approval to irrigate and cultivate 162 ha but to date the licence has not been activated. Ngemba Aboriginal Housing Company is seeking options to activate the licence to contribute to the economic base of the community. The water access licence is tradeable on the water market within NSW, and this type of licence accumulates the allocation every year if unused. However, the effect of the Barwon-Darling Water Sharing Plan on the future of inactive water licences is not known.

A representative of the Ngemba Housing Co-operative advised that it receives correspondence on the water sharing activities in the valley and also charges for administration fees (which are paid annually). There are limited resources within the Western CMA and the Office of Water to assist the organisation to optimise the use of this licence perhaps by entering the water market (Field Notes, 31 May 2010).

During consultation for this case study, Peter Terrill of DECCW advised that in 2010 licence holders in the Barwon River valley were informed in writing by the Commissioner of Water that their allocation was to be reduced by 17%. Such a
The Ngemba community, with assistance from DECCW, will assess if this is a viable option, considering that infrastructure is required in the form of mobile pumps and that environmental water attracts water use fees from State Water.

Ngemba participants believe that there are multiple social and economic benefits from his community’s engagement in ‘natural development’ and managing the billabong within the IPA. There is also, he believes, a big opportunity for a different type of tourism:
The opportunity exists in the education of corporate Australia by teaching Aboriginal natural development, as this project is providing for the good of Australia in managing the IPA and can offer corporate Australia the opportunity to invest in Natural Development to offset any of their impacts on the landscape. The credible evidence that natural development works is that Aboriginal have survived on the driest inhabited continent on earth (Field notes, 31 May 2010).

Potential impacts of changes in water availability on the Ngemba people

The Ngemba Housing Co-operative has an unutilised water access licence for their Moonbi property. Recent changes to diversion limits in the Barwon – Darling have reduced the allocation available under this licence. It is not known how any changes to SDLs may affect the allocation in the future.

Similar to the Nari Nari case, Ngemba people interviewed for this study frame their water management aspirations and practices as an economic development strategy with cultural and environmental benefits. They perceive long term benefits from improved access to land and water bodies, greater effective management and protection of features of cultural and environmental significance and assertion of customary responsibility to restore the health of the wider regional ecosystem and revitalise Indigenous society. Employment, training and re-education of Ngemba youth are central to this strategy as the training and capacity building efforts attest.

DECCW is supporting the Ngemba Billabong Restoration and Landcare Group in their efforts to access water by firstly determining the Mission Billabong’s water requirements and then assisting them to consider options for sourcing the water either through Indigenous specific provisions of the NSW Water Management Act (cultural water access licence) or through applying to the Commonwealth’s Environmental Water Holder. An increase in environmental water to the Barwon-Darling River could benefit the Ngemba people, if directed to the Mission Billabong and the Brewarrina Aboriginal fish traps given the recognition that heritage and water management studies have afforded these significant sites. There will however be competing sites, such as internationally recognised wetlands, and the water requirements of these features may rank more highly than those prioritised by the Ngemba community.
5.2.3 Yorta Yorta interests in water and land at the Barmah-Millewa Forest Icon Site, Murray River, NSW/Victoria

The Yorta Yorta people have interests in land and water in the vicinity of the Barmah-Millewa Icon Site which spreads out along the Murray and Edwards River floodplain bounded by Echuca, Deniliquin and Tocumwal (see Figure 22). Most of the 65,000 ha area is dominated by dense strands of river red gum (Eucalyptus camaldulensis) that exist on both sides of the NSW and Victoria border and comprises one of the largest river red gum forests in the world (MDBC 1992). The region is one of the six Icon Sites managed under the MDBA Living Murray Basin initiative (http://www.mdba.gov.au/programs/tlm). The Yorta Yorta currently have some access to water licenses and are engaged in a range of co-management and regional catchment management planning arrangements. There are strong aspirations amongst the Yorta Yorta people to rehabilitate forests to a healthy state and ensure water allocations and management decisions recognise and protect Indigenous values in water and water ecosystems.

Water use and management in the Barmah-Millewa Icon site region

The River Murray and Barmah Choke define the hydrology of the Barmah-Millewa Forest. At the Barmah Choke the river channel narrows, resulting in reduced capacity and flooding and consequent formation of the forests and associated wetland systems. The forests contain numerous wetlands, the largest of which are Barmah Lake (Victoria) and Moira Lake (NSW) (MDBA 2010).

The Barmah-Millewa Icon Site is one of the six significant areas identified by The Living Murray (TLM) Initiative as priority areas for the allocation of environmental flows

Written by Cathy Robinson
Icon Site status recognises this region as being one of the most significant vegetation remnants in the mid-Murray region. Barmah-Millewa is listed in the Directory of Important Wetlands in Australia and is listed on the Register of the National Estate. The Barmah forest is listed as a wetland of international significance under the Ramsar Convention (Leslie 2001). Most of the region is classified as a wetland because under natural conditions it is regularly inundated when the Murray floods. This flooding regime supports the extensive red gum forests (*Eucalyptus camaldulensis*), flood-dependent Moira grasslands and networks of billabongs that are vital habitats for turtle, insects and fish that have important economic and cultural values for the Yorta Yorta people (Yorta Yorta April Workshop, 2010). The forest is also a significant habitat for over 50 species of waterbirds (DSE 2003) including at least 11 species that are vulnerable, endangered or critically endangered. The region is also the only remaining breeding ground of the superb parrot (*Polytelis swainsonii*) and is the habitat of woodland birds, such as the nationally endangered regent honeyeater (*Xanthomyza phrygia*).

Although the Barmah-Millewa forest is listed on the Register of the National Estate in recognition of its outstanding natural values and importance as part of Australia's heritage, it is important to note that this listing does not include cultural heritage. Even so, over 100 Indigenous heritage sites have been registered in the region including scarred trees, burials, freshwater middens, and stone quarries (Riverina 2009). Yorta Yorta accounts and archaeological evidence suggests that Indigenous people have used and managed this region for thousands of years (Neville Atkinson, pers comm.). The region remains an important area, as a source of bush food and medicinal plants, for family activities. There are hundreds of cultural sites that are still known, some of which have been recorded (Field notes, Yorta Yorta, 22 April Workshop). This intrinsic and long-held relationship to Barmah-Millewa was a component of the Yorta Yorta claim for native title rights and the basis of repeated calls to recognise Yorta Yorta’s management responsibilities, as evident in the literature reviewed in Section 4 above. A management plan for Yorta Yorta cultural heritage describes the significance of the forest:

> The forest nurtured [Yorta Yorta] ancestors and provided them with the means of everyday survival and well being. In turn, the Yorta Yorta looked after the forest and nurtured it for the future, and when these practices and methods of forest management and care are measured against more recent events, it is clear that they have an excellent track record that stands firm in its own right (Yorta Yorta clan groups 2001, 7-8).

Increased water use and management pressure is affecting the health of this region. Until recently cattle grazed in the Barmah Forest under licensing agreements (Linda Brockman, pers comm). Red gum was also an important source of timber for saw logs, chip wood, charcoal and firewood (MDBC 1992). Timber has been commercially harvested in the region since the 1860s and continues today under license. Dryland agriculture and horticulture are the main primary industries in the area and water is supplied to nearby farms via an extensive network of channels and overflow on the floodplain.

The socio-economic context report for the Goulburn-Broken Sustainable Yield Region includes the Barmah-Millewa Forest area (MDBA 2010). The report describes the Shepparton-Mooroopna urban centre as one that has:
• one of the largest growing urban centres
• a mixed industry base
• a total of 2771 Indigenous Australians residing in the region (constituting 4% of the Basin’s Indigenous population), and
• of these 2771 Indigenous people, 59% are aged between 0-24, and less than 10% aged over 55 (MDBA 2009, 28).

As a result of this mixed regional population and the variety of land management issues, there are significant debates regarding how the Barmah-Millewa region should be used. Land use debates are further compounded by issues relating to public and private ownership with conflicts arising between different interest groups. These groups include Indigenous and non-Indigenous loggers, graziers, irrigators and recreational fishers and campers (Ellemor 2003). As a result, debate about the management of the Barmah-Millewa region has been based on two broad visions for this region. On the one hand, there are strong interest groups who wish to pursue cattle grazing, wood collecting and other economic activities in the forests. On the other hand, there has been an alliance between some Indigenous Traditional Owners, community and conservation groups who have pursued an Indigenous jointly-managed, cross-border national park.

Environmental Water Issues

The natural flooding regime experienced in the Barmah-Millewa forest is thought to have played a critical role in maintaining the diversity of flora and fauna species found in this area. Before regulation there were few permanent wetlands in the Basin but semi-permanent billabongs and swamps that existed in Barmah-Millewa filled and dried with the river level and contained diverse species that were distinct from the mainstream (Briggs et al 1997). The natural wetting and drying cycles maintained the diversity of these semi-permanent water bodies because there were insufficient conditions to enable any species to become dominant. Periodic floods also enabled species in these water bodies to enter into the mainstream that ensure diversity was maintained and replenished throughout the whole river system (MDBC 1992). The Barmah-Millewa Forest Icon Site Environmental Management Plan (MDBC 2006) sets out flood frequencies and durations of selected vegetation communities before river regulation was imposed on this region (Figure 23).

Intense water pressure in the Murray Darling Basin has resulted in shifts in water flow. The region has been severely impacted by drought since 2002. For example, General Security allocations have fallen from an average of 82% prior to the drought to 26% over the period 2002–2009 (Marsden Jacob and Associates 2010). In pre-European times the river would flood the Barmah-Millewa forest every year between August and December followed by a dry period until winter to an overall reduction in the frequency and duration of flooding (Henry Atkinson, pers comm.). According to some estimates, the forest is now flooded in less than half as many years as it was under natural conditions and the duration has been cut by an average of one month per year (Keith Ward, pers comm.). The timing of floods has also shifted. According to Ladson (2001) winter floods have decreased in frequency and duration, summer floods have increased in frequency and spring floods are more variable. The water level is kept
artificially high in summer for irrigation purposes although some excess water (due to
rain or cancelled water orders) enters the forest.

<table>
<thead>
<tr>
<th>Vegetation community</th>
<th>Flood Frequency (% of years with inundation)</th>
<th>Duration</th>
<th>Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giant rush</td>
<td>75-100</td>
<td>7 to 10 months</td>
<td>Winter to mid summer</td>
</tr>
<tr>
<td>Moira grass</td>
<td>65-100</td>
<td>5 to 9 months (no more than 10 months at min depth of 0.5 m)</td>
<td>Winter to spring, 2 to 3 months dry in late summer to early autumn</td>
</tr>
<tr>
<td>River red gum forest</td>
<td>40-92</td>
<td>5 months</td>
<td>Winter to spring</td>
</tr>
<tr>
<td>River red gum woodland</td>
<td>33-46</td>
<td>1 to 2 months</td>
<td>Spring</td>
</tr>
<tr>
<td>River red gum and black box woodland</td>
<td>14-33</td>
<td>1 to 4 months</td>
<td>Winter to spring</td>
</tr>
</tbody>
</table>

Figure 23 Flood frequency and duration of selected vegetation communities before river regulation.

A reduction in frequency, duration and depth of floods in Barmah-Millewa has led to significant impacts on flora and fauna in this area. Breeding colonies of waterbirds such as avocets, grebes and stilts were almost eliminated by the 1980s because of a range of factors, including decline in nest security and reduced food from shorter floods (Leslie 2001). The Barmah-Millewa TLM Indigenous Coordinator Lee Joachim reflected on the impacts Yorta Yorta have noticed:

This includes the disappearance of aquatic life in the form of two key species of fish. These are the Walka and Gilgarja, which inhabited the large grass plains in times of floods. The grasslands are breeding grounds and an important part of the filtration of the floods (cited in Lawrence and Colloff 2008, p24).

Yorta Yorta people’s knowledge of changes to their country supports Ward’s (1991) study that shows red gums are encroaching on Moria grass plains, reducing their area by 55% from 4500 ha to about 1500 ha in just 50 years. Summer floods have led to giant rush (*Juncus ingens*) and upright milfoil (*Myriophyllum crispatum*) to also encroach on Moira grassplains. Less frequent flooding has also been connected to a decline in red gum strands (Kingsford 2000). The construction of dams, weirs, levees and other regulators, as well as snag removal and channelisation, has dramatically altered the way water flows through the Barmah-Millewa floodplains (Kingsford 2002). A Yorta Yorta elder interviewed for this study explained that people are very concerned about the implications this has for the unique attributes of the Barmah-Millewa region:

You just can’t manage this river system as a pipe … it is critical that wetlands, billabongs, forests in the floodplains get enough water … and at the right time of year for critical species [like the long neck turtle] to survive and flourish… (Field Notes, April 2010).
Environmental water management

The Living Murray (TLM) initiative was established in 2002 in response to evidence showing the declining health of the River Murray system (http://www.thelivingmurray.mdbc.gov.au/), including the forests and wetlands of Barmah-Millewa. State and Commonwealth initiatives have recovered or are in the process of recovering environmental water as part of this TLM program, with approximately 500GL of water available on average each year for environmental use by 2009, 125 GL of which is allocated to the Barmah-Millewa Icon Site.

Water allocations and decisions are managed through the Barmah-Millewa Environmental Watering Plan (hereafter ‘Barmah-Millewa EWP’) that identifies the specific water regime (volume, timing and security) needed at each Icon Site to meet key objectives (MDBC 2006). These objectives are consistent with obligations under Ramsar and are to enhance forest, fish and wildlife values, ensuring

- Successful breeding of thousands of colonial waterbirds in at least three years in ten, and

- Healthy vegetation in at least 55% of the forest (including virtually all the Giant Rush, Moira Grass, River Red Gum forest, and some River Red Gum woodland) (MDBC 2006-7).

Achieving these objectives is a complex undertaking, largely due to the region’s mix of land tenure which includes four state forests, one state park and a number of smaller reserves that are managed by several administrative bodies in two states (Victoria and NSW) (Abel et al. 2006). Under the Barmah-Millewa EWP a partnership between the Australian, NSW, Victorian, South Australian and ACT governments has been established to negotiate a range of collective actions aimed at returning the River Murray system to a healthy working river (MDBC 2006-7) (Figure 24).

The legislative and planning instruments that are coordinated by this cross-border planning framework have been described by Abel et al. (2006) as complex, often uncoordinated and often in conflict – especially when available water is limited. A number of plans that need to be integrated include:

- The Goulburn Broken Regional Catchment Management Strategy (GBCMA 2003 and amendments)
- The Barmah Forest Ramsar Site Strategic Management Plan (DSE 2003)
- The Murray River Reserve Recommendations (LCC 1985);
- The Mid-Murray Forest Management Plan (DNRE 2002)
- The Barmah State Park and Barmah State Forest Management Plan (DCE 1992)
- The Asset Environmental Management Plan (MDBC 2005) and
- The Barmah-Millewa Forest Water Management Strategy (BMF and MDBC 2000).
Under the Barmah-Millewa EWP ‘Indigenous community knowledge, values and perspectives are taken into consideration’. A TLM Indigenous Partnership Project Plan has been approved that

... presents a principle-based approach that ensures consistent and grounded involvement of Indigenous people in line with the MDBC Indigenous Action Plan. It is aimed at achieving inclusive, meaningful and effective outcomes of TLM and Indigenous and other Basin communities, creating a true partnership’ (MDBC 2006-07, p 8.)

Indigenous facilitators have been employed to ‘bring together community members to produce use and occupancy maps that will illustrate Indigenous input’ (MDBC 2006-07, p. 8). The updated (2007-2010) environmental management plan for this Icon Site is still under review. According to MDBA TLM officers and Icon Site Coordinator (NSW) Linda Brockman, it is expected that this plan will be finalised after the MDB Plan has been released (pers comm.).

The NSW component of the EWA is established under the Water Management Act 2000. The WSP for the Murray and Lower Darling Regulated Rivers Water Sources defines the EWA rules (s. 15) and the conditions under which it may be used. As a provision under the Water Sharing Plan, and because the EWA affects the bulk water supply of the NSW Murray River Water Source, the use and management of the EWA is subject to review. The Victorian Murray Bulk Entitlement Process provides for agreement of the Victorian component, including an increased allocation, accrual in storage, triggers for release and the provision of water loans in dry times (MDBC 2006-2007).

At a broader regional scale, the Goulburn River influences the Barmah-Millewa Icon site during periods of high flow. The MDBC Sustainable Rivers Audit Health Rating assessed the Goulburn-Broken catchment as ‘very poor’ prompting Australian Government water purchases of 80,261ML of high reliability water and 10,134ML of low reliability water in this catchment under the 2009-10 Restoring the Balance in the Murray-Darling Basin water purchasing program
Tensions in and challenges to efforts to ensure strategic watering of this Icon Site prompted a series of recent recommendations by the Independent Audit Group of the implementation of the Living Murray Program (MDBC 2009). Key issues identified included the need to ensure that key relict populations survive the current drought; that monitoring continues to maximise the learning from the extreme circumstances [caused by long drought conditions]; and to ensure the application of environmental water to optimise recovery when greater volumes become available (MDBA 2009, 24).

One response has included a joint partnership between the Goulburn Broken CMA, the Yorta Yorta Nation Aboriginal Corporation (YYNAC) Parks Victoria, Victorian Department of Sustainability and Environment and CSIRO, through the Water for Healthy Country Flagship (Lawrence and Colloff 2008). Under this arrangement management options to help repair damaged landscapes are being identified. TLM Indigenous Facilitator Lee Joachim has explained the importance of Indigenous community involvement:

The Yorta Yorta people hope that their knowledge will be valued as a fundamental part of the quest towards more environmental and cultural sustainable management options ... An Indigenous understanding of living with the environment needs to be heeded and no longer ignored. The forced exclusion of us and our cultural environmental management throughout Australia’s European history is going to take significant work to overcome. We are now trying to gain back our rightful place and be included and respected through what our knowledge holds, and what we can do in joint management of nature (cited in Lawrence and Colloff 2008, 24).

The challenges in realising Yorta Yorta people’s aspirations are evident in recent efforts to re-assess environmental water requirements of the Barmah-Millewa Forest as part of developing the Murray-River Basin Plan. A summary of ‘Indicator key environmental assets’ have been identified that include the Barmah-Millewa Forest (MDBA 2010). Proposed environmental objectives refine those under the Barmah-Millewa Forest Icon Site Environmental Management Plan and include:

- to conserve the Ramsar wetland consistent with its ecological character
- to protect and restore water-dependent ecosystems that support migratory birds listed in international agreements
- to protect and restore natural or near-natural, rare or unique water-dependent ecosystems
- to protect and restore water-dependent ecosystems that provide vital habitat
- to protect and restore water-dependent ecosystems that support Commonwealth, state or territory-listed threatened species and/or ecological communities
to protect and restore water-dependent ecosystems that support, or are capable of supporting, significant biodiversity (MDBA 2010, 19).

Proposed targets to achieve these objectives include

- maintain 100% of freshwater meadows or shallow freshwater marshes in healthy condition
- maintain 100% of moira grass plains in healthy condition
- maintain 100% or red gum forest in healthy condition
- maintain 100% of red gum woodland in healthy condition
- maintain 100% of black box in healthy condition
- provide conditions conducive to successful breeding of thousands of colonial nesting waterbirds at least 3 years in 10.

Flows required to inundate selected vegetation communities summarised in Figure 25 have been estimated using data generated from hydrodynamic modelling and scientific analysis of ecological characteristics and watering needs of the forest. In response, flows required to achieve proposed targets have been identified (MDBA 2010, page 22).

<table>
<thead>
<tr>
<th>Target</th>
<th>Flow required (measured at Yarrawonga)</th>
<th>Duration</th>
<th>Timing</th>
<th>Frequency</th>
<th>Maximum time between events (resilience period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain 100% of freshwater meadows or shallow freshwater marshes in healthy condition</td>
<td>12,500 ML/d</td>
<td>2 months</td>
<td>June to November</td>
<td>6 in 10 years</td>
<td>1 in 2 years</td>
</tr>
<tr>
<td>Maintain 100% of moira grass plains in healthy condition</td>
<td>15,000 ML/d</td>
<td>3 months</td>
<td></td>
<td>7 in 10 years</td>
<td>1 in 3 years</td>
</tr>
<tr>
<td>Maintain 100% of red gum forest in healthy condition</td>
<td>25,000 ML/d</td>
<td>1 month</td>
<td></td>
<td>1 in 2 years</td>
<td>1 in 3 years</td>
</tr>
<tr>
<td>Maintain 100% of red gum woodland in healthy condition</td>
<td>35,000 ML/d</td>
<td>1 month</td>
<td>January to December</td>
<td>1 in 5 years</td>
<td>1 in 4 years</td>
</tr>
<tr>
<td>Maintain 100% of black box in healthy condition</td>
<td>45,000 ML/d</td>
<td>3 weeks</td>
<td></td>
<td>3 in 4 years</td>
<td>1 in 5 years</td>
</tr>
<tr>
<td>Provide conditions conducive to successful breeding of thousands of colonial nesting waterbirds at least 3 years in 10</td>
<td>60,000 ML/d</td>
<td>2 weeks</td>
<td></td>
<td>1 in 6 years</td>
<td>1 in 6 years</td>
</tr>
<tr>
<td>Provide conditions conducive to successful breeding of thousands of colonial nesting waterbirds at least 3 years in 10</td>
<td>15,000 ML/d</td>
<td>4 months</td>
<td>June to December</td>
<td>3 in 10 years</td>
<td>3 in 10 years</td>
</tr>
</tbody>
</table>

Figure 25 Environmental flows and targets derived from modelling.

**Indigenous community and description of participating group**

Yorta Yorta Country takes in the townships of Echuca, Shepparton, Mooroopna and Kyabram and includes significant cultural and geographic features such as Barmah/Millewa Forest and parts of Gunbower, Perricoota/Koondrook Forest. The
Yorta Yorta Nation is comprised of 16 family groups and constitutes 95% of the Indigenous (Traditional Owner) population in the Barmah-Millewa area (Yorta Yorta 2007).

Ownership and management rights to the Barmah-Millewa forest were a key issue underpinning the Yorta Yorta people’s native title claim. The way legal processes interpreted historical records and Indigenous connection to the land have been critically scrutinised from academic and Yorta Yorta perspectives (Atkinson 1997; Hagen 2001). Descendants of Yorta Yorta people still live in the area and continue to ascribe strong social and cultural meaning to this forest. They are involved in recovering their heritage and in managing the natural environment. Source:http://www.npansw.org.au/website/index.php?option=com_content&task=view&id=377&Itemid=461.

In 1998 the YYNAC was formed. It is incorporated under the Commonwealth Aboriginal Councils Association Act 1976. Amongst other objectives, the YYNAC was established to

represent the members of the Family Groups who are descendants of the Original Ancestors of the Yorta Yorta peoples; to acknowledge those Original Ancestors of the Yorta Yorta peoples; to make decisions and act on any matters of significance to the Yorta Yorta peoples; and to enter into agreements with any person, Government agency or authority in relation to the protection of Yorta Yorta country’ (http://www.yynac.com.au/about.php).

The Yorta Yorta people are also members of the MILDRIN alliance. In 2003, MILDRIN entered into a funding agreement with the MDBC. Under this arrangement MILDRIN has facilitated access to traditional owners and secured a range of partnerships with a number of CMAs based on a common motivation to have the economic, environmental and religious dimensions of ‘cultural flows’ recognised (Weir 2009: 91-117).

Current status of Indigenous participation in water (and land) management and access to water resources

The YYNAC is currently engaged in a mix of water planning and management activities in this Icon Site area as part of their efforts to meet a range of holistic objectives. The YYNAC has negotiated an agreement with the Victorian Government which provides for Indigenous co-management arrangements over Barmah Forest on the Murray River. This includes Crown Land in north central Victoria, including the Barmah State Park, Barmah State Forest, Kow Swamp and specific parcels of public lands and waters along the Murray and Goulburn Rivers, a total of 50,000 ha. Under this co-management agreement the Victorian Government:

recognises the Yorta Yorta people’s role in management decision-making within the Designated Areas relating to the protection, maintenance and sustainability of cultural and environmental values (Section 12, Cooperative Agreement http://www.dse.vic.gov.au/CA256F310024B628/0/B695ACD3EF5BCEF0CA25727D00180410/$File/Agreement2004.pdf.

A Yorta Yorta Joint Body has been established to provide advice and make recommendations about a range of management issues, including the future use of
In May 2010, the NSW government announced a decision to protect 100,000 ha of river red gum forests and woodlands and restore wetlands of international significance. As part of this announcement Premier Kennelly noted that this Riverina Red gum forest agreement will ‘ensure that land set aside as Indigenous Protected Areas will not be logged’ and that ‘$17 million has been added to the River Red Gum package for structural adjustment and community development’ to compensate the impact this has on the logging industry. A joint management arrangement of the Millewa forests with the Yorta Yorta people is also part of this agreement (NSW 2010). The YYNAC have noted that negotiating with Traditional owners will need to be on a Nation by Nation basis due to the diversity of interests and aspirations Yorta Yorta family groups have for the Barmah-Millewa region (Yorta Yorta 2007, 6).

There are currently around 15 Yorta Yorta people engaged in ranger training at Yenbena Aboriginal Training Centre. The Centre also offers cross-cultural awareness programs for non-Indigenous people involved in collaborative cross-cultural work. There is an expectation amongst the Yorta Yorta people that training and community development aspirations would be realised through joint management agreements and resources (Yorta Yorta 2007, 11). Parks Victoria and the Yorta Yorta Nation Aboriginal Corporation (YYNAC) have just established five permanent positions that form part of a Yorta Yorta Caring for Country Ranger Team that are employed by YYNAC using Working on Country funds and seconded to Parks Victoria for a period of three years (Field Notes, April 22, 2010). The YYNAC have also recently engaged with the Indigenous Protected Area Program with an original focus on establishing good governance arrangements to facilitate co-management and joint management in the Barmah-Millewa region (Field Notes, April 22, 2010).

Yorta Yorta people are also participating in a range of economic, cultural and environmental activities on Yeilima, a property purchased through the Indigenous Land Corporation in 2000. A master plan for the Yeilima property has been recently been prepared to guide Yorta Yorta efforts to pursue a range of aspirations and activities the Yorta Yorta have for this land. Potential options to use and access available water are an integral part of these planning activities. The Yorta Yorta Nation Aboriginal Corporation currently holds a water license to pursue aquaculture and horticulture activities (Altman and Arthur 2009, p. 15). CSIRO requested further information on the nature of this licence and any allocation but is currently unable to ascertain whether this water is being used or traded.

The Yorta Yorta community also participate in CMA planning and management activities (see Section 11.1 and 11.2 for a description of NSW and Victoria’s water management arrangements and consultative mechanisms). CMAs with responsibilities for the Barmah-Forest include the Goulburn Broken CMA region in Victoria and the Murray Catchment Authority in NSW. Under both CMA plans, Indigenous participation
in floodplain and water management activities is listed as a key strategy to achieve Icon Site management objectives (e.g. Murray CMA 2007, p580). As of writing, no information has been obtained about the level of resources allocated to Indigenous planning, management and engagement issues in the Murray CMA, although officers believed that it was ‘substantially less’ than their Victorian counterparts (Field Notes, 26 March, 2010).

The Board of the Goulburn Broken CMA set a range of strategic directions for Goulburn Broken region, including activities focused on substantial improvements to the management of major wetlands and forests. New National Parks to be established on the Lower Goulburn River and the Barmah RAMSAR wetland will result in the removal of grazing and logging activities. Significantly, $38m has been allocated to resource the establishment of these Parks. This includes funds for the redeployment of displaced timber workers and it is expected that CMA project offers and Yorta Yorta rangers will be involved in a range of ecological rehabilitation work (Field Notes, 21 April 2010).

The 2009-2010 Goulburn Broken CMA corporate plan notes that there ‘is strong support for Indigenous co-management of Barmah and other culturally significant areas’. Activities that provide explicit recognition of Indigenous engagement have been supported through Commonwealth Government Caring For Our Country funding, and includes $430,000 for ‘weed control and Indigenous engagement’ as well as ‘Barmah Icon site restoration activities’ (GBCMA 2012). Oral histories of Yorta Yorta people’s relationship to local river flats and floodplains have also been recorded and coordinated through the GBCMA, funded by the Caring for our Country program (http://www.nrm.gov.au/projects/vic/gbro/2006-10.html).

How Well do Environmental Flows Address Indigenous Water Values?

As discussed above, Yorta Yorta people have conveyed their concerns about water management objectives and activities in the Murray- Darling Basin to consultants commissioned by the MDB in 2002 and 2003 (Farley 2003) and more recently to Weir (2009). A number of reports referred to in the section above compiled information shared by traditional owners from the Murray Darling Basin. Several key messages have been clearly and repeatedly expressed:

- there are intimate relationships between particular people, land, law and place
- knowledge about water systems are based on these relationships and resulting connections with country in the MDB
- river management objectives need to be based on sustainable use that preserve the core values of the river system and control the threats to these values (such as carp)
- there is a concern that government water managers only value what Indigenous people can offer from the past. This can restrict Indigenous participation in water management and decision-making to cultural heritage site protection rather than recognising the full economic, cultural and social dimensions of Indigenous interests in water and decision-making; and
decision making needs to respond to and respect the role and agency of the living places and species of the Murray River, and not just focus on people’s needs.

Central to these messages is the demand for ‘cultural flows’ or ‘cultural water’ to be allocated beyond current environmental water allocations. Cultural flows are expected to enable Yorta Yorta people to meaningfully fulfil their responsibilities to care for their country, including the Barmah-Millewa Icon site. As a recent Yorta Yorta submission to the River Red Gum Forest Investigation argued, the result will require a shift in the planning logic behind Barmah-Millewa water objectives and targets:

*The use of ‘environmental flows’ as flooding separate sections of the floodplain for outcome focused events is not culturally appropriate, nor does this bring about sustainable ecological benefits to the forest environment. The Yorta Yorta speak of cultural flows as large and encompassing flood events that replenish, reconnect and sustain ecological and cultural integrity of the forest (Yorta Yorta 2007, 15)*.

In contrast to the knowledge base and indicators currently being used to direct and monitor water management in Barmah-Millewa, the Yorta Yorta people have their own knowledge of the river and indicators of floodplain ecosystem health. Anatomical analogies have been used by Yorta Yorta to highlight the inter-connected dimensions of indicators used to monitor and assess the health of their country:

*We identify the Barmah Lakes and the Moira Lakes as part of us – they are our kidneys. The narrows (what others call the choke) – is like our central nervous system, and we are part of that. It controls so much of the cultural flow aspect – the correct flooding period is controlled through those narrows and all aspects of flooding in the Barmah-Millewa Forest. We know the health indicators of the river system (cited in Yorta Yorta 2007: 4)*.

Participants at a workshop with Yorta Yorta representatives held in April noted that water management objectives and targets for the Barmah-Millewa have not been able to incorporate their knowledge of the river, floodplain and forest. Indicators used to set and measure the performance of water targets do not include the species of totemic importance (such as the long necked turtle) and there is a need to enable Indigenous knowledge to also be utilised in planning, implementing and evaluating decisions. As a Yorta Yorta elder observed, such a step requires two-way capabilities to be built:

*Agencies need to learn how to respect and use our knowledge and values about water appropriately ... Yorta Yorta people need training so we can work out what 12,000 ML means for flooding and health of our floodplain country (Field Notes., 21 March 2010)*.

According to Icon Site Managers and CMA Water Project staff, significant effort has been given to developing Yorta Yorta capacity to engage in operational level water decisions. Since the release of the Barmah-Millewa EWP, a range of meetings, workshops and field visits have been conducted to engage the Yorta Yorta people in discussions about the location and amount of available environmental water. Diverse perspectives and aspirations amongst the Yorta Yorta community, a complicated governance structure within the YYNAC, an ongoing frustration with planning decisions and processes, and a lack of formal training and education were noted by water managers as key issues facing effective collaborative relationships with Yorta Yorta
people (Field Notes, 22 April 2010). This was captured in an interview with one water manager who commented on the current tension that exists in the Barmah-Millewa forest and the implications this might have on the success of future partnerships and relationships:

The Yorta Yorta are so angry [about the injustices of past legal decisions and planning processes] ... and rightly so. ... The trouble is this rage is taken out on operational staff in day-to-day operations ... staff get tired and frustrated and [no doubt] so do Yorta Yorta individuals...

.... This [broader] politics makes it difficult to build trust and capacity for all parties needed to make good water decisions for this region (Field Notes, 21 April 2010).

MILDRIN and the YYNAC are critical of the Basin’s planning approach and sections of the research community that have yet to fully recognise Indigenous cultural values within their studies of wetlands, river habitats and systems (cf. Morgan 2002). Recent use and occupancy mapping activities funded by the MDBC have included significant species of cultural and economic value. The focus of use and occupancy mapping is on the individual’s life experience on their country, on activities involving the harvest of customary resources and the occupancy of people through place naming, revealing traditional knowledge and stories and acknowledging burial grounds (Field Notes, April 21 2010). The maps are intended to assist Yorta Yorta people and Icon Site managers to better understand the significance of the Barmah-Forest in Yorta Yorta belief systems and to contemporary use. Lee Joachim hopes that such understanding will then influence water management actions to protect and enhance Yorta Yorta values (Field Notes, 22 April 2010).

Notwithstanding the tensions described above, there is clear agreement amongst Yorta Yorta and water managers that more water is required to sustain the health of the Barmah-Millewa system. The recent assessment of flows required to meet Barmah-Millewa’s environmental targets led to the sober conclusion by the MDBA that:

With one exception, the current flow regime over the past 10 years did not have any flow of the required magnitude and duration for all the recommended water requirements (MDBA 2010, p. 22).

Potential impacts of changes in water availability on the Yorta Yorta people

The outcome [for determining a cultural flow] might be similar to an environmental flow, and it could be used to supplement an environmental flow, but it’s who has control of it, and who has control of the mechanism, and the timing, and where it goes (Steve Ross cited in Weir 2009: 128).

Discussions with Yorta Yorta people revealed an enthusiasm for increased environmental allocations to enhance the environmental features of the Murray River Basin. Participants argued that it was critical that the water requirements of the region’s creeks and wetlands are also met from changes to SDLs.

The prospect of changes in commercial water use raised some concerns; in particular, if reductions in SDLs were to have a negative impact on Indigenous-held water licenses. There was a concern that a reduction in water allocation for agriculture, forest
industries and other water dependent commercial activities may have a direct impact on Yorta Yorta industries and employment opportunities. Discussions with water planners and managers of the Barmah-Millewa Forest Icon Site reveal that this uncertainty is amplified by inadequate or non-existent data that can be used at the regional water plan level. Data inadequacies include the amounts of water needed to sustain economic, environmental, cultural and other dimensions of this Icon Site and levels of Indigenous interest in water-based industries and their demand for water.

A further issue raised during consultations was that current and proposed changes in water allocations for this Icon Site have not accounted for a cultural allocation of water for the Yorta Yorta to maintain and pursue their interests in water dependent commercial, cultural, livelihood and environmental activities. Water objectives for this Icon Site are currently focused on the environmental attributes of the site. Many different types of water are adaptively allocated to provide the environmental flow for this site (Linda Brockman, pers comm.) so as to manage water as closely as possible to natural river hydrology. Weir (2009) reports that the Yorta Yorta are critical of the currently limited evidence base for making environmental flow decisions and those concerns echo issues raised during consultations for this study with the Yorta Yorta:

- Environmental flow needs to mimic variability of flow, rather than simply releasing water to a steady flow;
- Cold environmental flow released from the bottom of the dam can be described as ‘thermal pollution’ for some ecosystems and species;
- Unseasonal movement of water along ephemeral river beds to downstream irrigators, including the flooding of the Barmah-Millewa forest, has been called an environmental flow’
- Crisis measures to flush water down a river in response to blue-green algae has been defined as an environmental flow;
- Monitoring environmental flows focused on fish and / or bird breeding does not encompass all the life on country.

Yorta Yorta workshop participants argued that objectives used to manage the Icon Site need to include water requirements for species and places that are significant to the Yorta Yorta community (Field Notes, 22 April 2010). From a Yorta Yorta perspective, it is critical that cultural flow allocations are incorporated into the existing water management framework. The following changes were nominated as suggestions to address this need:

- Water licenses held by Yorta Yorta could be used to rehabilitate and enhance the multiple benefits of country (that is, the aspiration to rejuvenate and care for important creek systems and wetlands on Yielima)
- Water allocations could reflect and sustain the nature and extent of land use and occupancy activities already mapped in the region
- SDLs could be based on sufficient information about water allocation requirements needed to sustain and enhance Yorta Yorta’s water-dependent commercial interests and aspirations in the region.
An increase in Indigenous participation in water allocation decisions in the Barmah-Millewa Icon Site could provide the means for Yorta Yorta to anticipate and manage any impacts that changes in water allocation may have on their community and the Barmah-Millewa region. There is some interest in enhancing this participation through adaptive co-management approaches. The Yorta Yorta people consulted for this case study emphasised that the habitats and species of the Barmah-Millewa Forest Icon site have been actively managed through customary governance and management activities for thousands of years. Yorta Yorta people are also involved in planning and decision-making through CMA activities and co-management partnerships. They regarded the available planning processes as unnecessarily complex and confusing. This complexity requires considerable time, resources and capability to maintain satisfactory levels of participation. This process is further complicated by the different support mechanisms available for Indigenous engagement on each side of the state border. There appears to be little monitoring and evaluation of CMA and co-management group performance in respect of their obligations to Indigenous people. Preliminary discussion about co-management processes focused on how any impacts from SDL changes could be managed, and these included:

- setting environmental and cultural water allocations for the Icon Site, and
- determining interim operating triggers for storage and release of the environmental and cultural water.

It was concluded that strategies need be negotiated, resourced and implemented in ways that enable Indigenous, technical and scientific information to be translated into actions to guide collaborative water planning and management. These strategies would also need to provide mechanisms to review the partnerships that result in specific water decisions. This review would then facilitate learning, as part of the adaptive co-management process, to improve future water allocation decision making.

5.3 Case study analysis and discussion

The three case studies presented here describe the water management practices and aspirations of Indigenous groups in diverse regions of the MDB. The case studies focus on the efforts of key members in the groups interviewed to participate in water management decisions and access water to meet collective natural and cultural resource management priorities. Restoration of environmental and cultural heritage values is a common objective across all cases. The participating Indigenous groups are involved in water management in their capacities as traditional owners with rights and interests in land and water under their own systems of law, as water licence holders and as owners of land of recognised heritage and environmental significance.

A complex set of legal factors have restricted the number of Indigenous groups that have water rights recognised as a matter of law, the nature and extent of those legal rights, how much effective control any legal rights gives Aboriginal rights holders, and the quantum of benefit derived from water-based enterprises on Aboriginal land (Jackson in press). These factors include the alienation of land, the separation of land and water rights and amendments to the Native Title Act. The Yorta Yorta case highlights the impact of these legal developments on Indigenous rights to water. Policy
initiatives designed to improve Aboriginal access, like NSW’s Cultural Access Licence, confront an historical legacy of entrenched inter-temporal inequity in rights to water.

Reduced inflows and over-allocation of water have stressed the Basin’s environment and intensified the competition for water. The Basin’s water resources are now so tightly constrained that Aboriginal people find it extremely difficult to compete against those accessing water for either consumptive or non-consumptive uses. Indigenous water requirements have not been ascertained in any systematic or comprehensive manner at a catchment scale in any of the cases under consideration here. Preliminary studies of the water requirements of the Brewarrina Old Mission Billabong at Brewarrina point to a welcome effort to assess the needs of a place of considerable importance to the Ngemba people and to seek ways of meeting those needs under water planning and environmental water programs.

The case studies reveal that Indigenous people have diverse and multiple interests in water. In the case studies there was some degree of inter-dependence evident in the livelihood strategies being employed by Indigenous groups consulted. Although many communities prioritise environmental and cultural objectives in their land and water management strategies and economic development aspirations, Indigenous people consulted here are extracting some economic benefit from water use and using water assets to support social and cultural priorities. Although the literature described above does not give close attention to Indigenous commercial interests in water, in all three of the cases described below Indigenous organisations have a commercial entitlement and, in two cases, they are trading their water allocations in order to underwrite their social, cultural and environmental activities. A cautionary note is however required. It is possible that there are Indigenous organisations in the Basin who are pursuing a more singularly commercial approach to water use, for irrigation for example, and that these communities are not involved in or particularly interested in environmental water management activities. The analysis undertaken by Arthur (in prep) will depict Basin wide Indigenous access to water licences and will be a valuable source of data in designing impact mitigation strategies.

Indigenous water management strategies vary in the extent to which they contain a mix of conservation management, commercial water use and environmental water management activities. The following table (Figure 27) compares the major features of each case study.
The groups experience differing degrees of control over water use. For the Nari Nari and the Ngemba, who are focused on restoration and rehabilitation of discrete wetlands on their properties, watering is a key management tool. In both these cases there is evidence of considerable progress and success in the watering efforts of these groups even though the Ngemba are not as far advanced in developing their watering regime as the Nari Nari. The efforts described above represent a significant step in the group’s respective natural and cultural resource management strategies. Such strategies commenced with the acquisition of land and development of the capacity (human and other kinds of capital) to restore it and use it as a resource to develop enterprises in accordance with local cultural prerogatives and social and economic needs. A variety of Indigenous institutions have assisted including LALCs, the ILC and the IPA program of DEWHA, as have a number of environmental and catchment management bodies and programs.
For the Yorta Yorta people, who are operating at a larger scale to improve the management of a nationally significant forest system managed under extremely complex governance arrangements, there is also evidence of progress in sharing of decision-making control through co-management of protected areas in the Barmah-Millewa forest. The Yorta Yorta have applied the Land Use and Occupancy mapping process developed by the MDBC’s Indigenous Liaison Unit over a number of years to improve the understanding of Indigenous water requirements. The Yorta Yorta critique of the current shortcomings in water management has motivated MLDRIN and other groups to argue for a separate cultural flow, directed and managed in accordance with local Aboriginal priorities and interests.

Nari Nari and Ngemba peoples are accessing special mechanisms designed to improve Indigenous access to water in NSW. Both are now aware of the existence of Environmental Water buy-back programs and are considering the ways in which such programs might meet their needs. The Indigenous groups consulted here are engaging with CMAs within their catchments, where in the Murrumbidgee and Barwon-Darling regions at least there are Aboriginal Reference Groups.

The Yorta Yorta are seeking deep reforms to water management system in the Basin by challenging the dominance of western resource management approaches, particularly the stark separation of people and their value systems from the biophysical landscape which is evident in current constructions of environmental assets and environmental flows (Weir 2009; Jackson 2007). The Yorta Yorta are also seeking more radical changes to the Murray’s flow regime than are the Nari Nari and the Ngemba. These latter groups are currently focused on smaller scale improvements to wetland health.

The cases show a clear need to develop rigorous methods for determining Indigenous water requirements in each catchment throughout the Basin. The Nari Nari situation, and other cases in NSW where water had been allocated to Indigenous groups, demonstrates a number of problems that Basin Planning should take into account (Jackson 2009). In her review to the National Water Commission, Jackson (2009) stated:

it is not clear from any descriptions of the NSW framework how the Aboriginal specific allocations were determined and what process will be established to evaluate whether the apparently arbitrary maximum figures permitted are meeting Indigenous needs. These innovative mechanisms are not supported by policy infrastructure such as consistent guidelines, transparent methods for determining allocations and robust measures for meeting objectives (targets, standards, indicators).

In all three cases Indigenous groups interviewed have encountered considerable difficulty in having their values recognised in environmental water management. All groups interviewed share with many water managers and stakeholders a desire for increased environmental water. However, in both the Yorta Yorta and Nari Nari cases environmental water managed according to WSPs is not being directed to the features of greatest significance or value to Indigenous people interviewed for this study, and in the Ngemba and Nari Nari cases there has been no formal Indigenous participation in the generation of the water plans that establish environmental water objectives, targets and actions. In the case of the Yorta Yorta, there has been direct Indigenous involvement and some concerted effort to improve the documentation of Indigenous
values in the development of the Water Management Plan for the Icon Site. Yet the Yorta Yorta people interviewed remain unsatisfied by the lack of explicit or specific allocation of water to maintain and pursue their interests. The cases demonstrate the pressing need to find more effective ways of including Indigenous people in environmental water management.

The Nari Nari are using water as a tool in the management of the natural and cultural resources of their IPA. The Ngemba people are planning to do similarly, and are strongly motivated by their desire to improve downstream water quality, and in doing so, contribute to the restoration of the nationally significant Brewarrina fish traps. One of the barriers facing the Nari Nari is the cost of water (purchase and delivery) pointing to the critical need to consider equity and implementation issues when new Indigenous water access mechanisms such as Cultural Access Licences are designed. The NNTC is paying water charges to undertake activities with publicly valued ecological and cultural outcomes recognised by the National Reserve system, and this cost prohibits them from accessing greater volumes of water currently available under the CAL. Greater recognition from DEWHA’s Indigenous land management and biodiversity programs could assist any Indigenous groups considering water management undertakings on IPAs or other tenures.

IPAs are also a planning mechanism being used in each of the case-study areas to enhance Indigenous participation in management of water bodies that are environmentally significant. There is much to learn from the Indigenous co-management agreements operating within the Basin, particularly the Murray River Basin’s floodplain, and the application such agreements might have for collaborative water management.

The omission of Indigenous priorities and perspectives from the identification of features (places, species) targeted for environmental water provision remains a significant barrier to greater Indigenous participation in environmental water management under either State/Territory or Commonwealth programs. Indigenous people interviewed during the case studies as well as during other consultation report that they have had no input into the identification of environmental assets (MLDRIN Working Group Meeting, Albury. 5 February 2010). Significantly, the MDBA does not appear to recognise the conservation significance of IPAs in setting SDLs.

In contrast to the irrigation community whose voices are reflected in the socio-economic impact study undertaken by Marsden Jacob and Associates (2010), Indigenous people report that they are accessing employment opportunities from environmental restoration programs and from the increase in protected area management activity. Marsden Jacob and Associates (2010) report that the regional residents they interviewed perceived that there are few (if any) significant economic development opportunities from increased environmental flows that would offset the impacts of loss of irrigated agriculture.

Protected area management in the case study regions is increasing the extent to which it engages Indigenous people, particularly in the Murrumbidgee and the Murray regions. There are, for example, new co-management arrangements being negotiated for two areas in the Murray Region: the Barmah Millewa and Werai Forest areas, and in the Murrumbidgee DECCWA is developing closer ties with traditional owners to deliver environmental services to the park estate (Nari Nari participant, pers comm.). All cases show an increase in Indigenous training in natural and cultural resource
management skills and capacity. All groups involved in the cases aspire to greater participation in natural and cultural resource management, including water management, and see this engagement as a means of improving their livelihoods and well-being.
6. POTENTIAL IMPACTS FROM CHANGES TO WATER AVAILABILITY

The literature reviewed above in Section 4 describes the numerous Indigenous interests in water management in the MDB. It is understandably skewed towards describing Indigenous perspectives on the ways to improve natural resource management and involve Indigenous people in water and natural resource governance. Consistency in Indigenous aspirations emerges from the consultative reports. Indigenous people stress the critical importance of the Basin’s river systems to social, cultural and economic life and the need for balance in meeting the needs of other stakeholders. The desire for restoration of environmental systems and the relationships Indigenous people have maintained with their countries is a key motivation behind Indigenous participation; indeed it is compelling obligation within Indigenous value systems and law.

Some preliminary profiling of Indigenous demographic patterns and socio-economic status has been undertaken prior to this study, although the bulk of this data was not prepared with changes in water availability in mind and is not analysed at the local scale, therefore limiting our ability to make conclusive statements about potential impacts, including vulnerability to change, and to prioritise such potential impacts. In the absence of information about the SDL limits and their spatial impact we are also unable to predict geographic areas of greatest impact with sufficient certainty.

There is a severe lack of quantitative data on Indigenous water uses and values, the only source being Altman and Arthur’s (2009) preliminary investigation of commercial use and Arthur’s description of land and water entitlements currently in preparation for the MDBA. Measuring impacts is therefore not possible without further primary data collection or intensive case specific investigations. There are substantial gaps in the knowledge base from which to advance this task. Quantification of Indigenous water use and the specification of Indigenous water requirements lags behind other uses in the scientific development of socio-economic assessment methods for estimating relative benefits of water use and resolving tensions between competing allocations, and environmental flows methods continue to manifest an exclusive focus on ecological objectives. There is still further work to be directed towards developing Indigenous water management institutions such as the much promoted cultural flow concept.

Social impact assessment of changes in water availability, including SDLs, is seriously constrained by the lack of knowledge and technical capacity as well as the diversity of Indigenous interests in water across this vast region.
With these limitations in mind, the following potential impacts have been identified:

1. **Enhanced environmental flows are highly likely to generate positive impacts**

   Given the vision for a healthy Murray Darling system articulated by Indigenous groups throughout consultations undertaken by either the MDBC or the MDBA, it is clear that general improvements to the environmental condition of the Basin will be viewed positively by many Indigenous people. A 2003 Scoping Study on the Social Impacts of Increased Environmental Flow Allocations on the River Murray argued that the Living Murray Program had generated benefits for Indigenous people:

   *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…*

   *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 (Hassall and Associates 2003: 66).*

   Morgan, Strelein et al. (2004: 22) observed that the environmental crisis in the MDB ‘saw unprecedented alignment in government and bureaucratic policy and indigenous interests’. A concerted effort to redress water management problems, particularly over-allocation, could similarly enhance relationships between Indigenous people and other sectors, including government.

   There is however a risk that, in the absence of changes to the way that environmental water requirements are assessed and environmental water is managed, the full potential for increased environmental flows to substantially benefit Indigenous people will not be realised. There are two aspects to this qualification. Firstly, environmental flows tend not to include Indigenous values e.g. preferred places, favoured wild resources etc. Neglect of Indigenous priorities for watering for example is evident in the exclusion of Indigenous values from the selection of Key Ecological Assets for the Basin Plan. The water requirements of Key Ecological Assets are to serve as the basis for the Basin’s Environmental Water Plan. Without a mechanism to gain Indigenous input to the identification of these target water features and their water requirements, the Basin Plan could entrench the pattern of exclusion of Indigenous values from environmental water management well documented in the literature cited above. Incorporating Indigenous social, spiritual and customary objectives in the framework for identification and protection of key ecological assets would be consistent with the expectations of the NWI.

   Changes will need to be made to environmental flow methodologies to address this shortcoming and enhance the direct impacts of particular environmental improvement to Indigenous patterns of resource use and interactions with country.
Secondly, environmental water management, no matter how adequate it is at meeting ecological water requirements, does not currently recognise Indigenous resource governance systems, nor allow for co-management with Indigenous people. There are however special measures in NSW that provide access to water for cultural purposes as revealed in the Nari Nari and Ngemba case studies described above. The Nari Nari case shows that an exclusive focus on small and ad hoc ‘cultural’ allocations is unlikely to satisfy Indigenous requirements, and may in fact generate tensions among competing Indigenous groups. The isolation of water dedicated to cultural purposes from wider environmental water management may also result in sub-optimal outcomes, particularly in situations of water scarcity.

Indigenous people have expressed a strong desire to exercise authority, responsibility and control in the determination of allocations to meet their water requirements through a separate ‘cultural flow’, and a strong say in the setting of environmental flows. According to reports in the literature, environmental flow improvements alone would not address the full range of Indigenous water requirements and the further exclusion of Indigenous people from water sharing decisions could potentially weaken the religious basis of culture and affect social cohesion.

2. SDLs could limit Indigenous economic development options

Indigenous people own land in the agricultural districts of the Basin; some have formal entitlements to water and Indigenous people are employed in agricultural industries and the service sectors that support primary industries. Although economic dependence on water-based agriculture appears from the demographic literature to be relatively low, the disadvantaged status of Indigenous populations generally suggests that they are particularly vulnerable to negative impacts on Indigenous businesses or employment rates. An earlier study of the social impacts of increased environmental flow allocations to the Murray River system raised this very issue:

*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 (Hassall and Associates and Ross 2003).*

From a reading of the consultation reports prepared for the MDBC it does not appear that there is a very strong Indigenous desire to participate in the irrigation sector. We cannot be sure that this omission in the largely NRM literature reflects accurately the perspectives across the entire Basin. Indeed the existence of numerous Indigenous businesses reliant on commercial use of water suggests that the economic dimension is nonetheless a very important one, perhaps more so in some regions than others. In two of the cases described above, Aboriginal organisations are leasing their water rights for an economic gain that underwrites their social and cultural objectives.

Indigenous land owners may be adversely affected if their water entitlements are reduced and agricultural activity decreases. The severity of this impact will be affected by the degree of Indigenous access to improved irrigation efficiency, non-Indigenous uptake of irrigation efficient methods where they are leasing Aboriginal land, and the extent of Indigenous owned agriculturally viable land in the areas most vulnerable to reductions in SDLs.
The case study evidence demonstrates that water is an asset of considerable value to some Indigenous communities (e.g. Nari Nari), allowing them to employ land management staff and run community organisations. It is also possible that direct impacts on Indigenous wealth and labour force participation may adversely affect the customary sector because of interdependencies between the market, state and customary sectors (Altman 2004).

As mentioned above, the case studies show that Indigenous people are using water to achieve multiple objectives. These interdependencies between commercial, cultural and environmental management objectives should also be taken into account in mitigation strategies.

Altman (2004) has developed an analytical device referred to as the hybrid economy framework to highlight the significance of the non-market sector to Indigenous regional economies and the extent of sectoral inter-linkages. In Jackson and Altman (2009) a case study of water use and governance in Maningrida (NT) sought to

highlight the role that fresh water plays in each of the economy’s three sectors – private, public and customary – and more importantly in the four key segments of inter-sectoral overlap between these three sectors where most productive economic activity is undertaken (2009: 35).

Altman and Jackson (2009) argue that this model is also useful for challenging the consumptive–productive vs non-consumptive–‘unproductive’ dichotomy that is currently dominating water allocation thinking.

In the case of Nari Nari water use, applying the hybrid economy framework reveals the interdependencies between consumptive commercial water entitlements (General Security Licences) and cultural water entitlement (Cultural Access Licence) and customary water use (e.g. non-consumptive water use like fishing). Nari Nari livelihoods derived from their land base (Toogimbie IPA and neighbouring properties) depend on:

1. access to water to restore the country’s environmental condition and aquatic health as well as improve subsistence access to aquatic resources such as fish,
2. continued support from the IPA program which requires conformity with environmental objectives and
3. temporary trade of water to underpin (1) and (2) above.

There is a pressing need to generate a substantial number of jobs to meet future Indigenous employment needs, especially in regions where the Indigenous population is young and growing rapidly. Reductions in the viability of the agricultural sector will narrow the options available to people to develop their land base and any new land that may be either claimed or purchased over coming years. Given the pattern of Indigenous migration, structural economic changes may limit the extent to which Indigenous people return to their homelands after a period away in urban centres.

However, there is also the possibility that reductions in water availability could increase the value of any high security water entitlements held by Indigenous people or enterprises. In certain areas the asset could increase in value providing increased benefits.
There is also considerable potential for structural change to open up new opportunities for Indigenous people in emerging cultural and natural resource based industries, such as payment for environmental services, stewardship arrangements, small scale bush foods businesses, and tourism. (Hunt, Altman et al. 2009) show that in NSW, 5% of employed Aboriginal people are engaged in NRM. Benefits from this form of engagement could be enhanced through a livelihoods strategy that looks at long-term structural adjustment programs, including land acquisition, training, and support for enterprise development. Specific recommendations from Hunt, Altman et al. (2009) include:

- Developing a whole-of-government policy and approach to support Indigenous development through cultural and natural resource management (CNRM);
- Develop a cultural and natural resource based Aboriginal employment and business development strategy;
- Adopt a livelihoods strategy for development through sustainable use of natural resources, and
- Respect the contribution that local Aboriginal knowledge can make to addressing environmental problems, and resource the reproduction and transmission of this knowledge.

Realisation of this potential hinges on the efficacy of mitigation strategies.

3. Risks to Indigenous engagement from Basin planning processes, including SDLs

The terms of reference required that the review should also include some outline of the difficulties (if any) for Indigenous people of the proposed approach to setting SDLs.

There was no specific literature available to inform consideration of this issue. However, the strength of the criticisms of previous water planning and management processes made by Indigenous people reported in numerous sources and recommendations made on NRM planning in the Boomanulla Statement (2002) indicates that there may be some areas of concern:

- the technical complexity inherent in setting SDLs makes it difficult for Indigenous people to actively participate in the planning process;
- the lack of time available for Indigenous people to contribute to setting SDLs and the likelihood that few Indigenous people will be engaged in the process;
- the lack of Indigenous participation in the selection of environmental assets and determination of their water requirements (i.e. exclusion of cultural values). This may result in conservation decisions that ignore issues of importance to Indigenous identity, cultural practices and customary economic life.

On the other hand, some Indigenous people may take the view that the Basin Plan aims to bring about a significant environmental improvement and regard the planning process positively. Even so, concerns raised by Indigenous people in response to changes to environmental flows under the Living Murray River initiative recorded by
7. ADVICE ON MITIGATING IMPACTS AND SUGGESTIONS FOR FURTHER RESEARCH

The purpose of this chapter is to identify and explore the scope for impact mitigation and enhancement, as well as to outline future directions for research.

7.1 Summary of findings

The literature reviewed in Section 4 above describes the neglect of Indigenous interests in water planning. According to the National Water Commission (NWC) (National Water Commission 2009) there has been little improvement in the inclusion of Indigenous Values and needs into water planning since the inception of the NWI. The NWC recommends that

...all jurisdictions develop and publish processes for effective engagement of Indigenous people in water planning and that parties should ensure that all new water plans (including statutory reviews of existing water plans) provide for Indigenous access to water resources by at least incorporating Indigenous social, spiritual and customary objectives and strategies for achieving those objectives. Jurisdictional processes should also make clear how Indigenous groups can pursue their legitimate economic objectives (2009: 27).

The Basin Plan and the Government’s response to implementation and mitigation present a significant opportunity to address the long standing neglect of Indigenous interests in water planning and to markedly improve the extent to which Indigenous people benefit from water reforms, particularly from environmental water management.

Consistency in Indigenous aspirations emerges from the literature review: Indigenous people stress the critical importance of the Basin’s river systems to social, cultural and economic life and the need for balance in meeting the needs of other stakeholders. The desire for restoration of environmental systems and the relationships Indigenous people have maintained with their countries is a key motivation behind Indigenous participation; indeed it is compelling obligation within Indigenous value systems and law.

Indigenous people have diverse and interrelated interests in water and are responding in varied ways to address water management issues within their customary estates. The case studies show that in some situations Indigenous groups are using water as an economic asset to meet social, environmental and cultural objectives. An exclusive focus on ‘cultural values’, if construed as non-commercial and non-consumptive, might preclude consideration of the economic impacts on Indigenous communities from changes to SDLs and the consequent indirect effects on holistic land management aspirations.

An exclusive focus on socio-cultural impacts may also result in the omission of potentially negative economic impacts. Although economic dependence on water-based agriculture appears from the socio-economic literature to be relatively low, the disadvantaged status of Indigenous populations generally suggests that they are
particularly vulnerable to negative impacts on Indigenous businesses or employment rates.

It is not possible to measure the impacts of SDLs because of the severe lack of quantitative data on Indigenous water uses and values. In the absence of sufficient information on Indigenous water use and sensitivity to changes in SDLs a precautionary approach should be adopted. To mitigate the final impacts of the Basin Plan on Indigenous enterprises and communities, further research and monitoring is required during the life of the Plan. Baseline socio-economic and demographic data should be collected and a monitoring program designed to track the effects of changes in SDLs on Indigenous access to water and economic participation.

Because the final impacts are contingent on Government policies and Plan implementation, there is substantial scope to exacerbate some impacts as well as the potential to forego opportunities to maximise benefits. Again, lack of information has created uncertainty in this area. Marsden Jacobs and Associate’s socio-economic assessment argues that the ultimate socio-economic impacts from the introduction of the Basin Plan depend on how governments implement and mitigate the Plan (2010). The same follows for the impacts on Indigenous communities.

General improvements to the environmental condition of the Basin will be viewed positively by many Indigenous people. The benefits accruing to Indigenous people, however, could be greatly enhanced if reforms are made to Basin State water planning processes and environmental water governance. Changes will need to be made to environmental water management, particularly flow assessment methods, so that they are more inclusive of Indigenous values, use and priorities. Secondly, state management of environmental water, no matter how adequate it is at meeting ecological water requirements, does not currently recognise Indigenous resource governance systems, nor allow for co-management with Indigenous people. Indigenous people have expressed a strong desire to exercise authority, responsibility and control in the determination of allocations to meet their water requirements, through for example a separate ‘cultural flow’ and a strong say in the setting of environmental flows. According to reports in the literature, environmental flow improvements alone would not address the full range of Indigenous water requirements and the further exclusion of Indigenous people from water sharing decisions could potentially weaken the religious basis of culture and affect social cohesion.

The case studies show that Indigenous people participate in water management activities in diverse ways and are determined to fulfil their customary responsibilities to contribute to improved water management. NWI objectives would be better served by more rigorous and consistent approaches within Basin States to engaging Indigenous people, determining their water requirements, protecting their native title rights and allowing for their values and priorities to influence water management. An increase in Indigenous participation in water allocation decisions could improve this sector’s capacity to manage and adapt to changes in water availability. Efforts to share control of water management decisions under the rubric of co-management of water could bring the kinds of benefits realised in the Australian protected area system.

Investing in Indigenous capacity to contribute knowledge and manage environmental water offers one means of enhancing the potential benefits from greater access to water under the Basin Plan. This capacity could also spill-over into other areas of land
and water management (national park, Indigenous protected area management) and bring broader social and economic benefits (Hunt, Altman et al 2009). It may be possible to do this in ways that are consistent with existing water management institutions such as CMA’s, Indigenous Reference Groups, MLDRIN and NBAN and environmental water programs.

CMAs have been developing the capacity to facilitate Indigenous input to water management and are very well placed to play a greater role. A clearer understanding of the critical success factors evident in those CMA’s considered to be effective might contribute to a more consistent approach across all CMAs within the Basin.

Efforts to build capacity may need to be undertaken at a number of scales:

1. at the catchment level where Indigenous groups need assistance to articulate their priorities and bring their knowledge to scientific water assessment processes governed by complex administrative arrangements (interacting with numerous agencies - customer service committees, environmental water advisory groups);

2. at the regional scale where the northern and southern Indigenous groups (MLDRIN and NBAN) need assistance to analyse data and reflect on trends in water access and participation in management, to contribute to research on ways of quantifying flows for Indigenous purposes, and to offer policy advice on barriers to Indigenous access to water, and implementation of the Basin Plan.

There is also considerable potential for structural change to open up new opportunities for Indigenous people in emerging natural resource based industries, such as payment for environmental services, stewardship arrangements, small scale bush foods businesses and tourism. Positive impacts could be enhanced through long-term structural adjustment programs, including land acquisition, training, and support for enterprise development. Realisation of this potential hinges on the efficacy of regional development mitigation strategies.

### 7.2 Recommendations

The suggestions below, if implemented, would be entirely consistent with the National Water Initiative, and Closing the Gap Indigenous affairs policy.

**Increase the benefits to Indigenous people through improved environmental water management**

a. DEWHA might consider a mechanism to advise the CEWH on ways to increase Indigenous access to environmental water, e.g. establish an Indigenous advisory committee.

b. There is a need to develop closer linkages between CEWH and Indigenous land management and conservation programs within DEHWA. This would see Indigenous values given greater attention in the identification of environmental assets and the specification of their water requirements.

c. Environmental water management planning frameworks should recognise Indigenous values and the need for Indigenous input e.g. the MDBA’s
Environmental Water Plan. The MDBA might like to consider ways in which Indigenous perspectives can contribute to the Environmental Water Subcommittee of the Basin Community Committee e.g. through Indigenous representation.

d. IPAs could be acknowledged as ecological assets and their environmental water requirements assessed as a matter of priority. IPAs could be included in Environmental Water Plans.

e. IPAs could recognise the cost of water as an input to conservation management and meet watering costs where they are consistent with a Plan of Management. The IPA program might need to seek DEWHA funding to investigate and improve water use efficiency on IPAs.

**MDBA might set benchmarks for accreditation of State Basin Plans that reflect Indigenous water needs.**

Paucity of Indigenous water use information, however, requires a number of initiatives to be considered:

(i) Undertake systematic and transparent catchment scale assessments of Indigenous water use requirements (as per the NWI). This might be achieved through the generation of Indigenous Water Management plans for each catchment to achieve the objectives of the NWI. For each catchment:

a. determine Indigenous water use and management aspirations and 5 year targets for improved access to water;

b. draw on the water licence data collected by Arthur (in prep) to identify Indigenous commercial users and discuss the need to provide support for transitional arrangements in areas where SDLs will affect access to water and the commercial viability of Indigenous enterprises. This step would ease any potential structural adjustment by ensuring that Indigenous groups can access buy-back programs as well as programs to achieve irrigation efficiencies. Assistance could be provided to identify other government programs to redress disadvantage.

Regions with the greatest number and/or largest water shares should be prioritised. Other structural adjustment measures to prevent negative socio-economic impacts may be required;

c. consider the socio-economic impact of SDLs on native title interests and identify features of major Indigenous, cultural heritage or spiritual significance (as per Section 3 of the Water Act 2007). Early identification, assessment and management might avoid negative impacts from water markets and trading;

d. build Indigenous capacity to draw on diverse sources of knowledge and identify priorities for environmental water set aside under water plans and other mechanisms/programs such as Aboriginal Access Licences in NSW. Some groups may wish to call some or all of this water a ‘cultural flow’;

e. assist Indigenous decision-makers to receive, evaluate and prioritise applications from Indigenous people for watering;
f. determine the water requirements of those priorities identified in (d), ideally through methods that engage Indigenous people in the collection of social, economic and ecological data and draw on Indigenous knowledge;

g. monitor and evaluate outcomes of watering, with input from Indigenous communities, within an adaptive management framework;

h. build formal and effective linkages between Indigenous Reference Groups to CMAs, other representative Indigenous groups, groups like Riverbank and Environmental Water Advisory Groups to provide guidance to government and Indigenous communities on how Indigenous allocations can be used and managed and to improve the extent to which environmental water plans address Indigenous values and interests (link Indigenous water plans to Environmental Water Plans); and

i. set targets to improve Indigenous representation in water management processes and for increased allocations to Indigenous communities.

(ii) Consideration could be given to resourcing CMA Indigenous Reference Groups to play a greater role in water management and promote Indigenous knowledge of water resources and Indigenous water values and heritage. CMA Reference Groups could be given responsibility for developing the Indigenous Water Management Plans referred to above, although other groups may be more appropriate depending on the jurisdictional arrangements. Collaboration between Indigenous groups across the Basin will serve to promote cultural connections and interactions.

(iii) Finance the purchase of environmental water by Indigenous groups and the cost of delivery to areas/features/purposes identified by (i) above.

Recognising Indigenous people’s strong desire for greater autonomy in managing water, investigate the governance features of a range of entitlement holding and management models, including Indigenous reference groups to CMAs, a Basin-wide or sub-regional Indigenous NGO(s) similar to the Murray Wetland Group, or local Aboriginal corporations such as Land Councils. Other topics for consideration could include agreement on common mechanisms to address fees charged on water licences and/or deliveries and whether restrictions on trade of entitlements are warranted.

(iv) Assist in the development of robust governance arrangements to enable Indigenous people to manage water allocations. Assist existing Indigenous representative structures such as MLDRIN and NBAN (Northern Murray Darling Basin Aboriginal Nations) to play a leading role in overseeing implementation of the Basin Plan.

An Indigenous Water Fund might be established to resource some of these initiatives.
Regional economic development and planning – Indigenous livelihood opportunities from SDLs

The MDBA and DEWHA could assist MDB national parks agencies, Land Councils, the ILC and NGO conservation agencies to seek region-wide benefits from changes in land use and growth in conservation estate, in particular through Indigenous employment in the provision of environmental services.

Where environmental water purchases result in a change in land use to conservation (e.g. Toorale Station in NSW) efforts might be made to provide employment opportunities for Indigenous communities under joint management arrangements.

The NSW River Environmental Restoration Program represents an example of a potential vehicle for undertaking studies of economic opportunities from wetlands and water management.

7.3 Research suggestions

Further research is required to develop effective mitigation strategies and to enable monitoring of social impacts from changes in water availability. Monitoring and evaluation effort is likely to be seriously constrained by lack of knowledge and technical capacity. Further research is needed to:

- establish a base line of Indigenous commercial water use for future monitoring (this may require an Indigenous identifier in current State/Territory licensing data bases);
- develop accessible socio-economic regional profiles for future monitoring, e.g. an Indigenous Atlas;
- advance the understanding of the barriers to Indigenous participation in the water market;
- quantify Indigenous environmental and cultural water use and the specification of Indigenous water requirements;
- examine the ‘cultural flows’ concept and test its alignment with environmental flows to maximise benefits for Indigenous people, including under differing management models;
- assess the efficacy of different water policy instruments in meeting Indigenous people’s cultural, environmental and economic needs.

In specific case study settings the research could explore opportunities to realise multiple cultural and environmental benefits from environmental water allocations, including approaches to ensuring Indigenous input to the selection of key environmental assets and assessment of their productive values. It should advance the ability of researchers and Indigenous groups to measure and monitor outcomes and benefits from environmental/cultural flows. Such information will be of assistance to the CEWH and Basin State Environmental Water Plans and programs.

In 2002 when the MDBC articulated its vision for a healthy river system (Young et al 2002), a preliminary economic and social impact assessment of enhanced environmental flows argued for ‘tight integration of work on:

i. Smarter technical modelling of alternative flow regimes;
ii. Assessment of likely environmental benefits;

iii. Identification of the best options to secure water that take full account of social, economic, financial, environmental and administrative issues; and

iv. Assessment of the likely social, economic, financial and environmental consequences—both positive and negative—of securing more water for the environment and, also, continuing with the status quo (2002:7).

The same rigour and open debate is required to develop the conceptual and empirical understanding of the means to meet Indigenous water requirements and in doing so, fully involve Indigenous people in any subsequent policy development and decision-making. Collaborative empirical research and further discussion with Indigenous people through existing organisations will provide the data, analysis and capacity necessary to address Indigenous water access more comprehensively in future Basin planning.
8. REFERENCES


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9. APPENDIX 1 PROJECT PAMPHLET

Effects of change in water availability on Indigenous people of the Murray–Darling Basin

Water for a Healthy Country Flagship

The Murray–Darling Basin Authority (MDBA) is responsible for developing the Murray–Darling Basin Plan. The Basin Plan is being developed to support the integrated management of the Basin’s water resources. It will identify key environmental assets and ecosystem functions of water resources that must be protected.

The Plan will take into account social and economic issues, including social, cultural and economic issues of interest to Indigenous people. The MDBA will use social and economic information to make decisions about water delivery to meet environmental requirements.

The MDBA has commissioned a number of studies which will assist in setting the Sustainable Diversion Limits (SDLs). SDLs will be at the heart of the Basin Plan. There will be limits set on the quantities of surface water and groundwater that can be taken from the Basin’s water resources. SDLs are needed because many of the Basin’s river and groundwater systems are stressed and over-allocated.

How might the Basin plan affect Indigenous people?

The MDBA is keen to know how changes in water availability will affect Indigenous people in the Basin. They are interested in knowing:

- How would less water for irrigation and other agriculture affect Indigenous people?
- How would more water for some environmental features or assets affect Indigenous people?
- Are there actions that can be taken to reduce any negative impacts on Indigenous people from the SDLs, and are there actions that can be taken to enhance any positive impacts that may occur?

The MDBA is undertaking community consultations through regional meetings and discussions with Indigenous groups. The MDBA’s Indigenous Liaison Unit is responsible for this work.

The MDBA has also commissioned CSIRO to undertake a short-scoping study of the effects of change in water availability on Indigenous people. This project will:

- Review and summarise the current knowledge of Indigenous cultural, social, economic and environmental values of water in the Basin.
- Engage with Indigenous stakeholders and communities to gain their input to, and feedback on, the potential impacts of the Basin Plan on Indigenous rights, responsibilities and interests in water of the Basin.
- Assess the likely impacts (positive and negative) of a reduction in sustainable diversion limits on Indigenous values and interests.

The project started in February and will finish in June 2010. The results will feed into the Basin Plan which is due out later this year.

How will CSIRO do this study?

The project will involve two key steps:

1. A literature review and
2. Three case studies to explore the issues.

A final report will be prepared to pull together the information from these steps. Indigenous people will be consulted throughout the project.

> Scientists and traditional owners discussing Indigenous heritage management along the Murray River at Mildura.
CSIRO Roundtable Meeting, 2008.
Literature review

In February, CSIRO staff reviewed the available reports, books and papers on Indigenous interests in water in the Basin. This information was summarised into a draft literature review and sent to many Indigenous organisations for comment. It was also used by MIDBA staff to inform the early drafts of the Basin Plan. The Literature Review is still available for anyone to read and comment on before June 2010.

Case studies

The Basin is a very large area with many Indigenous groups holding diverse interests in land and water. It is not possible in the time available to research the effects of any changes in water availability that may result from the Plan on every Indigenous group. It is therefore necessary to look at a small number of areas for insights into whether the Basin Plan and the SDLs might change people’s way of life or their social, cultural or economic circumstances, and if so, how. These will only be short studies that will give a deeper understanding of the situation in these areas.

CSIRO staff have discussed the case studies with a number of key Indigenous groups and outlined how we would decide on the case study locations. In making our selection we considered the following criteria.

Case studies should:

- reveal the diversity of Indigenous interests (where there are culturally significant locations that may not have been identified as environmental assets, where there are opportunities to meet multiple objectives from changes to water management, and where Indigenous people’s economic interests may be affected)
- be in regions where there is accessible information on Indigenous values and environmental and hydrological information.
- as far as possible, be relevant to other situations and circumstances in the Basin, and
- if possible, given the time constraints, reveal the value of Indigenous knowledge to plan development.

With input from representatives from the Northern Murray Lower Darling Nations it was decided that there should be one case study in the southern, central and northern parts of the Basin. After looking at a number of areas, the following case study areas were selected:

1. Barmah – Millewa Forest on the NSW and Victorian border: this is an Icon Site under the Living Murray Program and is of great importance to the traditional owners.
2. Hay, NSW – where the Nari Nari Tribal Council is utilising water for a mix of cultural, environmental and economic purposes.
3. Brewarrina Old Mission Billabong, NSW – where the traditional owners are undertaking a number of assessments to ultimately ensure the cultural health and role of the Billabong in the health of the Barwon Darling River is achieved.

Who is working on the case studies?

There are three CSIRO people working on this project:

- Sue Jackson is the project leader and will be working with Brad Moggridge on the Hay case study.
- Brad Moggridge will be working on the Brewarrina Old Mission Billabong case study.
- Cathy Robinson will be working on the Barmah-Millewa case study.

During the next two months CSIRO staff will be visiting these areas and talking with traditional owners and others with any interest in the project.

For more information about the project, the case studies, or for a copy of the literature review please contact:

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CSIRO and the Flagships program

Australia is finding its future on science and innovation. Its national science agency, CSIRO is a powerhouse of ideas, technologies and skills. CSIRO initiated the National Research Flagships to address Australia’s major research challenges and opportunities. They apply large scale, long term, multidisciplinary science and aim for widespread adoption of solutions.
10. APPENDIX 2 REPORTED INDIGENOUS VALUES ASSOCIATED WITH LIVING MURRAY ICON SITES

THE LIVING MURRAY

The Living Murray involves the Australian Government (through the Murray-Darling Basin Authority) and the states that make up the Murray-Darling Basin. Works on the ground and environmental watering are managed by a partnership of state government departments and catchment management authorities. By returning water to the environment, and by building infrastructure such as regulators, weirs and fishways, The Living Murray aims to improve the environmental condition of the Murray River.

Icon sites
The Living Murray focuses on maintaining the health of six icon sites along the river, chosen for their environmental, cultural and international significance.

The icon sites are:

1. Barmah-Millewa Forest
2. Gunbower-Koondrook-Perricoota Forest
3. Hattah Lakes
4. Chowilla Floodplain and Lindsay-Wallpolla Islands
5. The Lower Lakes, Coorong and Murray Mouth
6. River Murray Channel


The arrangements for implementing the First Step decision are outlined in The Living Murray Business Plan, which describes how the actions and milestones in the Intergovernmental Agreement will be achieved. The Business Plan directs the development of The Living Murray Environmental Watering Plan (LMEWP) that acts as the system framework for making decisions on the volume, timing and frequency of water to be provided to each of the Icon Sites. The Business Plan also requires the development of an Icon Site Environmental Management Plan (Icon Site EMP) for each Icon Site that provides a framework for the delivery and management of environmental flows. The Indigenous values and engagement and assessment methods for each Icon site EMP is discussed in the table below.
<table>
<thead>
<tr>
<th>Site</th>
<th>Identified Interests/Affected Groups</th>
<th>Documented Values</th>
<th>Research Methods</th>
<th>Management Actions/Response</th>
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<tr>
<td>1. Barmah-Millewa Forest Icon Site EMP</td>
<td>Yorta Yorta, MLDRN and Cummeragunja LALC</td>
<td>Indigenous sites identified include occupation sites, burial grounds, mounds, middens, scarred trees and stone artefact scatters. Pg10</td>
<td>Indigenous communities will be consulted to determine the best approach to enable inclusive engagement of Indigenous people. Pg90</td>
<td>In Victoria, the Yorta Yorta Cooperative Management Agreement between the Victorian Government and the Yorta Yorta Nations Aboriginal Corporation. MOU with MLDRN. In New South Wales, Indigenous consultation will be undertaken in an inclusive manner through the establishment of an appropriate Indigenous reference group.</td>
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<td>2. Gunbower-Koondrook-Perricoota Forest Icon Site EMP</td>
<td>Integrated Coordinating Committee (ICC) membership being drawn from all interested Indigenous community groups including Indigenous Nations and other relevant groups such as Local Aboriginal Land Councils. pg12 …an inclusive process for engagement of all Indigenous communities with an interest in the Gunbower-Koondrook-Perricoota Icon Site. pg16</td>
<td>The forests have strong social and cultural meaning for Indigenous groups of the region and have long been regarded as a valuable natural resource. Pg5 Large numbers of Indigenous sites occur in the area, including scarred trees from which canoes or shields have been cut, sacred or significant sites, middens, ovens and burial sites. Indigenous uses also undoubtedly impacted on the ecological character of the forests, but those influences are considered part of the natural (pre-European) landscape. Pg69</td>
<td>Indigenous Coordinating Committee (Indigenous CC) will be sought for all aspects of development and implementation of the Icon Site EMP, with membership being drawn from all interested Indigenous community groups including Indigenous Nations and other relevant groups such as Local Aboriginal Land Councils. The principle of ‘informed consent’ will be a general requirement for consultation with all Indigenous Groups. Pg16 and pg 51. To achieve appropriate Indigenous engagement at this site, the following day to day principles will apply: • ensuring consultation is undertaken in an inclusive and appropriate manner; • involve Indigenous people</td>
<td>The involvement of the Indigenous community will be sought in all relevant aspects of environmental flow management to ensure that the aspirations, interests and contributions of Indigenous people are recognised during the development and implementation of the Icon Site EMP. Pg16 The Living Murray Committee has approved TLM Indigenous Partnerships Project Plan</td>
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effectively, through a process of informed consultation, which means that Indigenous people have an adequate knowledge and understanding of TLM to ensure they are aware of the consequences and outcomes which may result from their contribution and consent, with regards to cultural knowledge, values and perspectives;
• work towards improving the capacity of Indigenous people in relation to effective involvement in The Living Murray;
• recognise that The Living Murray Environmental Management Plan for Icon Sites have a role in delivering social, economic, environmental and cultural outcomes that are equitable and appropriate to all Indigenous people, as it relates to the Living Murray process; and Gunbower-Koondrook-Perricoota Icon Site Environmental Management Plan 2006-07 71
• ensure that partnerships between Indigenous people and the managers of each of the Icon Sites, are based on respect, honesty, and capacity
to participate equally, with shared responsibility and clearly defined accountability and authority. Pg70

While the plans have been prepared to date using an ecological objective paradigm, this does not take into account the cultural heritage values Indigenous people apply to the site, eg. Plant and animal species that have food, medicine or spiritual values and/or significance. Indigenous people are less likely to separate the ecological from the cultural heritage and social values. Pg74
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<td>3. Hattah Lakes Icon Site EMP</td>
<td>Hattah Lakes lies on the border between two documented language groups or ‘tribes’ – the Latji Latji and the Nyeri Nyeri. Pg8 Murray Valley Aboriginal Cooperative and Mildura Aboriginal Cooperative, which are listed in Schedule 1 of the Aboriginal and Torres Strait Islander Heritage Protection Act (1984); Traditional Custodians who have Native Title Determinations pending eg. the Latji Latji, Nyeri Nyeri, Tati Tati, and Wergaia peoples; and Other interested groups such as Aboriginal Affairs Victoria, North West Nations, and North West Cultural Program. Pg34</td>
<td>One of the outcomes of Indigenous consultation to date is the recognition of the value Indigenous people place on the Icon Site. While the plans have been prepared to date using an ecological objective paradigm, this does not take into account the cultural heritage values Indigenous people apply to the site, for example, plant and animal species that have food, medicine or spiritual values and/or significance. Indigenous people are less likely to separate the ecological from the cultural heritage and social values. Pg8</td>
<td>The principle of ‘informed consent’ will be a basic requirement for consultation with all Indigenous groups who have specific interest as traditional owners in these sites, even where there may be competing interests between groups. Pg33</td>
<td>To provide for adequate Indigenous consultation for the Icon Sites, it has been agreed that the MDBC Icon Site Indigenous Coordinator will be responsible for integrated site consultation. Pg34</td>
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<td>Site</td>
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| **River Murray Channel Icon Site EMP** | • The language groups and nations along the length of the River Murray Channel include the Wiradjuri, Wergie, Yorta Yorta, Wamba Wamba, Wadi Wadi, Barapa Barapa, Muthi Muthi, Latje Latje, Barkinji and Ngarrendjeri. Pg 15 | • As the first peoples of the Murray Darling Basin, Indigenous communities have lived with the river for thousands of years.  
• The river (and its floodplain) has shaped, and is a living part of, the beliefs and lives of Indigenous peoples. It contains sacred and significant places that Indigenous peoples expect to be respected, protected and preserved. Some Indigenous peoples still occupy traditional lands, with the river, the wetlands and the floodplain providing food, medicinal herbs and raw materials.  
• There is cultural diversity between the Indigenous peoples in relation to traditions, places of importance, creation stories, cultural laws and customs. They do, however, have the same vision for River Murray, which includes treating the River Murray Channel and landscape with due respect. The Indigenous vision for the River Murray is holistic and incorporates spiritual, cultural, economic and social values. Indigenous peoples have a sense of custodianship over country. Pg 15 | The process for consultation with Indigenous people is currently being established through the Indigenous Partnerships Project.  
Consultation with Indigenous people will take an inclusive approach, giving appropriate respect to the knowledge and views of traditional owners. Indigenous groups with an interest in the asset will be identified, in order for the consultation processes to be developed in a manner that addresses the group’s respective requirements. Pg 32 | Indigenous facilitators are available to assist in establishing, where appropriate, cross-border interactions to ensure consistency in approach to the various communities. Pg 34 |
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<td>5. Chowilla Floodplain and Lindsay-Wallpolla Islands Icon Site EMP</td>
<td>Barkindji people and other Indigenous groups downstream. Pg22</td>
<td>Barkindji people maintain a long association with the River Murray and see it as a living body: indeed, the river and its surrounds are one of the richest sources of Indigenous archaeological and heritage sites in Australia. Pg22</td>
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<td>Chowilla floodplain contained numerous Indigenous sites including artefact-scatters, middens, hearths, and scarred trees. The sand-bodies (dunes and lunettes) are particularly rich with sites that include cemeteries and individual burials. This survey found burials, hearths and artefact-scatters at Lake Littra that are thought to be of mid-Holocene age (5,000 years BP). Pg23</td>
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<td>The River Murray corridor, including the Chowilla floodplain, was one of the richest areas in Australia for natural resources and supported some of densest Indigenous populations (Angus, 1847; Butlin, 1983, Lawrence, 1968, Taplin, 1879, Tindale, 1974). The river, land and associated wetlands on the Chowilla floodplain are utilised by local Indigenous</td>
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<td>The involvement of the Indigenous community has been sought in all necessary aspects of the Icon Site to ensure the aspirations, interests and contributions of Indigenous people are recognised during the development and implementation of the EMP. Pg10</td>
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people in their pursuit of a cultural economy, based on traditional practices and knowledge. Pg24

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<tr>
<td>6. The Lower Lakes, Coorong and Murray Mouth Icon Site</td>
<td>Ngarrindjeri Nation</td>
<td>The Ngarrindjeri are engaged in mainstream economic activities, such as cultural tourism, education and awareness programs, retail, and community service programs, all of which contribute to the broader regional economy. They also rely on the health of the Lower Lakes, Coorong and Murray Mouth for their cultural economy. The condition of the system affects traditional practices such as fishing, hunting, gathering eggs, collecting reeds and making traditional wares (for example, baskets). Pg 11 Ngarrindjeri lands and waters is a living body. It must be healthy for Ngarrindjeri people to be healthy. This is a human right. Ngarrindjeri people need to manage the health of Ngarrindjeri Ruwe (lands and waters) according to Ngarrindjeri laws and traditions. Pg11 The Ngarrindjeri have a long and continued understanding of the importance of the</td>
<td>A separate engagement process with the Ngarrindjeri community has been identified through consultation with the Ngarrindjeri NRM Group. Pg90 Partnerships will be formed with the Ngarrindjeri people, and any other Indigenous Nations whose traditional country is involved in environmental management of the River Murray in South Australia. Pg92</td>
<td>The plan is being implemented through strategic partnerships with government agencies and key interest groups - Ngarrindjeri Nation through the Indigenous Facilitator pg4 Some cultural values such as archaeological sites have been included but this section requires significant expansion in consultation with the Ngarrindjeri community. Pg87</td>
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The Ngarrindjeri believe that too much water has been diverted from the system and that not enough reaches the lakes and Coorong. The Icon Site is no longer healthy and the water is not fit for drinking: the Coorong, lakes and river are dying. Pg30
11. APPENDIX 3 OVERVIEW OF INDIGENOUS PARTICIPATION IN WATER PLANNING AND MANAGEMENT IN THE CASE STUDY REGIONS

11.1 Indigenous water management in New South Wales

The objectives of NSW’s water legislation, the Water Resource Management Act 2000, explicitly include recognition of the interests of, or benefits to, Indigenous people from the use of water. Indigenous representation on water advisory committee is mandatory and special purpose Aboriginal licences are available. As a result, the NSW policy framework seems to be the most advanced of all jurisdictions, particularly with respect to providing water for economic development. The objectives of the Water Resource Management Act 2000 (NSW) and the Water Sharing Plans provide for the protection of spiritual, social and customary values of Aboriginal communities. The Act’s principles include the following:

- the protection of features of Indigenous significance and features of major cultural, heritage or spiritual significance and
- the need to provide ‘benefits to Aboriginal people in relation to their spiritual, social, customary and economic use of land and water’ (cited in Douglas 2004).

Target 7 of the 2002 Water Management Outcomes Plan (NSW DNR 2002) stipulates that ‘mechanisms (must be put) in place to enable Aboriginal communities to gain an increased share of the benefits of the water economy’.

Behrendt and Thompson (2004) provide a comprehensive examination of NSW’s approach in which they describe the translation of Indigenous spiritual values into legal rights and interests in NSW as a process in its ‘formative stages’. Further, that there remained a considerable amount of uncertainty as to what will be the complete range of rights and interests recognised in NSW cases (2004: 78). They refer to the welcome step of including Aboriginal interests in the stated objects of the legislation, and targets expressly referring to Aboriginal people in the over-arching water plan for the State (State Water Management Outcomes Plan). Notwithstanding the attention given in the Act and accompanying policies to Indigenous interests, considerable doubt is expressed by the authors about the beneficial effects of the legislative framework which is arguably the Australia’s most comprehensive. They are critical of the low priority given to Aboriginal interests vis à vis a broad range of competing interests, the unenforceable nature of policy initiatives, and the minimal protection of native title rights and interests, arguing that the NSW Water Management Act 2000 goes no further than the Native Title Act 1993 (2004).
11.1.1 Indigenous participation in water planning

The Water Management Act entitles Aboriginal people to be represented on management committees: indeed at least two people are required on both Water Management Committees and the State Water Advisory Council, and therefore to provide input to the establishment of Water Sharing Plans (McKay 2002).

According to NSW’s NWI Implementation Plan (Government 2006), during the development of Water Sharing Plans, each committee included two representatives from the local Aboriginal community, such as representatives from Local Land Councils, Elders Groups etc. An information pamphlet for Indigenous water users states that the NSW Government has worked closely with Indigenous people to develop the first round of water sharing plans.

NSW is to extend this model of consultation and engagement to a system of Aboriginal Reference Groups to be established by CMAs. They will act as the representatives for local Aboriginal communities. Land councils, Elders Groups, and Traditional Owners are represented on these groups. These Reference Groups will be used for consultation on future Water Sharing Plans (NSW Government 2006: 27).

For example, the Murrumbidgee CMA has many Indigenous nations within its boundaries, and has supported the establishment of a traditional natural resource and heritage reference group, comprised of Mutti Mutti, Nari Nari, Wiradjuri and Ngunawal elders (Weir 2008).

11.1.2 Protection of native title rights

The Water Resource Management Act makes provision for Aboriginal people to exercise their native title rights so long as those rights are limited to the use of water for traditional purposes (McAvoy 2006). These uses do not require a licence and the amount that can be taken or used by a native title holder in any one year is the amount prescribed by the regulations. McKay (2002) describes the Act’s definition as ‘limited’ for it means the ‘right to take and use water for domestic, personal and non-commercial communal purposes’ (p. 32).

McAvoy explains the effect of the Native Title Act:

…where a person has a right obtained through some form of ‘valid act’, such as a water access license granted by the Government, that right is protected. However, to the extent that native title is impaired then compensation is payable (2006: 100).

He further explains that a native title right to water is subordinate to the rights of other users who have valid rights and that

… If the rights held by the other users had the effect of depriving native title holders of the use of those waters, then the NSW Government would arguably
be required to compensate the native title holders for the water rights given to third parties (2006: 100).

The extent to which a native title entitlement will satisfy native title requirements can only be determined on a case by case assessment, although it is noteworthy that a review of the 35 water sharing plans in operation reveals that only 2 have provided an allocation for native title. According to the NSW NWI Implementation Plan there is provision for allocations to meet native title requirements, should they be determined:

Each of the WSPs recognises that extractions as part of a native title right may increase over the term of the WSP, in the event that native title is granted in NSW. In addition, applications for consents under the WMA (in relation to a new grant of water, or an approval) are notified to native title claimants etc, in accordance with the Native Title Act 1993.

The Apsley Water Sharing Plan of NSW is an interesting case. It is one of very few existing plans that provides an allocation for native title purposes to an Aboriginal community residing on the Apsley River (0.01 ML/per day). This amount was determined using a formula based on per capita residential water use, not any other considerations relating to spiritual or cultural objectives or aspirations. According to an officer of the Department of Natural Resources there was considerable discussion about the nature of this right, both in-house and with the affected Aboriginal community (Miller pers. comm.). In this case the community had a water frontage and was therefore entitled to a basic landholder right to water for domestic and stock purposes, making articulation of the difference between the basic right and the native title right difficult (ibid). This landholder ‘riparian’ right is available to Indigenous Australians, if they or a community group owns or leases land, in all Australian jurisdictions (McKay 2002a).

Behrendt and Thompson (2002) argue that apart from the requirements to deal with native title in the Water Sharing Plans, the Act itself only provides the most minimal of protections of native title rights and interests. They repeat the point observed by other legal commentators (McKay 2002; Craig 2006) that little satisfaction could be gained from an entitlement to extract water in the exercise of native title rights if there is insufficient water to extract or if it not of a consumable quality (2004: 97). The NSW Department of Natural Resources explains the practical effect of competition for water on native title rights:

Where established under Commonwealth law, Native Title rights to water are also protected by the New South Wales Sharing Plans. The water sharing plans protect these rights by allowing you to continue to take water even when

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14 In NSW a native title holder means a person who holds native title rights pursuant to a determination under the Native Title Act 1993 (Cwth) (McKay 2002). As there are so few determinations to date this level of proof may continue to limit substantially, and for some time, the number of instances in which water is allocated for native title purposes.

15 This question of prioritisation of Indigenous rights and needs has surfaced in case law involving disputes over water and fisheries management in Canada and the USA.
licensed users must cease to pump. However, in very dry times, restrictions may be imposed on the amount of water that can be taken, recognising the impacts of extraction on the environment and other users. These restrictions are described in the Water Management Act 2000 and are not generally defined in the plans (cited in Rural Solutions 2008: 26).

A number of NSW Water Sharing Plans, such as the Gwydir Regulated River Water Source Plan (2002), state that the water supply system shall be managed ‘so that it would be capable of maintaining supply to those exercising native title rights through a repeat of the worst period of low inflows to those water sources’. In the Gwydir case, achieving this clause would require that sufficient volumes of water must be set aside from assured inflows into this source and in reserves held in the Copeton Dam.

Applications for consents under the Act (in relation to a new grant of water, or an approval) are notified to native title claimants, in accordance with the Native Title Act 1993. McKay (2002) notes, in regard to water to protect native title interests, there is nothing in the Act which quarantines water for this purpose, however, with that consideration in place, an Indigenous community would have standing to review the decisions made by a Minister regarding water allocations. Protection of native title in the NSW legislation might provide greater recourse to Indigenous people to review water allocation decisions than they currently have under the amended Native Title Act.

Behrendt and Thompson (2004) point to further limitations relating to compensation and the exclusion of commercial rights from definitions of traditional purposes.

### 11.1.3 Indigenous specific purpose licences

The NSW Water Management Act 2000 provides for the grant of specific purpose licences to be accessed by Aboriginal people or communities for either cultural or commercial purposes. These are to be determined in accordance with macro water sharing plans that apply to areas that are generally characterised by low water usage.

Each of the WSPs provides for access to water for cultural purposes by Indigenous communities and persons. The range of uses supported by the licences include: ‘personal, domestic and communal purposes including the purposes of drinking, food preparation, washing, manufacturing traditional artefacts, watering domestic gardens, cultural teaching, hunting, fishing, and gathering, and for recreational, cultural and ceremonial purpose’ (Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2003, Section 59 (9)). A DNR pamphlet states that these licences will generally be granted.

The cultural access licences are capped at up to 10 ML per licence per year and are not to be traded. Aboriginal cultural access licences will also apply to all future WSPs developed in NSW. The NSW Government has waived the application fee for cultural
access licences, although according to respondents interviewed during the course of the Nari Nari case above, charges are levied on the diverted water.

The first and only Aboriginal cultural access licence was allocated to an Indigenous group, the Nari Nari Tribal Council near Hay in 2005 (NSW Department of Natural Resources 2006). As discussed in full above, the licence has been used to water a culturally significant wetland on Toongimbie property, which is an Indigenous Protected Area.

In addition, coastal WSPs make provision for Aboriginal community development licences. These licences can be used for commercial enterprises owned by Aboriginal people and could include:

- Irrigated cropping, such as maize;
- Horticulture, such as fruit, vegetables, flowers or ornamental plants;
- Irrigated pasture, such as lucerne for a dairy farm;
- Aquaculture, such as oyster growing or prawn farms; and
- Non-agricultural activities, such as manufacturing or crafts.

These commercial licences are only available under restricted terms in the coastal river areas not affected by the Murray Darling Basin ‘cap’\(^{16}\). They will be permitted in coastal areas provided this additional extraction would not negatively impact on ecological values that are dependent on high flows. They are not to exceed 500 ML p.a.\(^{17}\) and are non-tradeable\(^{18}\) (Rural Solutions 2008). Future coastal WSPs will provide for Aboriginal commercial access licences (NSW 2006). In addition there may be opportunities in some groundwater systems to grant Aboriginal commercial licences. This will occur in areas where licensed entitlement is less than the sustainable yield of the aquifer. In northern NSW, commercial licences to groundwater sources may prove to be of greater economic value to certain Aboriginal communities holding land and in localities where the costs of extracting water from the aquifer are not prohibitive (Miller pers. comm.).

To date no commercial licences have been granted. Further information is required to explain the poor uptake of this provision, which could be attributable to unattractive terms, low awareness or lack of interest in irrigated agriculture amongst the Aboriginal population. The commercial licences require water storage and infrastructure capacity to utilise efficiently, for water must be pumped from rivers during higher flows and stored for use as needed. It is possible that this costly requirement precludes many Aboriginal people.

\(^{16}\) The cap limits the total extraction amount to the 1994 level of development, effectively preventing the issuing of any new water licences on inland rivers.

\(^{17}\) The macro sharing plan will not limit the volume assigned to each individual Aboriginal commercial licence, only the total volume per water source.

\(^{18}\) Tan’s (2009) study shows that there is conflicting information on this aspect and therefore some doubt about whether they can be traded.
Equality of access to these types of allocations is a consideration for the future. Will there be an increase in inequality accompanying access to commercial water rights, for example, as Indigenous groups who benefit the most are the ones with assets to invest in infrastructure? The rationale for making these allocations lacks transparency (e.g. are grants to individuals or corporations?) and there doesn’t appear to be any monitoring by the NSW agency group charged with the responsibility of socio-economic monitoring of water reforms. Rural Solutions (2008) notes that the Nari Nari Tribal Council was required to register their interest with the Murrumbidgee CMA, whose Indigenous Reference Group assessed the application, and defined the licensing rules. The same report notes that questions have been raised about the effect of insecure tenure on the uptake of such licences. Indigenous groups who do not have secure title to land requiring watering are ‘likely to be reticent to make the effort… where they have no guarantee that their restoration efforts will not be undone by sheep or cattle’ (Rural Solutions 2008: 11).

In conclusion, it is not clear from any descriptions of the NSW framework in the literature how the Aboriginal specific allocations were determined and what process will be established to evaluate whether the apparently arbitrary maximum figures permitted are meeting Indigenous needs. These innovative mechanisms are not supported by policy infrastructure such as consistent guidelines, transparent methods for determining allocations and robust measures for meeting objectives (targets, standards, indicators). The Nari Nari case study shows that DECCW, the CMA and Indigenous groups are now attending to these problems.

Within the literature on Indigenous water rights and interests there are outstanding concerns expressed by native title specialists over the impacts of commercial use of water on Indigenous rights, and criticisms of the degree to which the Native Title Act can protect native title rights in the face of over-allocation of the resource (Behrendt and Thompson 2004).

11.1.4 Special measures: the Aboriginal Water Trust

The NSW water policy arrangements provide a mechanism for Indigenous people to participate in the State’s water economy. In 2002, in response to the NSW Act’s requirement that the management of State water resources benefits Aboriginal people, the Government agreed to a Water Trust of $5 million. It aims to provide an increased level of Aboriginal participation in the water market and to assist water related enterprises. Grants from the Aboriginal Water Trust are available to run commercially viable businesses where water is an essential component of the business’s operations. Funding is also available for projects that conserve water, support Indigenous people’s efforts to conserve and contribute their hydrological knowledge to water planning and to access water licences for cultural purposes. Funding of $5 million was made available for the first two years of operation.

19 The Toorumbee Creek Water Source Plan 2003 says that in the event of an application for an Aboriginal commercial access licence, the Minister will seek the views of the Aboriginal Reference Group as to the benefit of the proposal. If an ARG has not been established the advice of the Local Aboriginal Land Council will be sought.
Aboriginal groups in NSW had originally developed a proposal to establish a water trust to overcome the impediments posed by the decoupling of land and water titles in the late 1990s. McAvoy explains that the Trust envisaged by Aboriginal groups never eventuated:

The Aboriginal Water Trust on the other hand never really got off the ground because the Cabinet approval was for a grants program which assisted Aboriginal people in developing water based enterprises, not buying water licenses (2006).

According to the Trust’s former Executive Officer (Virginia Falk, interviewed in 2006), there were twelve proposals in the first round from Aboriginal communities and individuals to access funds for various water-based enterprises and initiatives (Falk pers. comm.). By 2007 no grants had been made due to ‘bureaucratic problems’ (Rural Solutions 2008).

Interestingly the Trust has attempted to integrate projects that seek to meet community cultural objectives into its eligibility requirements instead of a strictly commercial orientation to project proposal. According to Falk, what is common to these proposals is a desire for a ‘community outcome’ (ibid). Fund principles and operational guidelines were adopted following consultation with Aboriginal people and are available on the NSW DNR website.

The NSW Water Trust has since been reviewed although the results are not yet available.

### 11.2 Indigenous water management in Victoria

Victoria’s water allocation framework provides the basis for the management of Victoria’s water resources. Under the Water Act 1989, the State Government retains the overall right to the use, flow and control of all surface water and groundwater on behalf of all Victorians. All water taken for consumptive purposes in Victoria is done so under entitlements set out in the Water Act 1989 ([http://www.ourwater.vic.gov.au/allocation/water_allocation_framework](http://www.ourwater.vic.gov.au/allocation/water_allocation_framework)).

Regional water strategies are used to plan for the sustainable use of water. There are four Victorian regions. Victoria’s ten catchment management authorities (CMAs) have a role to play in water planning. They are provided with regional waterway, floodplain, drainage and environmental water reserve management powers under the Act.

Victoria’s response to the Indigenous access provisions of the NWI emphasises its engagement efforts which are influenced by two state-wide processes, the Indigenous Partnership Strategy that commenced in 2001 and the 2004 Indigenous Land Management Framework (Victorian Government 2006). Indigenous values are also said to be recognised in the Victorian River Health Strategy and consultation is a
requirement of all river health plans. According to its Implementation Plan, the mechanisms for addressing the Indigenous access provisions of the NWI include:

- to invite all affected Indigenous groups to participate in bulk entitlement\textsuperscript{20} consultative processes
- to establish and support regional Indigenous reference groups to advise Department of Sustainability and Environment on land and resource management issues
- to establish an interagency forum to provide a coordinated approach to addressing land and resource management issues, and

Indigenous groups have been consulted in the development of Regional Sustainable Water Strategies (e.g. Northern Region - 14 groups). CMAs have also employed Indigenous Liaison Officers. Weir (Weir 2008) notes that the North Central Catchment Management Authority in Victoria has signed a protocols agreement with the North West Nations and the Yorta Yorta Nation. Tan’s report (2009) concludes that there is little evidence of Indigenous consultation in either the bulk entitlement conversion process or in the making of statutory plans.

There are no mechanisms to allocate water to specific Indigenous purposes in Victoria.

11.2.1 Native title

In 2009 there had been no native title awarded in Victoria (Jackson 2009). There are currently approximately twenty claims registered but yet to be determined. However, two Native Title consent orders were recently granted by the Federal Court involving the Wotjobaluk people around the Wimmera River, north of Dimboola, and the Gunditjmara in the north-west. The rights and interests to land and water recognised in both cases were non-exclusive. With respect to the Gunditjmara determination, it recognises the Gunditjmara people’s non-exclusive native title rights and interests over 140 000 hectares of vacant Crown land, national parks, reserves, rivers, creeks and sea north-west of Warrnambool. The Determination states that ‘insofar as the native title rights and interests may provide a right to take water from waterways, that right is limited to domestic and ordinary use’ (Determination, para 6). Further, there is no native title in the Native Title Area in or in relation to groundwater as defined in the Water Act 1989 (Vic) (Determination, para 3).

\textsuperscript{20} A bulk entitlement is a right to use and supply water which may be granted to water corporations, the Minister for Environment and other specified bodies (e.g. electricity companies).
The Victorian Government intends to account for any water legally allocated to native title holders for traditional cultural purpose, although their Implementation Plan does not provide any further information on its proposed accounting mechanism.

Water use issues have been the subject of native title negotiations in Victoria. In two cases, agreements have been reached over wetlands and lakes of significance. One with the Yorta Yorta (discussed in Section 5 above), and one with the Gunditjmara. The Victorian Government’s NWI submission cites the Yorta Yorta Co-operative Management Agreement and Lake Condah Sustainable Development Strategy as good examples of positive outcomes reached in this regard (2006). The Yorta Yorta Nation Aboriginal Corporation has reached a cooperative management agreement with the State of Victoria over 50,000 hectares of Crown land in northern Victoria. The areas of responsibility include Barmah State Forest, Kow Swamp and areas along the Murray and Goulburn rivers. Under the terms of the Yorta Yorta Co-operative Management Agreement, five community members, along with three government representatives, will report directly to the state’s environment minister on land management issues.

At Lake Condah in western Victoria, mediated native title negotiations resulted in an agreement in 2007 for joint management of Mt Eccles National Park and the purchase of water to meet Gunditjmara requirements to restore the levels of the lake (Rural Solutions 2008). In March 2008, Lake Condah was returned to its traditional owners by the State of Victoria. Restoration of permanent flows is integral to the Lake Condah Sustainable Development Project which is supported by local Government, the local CMA and others. The aim is to restore the lake and re-establish the eel fishing activities conducted by Gunditjmara people over many centuries. A World Heritage nomination is in preparation and tourism activities under development. The Lake Condah Sustainability Development Project, the Department of Sustainability and Environment, the Glenelg Hopkins Catchment Management Authority, Parks Victoria and Southern Rural Water worked together to facilitate hydrological feasibility and environmental flow studies. Continued community consultation and engagement are a crucial part of the processes (http://www.lakecondah.com/objectives2.html).

It is possible that this is Australia’s first case of a native title consent determination that has resulted in an allocation of water to meet Indigenous people’s objectives. More information on the mechanisms involved could confirm this.