LAW, POLICY AND PRACTICE FOR ECOLOGICALLY SUSTAINABLE WATER ALLOCATION AND MANAGEMENT

An analysis of institutional developments to provide for environmental water needs in the Murray-Darling Basin (New South Wales and Victoria), 1994-2009

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ABSTRACT

A comprehensive national program of water reform, aimed at achieving more sustainable and efficient water allocation and management, commenced in Australia in 1994. A key platform of the reform agenda has been the commitment to provide for environmental water needs by addressing unsustainable levels of water allocation; providing legal recognition and protection for environmental water; and reforming river management arrangements.

This thesis evaluates progress on this reform agenda in the Murray-Darling Basin, Australia’s major inland river system. This evaluation centres on the developing law, policy and practice of environmental water allocation, particularly processes to allocate water between competing users; legal mechanisms and supporting legal structures to facilitate and protect environmental water; and management arrangements for rivers with environmental water regimes. A central focus is the strategic and structuring role of law in establishing and sustaining effective environmental water governance across these three areas.

To structure this evaluation, an analytical framework of institutional considerations is developed early in the thesis. This framework represents a synthesis of pertinent research, drawing on the scientific basis for environmental water reforms and a range of conceptual approaches to institutional design and governance for sustainable natural resource management. Essentially, this framework establishes the parameters for an emergent model of governance for ecologically sustainable water allocation and management, focusing particularly on the role of law within a broader institutional context.

The framework is applied in a range of different management contexts and at a range of jurisdictional levels through case studies. This contextual application allows the considerations and contentions raised through the framework to be further explored, tested and advanced, with the purpose of contributing to the articulation of a proposed model of governance for effective environmental water allocation in conclusion to the thesis. This governance model proposes more strategic and purposeful use of legal
settings to set standards and parameters for a range of water allocation and management functions; to guide and constrain relevant decision-making; and to distribute duty and authority, and foster institutional capacity in a manner which best supports effective environmental outcomes. The model represents an important blueprint at a critical time in the ongoing Australian water reform process; and at a broader level contributes to the literature on the role of law and legal change in establishing institutions for sustainability outcomes.
DECLARATION

This is to certify that:

(i) the thesis comprises only my original work towards the degree of Doctor of Philosophy, except where indicated in the Preface;

(ii) due acknowledgement has been made in the text to all other material used;

and

(iii) the thesis is less than 100,000 words in length, exclusive of the front matter, diagrams, tables, maps, bibliographies and appendices.

Signed:
PREFACE

Aspects of this thesis have previously been published in the journal articles listed below:


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CHAPTER ONE: INTRODUCTION

Ecological sustainability is a relatively new policy agenda in the allocation and management of water resources in Australia, and finds its application in recent institutional developments to allocate, protect and manage water to meet environmental outcomes. A key platform of a comprehensive national program of water reform, launched in 1994,\(^1\) has been the commitment to provide for environmental water needs through addressing unsustainable levels of water allocation; providing legal protection for environmental water; and refashioning management practices to better achieve environmental outcomes.

The focus of this thesis is the realisation of these reforms within the Murray-Darling Basin [MDB], Australia’s major inland river system in south-eastern Australia.\(^2\) The complexities and challenges inherent in delivering the environmental water reform agenda in this context are considerable. Historical laws, policies and practices for water management have evolved to support resource exploitation, and have resulted in unsustainable levels and patterns of water use, including highly over-allocated water resources. Consequently, many natural systems are highly degraded with widespread loss of biodiversity and threatened ecological function.\(^3\) Addressing these issues effectively represents very significant changes to the existing distribution and management of water resources. In most rivers of the MDB there are high levels of consumptive use and powerful, established social and economic interests, which largely conflict with environmental reform imperatives. Increasing conflict over scarce water resources under climate change scenarios will only accentuate these challenges.

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\(^2\) The Murray Darling Basin includes the territory of five Australian states: Queensland, New South Wales, Victoria, the Australian Capital Territory (Canberra), and South Australia. Basin water resources support extensive agriculture and many regional cities and towns. A map is provided later in Chapter One, and key characteristics of the river system are discussed in Chapter Two.

\(^3\) For a recent and comprehensive assessment of river health throughout the MDB, see Murray Darling Basin Commission, *Sustainable Rivers Audit* (2008).
This thesis presents a critical analysis of the developing law, policy and practice of environmental water allocation [EWA], and makes recommendations for the ongoing reform process to enable a more effective realisation of environmental outcomes. It argues that progress on environmental reforms has been slow and often ineffective. Developments in this area have tended to reflect a conceptualization of the environment as just another water user whose needs may be met by manipulating and adding to existing institutional systems for water allocation and management. Yet existing systems are biased towards capturing and supplying water for consumptive use. Merely grafting on new legal forms and management functions has failed to achieve the level of institutional change required to provide effectively for environmental water needs.

As such, fundamental changes to the institutional framework for water allocation and management are put forward in the form of a model of governance for effective EWA. This governance model reflects a broader conception of environment as the basis for healthy rivers on which all other uses depend, rather than just another competing water user. It embodies a shift in the underlying purpose of water management, from resource exploitation to sustainability. To achieve this, the model proposes strategic and more purposeful use of legal settings to set the parameters for a range of key water allocation and management functions; to guide and constrain relevant decision-making; and to distribute duty and authority, and foster institutional capacity in a manner which best supports effective environmental outcomes.

The thesis argues that effective EWA would be supported by overarching legal settings that:

- Set clear substantive standards and accompanying duties to achieve sustainability outcomes across three broad areas of environmental water governance: allocation, protection and management;
- Facilitate and support processes to allocate water between competing users so as to achieve these outcomes;
• Provide enforceable, targeted legal mechanisms to facilitate effective environmental water outcomes and protect environmental water; and
• Guide, constrain and support the adaptive management of rivers for environmental outcomes.

I Scope of Research

In order to propose such changes to institutional frameworks for water allocation and management, this research has investigated how environmental imperatives have been treated at the level of policy, law and practice in the reform process to date; identifying constraints and opportunities for the comprehensive and effective provision for environmental water needs. This investigation has focused on:

• The design of resource allocation processes to share water between consumptive and environmental requirements and address current unsustainable allocation levels;
• Important characteristics of legal mechanisms and necessary supporting legal structures for effective environmental water provision; and
• Management arrangements, which are suited to managing rivers with environmental flow regimes for broad river health outcomes.

The essence of this investigation has been understanding law as an institution, or a central part of an institutional framework, and as a tool of governance. First, institutions are broadly conceived in the thesis, to include laws, and associated policies and practices - particularly organisational practices and capacities that influence the pace and nature of the implementation of law and policy. This conceptualisation draws on the literature on institutions for sustainability, which recognises the complexity of factors influencing both the development of law and policy and its implementation; and also the key role of law and legal change as a component of policy and institutional change for realising sustainability imperatives.⁴

⁴ See, for example, Benjamin J Richardson and Stepan Wood (ed) Environmental Law for Sustainability: A Reader (2006); Stephen Dovers and Robin Connor, 'Institutions and Policy Change for Sustainability' in Benjamin J Richardson and Stepan Wood (eds), Environmental Law for
Second, the thesis is directed to proposing a model of governance for effective EWA. Governance is treated as a much broader idea than management, and encompasses the totality of mechanisms and instruments available for influencing social change in certain directions. Thus, the concern is with far more than a legal framework, rather the way law works in combination with policy and practice to achieve sustainability outcomes. This recognises, in the tradition of socio-legal and law-in-context research, the importance of looking beyond formal law and policy on the books, so as to understand the multiple factors influencing both the development and implementation of law and policy in practice.

There has been a deliberate decision to concentrate on EWA for surface water resources as a key component of broader integrated catchment management. It is however important to recognize that providing for environmental water needs is but one component of the broader integrated management approach required to address the complexity and inter-connection of land and water systems (including groundwater) within a catchment.

The National Water Reform process is ongoing. Achieving an ecologically sustainable allocation and management of water resources in the MDB, particularly in light of climate change scenarios, continues to dominate public debate. The research period, 1994–2009, is established to allow an evaluation of the major period of formal reform to date. The end point marks a new phase of increased federal involvement in water management and allocation, following the introduction in late 2007 of comprehensive new federal water legislation,\textsuperscript{8} which initiates significant changes to the developing law, policy and practice of EWA. This framing allows important lessons from previous reform experience at the state level to be identified and applied to the ongoing process of water reform.

The research focuses specifically on inland regulated river systems\textsuperscript{9} in New South Wales [NSW] and Victoria, within the broader context of the MDB. A map of the Basin is included below. Inland regulated rivers provide an ideal template for investigating the introduction of a major new policy imperative – the provision for environmental water needs – against a backdrop of long established human uses, which largely conflict with such needs. This context presents an opportunity to explore institutional design directed to changing existing unsustainable patterns of resource use, and achieving more sustainable water allocation and management.

\textsuperscript{8} Water Act 2007 [Cth]

\textsuperscript{9} A regulated river is a section of a river system where flows can be managed and manipulated, through infrastructure such as storages, weirs and channels. This infrastructure has been developed to enable the supply of water for consumptive use. In unregulated sections of rivers, consumptive use involves far less sophisticated infrastructure, and usually is achieved via direct extraction from the river. Thus the management opportunities and imperatives are very different in regulated and unregulated rivers.
The focus on NSW and Victoria reflects their significance in the MDB in terms of the presence of important tributaries to the Murray-Darling system, and a long history of intensive water use. Progress made in re-allocating water to achieve effective EWA in both states is critical to outcomes at the level of the whole MDB. Focusing on the state level, in the context of broader initiatives at the MDB level, also provides the opportunity to consider the effects of federal tensions and conflicts, which have been so influential in the progress of water reform in Australia. The potential of recent developments in water reform through increased direct federal regulation can be compared with the experiences to date of largely state-based implementation of a national water reform policy agenda. This enables consideration of the appropriate scale for the situation of various institutions of water management, such as the
guiding parameters for the re-allocation of resources, or the practical delivery of environmental water, and the way these functions and responsibilities should be best distributed between various levels of government and community.

Finally, it was beyond the scope of this research to compare the Australian experience of introducing institutions for EWA on an international scale. For example, recent major water law reform in South Africa establishes a prioritised water reserve to ensure basic human needs, and protect and maintain aquatic ecosystems, which is conceptualised and protected as a public right;\textsuperscript{10} and the most recent European Water Framework Directive institutes an ambitious environmental standard of “good ecological status” for both surface and ground water bodies, to be delivered by a range of innovative new governance approaches.\textsuperscript{11} Exploring the Australian experience of reform implementation in a broader international context would be a valuable extension of this research in the future.

\textbf{II \hspace{1em} RESEARCH APPROACH AND SIGNIFICANCE}

An original framework of institutional considerations to structure the analysis of the developing law, policy and practice of EWA has been developed in this thesis. The framework is grounded in an understanding of the scientific basis, the legal and policy context for environmental water reforms, and a review of key conceptual approaches to natural resource allocation and management. By spanning formal law and policy, and the institutional practices and capacities which will influence its implementation, the framework facilitates a law-in-context approach to the analysis, and underscores the importance of broad institutional change to effective EWA.


The framework combines four inter-related elements, which represent key components of a governance model for EWA:

- overarching legal settings;
- processes to allocate water between competing users;
- legal mechanisms to facilitate and protect environmental water; and
- processes to manage rivers with EWA.

These elements are portrayed within the framework as inter-related because effective EWA depends on institutional change in all four areas, and because there are many connections between them. However, as the essential focus of the thesis is the role of law and legal change in achieving institutions for sustainability, the relationship between overarching legal settings and the other three areas of environmental water governance assumes prominence in the analysis.

This analytical framework serves a dual purpose in the thesis. First, it provides a structure for the evaluation of institutional responses to the EWA reform agenda, establishing general parameters around what might amount to a governance model for effective EWA, which can be more fully explored in a variety of contexts in the thesis. Second, drawing on this contextual exploration, the framework is further developed in the final chapter in order to propose key elements of a governance model for effective EWA.

The resulting model captures the key institutional ingredients identified through this research to be important to achieve more sustainable water allocation and management. In this respect, it is an important contribution to the ongoing Australian water reform process. The analytical framework and resulting model also represent a broader contribution to the literature on the role of law and legal change in achieving adaptive institutions required for sustainability outcomes. As such they may have broader potential applications to natural resource re-allocation processes in different contexts.

The analytical framework is applied throughout the thesis to three different jurisdictional contexts: NSW, Victoria and the Murray-Darling Basin. In addition to

\[12\] Above n 4.
an analysis of legislative and policy responses at the state and federal level against
this framework, a key component of the thesis is the presentation of two case studies
at the level of a particular river management area in each state. These cases are used
to illustrate how a range of institutional factors, such as the legal mechanisms selected
to facilitate and protect environmental water, and organisational and community
practices and capacities, will influence reform outcomes in practice. A series of
qualitative interviews and observations have targeted the practical experiences of a
wide range of stakeholders involved in the negotiation of EWA and / or management
of rivers with environmental flow regimes.\textsuperscript{13}

There is a growing body of literature on legal and policy frameworks for
sustainability,\textsuperscript{14} and more specifically water allocation and management.\textsuperscript{15} Yet given
the currency of this reform process, there has been less assessment of the practical
experience of implementation, which highlights important areas for ongoing
institutional reform.\textsuperscript{16} This analysis clearly demonstrates the often considerable gaps
between policy and law on the books and in practice, and the extent and nature of
institutional change required to effectively realise environmental outcomes.

III Chapter Overview

In Chapter Two, EWA is introduced as a reform agenda. To do this, the scientific
literature in the fields of freshwater and restoration ecology is reviewed to establish
the environmental imperatives behind the reform process. The chapter then explores
how these imperatives sit within the established institutional context for water

\textsuperscript{13}Appendix A details the methodological approach to this empirical work.
\textsuperscript{14}See above n 4.
\textsuperscript{15}This includes Fisher (2007) above n 4; Douglas E Fisher, ‘Water Resources Governance and the Law’
(2006) 11(1) Australasian Journal of Natural Resources Law and Policy 1; Mike Young and Jim
McColl, A Future-Proofed Basin: A New Water Management Regime for the Murray-Darling Basin
\textsuperscript{16}at 29 September 2008; Karen Hussey and Stephen Dovers (ed) Managing Water
for Australia: The Social and Institutional Challenges (2007); Alex Gardner, ‘Environmental Water
\textsuperscript{16}Formal inter-governmental processes for assessing progress on reform should however be noted here.
The most recent assessments by the National Water Commission are National Water Commission,
National Water Initiative - First Biennial Assessment of Progress in Implementation (2007); National
Water Commission, Australian Water Reform, 2009 - Second Biennial Assessment of Progress in
allocation and management in the MDB. It is clear from this discussion that the management imperatives for environmental water differ considerably from the way that rivers have been managed historically to supply water for consumptive use. Hence, considerable institutional reform is required to realise effective EWA. In this context, the National Water Reform agenda is introduced and critiqued, focusing specifically on reform commitments to respond to environmental imperatives. Finally, to bring this broad-ranging discussion together, the chapter turns to the public policy literature on institutions for sustainability, to frame the issue of EWA as a complex public policy problem. It draws on the understanding that sustainability problems are complex and systemic, and highlights the need for novel adaptive institutional responses, of which law and legal change play a central role. This chapter establishes the context for the subsequent conceptual exploration of institutional parameters for effective EWA in Chapter Three.

Chapter Three constructs the analytical framework against which the developing law, policy and practice of EWA will be evaluated, and from which key elements of a governance model for effective EWA are developed in Chapter Seven. The four-part framework identifies key considerations in the development of strong legal settings for effective EWA, which provide clear strategic direction and purpose for the allocation, protection and management of environmental water, and accordingly parameters for key statutory functions and processes. The framework also covers the distribution of duty, authority and institutional capacity to undertake key functions of water resource management, critical to achieving effective EWA. At this stage, the discussion is conceptual. The purpose is to introduce general parameters for environmental water governance to guide later detailed evaluation of progress on EWA in a range of contexts. Thus, the discussion explores relevant theoretical positions and comments on broader developments in the field of natural resource allocation and management in order to identify the most promising combination of institutional responses (law, policy and practice) to the complex sustainability problem at hand.

Chapters Four and Five explore progress on EWA at a state jurisdictional level in NSW and Victoria using the framework developed in Chapter Three. A key part of this analysis is the presentation of the two case studies on the negotiation and implementation of EWA in practice. In Chapter Six, recent federal initiatives which introduce a new level of regulation and planning for the MDB are examined. Key findings, from both Chapter Three and the chapters outlining progress at a state level in implementing reforms, are used to critique the new federal regime and to provide constructive input to the design of its implementation.

These three middle chapters applying the analytical framework to different water management and jurisdictional contexts offer a range of experiences of water reform and, therefore, allow some comparison of different institutional approaches. Viewing these varied experiences through the lens of the analytical framework facilitates a broad examination of potential institutional parameters for effective EWA. It also helps to test and further develop the arguments raised in the framework.

For example, legal settings for EWA have evolved considerably since national water reform began in 1994, in terms of the use of strategic statutory mechanisms to establish clear direction and purpose for the conduct of various statutory functions, particularly water re-allocation through planning mechanisms. Similarly, water allocation planning has been approached in the different jurisdictions using different levels of public participation and at different institutional scales. Considering these trajectories, in conjunction with resulting environmental outcomes, helps to understand the central role of law in structuring processes to reach a more sustainable allocation of water; and identifies key aspects of process design and conduct which have influenced environmental outcomes.

Different practical water management contexts illustrated by the case studies also offer different insights for the eventual articulation of the governance model. For example, both State case studies highlight a range of difficulties associated with facilitating effective environmental outcomes and protecting environmental water in practice. The NSW case on the Gwydir River illustrates the very significant operational constraints to delivery of EWA in many regulated rivers, which can potentially undermine its status and enforceability in practice. The Victorian case on
the Loddon River demonstrates that current legal mechanisms for EWA do not provide sufficient management flexibility or protection in the context of increasing water scarcity. Such understanding is used to formulate options for refining the legal mechanisms to provide for EWA and their broader legal settings, within the proposed governance model.

The new federal regime for the MDB discussed in Chapter Six represents a significant shift in the institutional scale for water allocation and management and employs many of the institutional mechanisms which were identified in the analytical framework as important ingredients for effective environmental water governance. In many respects, it signals considerable steps towards governance arrangements with the potential to support more sustainable water allocation and management. However, the broad institutional analysis conducted throughout the thesis helps to raise issues and considerations for strengthening the regime and, particularly, for contributing to its full and effective implementation.

In Chapter Seven the legal and policy developments nationally and in both states, and the experience of these laws and policies at the case study level are consolidated to propose key elements of a governance model for effective EWA that will contribute to more ecologically sustainable water allocation and management. This governance model is based on a broad conception of environment as the basis for healthy rivers on which all consumptive uses depend. Thus, it moves beyond merely grafting on new legal forms and functions to existing systems and proposes fundamental changes to the institutional framework for water allocation and management.
CHAPTER TWO:
ENVIRONMENTAL WATER ALLOCATION
AS A REFORM AGENDA

Understanding Environmental Water Allocation [EWA], as a reform agenda, requires an appreciation of the environmental problems and key environmental imperatives driving reform. It is also, however, important to understand how these imperatives interact with established institutions for water allocation and management; and the extent of institutional change required to respond effectively to them. In order to establish this important context for the subsequent evaluation of the developing law, policy and practice of EWA, this chapter draws together three diverse areas of scholarship.

First, a review of recent scientific literature in the field of EWA highlights the environmental objectives driving the reform agenda and the extent to which management requirements for environmental water differ from the way that rivers have been managed to supply water for consumptive use, such as irrigated agriculture and urban supply. These environmental objectives are not the sole basis for subsequent evaluation of the effectiveness of reforms, and this is underscored by the discussion of the inherent trade-offs within public policy decisions surrounding EWA. Nonetheless, understanding the complexity of natural aquatic systems and their water requirements is a critical basic foundation to gauging the contribution of developing institutions to effective EWA.

Second, this chapter outlines key characteristics of the institutional setting for water allocation and management in the Murray-Darling Basin [MDB]. The discussion of water laws and policies, and prevailing management practices, charts an evolution from institutions focused on facilitating resource development to the recent water reform agenda, which anticipates comprehensive institutional change to respond to both environmental imperatives, and to resource security and efficiency imperatives for consumptive water use. Understanding how institutions have developed primarily to facilitate consumptive use and how these imperatives continue to influence the
institutions of water allocation and management is central to the subsequent analysis in the thesis of the status and effectiveness of new institutions for EWA. This discussion also introduces concepts of institutional scale for water allocation and management in the context of a river basin such as the MDB, which spans multiple jurisdictions within Australia’s federal system of governance. This too is a recurring theme in subsequent discussions of institutional design for sustainable water allocation and management.

Finally, drawing on the literature on institutions for sustainability, the issue of EWA is framed as a complex public policy problem, for which novel, adaptive institutional responses are required. Particular attention is given to the central role of law and legal change in initiating and sustaining appropriate institutional forms. This characterisation and discussion sets the scene for the more detailed investigation of developing institutions for EWA, and the mooting of general parameters for a governance framework for effective EWA in Chapter Three.
I ENVIRONMENTAL IMPERATIVES FOR REFORM

It is now well recognised that high levels of river regulation and water extraction throughout the MDB are key contributors to a severe deterioration in river health.\(^1\) The following discussion outlines the nature of these changes and how they impact on river function and condition. The discussion focuses on the relationship between the natural flow regime and river health variables such as ecological function and biodiversity. Flow is understood as a key determinant of river condition, and is the target of EWA as a management intervention. EWA involves the re-introduction of elements of the natural flow regime to redress the adverse impacts of river regulation and water extraction, and provide water to sustain or restore ecological processes and aquatic ecosystems. From this basis, the environmental imperatives which have driven EWA reforms to date can be highlighted. Understanding the complex and interconnected nature of these imperatives provides important context for subsequent analysis of institutional responses to them throughout the thesis.

A River Function and Ecology

The following conceptualisation of general river function in the MDB is presented to situate EWA as a specific intervention within a broader river management context, which recognises the multiple, and complex range of factors contributing to river health. As such, it is useful to conceptualise a river as an integrated system within the landscape, with three broad tiers of interacting variables.\(^2\)

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\(^1\) For a recent and comprehensive assessment of river health throughout the MDB see Murray Darling Basin Commission, *Sustainable Rivers Audit* (2008). The term “river health” is used to refer to the condition of rivers, encompassing such concepts as riverine biodiversity, habitat availability, water quantity and quality. See R H Norris and M C Thoms, “What Is River Health?” (1999) 41 *Freshwater Biology* 197; Peter Cullen, ‘Can We Really Measure River Health?’ (2000) July *Watershed* 1; Peter Cullen, John Whittington and Greg Fraser, *Likely Ecological Outcomes of the COAG Water Reforms* (2000), 34.

**Primary variables** such as climate, topography, and vegetation cover determine the environmental hydrology of a river basin: the distribution and movement of water in a system in time and space. Hydrology can be directly altered by the extraction and storage of water. Indirectly it is affected through land use change in the catchment, such as the removal or addition of vegetation, which alters the rate and quantity of infiltration and overland flow. The influence of a changing climate on the hydrology of the Basin will be discussed in more detail below.

**Secondary variables** include flow regime, river form, and energy and nutrient cycling. The flow regime is the long term generalisation of flow behaviour, and can be described by the natural range of flow level and timing, encompassing variations to flood and drought cycles. Together with land use patterns, the flow regime determines the quantities of sediment and nutrients transported through the river system. Flow regime and sediment load together determine the form, shape and size of the river channel, river bed and the building and maintenance of the floodplain. These physical elements, together with the distribution of water in time and space, form the range of riverine habitats.

Riverine habitat, ecology and biodiversity are understood as **tertiary variables** of the system, and are largely determined by primary and secondary variables described above. Specifically, the transport of sediment and nutrients by water affects how energy flows through the system, the interactions between levels of the food web, the ecology of organisms and ultimately the biodiversity of the river.

Tertiary variables such as biodiversity are often used as key indicators of river health. Yet, the primary and secondary characteristics of the system act largely as the template for these tertiary characteristics, and it is at these levels that most of the human-induced changes associated with river regulation occur. In particular, the volume and timing of river flow is a major determinant of the structure and function of riverine ecosystems, and modifications to flow (through river regulation and

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3 Young above n 2, 4-6; National Land and Water Resources Audit, above n 2, 58.
4 Young above, n 2, 4-6; National Land and Water Resources Audit, above, n 2, 60-65.
5 National Land and Water Resources Audit, above n 2, 71; Young above n 2, 5.
extraction) will manifest in ecological responses.\(^6\) As a management intervention, EWA addresses this particular relationship by re-introducing elements of the natural flow regime of importance to river health. In order to highlight the specific environmental imperatives driving EWA, a more detailed understanding of this relationship between flow regime and river health, and the way it has been altered, is developed below.

There are however important caveats to place on the discussion which follows: levels of system complexity and the relative short history of research in this area mean that there are continuing uncertainties and knowledge gaps in the field. These are amplified by uncertainties associated with climate change and the magnitude of its impact on water resources.\(^7\) There is strong evidence internationally to show that both river ecology and geomorphology are altered when river flows are changed from natural, and that the regulation of flows is a major cause of deteriorating conditions in many Australian rivers. However, the relationship between flow change and ecological response is not simple, and not necessarily proportional.\(^8\)

For example, relatively small flow changes can lead to relatively large ecological responses. It is often difficult to determine which attribute of the altered flow regime is directly responsible for observed impacts as there are several inter-related causal mechanisms operating over different temporal and spatial scales. A compounding factor is the lag effect in biological response to flow alteration - biological impacts may not necessarily coincide with actual changes in flow regime because of longer time scales for river channel adjustment. Importantly, it is also often impossible to

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separate the impacts of direct flow alteration from the indirect impacts associated with land use change and catchment condition.\(^9\)

In this light, the focus of much ongoing research has been to test existing hypotheses about river function and the relationship between flow and river health. Such experimental research can be closely aligned with restoration projects and adaptive management frameworks to test and measure ecosystem response to interventions.\(^10\)

The final section of this chapter will illustrate how such high levels of complexity and uncertainty are common to modern sustainability problems, and highlight the need for appropriate institutional responses.

**B Flow and River Health: the impact of river regulation and water extraction**

Since European settlement, the rivers of the MDB have been extensively regulated to manage naturally high spatial and temporal variability in water availability and thus provide secure and reliable water to enable settlement and development. This has yielded a highly altered, engineered system of large dams, weirs and channels to store and distribute water within and between river basins, and levees to manage and harvest floodwaters. Through this system, natural river flows are extensively manipulated to supply water for extraction.\(^11\) In inland NSW and Victoria, irrigation has been the primary driver of the extensive development of water resources,\(^12\) and accounts for the vast majority of water extracted from the inland rivers in both

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\(^10\) Bunn and Arthington, above n 9, 492.


\(^11\) Hillman, above n 6, 128-32.

states. Catchment dams and land use change, such as plantations or forest regrowth following bushfire; also exert a very significant impact on water yield.

The following discussion illustrates how key characteristics of natural flow regimes have been changed by these human interferences, and highlights the broad environmental imperatives driving EWA reforms.

1 Flow Regime

Flow regime refers to the range of flow components in a river, from very low flows or cease-to-flow conditions to floods. The rivers of the MDB have some of the most variable flow regimes in the world. Many species have adapted to cope with or avoid variability of conditions, and variations, such as low flows or flood pulses, are integral to the lifecycle of many organisms. For example, water level rises are known to stimulate spawning in many Australian freshwater fish, and floodplain inundation leads to an abundance of food for fish larvae, also supporting breeding of water birds and frogs in wetlands. The magnitude of the variation, its temporal pattern and sequencing, and seasonality are important. For example, both floods and higher temperatures stimulate biological productivity, and the seasonal timing of floods is known to trigger the recruitment of species. Rates of flow change are also significant; for example, a very rapid change may cause fish to become stranded in floodplain or wetland habitats.

Various elements of the natural flow regimes have been altered in different ways throughout the MDB, significantly reducing the range, extent and quality of habitat available to aquatic biodiversity. For example, in the upper catchments, land use activities such as clearing have resulted in significant changes to flow and sediment regimes, with increased erosion leading to increased run-off, sediment loads and

15 See for example Young, above n 2, 18; Bunn and Arthington, above n 9, 496-497; Hillman, above n 6, 130-32.
16 Young, above n 2, 32.
higher peak flows. Major dams and inter-basin transfers in the upper Basin have also altered flow, with generally lower flows with a highly reduced variability observed below such large dams.17

River sections below dams in the lowland areas of the MDB are largely operated as irrigation supply channels. Consequently there is a general reduction of flood flows, with only the largest of floods not captured by large dams; increased in-channel flows because rivers are kept bank-full for extended periods; and a reduction in short term flow variability as release levels are kept constant for consumptive supply. Water transfers within and between catchments, can also affect flow patterns depending on volumes, timing and direction of trade.18 In the southern MDB, there has been a complete inversion of natural seasonal flow patterns: low summer flows and higher winter/spring flows have been replaced by high flows in summer to meet irrigation demand, and the capture of winter/spring flows in storage.19

Downstream from major irrigation diversions, flows are greatly reduced, but often kept at a low constant flow level for stock and domestic supply. This means that the once natural occurrence of cease-to-flow events, in which rivers are reduced to a series of pools, is no longer part of the flow regime.20 Finally, diversion levels have led to a massive reduction in median annual flows at the Murray Mouth in South Australia, and the lower reaches of the Murray experience drought conditions at a highly increased frequency.21

As later discussion shows, many of these impacts on flow will be amplified under climate change scenarios of varying rainfall distribution and magnitude, and higher temperatures.

17 Young, above n 2 45-49.
20 Young, above n 2, 108-111; Hillman, above n 6, 130-31.
2 Channel Features and River Form

Components of the physical habitat of a river vary over its course. In upland parts of the MDB, the valley is usually constrained and does not have a significant floodplain. In middle reaches, the valley widens and physical features such as in-channel benches and flood runners develop. There is considerable movement and deposition of sediment, and organic inputs, including snags are important. In the lower reaches the river generally splits into several channels with extensive floodplain features such as billabongs and anabranches, woody debris and snags. All of these flow-determined physical features are important habitat for various riverine ecosystems.

Erosion of riverbeds and banks, and the transport of sediment along a river, are essential, natural and ongoing processes. Yet the excessive sediment loads associated with clearing of native vegetation, particularly in the riparian zone bordering rivers and streams, can simplify the natural physical features of a river, and may cause the channel to become narrow and shallow, facilitating colonisation by semi-aquatic vegetation and exotic species. This further chokes the channel and reduces available habitat.

In some areas of the MDB below major storages, various interventions, such as channel straightening, de-snagging and dredging, have been carried out to improve the hydraulic efficiency of the river. The flood-mitigating effects of these large dams also means that the instead of spilling out onto the floodplain, flooding is concentrated in the river channel below major storages, leading in some cases to increased channel dimensions. River regulation has therefore considerably altered the form and shape of rivers, and range of habitats, at an accelerated rate.

3 Lateral Connectivity to the Floodplain

Naturally flowing floodplain rivers are very dynamic ecosystems, with enormous spatial and temporal complexity. The key drivers for a range of complex ecological

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22 National Land and Water Resources Audit, above n 2, 65; Young, above n 2, 7-10.
23 National Land and Water Resources Audit, above n 2, 65.
24 Young, above n 2, 33-35, 112; Hillman, above n 6, 128-30.
processes and rich floodplain biodiversity are lateral connectivity to the river and unpredictable flows.\textsuperscript{25} Water bodies in the floodplain, such as wetlands and billabongs are naturally connected to rivers during high flows. Flood pulses move nutrients and energy between the river and floodplain, with exchanges in both directions essential for maintaining biodiversity and supporting river function. When filled, these water bodies provide an extensive variety of aquatic habitats – important spawning, nursery and foraging areas for many species.\textsuperscript{26} As water levels recede, organisms and materials are fed back to the river, thereby replenishing in-stream resources. Cycles of wetting and drying also play a crucial role by fostering the decomposition of organic matter which releases energy and nutrients for other aquatic organisms.

Changes to the flow regime, in particular the volume, seasonality and frequency of flooding, therefore seriously affect both rivers and floodplain ecosystems. Highly variable natural patterns are replaced by permanent ones, starving certain wetlands of floods, and permanently inundating others.\textsuperscript{27} The effectiveness of the critical exchange between the river and its floodplain is also reduced by floodplain development, fragmentation and isolation – mainly as a result of channelisation and levee construction.\textsuperscript{28}

It is estimated that 90\% of the floodplain wetlands of the MDB have been lost as a result of river regulation and floodplain development. The health and function of remaining wetlands is significantly compromised.\textsuperscript{29} The case studies in Chapters Four and Five are illustrative.

\textbf{4 Longitudinal Connectivity}

The catchment plays a significant role in sustaining a river. Nutrients and energy sourced from the upper catchment spiral downstream to support the lower river. These links between the upper and lower river (longitudinal connectivity) are important not only in energy and nutrient dynamics, but also in the reproduction and maintenance of

\textsuperscript{25} Kingsford, above n 10, 111; Hillman, above n 6, 135-6.
\textsuperscript{26} Bunn and Arthington, above n 9, 498-499; Hillman, above n 6, 130-32.
\textsuperscript{27} Kingsford, above n 10, 109; Hillman, above n 6, 130-31.
\textsuperscript{28} Bunn and Arthington, above n 9, 499.
\textsuperscript{29} Arthington and Pusey, above n 10, 380.
populations of many aquatic species. Plant seeds and spores are dispersed down river by flow. The ability of fish to move freely up and downstream is also important in reproduction cycles and in maintaining the genetic health of populations.\textsuperscript{30}

Constructing dams and weirs results in a discontinuous river system. From a biological perspective, these rivers become a series of isolated reaches, with little or no opportunity for upstream and downstream movements of fish and other species. When populations decline, they will not be replaced with incoming fish from other areas, and stocks may fall to very low levels. The genetic links between populations, which ensure resilience to local extinction and ability to adapt to changing circumstances, are difficult to maintain.\textsuperscript{31} In addition, the transformation of the rivers into a chain of cascading pool habitats, often favours exotic fish species, which compete with and therefore further threaten the viability of many native species.\textsuperscript{32}

\textbf{C Environmental Reform Objectives}

The above discussion has highlighted the following broad environmental objectives driving EWA reforms:

- All elements of a river’s flow regime are of ecological significance. Environmental flows should recapture natural variability, over spatial and temporal scales.

- Flows should maintain or restore flow-related channel features and river forms important for habitat and ecological function. Complimentary management interventions on a catchment scale are critical to such EWA initiatives, particularly management of riparian zones and floodplains.\textsuperscript{33}

- Flows should achieve floodplain and riparian connectivity at appropriate spatial and temporal scales. This may require adaptation of existing river regulation infrastructure or construction of new infrastructure. For

\textsuperscript{30} Hillman, above n 6, 129, 137.
\textsuperscript{31} Young, above n 2, 51; Bunn and Arthington, above n 9, 498.
\textsuperscript{32} Bunn and Arthington, above n 9, 496, 499.
example, where wetlands have been isolated from the natural flooding regime, water may need to be delivered via pipes and channels.

- Modification or removal of infrastructure, such as dams and weirs, which act as a barrier to longitudinal connectivity is also critical to effective EWA.

## D Water Quality

Water quality is not the central focus of EWA. As a management intervention EWA is more concerned with rate, timing, and magnitude of flow. However it is a crucial and integral baseline consideration for achieving river health outcomes. Poor water quality will undermine the effectiveness of EWA and, in many instances, EWA can be implemented in conjunction with supporting catchment management interventions, or in a way that ameliorates water quality problems. For example, temperature is a significant water quality factor, regulating in-stream migration and providing cues for spawning and migration of organisms such as fish. The majority of dams in the MDB release water from the bottom of the impoundment, leading to significant and prolonged reductions in water temperature which can be of considerable detriment to riverine biota. Therefore, combining EWA reforms with modernisation of river regulation infrastructure to release water of an appropriate temperature will greatly enhance the effectiveness of EWA.

With many water quality problems likely to accentuate under climate change scenarios of water scarcity, managing environmental flows for water quality outcomes will be increasingly important. For example, in many wetlands of south-east Australia, including the Lower Lakes above the Murray Mouth in South Australia, record low inflows in recent years have led to wetland drying and exposure of acid sulphate soils. When water returns to the system, this can lead to wetland acidification and irreversible environmental damage.

34 Bunn and Arthington, above n 9, 496-498; Young, above n 2, 42, 62; Hillman, above n 6, 129.
35 Hennessy above n 7, 186.
E Climate Change

An understanding of river function and the imperatives driving EWA is incomplete without an appraisal of the potential impacts of human-induced climate change on water resources. As our knowledge and predictive capacity related to climate change broadens, new imperatives for EWA arise, and the broader context of EWA as a management intervention changes as increased water scarcity heightens competition and conflict over water resources.

One of the most significant potential consequences of climate change in Australia is alteration to the hydrological cycle at the regional scale, with direct impacts for both volume and quality of river flow. In general, projections suggest a clear decline in precipitation in winter and spring in the MDB, particularly in the southern Basin, where much of this research is focused. Temperature is expected to increase throughout the Basin, with consequent increases in evaporation. These increases will be largest in regions and seasons in which rainfall decreases. Increases in open water evaporation will also affect wetlands and water storages. Additionally, the increase of extreme events, such as prolonged drought and increasing frequency and severity of bushfire in native forests in key water catchments, is likely to also have considerable negative impacts on long term water yields.

In this context, new objectives of adaptation and resilience are emerging to drive EWA, such as:

- Ensuring river and wetland assets survive during dry sequences and recover and fully function during average and wetter years (for example, protecting drought refuges such as deep pools and wetlands to enable re-colonisation and recovery of populations in wetter years);
- Avoiding critical loss of priority species and communities; and

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37 Hennessy above n 7, 184; Jones et al above n 7; Preston and Jones above n 7, 25-6.
38 Hennessy, above n 7, 176; Jones et al, above n 7, 3.
39 Van Dijk et al, above n 14, 32-58.
• Avoiding catastrophic events such as fish kills, algal blooms, and wetland acidification.\textsuperscript{40}

This developing approach, particularly evident in the Victorian case study presented in Chapter Five, is more responsive to prevailing seasonal conditions and less reliant on historical trends and patterns. It also, however, involves a narrowing of the broad objectives of EWA outlined previously, and increasing emphasis on identifying environmental priorities as the targets of EWA given reduced water availability across the board. These trends underscore the increasing difficulties, and hence institutional challenges, associated with providing for environmental water needs in a climate change future.

\textbf{F Providing for Environmental Water Needs}

In the existing socioeconomic context of extensive water development in the MDB, translating these scientific imperatives for reform into institutions to provide for environmental needs presents considerable policy challenges, particularly given the threats to water resources posed by climate change.

Generally, in the policy discussion surrounding EWA, science is treated as the starting point for a complex process of public policy development. A distinction is made between the water requirements of rivers and the amount actually provided for in EWA determinations following social, economic and political trade-offs.\textsuperscript{41} There is no magic allocation formula for ensuring that water extractions in a river system are sustainable — any extraction places the system at some level of risk; the more water extracted, the higher the risk of environmental damage.\textsuperscript{42} Science can inform these decisions by providing information about river function and, specifically, by predicting how a river will evolve under various flow conditions. A recent focus of

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\textsuperscript{40} Victorian Department of Sustainability and Environment, above n 36, 95. See also, Hillman, above n 6, 140-42.

\textsuperscript{41} Megan Dyson, Ger Bergkamp and John Scanlon (eds), \textit{Flow: The Essentials of Environmental Flows} (2003), 3; Gary Jones, 'Setting Environmental Flows to Sustain a Healthy Working River' (2002) February \textit{Watershed} 1, 2; Schofield et al, above n 10, 7, 15, 18; Jones and Cottingham, above n 10, 31.

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Australian river science has been the development of methodologies to determine environmental water needs and predict ecological responses of changing flow regimes.\(^{43}\)

In Australia, this policy trade-off process has been approached in a number of different ways. For example, river restoration projects have focused pragmatically on selected environmental objectives and important ecological assets such as floodplain wetlands.\(^{44}\) The term ‘healthy working river’ has been used to express the goal of achieving “managed rivers in which there is a sustainable compromise agreed to by the community, between the condition of the natural ecosystem and the level of human use.”\(^{45}\) Different levels of environmental risk have been entertained for different rivers depending on the degree of human disturbance and socioeconomic reliance on the resource, and various water availability scenarios.\(^{46}\)

While characterising EWA as a trade-off between competing values is pragmatic, it is nonetheless critical to ensure appropriate environmental outcomes. For example, given river function is influenced by multiple complex interacting variables, a pragmatic, narrow focus on icon sites will potentially compromise broader river health outcomes, and in the long term may undermine the condition of the prioritised assets.\(^{47}\) Whittington argues that the notion of long-term ecological sustainability must be emphasised in the trade-off. The compromise struck between the economic gains from the ‘work’ done by a river, and the loss of river health and ecosystem services, should be *indefinitely* sustainable — economic returns on use of water resources can be immediate or at least within the lifetime of current generations, whereas the consequences of loss of river health and ecosystems services may take decades to impinge upon the community. In many rivers of the MDB, the river health at the current level of ‘work’ is likely to decline for decades to come, and the eventual

\(^{43}\) The development of methodologies to determine environmental water needs and predict ecological responses of changing flow regimes is discussed in Arthington and Pusey, above n 10, 381-384; Jones and Cottingham, above n 10, 33; Schofield et al, above n 10, 18; and Gary Jones, ‘The Scientific Journey Behind the Living Murray Process’ (2003) December Watershed 1, 2.

\(^{44}\) For example the Living Murray Initiative targets six icon sites for environmental water recovery, Murray Darling Basin Ministerial Council, *The Living Murray: Restoring the Health of the River Murray* (2003).


\(^{46}\) Victorian Department of Sustainability and Environment, above n 36, 96-7.

\(^{47}\) Schofield et al, above n 10, 29-30.
level of health — when fully realised — is likely to be unacceptable to this generation and disastrous for future generations.\textsuperscript{48}

The discussion in the final section of this chapter, and throughout the remaining chapters, deals with this very challenge: establishing institutions which can appropriately balance these competing imperatives and support longer term sustainability outcomes in the context of generally dominant short term economic imperatives.

\textsuperscript{48} Whittington, above n 45, 3–4.
II AN EVOLVING INSTITUTIONAL SETTING

This discussion establishes the institutional context for water allocation and management in the MDB to which EWA reforms have been introduced. Key points along a trajectory of institutional development are identified: from early legal and policy settings focused on facilitating extensive water resource development, to more recent attempts to manage the excesses of this approach through a comprehensive national water reform agenda.

Two scales of institutional developments are particularly relevant to this discussion: statutory schemes for the administrative allocation of water at a state jurisdictional level; and combined federal / state institutional arrangements to manage and share common MDB water resources, which have increasingly operated as constraints on the allocation and management of water at a state level.

This discussion of an institutional setting, which has evolved to allocate and distribute water for consumptive use, underscores the extent of institutional change associated with introducing EWA as a reform agenda.

A Institutions to Facilitate Resource Development

Until the late 20th century, institutions for water allocation and management in the MDB focused on resource development. Key policy drivers were irrigated agriculture and associated rural settlement. There was little attention paid to the costs of such development in terms of resource security for water users or environmental impacts.49

Traditionally and constitutionally within Australia’s federal system of governance, direct management of water resources has been an issue for state governments. Early in the settlement history of Australia, the states of NSW and Victoria established statutory schemes which largely abolished inherited common law rules governing water allocation; vested control of water resources in the Crown; and established a system of administrative licensing for access to water, with only limited preservation of certain common law rights. Water infrastructure was massively subsidised by both state and federal governments. Powerful statutory authorities developed at a state level to manage water and facilitate continued growth of infrastructure. The resulting institutional framework facilitated the development of extensive irrigation industries in both states.

Certain characteristics of these state statutory schemes and their implementation over the 20th century have contributed to the unsustainable patterns of water use and consequent declining river health, and increased competition for scarce water resources, which have catalysed recent reforms.

First, early statutory schemes for water allocation in both states lacked measures to understand and plan for resource security. The mechanisms of the administrative system that could theoretically have been used to maintain entitlements at a level commensurate with available water resources were not actively used. For example, in NSW water access was facilitated predominantly through licences, against which annual allocations were made depending on water availability. Licences were not

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53 Smith above n 13, 58.
perpetual, but subject to periodic renewal at which point they could be revoked, suspended or modified at the discretion of water managers;\textsuperscript{54} and any new water use required a licence. Yet in practice, licences were routinely renewed and regarded almost as rights in perpetuity.\textsuperscript{55} Administrative practices saw the gradual over-allocation of the resource in many systems through continued grant of entitlements without reference to longer term resource availability.\textsuperscript{56} Similar problems of over-allocation occurred in the public irrigation schemes of northern Victoria: as storage capacity increased, new entitlements were issued, gradually eroding the security of all other water users.\textsuperscript{57}

Second, the way water was allocated and priced under these schemes, and the general lack of rigour in fully accounting for water use encouraged high levels of use and inefficiency. For example, in Victorian irrigation schemes, irrigators paid a set fee for their water right, regardless of whether they used it. Water was allocated and prices calculated on the amount of land suitable for irrigation and the crops grown, rather than water used.\textsuperscript{58} This practice encouraged the consumption of water and provided little incentive for efficiency, thereby contributing to the establishment of dominant land uses with relatively high water demands and low efficiencies, such as pasture irrigation.\textsuperscript{59} Similarly, in NSW, licences originally allocated water by referring to land area or crops irrigated, with little control over the amount of water actually used.\textsuperscript{60}

Even as water accounting practices were gradually tightened, through methods such as volumetric allocation and accounting introduced in NSW in the 1970s, poor accounting practices and considerable loopholes in the allocation system supported the pattern of increasing water use. Conversion of old entitlements, based on land area and crop type, to volumetric allocation on most inland regulated rivers took place.

\textsuperscript{54} Water Act 1912 [NSW], s 17a.
\textsuperscript{56} Farrier, above n 55, 571; Tan (2002 b), above n 51, 446-7; Pigram, above n 12, 190-94.
\textsuperscript{58} Tan (2002 a), above n 51, 6; Powell, above n 12, 148-149.
\textsuperscript{59} Powell, above n 12, 254.
\textsuperscript{60} Tan (2002 b), above n 51, 448.
through a process of consultation with right-holders which left entitlements essentially unchanged. The process was not used to address mounting problems of over-allocation and set a more sustainable limit on water use.\(^6^1\) Subsequent metering of entitlements was also notoriously inaccurate, and compliance in many areas was poor.\(^6^2\) Additionally, the amount of water specified by the allocation was not the maximum that could be supplied in a given year due to the administrative practice of off-allocation water. An off-allocation period was declared when rainfall resulted in river flows considered surplus to water requirements, usually when dam capacity was reached, or when flows entered a river downstream from a dam.\(^6^3\) The diversion of off-allocation water was measured and charged for, but not debited against the irrigator’s annual allocation. Many irrigators, particularly on northern rivers subject to natural high variability, came to rely on off-allocation water, and constructed large off-river storages which they filled during off-allocation periods, a practice which has substantially reduced the incidence and extent of natural flooding. Such practices also preserved considerable administrative discretion to continue allocating additional water to consumptive uses.\(^6^4\) Thus, while such reforms were important first steps towards more rigorous accounting of water use, the emphasis remained with maximizing consumptive use.

At the scale of the MDB, early institutional developments centred on facilitating and managing new water infrastructure, and managing state tensions over shared water resources. Resolution of lingering water management issues for the states reliant on the Murray River and its tributaries was central to their ongoing development.\(^6^5\) An intergovernmental agreement was used to provide for a series of infrastructure solutions to regulate the Murray and share its resources.\(^6^6\) This guaranteed certain proportions of inflow for the upstream states of NSW and Victoria, and likewise

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\(^6^1\) Ibid, 448-449.


\(^6^3\) *Water Act 1912* (NSW), s 20AA.

\(^6^4\) Farrier, Lyster and Pearson, above n 51, 465-466; Tan (2002 b), above n 51, 449; Pigram, above n 12, 202.


\(^6^6\) Ibid. The River Murray Agreement was signed by Commonwealth, NSW, Victorian and South Australian governments in 1914.
provision of flow to downstream South Australia. A common governance framework, with representatives from each government, was also initiated and empowered to supervise the construction and operation of river regulation infrastructure.67 These developments provided a guarantee of available water resources and thereby enabled states to engage in detailed planning and investment in new water resource projects.68 Establishing governance mechanisms to coordinate state and federal interests in common MDB water resources has been an ongoing theme of water reform in Australia, and will be revisited often in the thesis in investigating institutional forms and scales most suited to achieving effective EWA in the MDB.

B Emerging Flaws in the System

By the late 20th century, flaws in this institutional framework were beginning to show. A range of reforms were introduced to address the growing conflict and competition over water resources and the environmental impacts of such high levels of river regulation and water extraction. These reforms mark a shift in policy drivers towards the imperatives of efficiency and sustainability, which have since characterised national water reform.

For example, under the state statutory schemes land and water access grants were originally indivisible. This design was deliberate to facilitate the development of land deemed worthless without secure water, and to prevent independent transfer of water rights and the associated growth of monopolies in water, thereby meeting closer settlement / rural development policy goals.69 In the 1980s, states introduced legislative changes to permit trading in water rights separate to land.70 Economic arguments captured the policy debate. It was argued that water was scarce and not being used efficiently, and markets would facilitate more productive and efficient water and encourage structural adjustment to keep the irrigation industry efficient and

67 Ibid. The River Murray Commission was established in 1914.
68 Powell, above n 12, 143.
69 Powell, above n 12, 104-113; Tan (2002 a), above n 51, 4.
The low price traditionally charged for water meant that much was tied up in low value uses such as improving pastures. High-value users wanted greater access to water, but rivers were fully allocated. Water trade was encouraged in the interests of more efficient resource allocation. Property rights instruments and markets have since become dominant themes of ongoing water reform.

The late 20th century also saw the first introduction of environmental considerations to statutory schemes for water allocation and management. Yet statutory and policy provision was tentative and largely procedural; and resource development objectives continued to dominate. For example, following a comprehensive review of water management arrangements and governing legislation in Victoria, new legislation in 1989 formalized and clarified the system of water allocation to support the introduction of a water market. In theory, the new legislation also created the potential for water to be allocated to the environment; however, it lacked specific and appropriate legal mechanisms for EWA, and provision for dedicated processes to enable this in practice. As such, the prevailing policy to respect and clarify existing rights to water and improve their security ensured environmental commitments remained largely unfulfilled.

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74 See discussion of the Water Act 1989 (Vic) in Chapter Five.
At the scale of MDB institutions, the use of intergovernmental agreements and coordinated governance frameworks to manage common and competing state interests continued to develop. Significant reforms were achieved via these mechanisms in this era. Yet the difficulties encountered in setting and effectively implementing the reform agenda in the federal context clearly demonstrated the need for continuing institutional reform. The experience of introducing and implementing the Murray-Darling Basin Cap, a limit on water extraction, is illustrative of the institutional challenges.

The decision to introduce the Cap was preceded by growing concern over the environmental impacts of river regulation in the late 1980s and early 90s. An audit of water resources in 1994 confirmed increasing levels of water extraction and consequent decline in river health. It found that allocation systems only limited extraction during drought periods. During wet periods, extraction was encouraged through practices such as off-allocation declarations, and minimal monitoring and enforcement of licence conditions.

In 1995, a basin-wide cap on extraction was introduced. Participating state jurisdictions agreed voluntarily to cap water extraction at the volume of water used at 1993/4 levels of development. This limit referred to the water estimated as potentially available with the infrastructure in place and under the level of entitlements and type of management rules in existence at the time, assuming similar climatic and hydrological conditions. The cap was intended to limit extraction but not development. New development was allowed provided that the water was obtained by improving efficiency or purchasing water from existing developments.

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75 The Murray Darling Basin Agreement was signed by state and federal governments in 1987, and its ambit increased progressively as agreement was reached on coordinated responses to a range of issues such as salinity management, water trade and integrated catchment management. For a discussion of the evolving Agreement and governance framework, see Clark, above n 65, 70; J Scanlon, ‘The Need to Reform the MDBC’ (2001) 18 Environmental and Planning Law Journal 230, 231.
76 Ibid.
Yet there were a number of flaws in the design of the mechanism and its implementation, which have undermined its value. For example, the Cap was introduced at a very high level of extraction. From an ecological perspective, it is arbitrary and of little value, other than preventing even further decline of river health. Inactive licences, known as ‘sleepers,’ were included within the protected level of extraction.\(^7^9\) This policy decision has proven to be a significant flaw in the mechanism. With the concurrent introduction of transferability, these previously unused entitlements could be re-activated in the water market, thereby heightening the problem of over-allocation in many systems.

Additionally, the Cap has only applied to surface water extraction. There is evidence in many parts of the MDB that, as surface water availability declined due to institutional restraints or reduced stream flow, groundwater usage has increased. This has not been accounted for under Cap.\(^8^0\) Bringing groundwater use and catchment interception activities, such as farm dams and plantations, within such diversion limits is a key element of more recent reforms.

The MDB governance framework has also proven ill equipped to achieve full and effective implementation and compliance. The complex formula of the Cap was rendered even more complicated in practice due to a long history of poor record keeping and the very different water management systems in place across the MDB. Progress in establishing the necessary institutions to monitor and enforce the Cap has been particularly poor. The introduction of consistent standards for metering, monitoring and reporting across the MDB, and timely completion of compliance tools, has simply not been achieved.\(^8^1\)

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C National Water Reform

By 1994, two key policy imperatives emerged to drive the development of a comprehensive national water reform agenda [NWR]: improving security of supply and flexibility for consumptive users against a background of over-allocation and competition for increasingly scarce resources; and providing for environmental water needs to remedy highly degraded river systems. While NWR is a national agenda, much attention has been paid to its delivery within the MDB given increasingly urgent environmental and scarcity imperatives.

Reference is made throughout the thesis to NWR as a discrete agenda. Yet it is important to recognise that the policy has evolved significantly since first enunciated in 1994, and continues to do so. In 2004, NWR was consolidated and extended with the National Water Initiative. Subsequently the agenda is being influenced considerably by climate change pressures, and a new chapter of reforms was initiated by the federal government in 2007. This poses challenges for a clear definition of NWR content and a linear assessment of its implementation. Subsequent assessment in the thesis of the implementation of these reforms at a state level is more concerned with performance against the broader analytical framework of institutional considerations, developed in Chapter Three, than against specific reform commitments. Thus, the NWR agenda is presented here as part of the trajectory of developing law, policy and practice for EWA, not as a basis for comprehensive evaluation of reform implementation. Analysis of the latest chapter of federal reforms is left to Chapter Six.

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The outline below of the reform agenda and the institutional framework for its implementation uncovers an ambitious and comprehensive program for institutional change. A number of concerns about the potential implementation of environmental reforms are, however, identified. These are further explored in the more detailed consideration of a potential institutional framework for EWA in Chapter Three, and its application in Chapters Four and Five.

First, the governance arrangements for NWR negotiation and implementation continue and expand upon the cooperative federalism approach described above: overarching policy positions were established and appropriate market, regulatory and planning mechanisms identified at the level of state/federal agreement. States were to implement these commitments within their water management frameworks. Yet this arrangement has not overcome difficulties associated with achieving full and effective implementation of contentious reforms in a federal context of competing state interests. The reform program is expressed in quite general terms; allows considerable latitude to states to interpret and implement according to their own agendas; and arguably lacks viable mechanisms to ensure progress in implementation.

NWR was initially negotiated as part of wider micro-economic and public sector reforms under National Competition Policy. Reform delivery was tied to Commonwealth payments to the states over ten years. The potential of financial penalty for poor implementation arguably gave the process considerable initial impetus. Nonetheless, even in these early stages, progress on reform varied markedly between states depending on historical levels and nature of water resource development, and prevailing political climates. Delivery of environmental commitments has arguably taken second place to other reforms focused on consumptive resource use, particularly the establishment of a water market.

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84 Connell above n 51, 131.
As NWR has matured, institutions dedicated to the implementation of water reform have been established. The main mechanisms used to monitor and facilitate implementation by states have been the preparation and accreditation of Implementation Plans, regular reporting by states, and central assessment by the new independent statutory agency the National Water Commission. There is some discretion also associated with the allocation of funds for approved reform projects, however funds are minor compared with the costs associated with implementing this ambitious agenda. As such, the main strategy for ensuring compliance is exposure of non-cooperation to other members of relevant intergovernmental governance bodies and the public. This is, arguably, of far less impact than the more serious financial inducements of early reforms. The recent introduction of comprehensive federal water legislation to drive ongoing reform and progress particularly contentious issues in the national interest is an indication of how the model of intergovernmental agreement and state implementation has faltered in the face of difficult reforms.

Second, NWR commitments to environmental reforms appear prima facie to hold great potential to effect substantial institutional change. Yet these commitments are made in the context of a range of other measures addressing resource security, flexibility and efficiency. Given environmental reform objectives largely conflict with many imperatives for consumptive use and are highly contentious, it is arguable that the reform agenda fails to weight the environmental reform commitments appropriately in this context. This is no doubt in part a symptom of difficulties of negotiating beyond lowest common denominator outcomes in a federal context. However, clearer provision for the treatment of environmental imperatives within the inherent trade-offs of resource allocation and management decisions, and more
definitive timelines committing resources to progressing reforms, would have yielded a tighter agenda. This is supported by the following analysis of key reform measures.

1 National Water Reform: Providing for Environmental Water Needs

A key objective of the National Water Initiative of 2004 is “the return of all currently over-allocated or overused systems to environmentally sustainable levels of extraction.”91 An environmentally sustainable level of extraction is defined as the point at which, if exceeded, key environmental assets, or ecosystem functions and the productive base of the resource would be compromised. Over-allocated and overused systems are defined as those in which the volume of water able to be extracted by entitlement holders, or indeed the volume actually extracted at a given time, exceeds this level.92 At an overarching level, it is a significant and indeed substantive commitment to provide for EWA. Yet this is not well supported by the more specific measures addressing the detail and timelines for reform.

For example, under NWR, environmental water provisions are to be negotiated through water management planning, which is to be informed by best available science, socioeconomic analysis and community input.93 These plans must also determine a range of consumptive use outcomes including levels of consumptive use and allocation rules to ensure resource security outcomes. Thus, a planning mechanism is employed to manage the inevitable trade-offs associated with providing for EWA in systems with high levels of consumptive use. No clear reference is made here to the need to achieve environmentally sustainable levels of extraction. Rather, planning is portrayed as a balancing exercise to assist governments and community to determine water management and allocation arrangements to meet competing objectives. There is little detail on processes to achieve this in practice, and no recognition of fundamental information requirements to enable such planning.94 Additionally, this commitment is subject to a general provision that states can determine whether a plan is prepared, what area it should cover, the level of detail

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91 Council of Australian Governments (2004 a), above n 82, cl 5, 23(iii).
92 Ibid, Schedule B (i).
93 Ibid, cl 36-7. See also cl 93-7 for an overarching commitment to ensure open and timely consultation with all stakeholders in relation to significant decisions affecting security of water access entitlements or sustainability of water use.
94 Connell et al, above n 89, 87-91.
required, its duration or frequency of review and the amount of resources devoted to its preparation; providing considerable scope for varied implementation across the MDB.\textsuperscript{95}

NWR does commit state governments to use water plans to determine precise pathways by which systems will be adjusted to address over-allocation or overuse and meet environmental outcomes. Specific timelines for such action have been applied to a selection of river systems identified as priorities in the earliest round of reforms. Yet, for all other systems there is only a general commitment to substantial progress by 2010.\textsuperscript{96} As subsequent investigation of water management planning in Chapters Four and Five will illustrate, it has proven difficult to design planning processes which result in significant environmental outcomes.

NWR also provides that environmental water provisions are to be legally enforceable, given statutory recognition, and have at least the same degree of security\textsuperscript{97} as consumptive entitlements to water.\textsuperscript{98} They are to be defined as the water management arrangements required to meet the desired environmental outcomes, including water provided on a rules basis or held as a volumetric entitlement. These commitments address the mechanisms for EWA; their substance relies on the outcomes of the above planning processes. Yet, as the case studies show, the status and security of environmental water, even if formally provided by statute and water plan, cannot be taken as given in practice. Prevailing legal mechanisms for EWA are consequently in need of considerable refinement.

Finally, the agenda commits to establish effective and efficient management and institutional arrangements for environmental water. Managers must be accountable for providing environmental water and achieving environmental outcomes.\textsuperscript{99} This is to be achieved through monitoring, reporting, and transparent accounting for the delivery of

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{95} Council of Australian Governments (2004 a), above n 82, cl 38
\item \textsuperscript{96} Ibid, Schedule A, cl 41–45.
\item See discussion of the strength of these commitments in Gardner and Bowmer, above n 80.
\item \textsuperscript{97} An entitlement may be high or general security, a reference to the priority accorded to these entitlements in allocation decisions. Security is an important consideration given increasing water scarcity under climate change, which further decreases the reliability of general security water.
\item \textsuperscript{98} Council of Australian Governments (1994), above n 82, cl 4; Council of Australian Governments (2004 a), above n 82, cl 35.
\item \textsuperscript{99} Council of Australian Governments (2004 a), above n 82, cl 78-9, 84-9.
\end{itemize}
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EWA, and review of its adequacy in achieving the environmental outcomes sought. Again, later analysis in a case study context underscores the importance of these commitments for achieving effective EWA.


The environmental measures outlined above are situated in the context of commitments to provide for a system of clearly specified and secure water access entitlements, and the development of an open water market.100

For example, NWR provides that water access entitlements for consumptive use are to be separate from land. They are to be described as a perpetual or open-ended share of the consumptive pool of a specified water resource as determined by the relevant water plan.101 A range of specific commitments embody the important perquisites for a functioning open water market.102 Property rights instruments are widely supported as transformative policy tools to achieve sustainability goals in a natural resource management context.103 Yet in order to achieve environmental outcomes, an essential element of such a scheme is an environmental limit to total resource extraction.104 As noted above, the commitment to achieve an environmentally sustainable level of extraction through water planning within NWR is not strong and unequivocal.

The reform agenda also provides for the assignment of risks associated with future changes to the consumptive pool. A risk assignment framework intended to apply to any future reductions in the availability of water for consumptive use is proposed.105 This provides that consumptive entitlement holders are to bear the risk of any reduction or less reliable water allocation arising from seasonal or long term climate change; or periodic natural events such as bushfire or drought. The risk of any reduction arising as result of bona fide improvements in the knowledge about water systems’ capacity to sustain particular extraction levels are to be borne by users up

100 Ibid, cl 23 (i), (ii) (v) (ix).
101 Ibid, cl 28 - 33
102 Ibid, cl 30, 32; Council of Australian Governments (1994), above n 82, cl 5.
103 Above n 72.
104 Connell et al, above n 89, 100.
until 2014, but shared between government and users from this point. This provides a buffer in which reduction could theoretically be made to reach environmentally sustainable levels of extraction up to 2014 without compensation.\textsuperscript{106} Subsequent analysis of state water allocation and management frameworks and the new federal statutory scheme, however, highlights the political realities of environmental water recovery, and demonstrates how governments have shied away from administrative re-allocation of the resource through planning processes, instead preferring market mechanisms.

Finally, NWR recognizes that a number of land use change activities, such as farm dams and large scale plantation forestry, have the potential to intercept significant volumes of water now and in the future. States are to assess the significance of such interception activities on catchments and aquifers, and apply appropriate planning, management and or regulatory measures to protect the integrity of water access entitlements and achieve environmental objectives.\textsuperscript{107} Extending water regulation to effectively limit such activities is highly contentious and considerable information gaps remain as to the extent and nature of such activities.\textsuperscript{108} These factors are reflected in the lack of specificity in NWR commitments in this area.

Thus, while NWR represents a very significant development in the trajectory of institutional change for water allocation and management, this analysis has foreshadowed the difficulties of achieving governance frameworks to manage competing state interests, and the unresolved tensions between opposing policy imperatives. Together, these factors portent poor progress, particularly on environmental reforms. The following discussion contextualizes these concerns within a broader analysis of developing institutional responses to modern sustainability problems.

\textsuperscript{106} Gardner et al, above n 49, 398, 401-403. The risk assignment framework under NWI assumes that the NWI regime has been established by 2014, and that water allocation plans are dealing with historical over-allocation and over-use.

\textsuperscript{107} See particularly, Council of Australian Governments (2004 a), above n 82, cl 46.

\textsuperscript{108} Connell et al, above n 89, 95.
Modern environmental problems, such as water management in the MDB, are characterised in the public policy literature as highly complex and multi-faceted; typified by broad and variable temporal and spatial scales; the possibility of absolute ecological limits to human activity; irreversible impacts and related policy urgency; complexity within and between problems; pervasive risk and uncertainty; cumulative, rather than discrete impacts; and often ‘systemic’ problem causes embedded deeply in patterns of production, consumption, settlement and governance.\textsuperscript{109}

As this chapter has illustrated, the factors contributing to declining river health and increasing water scarcity in the southern MDB occur over broad and variable temporal and spatial scales, and it is the cumulative impact of many individual resource use decisions which has contributed to the current situation. The underlying causes of current problems are indeed systemic - deeply embedded in patterns of production, consumption, settlement and governance, and current reforms are the first tentative attempt to alter some of these patterns. There are multiple stakeholders with an interest in the approaches taken to such problems, with typical collision of interests between consumptive water users and the environment; and between different state jurisdictions within the MDB. Increasing evidence of ecosystem collapse and the predicted severity of the impacts of climate change on water availability for all users, also suggest the possibility of absolute ecological limits to human activity and consequent irreversible impacts, necessitating an urgent policy response and rescaling of human activity.

In the 1990s, Ecologically Sustainable Development [ESD] emerged internationally as a conceptual framework for managing such complex, systemic environmental

ESD aims to integrate three dimensions in decision-making about natural resource management: ecological, social and economic. The policy agenda generally promotes a pattern of economic and human development that does not diminish the opportunities for future generations to use natural resources and enjoy a healthy environment. It recognizes that all mainstream social and policy goals must include concern for the importance of biodiversity and ecological life support systems, and the need to treat environment and development in an integrated way rather than as competing considerations. Finally, it embodies guiding principles for policy and decision-making: factoring in both short and long term considerations; integrating environmental, social and economic concerns; taking precautionary measures in the face of possible serious environmental degradation; utilizing innovative policy approaches such as participation, institutional change and market mechanisms; and involving communities in decision-making.

ESD has since found expression in hundreds of national and state policies and laws in Australia, including much water policy and legislation. The NWR agenda is an example of attempts to unite ecological with economic and social objectives in order to comprehensively address a multi-faceted complex problem of public policy, and move towards sustainability outcomes. Yet, as the subsequent analysis of the developing law, policy and practice of EWA illustrates, it has proven very difficult to

110 Current understanding of ESD (or Sustainable Development) as a concept is the result of a trajectory of policy and legal developments at international and national levels, particularly during the 1990s. Key points along this trajectory at the international level include, The adoption by the United Nations of the Brundtland Report (World Commission on Environment and Development (1987) Our Common Future), in which development was defined as sustainable “if it meets the needs of the present without compromising the ability of future generations to meet their own needs;” The UN Conference on Environment and Development (1992), which aimed to formulate strategies to achieve sustainable development, and produced the Rio Declaration on the Environment and Development, and various international conventions committing signatories to implement ESD as it related to issues such as biodiversity conservation and climate change; and The World Summit on Sustainable Development 2002.

111 At the national level, see Intergovernmental Agreement on the Environment (1992), in which all levels of government formally committed to key principles of ESD and to their application in the assessment of natural resources and land use decisions and approval processes; and National Strategy for Ecologically Sustainable Development, endorsed by COAG in 1992.


move beyond such a framing of complex problems, to the development and successful implementation of institutional responses which appropriately address all sustainability parameters, particularly ecological.\textsuperscript{114}

\section*{A Institutions for Sustainability}

The literature on institutional responses to the sustainability agenda recognises that modern environmental problems lack simple, clear solutions, instead requiring a different approach to policy-making and implementation and more sophisticated tools and responses. The emphasis is on developing adaptive policy, institutions and management – or more broadly governance regimes, - which facilitate positive change, but in a closely monitored fashion allowing ongoing learning and improvement. Such institutions should recognise uncertainty, complexity and long time scales of sustainability problems; construe policy and management interventions as driven by a defined purpose but explicitly experimental; include stakeholders in a purposeful and structured fashion; and design and maintain sophisticated mechanisms of feedback and communication between policy and practice, with associated requirements for information generation and analysis.\textsuperscript{115}

Along these lines, this research focuses on how such broad institutional change can be best facilitated and implemented effectively. A particular emphasis is placed on the role of law and legal change in facilitating changed water management practices. This focus on the role of law does not ignore its broader institutional context – both in terms of how law is developed and how it is implemented. Statute law particularly can be seen as a direct product of political processes, in many cases a balancing of competing interests. It is not static, but evolves continuously in response to these changing imperatives. Additionally, the often considerable gaps between law on the

\textsuperscript{114} For example, Handmer et al emphasise the unequal focus on economic over ecological considerations in terms of their information base, political status and accreditation in policy processes Handmer et al, above n 109, 2 and 19.

See also Virginia Brunton, 'Sustainable Development: Are We Moving Forward?' (2000) 2 Australian Environmental Law News 21, 27; Hollander and Curran, above n 72, 48; Dovers and Connor, above n 109, 38.

\textsuperscript{115} Dovers and Connor, above n 109, 31, 41; Dovers above n 111,378-83

books and its implementation in practice underscores the importance of considering law as one facet of an overall institutional context, its implementation reliant on many variables. A brief reflection on how the sustainability agenda is reflected in Australian natural resource management legislation sets the scene for more detailed exploration of legal settings for water allocation and management in Chapter Three.

Bates’ account of the trajectories of modern natural resource legislation illustrates the reluctance of legislatures to design strong statutes to demand substantive environmental outcomes. This legislation typically employs a comprehensive list of objectives, addressing both environmental and consumptive policy agendas. There is rarely an attempt made to order these objectives, or direct the resolution of competing considerations between them. ESD is often included in the list of objectives as an additional consideration for decision-makers, rather than a focus or desired outcome of decision-making. Wide powers are conferred on decision-makers, yet this discretion is not tempered by proscribed performance standards, stipulated criteria and objectives for decision-making, or requirements to monitor performance against objectives. In the context of established and powerful economic interests, and systemic patterns of resource exploitation, this does not provide a strong basis for achieving environmental objectives.

The generally procedural and highly discretionary character of natural resources law is of course reflective of the broader political context of policy and law making, and the range of competing interests affecting these processes, particularly the strength of established social and economic policy drivers, and a “certain lack of political commitment” to competing environmental objectives. Indeed, as Bonyhardy illustrates, “the stronger the law, the more likely it is to go un-enforced or be amended” - even where legislation has provided clearly for substantive environmental outcomes, governments have shown a readiness to curtail legislation where it could

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117 Statute above n 113, 3.
118 Bates, Environmental Law in Australia (5 ed, 2002), 127; Stein, above n 113, 3.
119 Bates, above n 117.
not ignore its provisions.\textsuperscript{120} It is inevitable, and indeed recognised within the concept of ESD, that natural resource management involves balancing competing imperatives.

Yet, by building into legislation a wide measure of discretion and a lack of precision and direction in the strategic objectives, there is considerable scope for decision-makers to decide, or be required by political direction, to minimise or abandon progress on sustainability and environmental objectives, which may threaten powerful established interests.\textsuperscript{121} Bates argues that ideally such trade-offs should take place in the policy development process prior to legislation, not by officials in the implementation of legislation.\textsuperscript{122} Similarly, Dyson emphasises that legislation is a means not an end and, as such, the outcomes sought should be determined in detail before the statutory means to achieve them can be designed.\textsuperscript{123}

In this light, many commentators are concerned with how laws can be consciously designed to contribute to sustainability outcomes and, particularly, to establish institutions that reflect the characteristics noted above.\textsuperscript{124} For example, how can legal frameworks support the integration of decision-making across governmental spheres; establish the requirement and assign responsibility for the information gathering, reporting and analysis fundamental to an adaptive approach; build in opportunities to adapt management interventions to accommodate such new information; establish organisations which are transparent, persistent and accountable; or facilitate meaningful participatory regimes.\textsuperscript{125} This involves comparison of different policy mechanisms – regulatory, market, planning – including how they rely on legal underpinnings; but also consideration of how outcomes of such interventions will ultimately be influenced by the sophistication of supporting institutional frameworks for implementation.

\textsuperscript{120} Bonyhady, above n 115, 463.
\textsuperscript{121} Bates above n 115, 271.
\textsuperscript{122} Ibid.
\textsuperscript{125} Dovers and Connor, above n 8, 53-56, 60; Dovers, above n 10, 385-90; Fisher, above n 3, 125.
Fisher’s recent conceptualisation of a governance framework to implement NWR is an important contribution in this respect.\textsuperscript{126} He portrays a legal structure, which seeks to ensure not only compliance with rules but achievement of objectives. This broadening of legal scope, from a traditional focus on form, to a broader focus on adapting form to function, encompasses a notion of governance rather than management.

Fisher’s work is of significant value in mooting a legal framework to achieve institutions for sustainability. In seeking to uncover specific institutional settings for effective EWA as the parameters for a model for governance, the following chapter draws and builds on Fisher’s contribution, and the work of others, in exploring legal codification of sustainability concepts, their interpretation and application.\textsuperscript{127}

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\textsuperscript{127} For example, Jacqueline Peel, ‘Ecologically Sustainable Development: More Than Mere Lip Service?’ (2008) 12(1) The Australasian Journal of Natural Resources Law and Policy 1. In this exploration of legislative articulation and judicial interpretation of sustainability concepts, Peel argues that ESD as a concept is arguably more effective in structuring decision-making processes than articulating outcomes for such processes.
CHAPTER THREE:
AN ANALYTICAL FRAMEWORK

Framing Environmental Water Allocation [EWA] as a modern sustainability problem in the previous chapter emphasised the need for new and adaptive institutional forms to respond to environmental imperatives and progress towards sustainability outcomes. So as to better understand the nature and extent of institutional change required, this thesis conducts a structured evaluation of the developing law, policy and practice of EWA, identifying constraints and opportunities for the effective provision for environmental water needs. A framework for this analysis is developed in this chapter.

This analytical framework combines four inter-related elements, which represent key areas of environmental water governance: overarching legal settings; processes for the allocation of water between competing users; legal mechanisms to facilitate and protect environmental water; and processes for managing rivers with EWA. These four elements are portrayed as inter-related to emphasise that effective EWA depends on institutional change in all four areas; and because there are many connections between them.

This thesis, however, focuses particularly on understanding the relationship between overarching legal settings and the other three areas of environmental water governance. As such, it concentrates on the way in which legal settings can establish strategic purpose and desired outcomes for water allocation, protection and management; set parameters and standards for key statutory functions; influence the distribution of duty, roles and responsibility, and also the development of targeted institutional capacity to realise effective EWA.

The diagram below, representing the analytical framework, helps to conceptualise this research approach.
The framework itself forms part of the central argument of the thesis. Its coverage, spanning formal law and policy, as well as institutional practices and capacities, underscores the importance of broad reaching institutional change to realising effective EWA. It is also used to set the general, conceptual parameters for a governance model for effective EWA, raising arguments and exploring positions, which can be tested and particularised as the framework is applied throughout the thesis in different contexts. This culminates in Chapter Seven’s articulation of key elements of the governance model, which proposes strategic and more purposeful use of legal settings to set the parameters for a range of key water allocation and management functions, accompanied by broad-scale institutional change.
I ELEMENT ONE: OVERARCHING LEGAL SETTINGS

The first element of the framework explores how overarching legal settings for water allocation and management can play a central strategic and structuring role in a governance framework for effective EWA. Two significant concerns emerge. First, to what extent should legislation clearly prescribe outcomes for statutory processes and constraints on decision-making? Second, is it feasible to attempt to make this prescription and these constraints substantive in nature, thereby moving beyond the procedural quality of much existing natural resources law into the realm of purposeful governance?

An exploration of approaches to statutory design for natural resource management [NRM] suggests that governing water legislation is an ideal forum to formally articulate objectives and outcomes for EWA and link these, via expressions of duty and authority, to institutional functions and practices. Legislation can also play a significant role in establishing and sustaining institutional capacity to achieve environmental objectives in practice. Yet there are a number of challenges associated with achieving substantive prescription of outcomes and constraints on decision-making that are both feasible and enforceable. This discussion suggests that these can be partially overcome through clear, detailed articulation of outcomes, and the design of targeted processes of implementation which support their realisation in practice.

A Prescribing Outcomes and Constraining Decision-Making

The reluctance of legislatures to enact natural resources legislation with strong, substantive commitment to environmental outcomes has been noted in the previous chapter. NRM legislation generally confers broad discretionary powers on resource managers and concentrates on processes and procedures rather than prescribing outcomes.1 In light of the “implementation deficit”2 for environmental protection measures in an NRM context, the prevailing argument in much leading environmental

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law literature is that strong statutory expression of substantive environmental outcomes and careful constraining of administrative discretion are fundamental to more effective implementation of environmental protection measures.³

Taking a closer look at the literature in the fields of statutory design and environmental regulation unpacks this general preference for stronger, prescriptive environmental regulation.

For example, in a comprehensive review of policy literature on statutory design and implementation, Ingram and Schneider describe a continuum of statutory design according to how much discretion over policy content is retained in statutes and how much is left to be determined by those charged with implementation, including officials but also various models of community engagement.⁴ They distinguish strong statutes - which tightly constrain discretion, contain objectives and goals that are consistent, clear and specific, closely control the allocation of resources and management tools to agencies, and provide for limited public participation – from other models of statutory design which allocate far greater discretion to those tasked with implementation. An example of the latter is a “support building approach” to statutory design, which places far less emphasis on achieving instrumental goals, instead focusing on how statutes influence values, participation patterns and the reconciliation of competing interests; and providing rules of participation in order to structure access and bargaining that promotes the resolution of conflict.⁵

Ingram and Schneider argue that statutory design, and specifically the allocation of discretion within legislation, should be tailored to fit different contexts; that certain models are appropriate for certain situations. For example, where there is a lack of broad public support for the policy agenda and high levels of value conflict, a strong

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⁴ Helen Ingram and Anne Schneider, 'Improving Implementation through Framing Smarter Statutes' (1990) 10 (1) Journal of Public Policy 67.

⁵ Ibid 67-81.

Similar arguments are made in theories of reflexive law. Rather that dictating objectives to be achieved or principles to be followed, reflexive law provides structures for self reflection or self criticism, and seeks to change the culture within which decisions are taken so as to contribute to more appropriate decision-making. See Holder and Lee, above n 2, 373, 435; and Eric W Orts, 'Reflexive Environmental Law' (1995) 89 Northwestern University Law Review 1227.
The statute is unlikely to be effectively implemented. Where there are high levels of uncertainty, statutory design should provide incentives for those involved in implementation to add to policy knowledge, a process that may be best facilitated by extensive allocation of discretion to the grass-roots level.6

Parallels can be drawn with the debate within regulatory theory between prescriptive command and control regulation, and deregulation; and the emergence between these extremes of a more pluralistic conception of regulatory design. For example, Gunningham and Grabowsky conceptualise “smart regulation,” which employs a wide variety of instruments and harnesses a range of institutional settings and actors, tailored and combined to suit the complexity of different environmental problems and institutional contexts.7 A firm place remains for the more traditional standard setting and enforcement activities of prescriptive regulation, yet this is combined with innovative approaches such as market mechanisms or more deliberative, participatory processes, which are far less prescriptive, but nonetheless rely on a certain level of regulation.8 A broad range of policy tools and community engagement are of course central tenets of sustainability policy discussed in the previous chapter.9

The introduction of EWA as a reform agenda in Chapter Two emphasised the complex, multi-faceted, and often competing nature of the policy imperatives driving water reform. Compelling arguments for a strong substantive approach to statutory provision for EWA objectives and outcomes, and tight constraints on the exercise of statutory powers and functions were raised. For example, achieving environmental reforms represents significant changes to the status quo of resource allocation, the socio-economic interests supported by this, and the institutional framework, which has evolved to service these interests. Additionally, environmental imperatives are in

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6 Ingram and Schneider above n 4, 67-81.
7 Neil Gunningham and Peter Grabowsky, Smart Regulation: Designing Environmental Policy (1998). This work builds on previous regulatory theory, particularly, Ian Ayres and John Braithwaite, Responsive Regulation: Transcending the Deregulation Debate (1992).
8 Gunningham and Grabowsky above, chapters 2 and 3.
See also Carolyn Abbot, 'Environmental Command Regulation' in Benjamin J Richardson and Stepan Wood (eds), Environmental Law for Sustainability: A Reader (2006).
9 See, for example, Dovers and Robin Connor, 'Institutions and Policy Change for Sustainability' in Benjamin J Richardson and Stepan Wood (eds), Environmental Law for Sustainability: A Reader (2006) 21, 28-30.
many cases competing with parallel reform commitments to enhance resource exploitation, also supported by powerful political and economic interests. In this context, clear, prescriptive articulation of desired outcomes is arguably fundamental to achieving changed allocation and management practices.

Yet given the complexities, uncertainties and long time frames pertaining to this environmental problem, it is clear that adaptive processes and mechanisms are also required. In many cases, this will require the allocation of a broader discretion to those involved in implementing the reform agenda and benefit from more deliberative, participatory approaches. For example, public participation has been incorporated to varying degrees in strategic water planning processes to make the trade-offs inherent in water re-allocation at a scale of relevance to both ecological and socio-economic considerations. Legal mechanisms used to facilitate and protect environmental water and their management arrangements also require considerable discretion and participatory input to enable environmental water managers to best respond to environmental water needs and changing climate imperatives.

As such, the focus of this discussion is how legal provision for EWA can be strengthened and clearly linked to the exercise of powers and functions under the legislation so as to improve implementation of this policy agenda. The value of purposeful, substantive objectives and expressions of outcome accompanied by tight constraints on discretion is emphasised. Yet this does not discount the importance of a pluralistic approach to statutory design and environmental regulation, which incorporates a range of tools, instruments and actors within the governance framework and may, in many cases, allocate considerable discretion within statutory processes. This plurality is reflected in the analytical framework.

B Substantive Constraints on Decision-Making?

Objectives, Duties and Rules of Law

It is now commonplace for modern NRM legislation to specify the objects of legislation. This serves not only to articulate the intent of the policy embodied by the legislation, but also to guide the parameters of legal powers created by the legislation.
In addition to an overarching expression of objectives, NRM legislation increasingly prescribes duties and binds decision-makers to carry out functions in line with certain objectives.10

In terms of using these mechanisms to further a strong and purposeful legal framework for effective EWA, two considerations emerge. First, NRM legislation typically addresses the balancing of competing policy imperatives – resource exploitation and environmental protection. Yet, at the legislative level, there is generally a reluctance to prescribe how these competing interests should be balanced in decision-making. Statutory objects characteristically list a range of often competing objectives, and do little more than restate or reiterate the importance of principles of Ecologically Sustainable Development.11 The way objectives relating to environmental imperatives are treated and prioritised at this strategic level is arguably important to set the context for a fuller implementation of environmental protection measures.

Second, NRM legislation generally establishes essentially procedural duties and constraints on decision-making, for example a requirement to consider or have regard to statutory objects in the exercise of statutory functions.12 Given the strength of competing socio-economic interests representing the status quo, such constraints are unlikely to support a full implementation of environmental objectives. Thus, the challenge becomes to design duties and constraints of a more substantive nature, that move beyond mere procedural considerations to create responsibilities to achieve certain outcomes or undertake certain functions in pursuit of certain objectives.


11 Statutory interpretation legislation throughout Australia commonly states that in the interpretation of a legislative provision, a construction that would promote the purpose or object underlying the legislation shall be preferred to a construction that would not. For example, Interpretation Act 1987 (NSW), s 33.


Yet providing for substantive sustainability and environmental outcomes through legislation raises a number of considerations about feasibility in implementation and enforceability.

Fisher’s consideration of how legal frameworks for NRM can be re-oriented as broader governance regimes directing widespread efforts towards sustainability outcomes is an important contribution to this discussion.\(^\text{13}\) He explores the use of purposive statutory mechanisms, such as objects and duties in environmental law and, particularly, whether it is workable to use such mechanisms to specify sustainability as an outcome of the regulated resource use. Particular emphasis is given to the design of rules of law that express sustainability outcomes as duties binding on certain actors within the statutory scheme or, more generally, binding on certain types of decision-making or operational activities.\(^\text{14}\)

Fisher’s proposed governance model for the comprehensive implementation of National Water Reform [NWR] furthers this work in the context of water management.\(^\text{15}\) He envisages a legal framework with three inter-dependent components: stated strategies and outcomes; legal support for processes to reach such outcomes; and regulatory functions – rights and responsibilities in relation to water access. Much emphasis is placed on the expression of strategic guidelines and stated outcomes, and how these should be linked clearly to the exercise of all processes and decision-making under the legislation through a matrix of enforceable duties and priorities.\(^\text{16}\)

\(^{13}\) Fisher (2000), above n 10; Fisher (2001), above n 3.
\(^{16}\) Fisher (2007), above. 120-6.
However, in light of the inherent uncertainties and long time frames pertaining to this and other modern sustainability problems, the difficulties of articulating substantive environmental outcomes that are feasible and also enforceable in a legal sense must be conceded.

In general terms, enforceability of a statutory duty relies on a clear definition of substantive outcomes sought or processes to be followed: “a rule of law that is enforceable sets out with clarity and certainty what may or may not be done, how it must be done or not done and the standards applicable to the decision or the activity.” Yet achieving such clarity around the concept of ecologically sustainable water allocation and management, particularly expressed as an outcome, may be very difficult. Fisher argues that, while such duties and rules may be difficult to enforce, they are not unenforceable. He suggests that, if there was a serious intent to frame such rules, the legislature would support them by incorporating into legislation interpretation of key expressions such as sustainability, complemented by more positive ways of ensuring enforceability such as compliance indicators, the formulation of codes or guidelines, and the indication of best practice.

Drawing on recent judicial consideration of sustainability used as a guiding objective in various natural resources legislation, Peel distinguishes between its value in influencing decision-making processes and in articulating ultimate outcomes of decision-making. She suggests that “the effect ESD has on structuring decision-making processes, may potentially be more significant than the contribution it can make to determining the outcomes of such processes.” Peel argues that the dynamic and long-term nature of environmental problems makes it difficult to articulate a permanent set of policy choices that respond to these imperatives. As such, it may be more realistic and feasible to focus on establishing tight processes for ensuring the appropriate treatment of environmental information and imperatives in decision-making, rather than attempting to define sustainability outcomes in legislation. Indeed, judicial treatment of the concept to date indicates considerably more traction in applying and expanding on the procedural principles of ESD than in using the

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17 Ibid, 115.
19 Peel, above n 11, 17.
20 Ibid.
concept to review the substantive balance struck between environmental and resource exploitation concerns in the pursuit of sustainable outcomes.\textsuperscript{21}

In this respect, it is important to consider the role of courts of law within the institutional framework. Incorporating substantive standards for sustainability outcomes within NRM legislation introduces new and contentious territory for judicial intervention in the actions and decisions of administrators.\textsuperscript{22} Judicial review of administrative decision-making under legislation concentrates on the way decisions were reached and whether they were lawful, not the merits of the decision itself. Courts are very wary of straying into a review of the policy behind a decision.\textsuperscript{23} This strengthens the argument for use of clear and unambiguous statutory language, and a range of supporting mechanisms, which enhance enforceability in the design of statutory standards and processes. It also, however, raises question marks about the eventual legal enforceability of substantive statutory standards pertaining to EWA. The NSW case study in Chapter Four provides an opportunity to investigate the enforceability of statutory standards for EWA. This is important input into later consideration in Chapter Six of recent federal legislation and its use of a substantive standard of ecologically sustainable water allocation.

The following discussion of the applicability of strategic statutory mechanisms to the key institutions of environmental water allocation, protection and management raises some of the potential opportunities and challenges in achieving substantive constraints on key decision-making functions in these areas.

1 \textit{Allocating Water to the Environment}

To develop a strong and purposeful legal framework for effective EWA, one of the most fundamental issues for substantive determination is the allocation of water between environmental and consumptive interests. An ecologically sustainable level of allocation is, of course, a highly contested concept given inherent uncertainties in

\textsuperscript{21} Ibid.
\textsuperscript{22} See discussion in James Levinson, 'Sustainable Water Allocation by Judges' (2000) 17(4) \textit{Environmental and Planning Law Journal} 353; Peel, above n 11; Stein, above n 11.
the science, and competing socio-economic interests. There has been some consideration in the literature of whether a substantive expression of an allocation objective is workable and, if so, what form it may take. This reflects some of the challenges raised above.

For example, in the context of the implementation of NWR, Fisher argues for an enforceable statement of priority or a binding duty under water legislation to remedy and prevent over-allocation of the resource.24 Following Fisher’s line of argument, it may be possible for the legislature to substantiate such an expression to a certain degree by providing decision-makers with additional guidance as to what may constitute over-allocation, and carefully designing processes to be used to reach such a determination, for example providing guidance on the balancing of scientific and socio-economic information. Gardner, however, finds that, in light of inherent uncertainties and given the different situation in different rivers, it is difficult to conceive of general water resource legislation mandating an overall standard for executive government determinations of EWA. Instead, he explores more workable and place-specific duties to make EWA in certain places and at certain levels, which could be accommodated in purpose specific legislation.25

The more targeted approach put forward by Gardner above is evident, for example, in the prioritisation of rivers to be addressed initially in efforts to recover water for the environment through the NWR process,26 and the significant investment in environmental water recovery across the MDB under the Living Murray Initiative which addresses six priority ecological assets.27 While such a pragmatic approach has many advantages, there is of course a related danger that the focus on high profile sites will be rendered largely ineffective without recognition of their situation and dependence on broader river health variables.28

26 Council of Australian Governments, Intergovernmental Agreement on a National Water Initiative (2004), cl 41-45, Schedule A.
As discussion in Chapters Four and Six will illustrate, some jurisdictions have attempted to establish the kind of objective / duty / rule of law matrix advocated by Fisher, incorporating substantive standards and mechanisms to varying degrees. This provides an opportunity to explore in more detail the difficulties associated with substantive expression of water allocation outcomes and how such expression should be clearly linked to, and well supported by, the processes applicable to such determinations.

2 Protection of Environmental Water

Another key issue to be addressed with strategic statutory mechanisms, both at the level of guiding objective and rules governing key processes, is the legal status and protection accorded environmental water. As later discussion shows, this can be undermined as a result of diminishing water availability under climate change; poor regulation of interception activities, which reduce stream flow; or indeed practical operational decisions taken by water managers. Given the very different nature of environmental water and water for consumptive use - particularly in terms of management requirements and end uses - any expression of legal status would need to incorporate consideration of the types of legal mechanisms suited to achieving environmental water outcomes and their status relative to mechanisms allocating water to consumptive use.

Beyond this it is important to investigate substantive constraints on the exercise of powers, which could potentially undermine the integrity of environmental water. For example, decision-making covering the regulation of interception activities or the responsiveness of water allocation to changing water availability could be subject to a positive requirement (phrased as a binding legal rule) to ensure the integrity of existing entitlements, particularly environmental water. Discretionary powers, which would potentially undermine EWA, could also be constrained in some way. For example, subsequent discussion illustrates how broad statutory powers allowing ministerial qualification of entitlements in the situation of critical water shortages impact heavily on environmental water. In this context, the possibility of a prioritised legal protection for a certain level of EWA, which is determined to be essential to maintain ecosystem function and viability, is explored.
The Victorian case study in Chapter Five provides a context for exploring levels of protection accorded environmental water, particularly in the context of climate change scenarios of increased water scarcity, and whether substantive constraints on decision-making would be feasible and acceptable in this context.

3 Management of Environmental Water

Finally, there are a number of strategic statutory provisions that could act as substantive constraints on decision-making in relation to the delivery of environmental water and the management of rivers with EWA. For example, to support an overarching objective directed at adaptive management, more specific duties and rules could address the implementation of important prerequisites for adaptive management including monitoring of the implementation and effectiveness of EWA, related data collection responsibilities and standards, and public reporting. These are all areas in which the commitment of resources over appropriate time frames has been characteristically lacking, and statutory provision directed at establishing institutional capacity would be worthwhile.

Given the different and often conflicting management requirements of consumptive and environmental water, some provision for managing competing interests in a practical management context may also be warranted. For example, in many regulated rivers there may be instances of direct conflict between environmental and consumptive water delivery requirements. Managers could be provided with priorities for managing such conflict at crucial times, or a more general direction to optimise environmental outcomes from irrigation water delivery thereby encouraging more holistic river management to also achieve environmental outcomes.

Many of the options discussed above in relation to water allocation, protection and management, involve considerable detail that may be best provided for at a scale more relevant to practical management. This suggests that statutory provision for such

substantive outcomes and constraints may be quite general, however, legislation may also provide for the development of related regulations to govern implementation processes and the operation of responsible organisations, where such substantive guidance can be made more specific.

The above discussion has raised a number of considerations for subsequent analysis in the varying contexts of EWA throughout the thesis. At a general level, it is argued that a substantive expression of environmental objectives and stated outcomes will provide critical direction to the collection of statutory functions key to effective EWA. Yet the difficulties of articulating this in a form that is feasible and, indeed, enforceable are conceded. This discussion has suggested that these challenges can be lessened through establishing clear links between such statements and key statutory functions and processes, and ensuring statutory processes are designed to best support these objectives.

As such, subsequent analysis will explore:

- whether and how water legislation expresses environmental objectives and desired outcomes; including whether they focus on outcomes and/or processes; whether they are expressed substantively; and how they manage inherent trade-offs between competing interests;
- the way in which objectives and outcomes are linked by duties and rules of law to key statutory processes and functions; and
- whether key processes and functions are designed to reflect environmental objectives and desired outcomes.\(^{30}\)

\(^{30}\) The exploration against these considerations translates ultimately to Recommendations One and Two put forward in Chapter Seven as key elements of a governance model for effective EWA.
II ELEMENT TWO: PROCESSES TO ALLOCATE WATER BETWEEN COMPETING USERS

The second element of the analytical framework investigates processes to achieve environmental water regimes in rivers which are already highly developed and which will therefore involve a significant re-allocation of water resources. The discussion assumes that the purpose of such institutions is re-allocation towards ecologically sustainable levels of water allocation. This issue raises some important questions of governance. For example, who participates in the setting of sustainable allocation limits; what processes can be used to achieve this re-allocation; and how are competing interests and different forms of knowledge and expertise balanced in the process.

The first element of the framework has explored the use of strategic statutory mechanisms, including a substantive articulation of desired outcomes for water allocation, as part of a matrix of objectives, duties and rules of law to guide key statutory functions and processes. This discussion is picked up again here, from the perspective of process scope and design to achieve desired outcomes.

Under NWR, statutory water planning is positioned as the central mechanism to address the re-allocation of water between competing users.31 There are a range of issues relevant to planning for environmental outcomes, including the extent to which planning processes should be closely constrained and governed by statutory and executive direction on this fundamental substantive issue or, alternatively, be the subject of deliberative, participatory processes. To explore these issues, the discussion draws on the scholarship around adaptive governance models for natural resource and environmental management, with its strong focus on public participation.32

31 Council of Australian Governments, above n 26, cl 36-7.
Since NWR there has also been considerable emphasis on economic instruments as tools of re-allocation. For example, recovering water for the environment through investment in infrastructure efficiency or through market-based processes, such as direct buy back of water entitlements, tends to be perceived as more efficient and politically tenable than administrative re-allocation through planning.\textsuperscript{33} This discussion introduces some considerations to guide subsequent analysis in the thesis of whether and how these approaches may complement and/or constrain progress towards a more ecologically sustainable allocation of the resource.

A Mechanisms for Water Allocation

A very general outline of current prevailing statutory mechanisms and administrative practices for the allocation of water is provided to situate the forthcoming discussion.\textsuperscript{34} This is also important context for the following two elements of the framework, which cover the protection and management of environmental water.

In regulated rivers the majority of consumptive uses are regulated through a system of entitlements and allocations.\textsuperscript{35} In the MDB context considered in this thesis, entitlements are generally held by individual water users, such as irrigators. Accounting periods for water allocation are generally one year. In a given water year, administrative allocations of water are made against an entitlement depending on water availability. It is important to emphasise the difference between entitlements and allocation – an entitlement is the maximum volume or proportion of available water that may be allocated to a certain user; whereas an allocation is meaningful only in the context of an accounting period and is the actual water available for use under the entitlement. Given natural variability, the allocation can vary quite considerably from the nominal amount specified in the entitlement; and throughout the irrigation season depending on inflows to storage. Generally, an overarching instrument of water allocation is established under legislation, which provides the rules for


\textsuperscript{34} For a detailed account, see Alex Gardner, Richard Bartlett and Janice Gray, Water Resources Law (2009), 216-254, 425-439.

\textsuperscript{35} The notable exception is supply of stock and domestic water, which is generally unlicensed. See Gardner et al, above, 219.
allocation over the area managed by that instrument. These instruments are either perpetual, or in place for a number of years pending formal review. They are also the primary direct planning instruments in regulated rivers to provide for environmental water needs.

Additional important concepts are reliability and security. The reliability of an entitlement is the statistical likelihood of receiving full entitlement in any given year. In many rivers of the MDB, situations of over-allocation mean that reliability levels are low. Under climate change scenarios, reduced water availability further threatens reliability, as there is less water spread between entitlement holders. An entitlement may also be characterised as high or general security, a reference to the priority accorded in allocation decisions. Traditionally, water users with permanent plantings such as orchards and vineyards held high security entitlements, which were allocated first priority from available water; and those with more annually variable irrigation needs held general security. Again, this characteristic becomes increasingly important under water scarcity scenarios, which will particularly affect the reliability of general security water.

Even once the allocation between competing users at an entitlement level is in place, this system of administrative access rights, in the context of a highly variable resource, involves significant operational management discretion. This is particularly so in determining allocation levels relative to amounts maintained in storage to meet ongoing commitments such as environmental flows, and future allocations.

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36 In regulated rivers in Victoria, water authorities hold bulk entitlements covering a certain area of the river, within which individual entitlements holders are situated. In NSW, water-sharing plans play this role. See discussion in Chapters Four and Five.
37 Gardner et al, above n 34, 282-4
As noted in Chapter Two, although NWR establishes statutory water planning as the central mechanism to address water allocation, the National Water Initiative articulates only broad parameters for planning; makes only selective commitments to address over-allocation and over-use; and arguably lacks a strong substantive prescription of environmental outcomes sought or an expression of how competing imperatives are to be treated in planning processes. State statutory provision for water allocation planning has varied significantly.\textsuperscript{40} Recent federal legislation introduces a further scale of statutory planning relevant to water allocation.\textsuperscript{41} In subsequent chapters, some of these varying approaches are explored. In anticipation of this forthcoming analysis, the discussion below raises key considerations for achieving environmental outcomes and responding to environmental imperatives through water planning processes.

1 Scope of planning

In considering the scope of planning for re-allocation, two key factors emerge. First, it is important to distinguish processes which have the potential to address the allocation balance between environmental and consumptive water directly through shaping a new instrument of allocation; and those processes set at a more strategic level that outline approaches to revisit existing allocation instruments or achieve EWA via alternative mechanisms such as buy-back of entitlements,\textsuperscript{42} but do not negotiate direct changes to the instruments themselves.

This distinction is important because EWA reforms were introduced as part of the NWR concurrently with reforms to achieve heightened security and certainty for consumptive users by characterising their interest as a perpetual and transferable right.\textsuperscript{43} Once these consumptive reforms are established, it is far more difficult

\textsuperscript{40} Gardner et al, above n 34, Chapters 15, 16.
\textsuperscript{41} Water Act 2007 (Cth), Part 2.
\textsuperscript{42} Buy-back refers to the purchase of water entitlements on the water market from existing entitlement holders, with the purpose of returning any water allocated against the entitlement to the environment. It is discussed as an approach to water re-allocation later in Element Two.
\textsuperscript{43} At a very general level, the common interpretation of these commitments is that consumptive use reforms were contingent on returning systems to sustainable levels of use. For example Daniel Connell,
politically to achieve changes to the status quo of resource allocation via an administrative planning negotiation. Specifically, the embedding of such reforms intensifies difficult issues of the right to compensation for any reduction of consumptive use entitlements.\textsuperscript{44} Thus, a process to negotiate a new instrument of allocation, which is introduced as part of the condition of moving towards more certain and secure consumptive rights, offers considerably more potential to achieve a change in the status quo than having to revisit entrenched rights which have since gained heightened security and status through corresponding reforms.

These two levels of planning are apparent in the approaches taken to re-allocation in NSW and Victoria. The case studies will allow some comparative evaluation of their contribution to a purpose-driven governance model for effective EWA.

Second, it is important to consider the extent of substantive guidance and prescriptive direction for planning outcomes provided in legislation. Naturally, there is a spectrum of approaches. Planning may be tightly constrained, for example through central executive determination of ecologically sustainable limits on extraction, and tight constraints on its application to more local management contexts. Some of the strategic statutory mechanisms outlined in Element One may be employed to facilitate such an approach.

An alternative approach is to allocate a broader discretion to planning bodies to determine substantive decisions on allocation between competing users, through more deliberative, participatory approaches to planning at a more localized scale. This latter approach styles the central allocation trade-off as a deliberation between more directly affected parties and interests.

\textit{Water Politics in the Murray-Darling Basin} (2007), 35; Daniel Connell, 'Contrasting Approaches to Water Management in the Murray-Darling Basin' (2007) 14\textit{ Australasian Journal of Environmental Management} 6, 8. Yet more specific interpretations highlight that policy direction on addressing environmental reforms as a precursor to consumptive reforms was quite strong in early iterations of NWR, yet received far less emphasis in the reform agenda over time. For example, Alex Gardner and Kath Bowmer, 'Environmental Water Allocations and Their Governance' in Karen Hussey and Stephen Dovers (eds), \textit{Managing Water for Australia: The Social and Institutional Challenges} (2007) 43; Gardner et al, above n 34, 304.

\textsuperscript{44} For a discussion of how rights to compensation for a reduction in water entitlements have been treated throughout the NWR process, see Gardner et al, above n 34, 388-398, 401-404, 489-507.
A brief overview of the rationale behind public participation in the context of natural resource and environmental management is important to this discussion and helps to articulate the central concerns and propositions of the analytical framework in this area.

Meaningful public participation is generally seen as central to the design of institutions for sustainability and adaptive governance for the environment. Much modern environmental law and policy, including NWR and related water legislation, provides for some degree of public participation. Public participation is seen as an important way of enhancing both the process and substance of environmental decision-making. It reflects the importance of open, transparent, democratic decision-making in modern society. Participatory processes can build trust and shared understanding, which contribute to broader acceptance and commitment to resulting outcomes. They also offer an opportunity to make decisions more relevant and responsive to the practical implementation context. This reflects the idea that modern sustainability problems are complex; they cannot be solved by experts alone but require multiple levels of input, including different forms of knowledge and experience.

There are of course many scales or gradations of public participation beyond basic participation in democratic elections. In a natural resource management context, public participation manifests in three main guises: public access to environmental information; direct participation in environmental decision-making; and access to

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46 Council of Australian Governments, above n 26, cl 93-7.
47 For example, Water Management Act 2000 (NSW), Chapter 2, Part 2; Water Act 1989 (Vic), Part 3, Division 1B, Division 3.
48 Holder and Lee, above n 2, 85-134.
See also Schindler and Cheek, above n 32.
50 Lebel et al, above n 32, 2-4.
See also Lebel et al, above n 32, 2, on different scales of public participation in decision-making and decision-exploring processes, from the provision of information by authorities to various levels of consultation, collaboration and empowerment.
justice through public rights to challenge decisions.\textsuperscript{52} While each of these will be touched on in some way in the thesis, the central focus here is on the role of public participation in environmental decision-making.

As Chapters Four, Five and Six illustrate, community input, particularly through stakeholder planning committees, has been used to varying degrees in different jurisdictions to shape water allocation policy through planning processes. In some cases, committees have been engaged to prepare water allocation plans, including quite direct participation in the development of substantive allocation policy. In the context of a highly contentious resource re-allocation with polarised stakeholders and powerful established interests, this is arguably a very difficult and contentious application of public participation. The extent to which public participation is being asked to shoulder the burden of balancing interests and values in society that properly should be carried out by the legislature remains a central question.\textsuperscript{53}

As such, the discussion below is a critical appraisal of the role for participatory approaches to decision making in this context. The intent is to look at the nature, scale and structures of participation appropriate to resource re-allocation issues and the way critical guiding parameters can be provided, while still accessing the benefits of public participation.

2 Process Design

(a) Representing the environment in participatory processes

In a water re-allocation context, considerable challenges arise in terms of managing the inevitable differentials of power and political influence between stakeholders.\textsuperscript{54} Achieving appropriate representation of long term, public interest environmental considerations against the power and political influence of existing socio-economic

\textsuperscript{52} Holder and Lee, above n 2, 85; Ramsey and Rowe, above n 23, 114.
\textsuperscript{53} Holder and Lee, above n 2, 89-90.
See also Rosemary Lyster, 'De)Regulating the Rural Environment' (2002) 19(1) Environmental and Planning Law Journal 34.
\textsuperscript{54} Lyster, above, discusses structural conflict, caused by unequal control over, ownership or distribution of resources, unequal power and authority.
On conflict resolution theory, see also Walkerden, above n 31.
interests in a situation where considerable changes to the status quo may be warranted is understandably very difficult. This is particularly so in the context of locally based stakeholder committees, where some stakeholders will have a very direct socio-economic interest in outcomes, and where it is often difficult to find appropriate environmental representation. Merely granting environmental interest groups a seat at the negotiating table, as has been the dominant approach in many NRM contexts, may not be sufficient to allow the development of appropriate environmental outcomes, and may just be a means to disguise or legitimise the continued dominance of economic interests. There is also the question of whether such interest groups should be solely entrusted with representing the environmental viewpoint, and how expert technical input should be balanced with local and community contribution. As such selection of the deliberating group in a way that achieves effective representation of interested and affected parties is critical.

A deliberative process should also be capable of recognising and articulating the needs of interested and affected parties and consolidating them into practical policies that can achieve consensus. While processes to manage the inevitable collision of values and interests and resulting conflict in a water re-allocation are critical, an insistence on achieving consensus in such processes may be naïve and may, in effect, favour the status quo in light of the power and political influence stacked against achieving any significant changes to existing socio-economic patterns of resource use and dependence.

The above comments suggest a need for guiding parameters for expected outcomes of planning processes along the lines of the substantive articulation of desired allocation outcomes explored in Element One of the framework and supported by careful selection of representative bodies and process design.

56 See, for example, stakeholder committees used in water sharing and catchment planning processes: Water Management Act 2000 (NSW), s 13; Catchment and Land Protection Act 1994 (Vic), s 15.
57 Holder and Lee, above n 2, 131; Lyster, above n 53, 41-8.
58 Ramsey and Rowe, above n 23, 117; Holder and Lee, above n 2, 130.
60 Scholz and Stiftel, above n 43.
(b) Facilitating Adjustment

In the context of existing high levels of allocation and socio-economic reliance on water resources, it is clear that any significant re-allocation of the resource to improve EWA will result in reduced entitlement or diminished reliability for existing users. A lack of tools to deal with necessary structural adjustment will fundamentally constrain progress on environmental outcomes through water planning. One of the major flaws of many planning processes under NWR to date has been the assumption that local communities could negotiate new water sharing arrangements, which would improve environmental outcomes although they diminished the reliability of other water entitlements, without considerable investment in accompanying structural adjustment.\(^61\) Despite the purported intention of NWR to use water planning to address unsustainable levels of water use without compensation payable for any resulting reduction in entitlement;\(^62\) the case studies demonstrate how it has been economically, socially and politically unacceptable to claw back more than a marginal amount of water without some form of adjustment assistance.\(^63\)

In the face of intractable divisions about extraction limits and a lack of adjustment tools, technical issues, such as the adequacy of the science, can become battlegrounds as well, often as proxies for the real issues. Gentle and Olszak suggest that, in such circumstances, it is very tempting to focus on temporary fixes and the areas of agreement between stakeholders, and postpone major re-allocation issues for a later date. Such an approach places additional pressure on subsequent review processes to address over-allocation. These constraints intensify as other aspects of the reform process strengthen property rights and enhance tradability, thereby further strengthening the status quo in a political and legal sense.\(^64\)

\(^{61}\) McKay, above n 14, 170.  
\(^{62}\) Gardner et al, above n 34, 304, 388-89.  
\(^{64}\) Ibid, 62-3.
(c) Skills, Time and Resources

Additional considerations in deliberative process design are the time and resource commitments required to properly conduct such processes; which are arguably particularly significant where direct substantive public input into policy making is attempted.65 A key factor is ensuring participants can access the necessary information to enable informed planning. Considering the highly technical nature of much of the relevant information, considerable time and resources must be invested in presenting the information in a format accessible to all participants.66 Such information and policy guidance should also be available to the process in a timely and comprehensive manner to avoid delays, and rushed policy development.67 Of course, it may be impossible to predict with accuracy all the information and policy support needs of such a process; and waiting indefinitely for adequate information may only delay responses to increasingly urgent situations. Thus, there is a clear tension between public participation and reasonably swift decision-making. As Lee and Holder highlight, there is a danger that making regulatory activity more difficult through such additional process requirements may simply strengthen the status quo.68

It is also important that processes are able to access and appropriately value lay knowledge as it is often through this input that plans gain their relevance to the local management context.69 Both State case studies illustrate the importance of such knowledge to water allocation planning and subsequent implementation of EWA, and highlight difficulties encountered in integrating such knowledge into processes in practice.

Finally, the skills base of planners coordinating a water reallocation process is an important ingredient of process design and conduct. While experience of the matter to be negotiated is critical in such a role, an ability to manage the process, including facilitating effective representation and conflict resolution, is perhaps more

65 Pagan, above n 55, 222-4; Holder and Lee, above n 2, 132; Ramsey and Rowe, above n 23, 117.
66 Lyster, above n 53, 43-44.
67 Gentle and Olszak, above n 63, 61.
68 Holder and Lee, above n 2, 132.
69 Syme and Nancarrow, above n 59, 240.
important. In relation to water planning under NWR, Gentle and Olszak observe, “suddenly engineers who had spent their lives designing or managing dams and irrigation systems became water planners charged with implementing major elements of the water reform agenda,” and in many cases lacked the requisite skills to conduct an effective process.

(d) Prescribing Content and Implementation

While strong substantive provision for environmental outcomes through planning may be critical, any plan is only as good as its implementation. Environmental regulation is generally plagued by considerable gaps between law on the books and implementation reality. As the case studies highlight, effective implementation is dependent on many institutional variables. Prescribing the content of plans in legislation can, however, also influence their subsequent implementation. For example, the inclusion of performance indicators to measure progress in achieving a plan’s objectives, and supporting monitoring and reporting processes to cover plan implementation and effectiveness, are measures which will help to build the institutional capacity required for full and effective implementation.

(e) Scale of Planning

Under NWR, water allocation planning has generally been conducted under State legislation and policy at the scale of river management areas, for example the regulated sections of rivers downstream of major storages. Yet there is also a need to consider the broader context of such management interventions, both biophysical and institutional, as a significant influence on reform progress, particularly in a context such as the MDB. Recent efforts to achieve a basin wide water allocation

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70 See also Schindler and Cheek, above n 32, 3-4.
71 Gentle and Olszak, above n 63, 61.
73 Essential monitoring and reporting functions are disused in Element Four of the framework. See discussion of performance indicators, and standards for monitoring and reporting in Gardner and Bowmer, above n 42, 52-3.
74 Gardner et al, above n 34, 297.
75 Integration across different policy scales and the location of power and responsibility with reference to problem context are key themes in the adaptive governance literature. See discussion in Lebel et al,
planning scale, and to integrate this down to the level of river management areas under new Commonwealth legislation, will be canvassed in Chapter Six. Given the federal tensions surrounding water management within the MDB, providing strong strategic statutory guidance for planning at the federal level, and then requiring local plans to implement resulting limits on extraction in a locally appropriate way, may be the most effective way to provide the substantive guidance required to achieve purposeful and structured public participation.

This discussion of water planning suggests that the scale of public participation employed and the scope, design and conduct of processes will be major determinants of environmental outcomes, and progress towards more ecologically sustainable allocation levels. It contends that achieving environmental outcomes through community-based stakeholder planning in the context of highly contested resource re-allocation issues, particularly if unaccompanied by strong statutory and policy guidance and tools of adjustment, will be very difficult. As the analysis of water planning in different contexts proceeds throughout the thesis, key considerations will be:

- whether the extent of substantive guidance provided through legislation and policy for outcomes of allocation planning processes has influenced environmental outcomes;
- whether the extent of public participation employed in the process has influenced environmental outcomes; and
- the key characteristics of process scope and design which will influence potential environmental outcomes such as stakeholder representation; management of competing interests and forms of knowledge; skills and

above n 32, 4; Dovers and Connor, above n 9, 51-2; Stephen Dovers, Environment and Sustainability Policy: Creation, Implementation, Evaluation (2005), Ch 10.

In an MDB context important considerations include the considerable range of biophysical environments, varied management approaches and institutional regimes, over five different State jurisdictions.
resources available to planners; time frames for planning; and links between different institutional and biophysical scales.\textsuperscript{76}

\textbf{C Alternative Approaches to Environmental Water Recovery}

Given participatory planning processes to achieve re-allocation of water resources are highly time, resource and process intensive, with results probably largely contingent on tools to deal with the necessary accompanying structural adjustment, it is important to also consider alternative approaches to environmental water recovery.

Consistent with the strong support for economic instruments as a response to resource allocation and sustainability issues prevalent within NWR, governments have demonstrated a clear preference for investing in infrastructure to generate water savings, and direct buy-back of water resources from willing sellers.\textsuperscript{77} While these approaches are often portrayed in the public debate as more efficient and politically acceptable options than administrative re-allocation through planning, this is a misleading simplification of their role and of the reasons why water planning may not deliver desired environmental outcomes. Any true comparison would take account of the quality of process design and conduct, and particularly whether structural adjustment is approached as part of the planning process.

In this light, it is helpful to view these approaches not as direct alternatives to planning, but as complementary adjustment tools that can be used to achieve re-allocation. Indeed such instruments may be more effective when clearly situated within a regulatory framework that sets desired limits on extraction to reflect ecologically sustainable levels of use and specifically employs these instruments to achieve such limits over an agreed timeframe.\textsuperscript{78}

\textsuperscript{76} The exploration against these considerations translates ultimately to Recommendations One and Two put forward in Chapter Seven as key elements of a governance model for effective EWA.

\textsuperscript{77} Crase and O'Keefe, above n 33, 172-5; Gardner and Bowmer, above n 42, 51.

This preference is reflected in key NWR documents, for example, Council of Australian Governments, above n 26, cl 79(ii).

\textsuperscript{78} For a useful summary of criticisms of economic instruments as alternatives to direct regulation see Holder and Lee, above n 2, 432-5.
1 Water Buy-Back

Buying water entitlements for the environment in the water market is widely regarded as an efficient and equitable approach to re-allocation of the resource. It is playing an increasingly significant role in reform efforts to achieve more sustainable levels of allocation. For example, recent Commonwealth initiatives in the MDB are discussed in Chapter Six. Yet the design of such programs and their situation within the regulatory planning framework, particularly with reference to agreed water allocation targets, will substantially influence their contribution to the desired re-allocation.

For example, relying only on willing sellers to offer entitlements for purchase in the market may constrain governmental attempts to acquire water in areas where it is particularly needed to meet environmental objectives. While any environmental water recovery is positive, in light of increasingly scarce resources, it is important to focus investment on critical environmental priorities. There is a danger that resulting allocation to the environment from buy-back schemes not conducted within agreed re-allocation targets is piecemeal and not appropriate to environmental priorities.

The pace of re-allocation achieved through buy-back programs is also relevant to both environmental and socio-economic adjustment goals. Young and McColl advocate a swift step change in the level of entitlement accompanied by just compensation, rather than a long drawn out adjustment process reliant on willing sellers and staged government purchases. They argue this would be more predictable for water users as the nature of the final outcomes is pre-determined and, therefore, offers a fairer, more equitable approach to the required adjustment. It would also of course respond to increasingly urgent ecological water needs throughout the MDB.

Finally, it is important to consider the range of economic instruments available for such purposes, beyond merely concentrating on purchase of entitlements. Indeed, a variety of approaches are advocated by resource economists, including options.

contracts with entitlement holders to facilitate access to water at certain times and in
certain situations; and more focus on temporary water purchase and leasing. As the
case studies illustrate, in many cases these approaches may yield more effective
environmental outcomes, particularly in a climate change context.

2 Efficiency Savings

Investing in improved efficiency in water delivery and storage infrastructure is also
often portrayed as a win / win option, with benefits accruing to both the environment
and water users. There is, of course, considerable scope to improve the efficiency of
water storage and delivery systems. However, casting this as the most appropriate
response to environmental water recovery is problematic. For example, such projects
are generally highly capital intensive, and may not be the most cost effective way to
generate water savings. Recent investigations into infrastructure projects to capture
existing ‘losses’ and re-allocate them to the environment, have demonstrated there are
very few cost-effective savings to be made from these activities. Given the
uncertainties of climate change, it is also difficult to predict the extent and situation of
water savings that will accrue from such investment. It is also important to consider
the broader environmental impact of associated works. For example, improving an
irrigation system to reduce system outflows may ‘save’ water in that area of the
system, but may also reduce water that would otherwise have been available to the
environment or indeed other water users downstream.

81 Michelle Scoccimarro and Drew Collins, Natural Resource Buy Backs and Their Use to Secure
Environmental Flows (2006), 3-6; Anna Heaney, Stephen Beare and Ahmed Hafi, 'Trading with the
Commodities 606; Hyder Consulting, Review of the 2007-08 Water Entitlement Purchases - Final
82 Crase and O'Keeffe, above n 33, 172-7.
83 For example, such programs represent a considerable proportion of the investment allocated through
recent federal reform initiatives. See, Commonwealth of Australia, A National Plan for Water Security
(2007).
84 Scoccimarro and Collins, above n 81, 8, 15; Drew Collins, A Market Approach to the Living Murray
Initiative: A Discussion Paper to the Murray Darling Basin Commission (2003), 9-10; NSW
Department of Environment Climate Change and Water, New South Wales Riverbank Business Plan:
85 For discussion of externalities associated with enhanced efficiencies in delivery infrastructure and
on-farm use, see Crase and O’Keeffe, above n 33, 176-7; Anna Heaney and Stephen Beare, 'Water
Trade and Irrigation: Defining Property Rights to Return Flows' (2001) 8(2) Australian Commodities
339.
86 See also Anita Foerster, 'Progress on Environmental Flows in South-Eastern Australia in Light of
As such, subsequent evaluation of economic instruments for water recovery will aim to unpack the prevailing public rhetoric in favour of such approaches, by considering:

- whether such programs are situated within a regulatory or planning framework which articulates clear objectives for water re-allocation; and
- whether mechanisms are selected and combined to achieve the required adjustment in the most effective and efficient manner.\(^85\)

\(^85\) The exploration against these considerations translates ultimately to Recommendation Two put forward in Chapter Seven as a key element of a governance model for effective EWA.
III Element Three: Legal Mechanisms to Facilitate and Protect Environmental Water

This element of the analytical framework explores the design of legal mechanisms to facilitate and protect environmental water, and their setting within the broader institutional framework. Both factors are important determinants of environmental outcomes.

First, direct legal mechanisms for EWA are explored to identify fundamental characteristics which contribute to effective environmental outcomes. This includes consideration of formal legal status; management flexibility to ensure responsiveness to changing imperatives such as climate; and a concept of practical management status, which explores their ability to deliver environmental outcomes in a practical management context. The empirical research conducted through the case studies is particularly helpful in illustrating this concept.

Second, corresponding measures in the regulation of the consumptive use of water, which impact directly on the status and protection accorded environmental water are explored. This includes setting limits on consumptive use; the legal characterisation of water entitlements and instruments of allocation in terms of how responsive they are to changing water availability; and the regulatory coverage of all forms of water harvesting.

A Direct Legal Mechanisms for Environmental Water Allocation

A central tenet of the NWR agenda has been the importance of legal recognition for environmental water, including specific commitments to ensure environmental water is protected with similar security to consumptive entitlements to water. This recognises that in the context of high levels of consumptive entitlement and a highly variable natural resource, particularly in light of climate scenarios, merely characterising environmental water as the remainder after entitlements have been filled, leaves it highly vulnerable to changing water availability. It also fails to

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respond to environmental reform imperatives, which demand targeted management to reinstate important elements of natural flow regimes.

Two direct legal mechanisms have emerged to provide this legal recognition for EWA: rules-based environmental water, and environmental entitlements. Yet these have largely adapted existing mechanisms and practices, which evolved to service consumptive needs, to environmental purposes, and there is consequently considerable scope for refinement. Subsequent investigation of the application of these instruments in the case studies will assess how well they respond to environmental reform imperatives, and whether they do in fact provide adequate legal protection and status in practice. To structure this evaluation, this discussion identifies fundamental characteristics for such instruments and anticipates certain problems in their application.

1 Rules-Based Environmental Water – Passing Flows

The overarching statutory instruments of water allocation described in Element Two above generally cover a variety of management arrangements and include water management rules binding on water authorities who operate storages and other infrastructure. Within these instruments, provision is made for operational flows to enable water delivery to customers and meet some public interest outcomes. These rules-based operational flows have been used as a mechanism to facilitate EWA. For example, flow rules can be used to mimic elements of the natural flow regime, which are important ecologically, such as a natural flush in the system, to support fish breeding, maintain water quality or sustain floodplain vegetation. A number of concerns about employing these instruments for EWA purposes arise.

First, the effectiveness of passing flow rules will depend foremost on how well they reinstate important aspects of the natural flow regime within regulated river operation. In this context it is important to acknowledge the practical difficulties of reconciling competing consumptive and environmental management imperatives. In regulated rivers it is very difficult to deliver many of the ecologically significant elements of the

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87 The case studies in Chapters Four and Five provide examples.
flow regime without impacting considerably on water available for consumptive use. As noted in Chapter Two, in the southern part of the Basin, delivering low summer flows and higher winter/spring flows (which would have occurred naturally) conflicts directly with the way rivers are regulated to deliver irrigation water in summer and capture as much as possible in storage over winter/spring. Alternative options for delivery (such as piping irrigation water instead of using natural carriers unseasonably) are generally considered prohibitively expensive. The State case studies illustrate the considerable resistance to re-instating the natural flow regime through fixed flow rules and consequent limited use of such instruments.

Second, in light of naturally high flow variability, the range of variables affecting river health, and particularly the uncertainties associated with climate change, there is an increasing requirement for management flexibility to allow environmental water managers to alter flows according to antecedent circumstances, and changing ecological priorities. For example, managers might want the flexibility to change when and how a high flow event is delivered to maximise its effect. Passing flows, which have to date been expressed as fairly fixed rules, may require considerable refinement to allow such flexibility.

A third consideration is the status and level of protection accorded environmental water through these instruments. The case studies illustrate how, at a formal level, overarching legislation and the statutory instruments of allocation under this can be used to prioritise these base flows in the system and oblige water authorities to manage in accordance with such rules. As such, passing flow rules have the potential to provide very secure environmental water, with a superior legal status to consumptive entitlements.

However, it is important also to consider status in a practical management context. A key issue here is the approach taken to guaranteeing water supply for human needs in light of increasing scarcity under climate change, and how this may impact effective EWA. Water legislation contains broad discretionary powers, generally allocated to the Minister administering the legislation, to qualify all water entitlements, including

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environmental water, in times of severe water shortage to meet critical human needs.\textsuperscript{89} The Victorian case study in Chapter Five explores the potentially severe and arguably disproportionate impact of this unconstrained power on environmental water relative to consumptive water.

Drought and water shortage create harsh political realities and, in these contexts, water for basic human needs is understandably prioritised over other competing uses. However, the scope and content of such a prioritisation, and how these competing uses should be treated within a longer-term river management framework aimed at ecological sustainability, are important matters for policy and legal development.\textsuperscript{90}

For example, do critical human needs include maintenance of public gardens and sporting facilities? What are the ecological implications of providing for some very limited environmental needs such as a certain fish population, but not maintaining a level of river system health? What is the resilience of river systems that are so comprehensively changed from their natural State and under stress from a range of factors including changes to the flow regime through river regulation? In this context, potential constraints on the exercise of such discretions are explored later in the thesis. For example, it may be important to develop and formalise safeguards for a certain level of environmental water to maintain basic ecosystem function over the long term. A variation of the flow rules instrument may well be suited to such purposes.

2 Environmental Entitlements

Water legislation at a State level also provides for environmental entitlements, against which water can be allocated, held in storage and released for environmental purposes.\textsuperscript{91} For example, water may be released to fill significant wetlands or extend the duration and extent of a natural flood so as to guarantee successful breeding of water birds. These entitlements are often seen as an important component of an environmental water portfolio due to the potential for active management tailored to

\textsuperscript{89} For example, Water Act 1989 (Vic), s 33AAA(2).
\textsuperscript{90} Foerster, above n 84, 10431.
\textsuperscript{91} For example, Water Act 1989 (Vic), Part 4, Division 1A; Water Management Act 2000 (NSW), s 8–8E. NSW and Victoria are the only states to have specifically legislated for tradeable environmental access entitlements to meet NWR commitments. See, Gardner et al, above n 34, 432–44.
climatic conditions. However, in practice, this value depends on the characteristics of these entitlements and their delivery arrangements.

At a formal level, environmental entitlements have similar legal status to other entitlements in the system. For example, water will be allocated against the entitlement according to availability. They are also distinguished by characteristics common to consumptive entitlements discussed earlier in the chapter, such as security, options to carry over unused water for later use and, in some cases, delivery rights. These characteristics are strong determinants of their contribution to effective EWA. For example, in light of climate scenarios, a mix of high and general security water with flexible management arrangements, such as generous carry-over provisions, would be of most value to the environment. This would ensure a higher likelihood of water being available to environmental managers as the value of general security water entitlements under climate change scenarios is particularly compromised. It would also provide important management flexibility. Delivery rights may also be important in identifying who takes precedence in a situation of direct conflict between consumptive and environmental demands on the system. This is potentially an issue when supplying water to wetlands, which are now isolated from the river and rely on irrigation channels for delivery.

In terms of practical management status, operational constraints on effective environmental water delivery in a highly altered regulated river also used to supply irrigation water may be very significant. The Gwydir case study in Chapter Four illustrates how, even when a significant entitlement is provided for and available in storage, it is often very difficult to use this water for designated environmental wetland watering purposes. This is a situation where operational constraints effectively undermine the formal status of environmental entitlements by curtailing their application.

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92 Carry-over rules allow water managers to retain in storage, for later use, any water that has been allocated against an entitlement but not used in a given water accounting period. Such provision often allows environmental water managers to build up enough water in storage to realise an effective environmental water release such as a flood event. Without such management flexibility, particularly given small volumes of environmental water generally available, this capacity would not be available. See discussion in Foerster above n 84, 10431-32.
Environmental entitlements are also subject to qualification of rights in times of water shortage. It is arguable that they are in fact more vulnerable to qualification than other rights in the system as the imperatives of environmental water management lead managers to bank water in storages to enable its use at opportune times. The majority of consumptive water users have not had this degree of flexibility built into entitlements at an individual level. Thus, the very fact that there will be environmental water in storage means it may be more vulnerable to qualification.

3 Management Capacity

Many of the comments made in the above discussion of legal mechanisms for EWA anticipate a very active role for environmental water managers in negotiating appropriate adaptation of flow rules to changing climate imperatives, and in the delivery of volumetric entitlements. The crucial role for independent, appropriately skilled and resourced environmental water managers and the powers and capacities that should be granted such a role relative to management functions addressing consumptive needs is investigated in the following element of the framework. While the above discussion suggests a need for increased flexibility and adaptive capacity in the implementation of these instruments for EWA, this is contingent on a careful reappraisal of who is exercising this discretion, how it is allocated and constrained to reflect guiding strategic outcomes in the governance framework.

4 Refining Legal Mechanisms for Environmental Water Allocation

The above comments suggest that existing legal mechanisms require significant refinement to enable effective EWA and there may be different legal forms and settings better suited to environmental water imperatives. For example, a broader provision for EWA less focused on rules and individual entitlements, but expressed as a share of the available resource, is often championed in the literature, as a way to provide more management flexibility and appropriate legal status for environmental

93 However at present, revising storage operation policy, including carry over rules for consumptive users is a key part of improving water security under climate change conditions. See Victorian Department of Sustainability and Environment, Sustainable Water Strategy: Northern Region - Draft for Community Comment (2008), 67-9.
water. Yet such an approach would rely on very strong and effective management arrangements for EWA. It may also benefit from some differentiated status to capture some of the potential benefits inherent in rules-based water, and elevate a certain level of EWA to a higher priority. These arguments are further developed below.

The following points of consideration will guide the evaluation of direct legal mechanisms for EWA throughout the thesis:

- whether and how the legal status and characteristics of mechanisms used to facilitate EWA influences environmental outcomes;
- how these mechanisms are applied in a practical management context, and whether this impacts on the status and protection of environmental water; and
- in what ways mechanisms for EWA could be refined to improve status and protection.

B Corresponding Regulation of Consumptive Water Use

The above evaluation of legal mechanisms for EWA will be combined with an investigation of important components of the regulatory framework governing resource access, which potentially exert a significant influence on the effectiveness of provision for EWA. The way consumptive water use is regulated will influence volumes of water available for environmental use at different times, and particularly the way environmental water is affected by reduced inflows as a result of climate change or interception activities affecting run-off.

1 Limits on Consumptive Use

Placing a cap on the water available for extraction in a river system effectively means that any water over this limit remains in the system and is available to the environment. Such limits are, therefore, an important basis for facilitating EWA.

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95 The exploration against these considerations translates ultimately to Recommendation Three put forward in Chapter Seven as key elements of a governance model for effective EWA.
However, the effectiveness of such a limit from an ecological perspective depends of course on where and how the limit is defined and whether it has any ecological basis; and whether the water remaining in the system is legally protected as environmental water and how it is managed.96

Chapter Two has outlined the first attempt in the MDB to place such a limit on consumptive use and its considerable flaws. For example, the MDB Cap set limits at very high levels of potential use as it was based on existing infrastructure and level of entitlement. While the actual amount of water allocated for use under entitlement has varied year to year depending on availability, the upper limits of use reflect dangerous levels in ecological terms. Indeed, investigation of the practical operation of this style of cap has revealed the perverse effect that it does very little to limit water use in dry years when resources are in most demand and thus environmental impact is greatest.97

Similarly, its operation under climate change will impact disproportionately on the environmental water supposedly protected above the limit. If long term stream flows are reduced under climate change, for example, then under the Cap rules the long term proportion of stream flow extracted will actually increase. This is because at lower stream flows the cap allocates a greater proportion of the flow for consumption. Any reduction in water yields from a catchment is at the expense of the environmental share.98

Additionally, because the MDB Cap has applied only to surface water extraction, the expansion of other forms of water harvesting which have been characteristically poorly regulated, such as farm dams and floodplain harvesting, has reduced the water available to all existing surface entitlements and undermined their reliability.99

This experience suggests that, in order to respond appropriately to environmental imperatives, a limit on extraction should be determined with reference to best

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96 See discussion in Foerster, above n 84, 10429-30.
98 Whittington et al, above, 70.
99 See discussion in Connell, above n 42, 9; Gardner et al, above n 34, 288; Young and McColl (2008), above n 80, 17.
available science on ecologically sustainable levels of extraction. It should refer not only to the level of entitlement, but also the level of use under such entitlement. It must be designed to respond appropriately to a naturally highly variable system and the added implications of climate change. Finally, all forms of water harvesting and interception activities which affect water yield must be encompassed. The setting of limits on consumptive use under new federal water legislation discussed in Chapter Six represents an opportunity to design a more effective regulatory instrument to these purposes.

2 Limits: expressed as shares?

Responding to the flaws noted above, Young and McColl propose a comprehensive re-working of the water allocation regime throughout the Basin, shifting the focus away from allowable diversions to inflow sharing rules, within which allocation priorities are developed. They suggest that “maintenance water” required to maintain system function and ensure water can be delivered is prioritised. Remaining available water is defined as shared water and subject to a regime that entitles all users and the environment to a share of any allocations made to this pool of water.100

Characterising consumptive entitlements as shares of the available resource, rather than as fixed volumes, has been a cornerstone of the NWR agenda, designed to allow managers to respond to changing water availability, and deal equitably with climate risk.101 However, as noted above, a combination of instruments and approaches has been used to facilitate and protect environmental water. This includes rules-based flows and volumetric entitlements (which most closely resemble a share of the available resource). However, as the case studies illustrate, much environmental water is still merely characterised as unallocated water above extraction limits. This accords no formal protection from variable water availability and increasing water scarcity. In their proposed revision of the allocation framework, Young and McColl argue for a broad treatment of environmental water as a share of the available resource. Their approach accords with the general NWR commitments to ensure environmental water is of a similar status and security to consumptive entitlements.

100 Young and McColl (2008), above n 80; Young and McColl (2008). above n 94.
101 Council of Australian Governments, above n 26, cl 28-33.
Giving environmental water such legal status addresses the issue of unallocated water, which is highly vulnerable to changing water availability. It also has the potential to lessen the need for complex rules-based environmental flows and provide for more management flexibility. However, the proposed allocation regime would arguably benefit from some important refinements to more adequately address environmental imperatives, and achieve an appropriate status and level of protection for environmental water. For example, as Young and McColl concede, the difficult substantive questions remain: how much water should be available for consumptive use, who makes this decision, and on what basis. Limits on allocation to the shared water pool, or sophisticated processes for balancing competing interests in this allocation, will still be required.102

A blanket approach to the status of environmental water may also be inappropriate. As noted above, environmental water may be more vulnerable in practice to water scarcity given extensive discretion for qualification and the tendency of environmental water to suffer disproportionately under such powers in practice. Similar legal status to consumptive users also means similar vulnerability to changing water availability. Taking a long term view, more differentiation of status for different components of the environmental water regime may better reflect the centrality of a certain level of EWA to a healthy working river.

Considerable refinement of the concept of “maintenance water” may also be warranted. In Young and McColl’s conceptualisation, this class of water clearly responds to consumptive delivery interests in ensuring system operation and the ability to deliver water. Yet its delivery will have significant implications for attempts to recapture some of the natural flow variability inherent to effective EWA. As noted above, this has been the thrust of attempts to use rules-based operational flows to achieve environmental outcomes. As such, the concept of maintenance water could be arguably broadened so it also includes maintenance of important environmental assets and functions.

102 Young and McColl (2008), above n 80, 22.
3 Adaptive Instruments of Allocation

Element Two has explained the way individual entitlements are nested within water allocation instruments such as statutory water sharing plans covering a water management area. It is through these instruments that limits on consumptive use and characterisation of entitlements as shares has been effected. Given inherent uncertainties in the science behind EWA, and particularly in light of climate change scenarios, institutions addressing the allocation of water between competing users must be equipped to adapt to changing information and circumstances. Thus, it is important to consider how opportunities to subsequently re-allocate water resources according to changing information and climate imperatives may be institutionalised.

This can be addressed through the status of allocation instruments; for example, giving water allocation plans a limited lifetime and setting up processes of review and renewal, which include potential for re-allocation to respond to review results. A substantial commitment to monitoring and assessment of both the implementation of plans and their effectiveness in achieving desired outcomes is critical to such processes. ¹⁰³ This is a good example of a situation where clear statutory provision for the terms of reference of review processes and prescriptive duties for monitoring and assessment functions, along the lines of the contentions made in Element One, would be appropriate.

A related issue is the allocation of risk for any reduction in consumptive entitlements resulting from such review and re-allocation processes. The characterisation of entitlements as shares institutionalises the ability to vary allocations against individual access entitlements in response to scarcity without requiring the payment of compensation. Yet the issue of compensation does arise for permanent reduction of entitlements, especially in the context of a re-allocation of the resource to reflect public interest environmental values.¹⁰⁴ Risk allocation formulas proposed under NWR have been discussed in Chapter Two. Their underlying rationale is that compensation is payable in certain circumstances after the first round of water

¹⁰³ Dyson, above n 15, 16. Dyson argues that adaptive management of water resources should encompass legislative requirements to undertake a cycle of assessing, planning, allocating, monitoring and reviewing, which also includes provision for re-allocation to accommodate the result of reviews.
¹⁰⁴ Gardner et al, above n 34, 490.
allocation planning under NWR had been carried out. This arguably presumes a return to sustainable levels of allocation for all over-allocated and over-used systems through this planning process.\textsuperscript{105} The case studies illustrate varied progress in implementing such commitments and provide an opportunity to explore whether this provision for risk allocation in such a context acts as a further impediment to achieving effective EWA.

4 Comprehensive Regulatory Coverage

Attempts to manage scarcity and variability with limits and shares for surface water will be undermined if other forms of water harvesting and interception, such as farm dams, floodplain harvesting and groundwater extraction, are not effectively brought within the regulatory framework and within such limits on consumptive use. The importance of comprehensively regulating the whole water cycle has received recent attention in the NWR agenda, which requires that states assess the significance of such activities on catchments and aquifers, and apply appropriate planning, management and or regulatory measures to protect the integrity of water access entitlements and the achievement of environmental objectives.\textsuperscript{106} The case studies in Chapters Four and Five, however, exemplify the challenges inherent in broadening regulatory coverage for water harvesting practices which are relatively disparate, unpredictable and opportunistic.

To ensure the regulatory regime is consistent with the way water moves throughout the hydrological cycle, Young and McColl argue that all activities that affect water supply should be included in the allocation regime; those that are able to be metered should be metered; those that are not should be off-set.\textsuperscript{107} This concept aims to address the adverse effects on supply reliability of all water interception activities, including forestry in high rainfall areas or building more farm dams. It also aims to prevent land use changes from undermining the reliability of the entitlements held by irrigators and the environment.

\textsuperscript{105} Council of Australian Governments, above n 26, cl 46.
Gardner et al, above n 34, 398, 401-403.
\textsuperscript{106} Council of Australian Governments, above n 26, cl 55-57.
See also McKay, above n 15, 171; Young and McColl (2008), above n 94; Connell, above n 42.
\textsuperscript{107} Young and McColl (2008), above n 80, 17.
Yet achieving such regulatory coverage will rely on sophisticated accounting and compliance procedures. Given the historically poor status of water accounting across the Basin,\(^{108}\) considerable resources will be required to establish the capacity to meter all extractions and the delivery of environmental water throughout the river system, let alone to calculate appropriate offsets for interception activities. Even if such a system is achieved, adequate levels of compliance and enforcement activity are important. Both the NSW and Victorian case studies provide a context for a general appraisal of monitoring and compliance activity, particularly the allocation of roles and responsibilities and the development of institutional capacity in this area.

Thus, in addition to the points of evaluation noted above, subsequent analysis will also consider how the regulation of consumptive use of water can be tailored to ensure environmental water is appropriately facilitated and protected. This will concentrate on:

- how limits on consumptive use are expressed, including the breadth of regulatory coverage for all forms of water harvesting and their responsiveness to changing water availability situations;
- how environmental water is characterised and protected alongside limits on consumptive use; and
- whether limits are supported by sophisticated monitoring and compliance measures.\(^{109}\)

\(^{108}\) Dingle Smith, above n 28.

\(^{109}\) The exploration against these considerations translates ultimately to Recommendations Four and Five put forward in Chapter Seven as key elements of a governance model for effective EWA.
IV ELEMENT FOUR:

PROCESSES TO MANAGE RIVERS WITH ENVIRONMENTAL WATER ALLOCATION

The final element of the analytical framework explores institutional arrangements for the management of rivers for broad river health goals, rather than just water delivery to consumptive users. The discussion highlights the potential difficulties and opportunities associated with managing regulated, working rivers for environmental outcomes. This serves to underscore the importance of the role of environmental water manager and identify fundamental characteristics of this role. Key management functions to support ongoing adaptation to changing environmental and climate imperatives are also posited.

The discussion here is based on concepts drawn from both the scientific literature on environmental flows, and the policy discussion within natural resource and environmental management, particularly surrounding institutions for sustainability and models of adaptive governance. Thus, it emphasises the importance of an adaptive management approach which incorporates purposeful experimentation, monitoring and testing of hypotheses about river function and restoration;¹¹⁰ and the development of governance structures which can support such an adaptive approach over time and deliver environmental outcomes in practice.¹¹¹ This helps to identify

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important management practices which would benefit from the strategic statutory
guidance contemplated in Element One of the framework; and supports a re-appraisal
of the distribution of authority and institutional capacity for key management
functions in this area, which can also be approached through statutory provision.

A Balancing Competing Management Imperatives at the Operational Scale

Chapter Two established that the management imperatives of environmental and
consumptive water entitlements in regulated rivers are very different and often
conflicting. Managing rivers for environmental outcomes involves not only
considerations of the volume, timing, rate and seasonality of water releases, but also
responsiveness to highly variable climatic conditions and considerable ecological
complexity and uncertainty. These demands conflict with the way that rivers have
been managed for consumptive use in a number of ways. For example, at an
overarching level, there is a tension between maximising water harvest and storage so
as to facilitate consumptive use, and allowing water to remain in the system for
environmental use, or bank environmental allocations in storage to accumulate
sufficient water to achieve certain environmental objectives.\textsuperscript{112} At a more specific
scale, the delivery of environmental water to meet environmental objectives may
directly conflict with delivery requirements of consumptive users at a certain point in
time. For example, delivering water to a wetland which is now isolated from its
natural floodplain and therefore relies on irrigation channels, might directly conflict
with consumptive demands on the infrastructure.\textsuperscript{113}

In the delivery of consumptive water there may also be opportunities to tailor releases
to minimise environmental damage or maximise environmental benefits. For example,
releasing cold water from low in storages may impede native fish spawning, or water
may be released at a rate that damages bank structures or degrades important

\textsuperscript{112} This is a considerable constraint in the negotiation of EWA discussed in the case studies of Chapters
Four and Five.

\textsuperscript{113} Ibid.
habitat. Some such issues require expensive infrastructure solutions, yet some can be addressed to a degree in operational management decisions. Similarly, on a more everyday level, operational decision-making could be broadened to consider whether certain environmental objectives may also be met with the release of consumptive water. For example, using consumptive water en route for multiple benefits, or piggybacking an environmental release on top of consumptive releases may help to achieve higher bank flows at certain times to meet certain ecological objectives.

In light of these considerable difficulties and conflicts of interest, but also potential opportunities, the effectiveness of EWA will depend significantly on the role and nature of the decision-making bodies involved, and whether there are clear guiding parameters for environmental water delivery. It is important to ensure that environmental outcomes will not be undermined by a lack of strategic guidance or adequate constraints on decision-making in river management, or indeed an inappropriate distribution of decision-making authority and management capacity.

B The Role of Environmental Water Manager

NWR commits to establishing effective and efficient management and institutional arrangements for environmental water. Subsequent chapters will explore developing management frameworks in a number of contexts, and how these contribute to goals of effective EWA. The discussion here raises a number of issues to guide this analysis.

For example, it is important to consider how the responsibilities of environmental water management are allocated within the overall management framework for a regulated river; particularly whether an independent institution of environmental water manager is established, or whether management functions are allocated to existing institutions.

114 Bunn and Arthington, above n 108, 496-498.
115 Victorian Department of Sustainability and Environment, above n 92, 137-41.
116 Council of Australian Governments, above n 26, cl 78-9, 84-9.
Water authorities are responsible for the harvest, storage and delivery of water, and operate as commercial entities, with consumptive users as customers. Maximising consumptive use of water is, therefore, a predominant objective. As EWA has been introduced as an additional management imperative, legal obligations to deliver passing flows and environmental entitlements have been added to their brief, and they have assumed much of the practical responsibility for EWA delivery. Yet in light of the potential conflicts of interest in managing rivers for multiple purposes highlighted above, and the inherent institutional bias towards consumptive interests within water authorities, this may not be the most suitable institutional arrangement to maximise environmental outcomes.

If responsibility for delivering environmental outcomes is allocated to existing institutions that have evolved to service consumptive interests, considerable attention must be paid to realigning management objectives and institutional capacity to also deliver environmental outcomes. This suggests a need for clear guiding parameters expressed through governing legislation and related instruments. However, if the legal mechanisms used to facilitate EWA are refined to allow more management flexibility along the lines of the previous discussion, it is clear that a specific skill set and allocation of authority to a targeted environmental water manager is warranted, and this may be best supported by the development of independent institutions.

The range of skills and expertise required to make informed management decisions for effective EWA is broad. Scientific expertise on river ecology and function is one part of the equation. Operational understanding of regulated rivers and opportunities to manipulate their management to achieve certain objectives is also fundamental. However, local community knowledge of river systems and how they have developed over time is, as the case studies demonstrate, a very important complementary input into decisions about how rivers may respond to management interventions such as

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118 The case studies in Chapters Four and Five illustrate the continuing central role played by water authorities in environmental water delivery.
EWA.\textsuperscript{119} This suggests a need for sophisticated decision-making and management structures that are able to access and balance these different forms of knowledge and experience.

It is also important to explore the extent of the role of environmental water manager in terms of the level of authority and breadth of management function allocated to such a role, and how this may be institutionalised. For example, does an environmental water manager merely advise on the release of environmental entitlements alongside commitments to supply consumptive users? Or can they be more deeply integrated into a more holistic management structure that attempts to balance competing demands on the system? Dyson suggests that effective environmental outcomes would be best supported by a broad allocation of authority and discretion in relevant decision-making to an environmental water manager.\textsuperscript{120}

There are a range of potential river management functions for which environmental expertise would be beneficial. For example, environmental managers could play a role in determining water availability for allocation to both consumptive and environmental entitlements, retaining sufficient amounts in storage to guarantee the ability to meet critical environmental passing flows rules over certain periods of time. They may require the power to alter passing flows according to changing environmental and climate imperatives, through an agreed process, as suggested in the preceding element of the framework. An ability to influence the way water is delivered to consumptive users to minimise adverse environmental impacts or maximise potential environmental benefits may also be beneficial. These are all examples of management functions which would benefit from targeted constraints on decision-making to realise a more holistic management objective. For example, Dyson suggests a statutory requirement to take the advice of an independent environmental water manager into account in certain decision-making functions.\textsuperscript{121}

\textsuperscript{119} The importance of integrating lay knowledge in adaptive management processes is a key theme in the literature. See, for example, Johnson, above n 109; Padma et al, above n 105; Syme and Nancarrow, above n 59, 240.

\textsuperscript{120} Dyson, above n 15, 26-7.

\textsuperscript{121} Ibid, 27.
Finally, parallel to many modern natural resource and environmental management issues, the scale and integrated nature of management arrangements is significant, and there are strong arguments for creating polycentric and multi-layered institutions. While much relevant operational and local expertise for EWA exists at the local management scale, links with broader MDB institutions and objectives are critical. For example, environmental flows released in a tributary for local purposes, could be coordinated to also meet downstream environmental objectives. More effective use of available environmental water is increasingly important in situations of water scarcity under climate change. However, spanning local and basin-wide management objectives will rely on highly sophisticated institutional arrangements. New federal water legislation discussed in Chapter Six introduces considerable changes in this area and provides a context for considering how to best streamline and integrate complex management layers.

C Creating Adaptive Management Capacity

Much of the recent policy analysis of Adaptive Management in the NRM context emphasises the difficulties associated with translating this policy ideal into practice. For example, Pagan identifies challenges associated with accepting policies as experiments; embedding the capacity to test alternative policy models over time; and ensuring the availability of ongoing objective information for making changes to policy settings. Previous discussion in Element Three has considered the need to ensure overarching instruments of water allocation are periodically reviewed and there is ample opportunity for a re-allocation of resources to meet changing management objectives. At this point, the discussion considers a range of measures at a practical management scale to support such processes and better embed adaptive management capacity within water management institutions.

122 Lebel et al, above n 32, 4; Dovers, above n 73, Chapter 10; Dovers and Connor, above n 9, 51-2.
123 Victorian Department of Sustainability and Environment, above n 92.
125 Pagan, above n 55, 226-228. See also Johnson, above n 109; Gunderson, above n 109.
NWR recognises the need for improved monitoring and accounting for water allocation and extraction generally,\textsuperscript{126} and makes specific commitments in the context of EWA delivery, including provision for reviewing the adequacy of EWA in achieving desired environmental outcomes.\textsuperscript{127} These measures are important both for compliance purposes, and as necessary inputs to an adaptive management approach. Monitoring and reporting on the implementation of EWA and its effectiveness will yield critical data to allow adaptive decision-making, both at an operational scale in terms of the delivery of EWA, and at an overarching allocation scale where the balance between environmental and consumptive allocation is reviewed for sustainability.

Earlier discussion in Element One has suggested that providing statutory duties and standards for such activities is important in building institutional capacity in this area. Given the highly complex and long term nature of monitoring requirements, and in many cases the low existing base from which such capacities must be established,\textsuperscript{128} available resources will also be a very significant constraint in practice.\textsuperscript{129} In terms of monitoring the implementation of environmental water rules, the case studies illustrate the quite different monitoring requirements of EWA relative to consumptive water delivery, including the need for multiple and distinct river gauging points and different frequencies of measurement.

Monitoring the effectiveness of EWA presents even greater challenges. As noted in Chapter Two, the measurement of environmental outcomes of EWA is particularly problematic given time lags in ecological response to management interventions, and the complexity of ecological relationships.\textsuperscript{130} Therefore, establishing a monitoring framework, including the selection of appropriate variables to measure, methods of measurement and accounting for the influence of other variables, is a complex task, requiring considerable expertise and a long term investment.\textsuperscript{131}

\textsuperscript{126} Council of Australian Governments, above n 26, cl 80-89.
\textsuperscript{127} Ibid, cl 78-9, 84-9.
\textsuperscript{128} Dingle Smith, above n 28.
\textsuperscript{129} Pagan, above n 55, 227.
\textsuperscript{131} See for example, Peter Cottingham, Mike Stewardson and Angus Webb, \textit{Victorian Environmental Flows Monitoring and Assessment Program: Stage One Statewide Framework} (2005).
An important adaptive management function for EWA, which demands good quality monitoring and reporting, is the preparation of periodic environmental watering plans. These plans map out potential use of environmental water according to water availability and ecological condition scenarios, and they provide a forum for ongoing adaptation of management objectives and strategies. The case studies again emphasise the importance of institutionalising such a function.

Environmental water management is a new and developing field. Institutions are young and evolving. As such, this is an important point in time to consider how environmental water management imperatives can best be met in practice, and to recommend direction for further development. This discussion has suggested there is considerable scope for better supporting effective environmental water management through a re-distribution of duty and authority to manage rivers, and careful articulation of adaptive management functions and associated roles and responsibilities. Such reforms can potentially be well supported through targeted legal provision. Important points for consideration in subsequent chapters drawn from this discussion include:

- how environmental and consumptive management imperatives may be conflicting or complementary in a given context;
- whether significant discretion remains in key allocation and management decisions and whether this should be constrained to achieve environmental outcomes;
- specific requirements for an adaptive management approach including key management functions and institutional capacities, and how these can be best institutionalised; and
- whether these management imperatives suggest the need for new institutional forms for the role of environmental water manager, including consideration of levels of independence, authority and responsibility.132

132 The exploration against these considerations translates ultimately to Recommendations Six and Seven put forward in Chapter Seven as key elements of a governance model for effective EWA.
Articulating the analytical framework in this chapter has served two purposes. First, it has set out a range of conceptual considerations to enable an informed and structured evaluation of the developing law, policy and practice of EWA in Chapters Four, Five and Six. Second, it has laid the foundations for the later development of recommendations for a governance model for effective EWA. The assumptions, preferences and arguments raised here will be tested throughout the analysis in terms of their potential contribution to a set of institutions for effective EWA.

For example, in Element One of the framework a tight, prescriptive legal framework to closely govern the institutions of environmental water allocation, protection and management, was advocated. Key areas that would benefit from such governance were identified in the other elements of the framework. Yet there are a number of constraints to achieving strong, substantive statutory provision, particularly addressing this to the contentious concept of ecologically sustainable water allocation as an outcome of statutory allocation planning processes. This suggests that legal settings need to combine any such articulation, with very strong, targeted provision for statutory processes designed to support such an outcome. The State and federal statutory schemes considered in subsequent chapters offer a range of approaches to statutory provision of parameters for water allocation functions, which facilitate a more detailed exploration of the significance and feasibility of achieving strong substantive statutory provision in this area.

The exploration in Element Two suggested that, if processes to re-allocate water resources are to deliver significant environmental outcomes, planning and other adjustment tools would benefit considerably from clear substantive guidance, achieved through overarching legal and policy frameworks. The role for public participation in substantive deliberation on matters of re-allocation is an issue that will be explored throughout the thesis, in considering process design and conduct. The case studies provide a spectrum of approaches to further explore the contention that it is difficult to achieve environmental outcomes through such a participatory approach, without very structured and purposeful process design to that effect. Process scale is
also a significant consideration, particularly given the combination of State and federal planning processes that have emerged within NWR.

Discussion in Element Three covered how legal mechanisms for EWA could be designed, and consumptive use of water constrained, so as to accord appropriate legal status and protection to environmental water. It was argued that existing mechanisms for EWA and their situation within the broader regulatory framework require considerable refinement to better reflect environmental imperatives driving the reform agenda and achieve appropriate status and protection. Understanding how existing legal mechanisms for EWA operate in a practical management context through the case studies of Chapters Four and Five will help to further develop these arguments.

Finally, Element Four canvassed key characteristics of an institutional framework to manage rivers for environmental outcomes, including the distribution of authority and responsibility, and the development of institutional capacity to enable adaptive management. The empirical case study analysis is again particularly helpful in elaborating on these considerations in a practical management context, and identifying important concerns for the ongoing development of a more sophisticated management framework for rivers with EWA.
CHAPTER FOUR:
ENVIRONMENTAL WATER ALLOCATION IN NEW SOUTH WALES -
A CASE STUDY OF THE GWYDIR REGULATED RIVER

This chapter applies the analytical framework outlined in the preceding chapter to the
developing law, policy and practice of environmental water allocation [EWA] in New
South Wales [NSW]. In addition to detailed consideration of relevant legislation and
policy, a case study of the negotiation and implementation of an environmental water
regime for the Gwydir regulated river provides a context to explore the practical
experience of reform implementation.¹ Together this material allows an appraisal of
how the institutional factors raised by the analytical framework have influenced
reform outcomes to date, and helps to identify important areas for ongoing
institutional reform, so as to contribute to the development of a governance model for
effective EWA.

The exploration of NSW water legislation against Element One of the framework
uncovers a legal setting with considerable potential to facilitate effective EWA.
Statutory priorities and duties are linked to targeted planning processes whereby water
could be re-allocated from existing consumptive uses to the environment to achieve a
more sustainable allocation balance. However, there are a number of ways in which
these legal settings could be strengthened and improved to better support such
outcomes. For example, the analysis of the NSW experience against Element Two of
the framework emphasises that planning processes for water allocation must be
carefully designed and structured, supported by statutory provision, and subsequently
conducted in a manner that supports desired environmental outcomes. In NSW, the
potential of the statutory scheme was undermined particularly by a failure to develop
and sustain strong institutional processes for implementation. A number of factors in
process design and conduct are identified as critical determinants of environmental

¹ The case study involved quite extensive empirical work, including a series of interviews with parties
involved in the negotiation and implementation of the environmental water regime, and observation of
key management processes. Appendix A details the approach taken in the empirical work for the case
studies. It also provides further information on the way that reference is made to this work in this
chapter, so as to protect the identity and respect the wishes of participants. Although this work was
largely conducted in late 2006, the issues raised have ongoing relevance to this discussion.
outcomes through this case study, and will be incorporated in Chapter Seven into recommendations for effective environmental water governance.

The NSW experience of water reform also supports the argument that, following National Water Reform [NWR], new legal forms and management functions for EWA have been largely grafted onto existing systems which have developed to service consumptive water use. Yet in order to deliver effective EWA, more targeted and far-reaching institutional change is required. In the NSW context, the analysis of legal mechanisms to facilitate and protect environmental water (Element Three) and management arrangements for rivers with EWA (Element Four) highlights how, even once EWA has been negotiated, its effectiveness can be undermined by, for example, operational constraints to water delivery in regulated systems; management arrangements which bias consumptive use of water; and broader regulatory frameworks which fail to effectively regulate the range of activities which can threaten environmental water. This experience supports recommendations for developing more targeted, enforceable legal instruments for EWA tailored to achieve environmental outcomes; together with corresponding institutional arrangements for river management which facilitate adaptive management for broad river health outcomes.

I A CONTEXT FOR ANALYSIS

A brief overview of the institutional, biophysical and socio-economic context of water allocation and management in NSW, and specifically the Gwydir river, highlights key factors which have influenced the pace, nature and outcomes of environmental water reform. Some contextual distinctions are drawn between the NSW and Victorian case studies. These differences partly explain varied approaches to and progress on the reform agenda in different jurisdictions. They also indicate the need for different institutional emphasis and scales within a broader governance model for effective EWA.
A Institutions of Water Allocation and Management

Water allocation and management in NSW is generally governed by the Water Management Act 2000 [Water Management Act]. This comprehensive water legislation was introduced to implement the NWR agenda, and consolidated much complex and outdated legislation. The timing of this legislative response to NWR has meant that, in contrast to older governing Victorian water legislation discussed in the next chapter, NSW has arguably achieved more integrated, comprehensive and coordinated statutory provision for key reform commitments, including EWA. The Act includes legal recognition for environmental water including targeted legal instruments for its allocation, and institutional processes to support this in practice, such as statutory planning to reallocate the resource to achieve EWA.

Since NWR began in the mid 1990s, there have been some significant shifts in governance arrangements for river management in NSW. These reflect NWR commitments, including the introduction of EWA as a management imperative.

Natural resource agencies and statutory authorities focused on resource development and exploitation have played a central role in the regulation of water use and allocation over many years. They have supported the relevant Minister in the administration and implementation of governing water legislation. Yet the distribution of roles and responsibilities for water allocation and management has changed considerably in recent years, and shifts of power and responsibility between key institutional actors continue. For example, in NSW, consistent with NWR, the operational management of rivers has been conducted separately from regulatory activities and policy development since 1997, with the establishment of a commercial

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2 NSW Department of Land and Water Conservation, Water Sharing - the Way Forward: NSW Progress on the Water Reforms 1995-1998 (1998); Jan Gill, 'The NSW Water Management Act 2000' (2001) 18 Environmental and Planning Law Journal 273. The Water Act 1912 (NSW) does however continue to apply in some areas, as the Water Management Act is designed to come into force only upon the implementation of certain key provisions such as management planning.

3 Key sections of the Water Management Act 2000 (NSW) are discussed throughout the chapter.


water delivery business, State Water. Since NWR, the State nature conservation agency, generally responsible to a different Minister, has also assumed a more prominent role within river governance frameworks through the regulation and administration of EWA. Indeed, very recent developments have seen water regulation and policy functions shifted from an agency with a resource use focus to an agency which combines resource use and nature conservation functions, the Department of Environment, Climate Change and Water [DECCW]. Consistent with moves to more integrated and adaptive natural resource governance, community based institutions, such as Catchment Management Authorities and stakeholder committees targeted at certain functions, also play a considerable role. Specific roles and responsibilities relevant to environmental water management are explored below in more detail against Element Four.

**B Gwydir Case Study: Biophysical and Socio-economic Factors**

**1 Environmental Objectives**

The Gwydir River occurs in the northern MDB. Rising in the northern tablelands of NSW, it flows north west through Moree, where it enters a vast floodplain of very low gradient, which causes it to branch into a number of distributary streams. Substantial overland flow occurring at the end of the system creates one of the most significant and extensive wetland systems in north western NSW. This semi-permanent terminal wetland has been recognised for its ecological significance, most notably

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6 NSW Department of Land and Water Conservation, above n 2, 15. This was furthered with the establishment of State Water Corporation, a State-owned corporation in 2004. See, *State Water Corporation Act 2004* (NSW).
8 For example, the Water Management Act provides for the involvement of Catchment Management Authorities in water management under the Act (s 398A), and for the constitution of water planning committees (ss 11-14).
9 Robert McCosker and John A Duggin, *Gingham Watercourse - Resource Management Issues, Gwydir River Basin, Moree NSW* (1992), 11; In natural circumstances, these streams would have flowed only during high flood through to the Barwon River, at which time the system linked directly into the MDB.
under the international Ramsar Convention for the Protection of Wetlands. The presence of such an ecological icon site in the catchment has focused and given impetus to management planning.

The system is regulated by a major upstream dam - Copeton Dam – and a number of weirs and other structures to store and distribute water. River regulation has facilitated the development of a significant, high value irrigation industry concentrated on distributary streams on the floodplain. Characteristic of the river systems of the northern MDB, where the natural flow regime is highly variable, water extraction for irrigation is opportunistic and focuses on annual crops such as cotton. Water for consumptive use is largely accessed directly from the river. In contrast, the Victorian case study in the southern part of the MDB, is characterised by long established, highly regulated and interconnected river systems with irrigation largely administered through formal irrigation districts. In these areas, water is largely delivered to irrigation areas via extensive channels and infrastructure, and water use concentrates on permanent plantings and pasture irrigation.

Like many other systems in the MDB, the water resources of the Gwydir have been significantly over-allocated, with implications for both consumptive users and the environment. Combined with naturally high flow variability from year to year, this has meant that water entitlements have a low level of reliability. This creates considerable pressure to access supplementary water and contributes to the reliance on large off-river water storages on farm to take advantage of water which enters the system below Copeton dam and to store ‘overland flows’ harvested from the floodplain.

12 Pigram, above n 4, 178; Mark D Morrison and Jeff W Bennett, Water Use Trade-Offs in the Macquarie and Gwydir Valleys (Choice Modelling Research Reports, No. 2) (1997).
13 Ibid, above n 4, 174
14 Ibid, 174, 190.
Map 2: Gwydir Catchment, Northern NSW
The regulation of the Gwydir system and subsequent development of an irrigation industry has changed the natural flow regime considerably, with accompanying impacts on the riverine ecology. Given the ecological significance of the Gwydir wetlands, the impacts of a changed flow regime and high extraction levels on wetland condition has been a major research focus.\footnote{Key resources consulted for this research include, McCosker and Duggin, above n 9; McCosker, above n 10; Keyte, above n 15; Robert McCosker, \textit{Gwydir Wetlands: Ecological Response to Flooding 1998} (A Report Prepared for NSW National Parks and Wildlife Service, NSW Dept of Land and Water Conservation, Gwydir River Management Committee) (1999); Jenny Davis et al, \textit{Environmental Water Requirements to Maintain Wetlands of National and International Importance: Environmental Flows Initiative Technical Report Number One, Environmental Australia / National Heritage Trust - National River Health Program} (2001); and W A Mawhinney, ‘Restoring Biodiversity in the Gwydir Wetlands through Environmental Flows’ (2003) 48(7) \textit{Water Science and Technology} 73.}

For example, reduced frequency and magnitude of flooding has been identified as a key contributor to a continued decline in the extent and ecological integrity of the wetlands.\footnote{Keyte above n 15, 1; McCosker and Duggin above n 9, 11.} The substantial reduction in the occurrence of flows large enough to reach the wetland can be attributed to three factors.

First, Copeton Dam has reduced the catchment area for the wetlands substantially. The dam has spilled only twice since completion allowing stored water to reach the wetlands. This means that the main contributors of water to the wetland system are smaller unregulated downstream tributaries.\footnote{Keyte, above n 15, 12-13.}

Second, diversion of small but frequent flow events into the once ephemeral distributaries where irrigation is concentrated has meant that small floods have been almost lost from the wetlands. There is generally a greatly reduced flow in the lower system. Before river regulation, the wetlands experienced natural periods of wetting and drying. Now, there are extreme and lengthy drying out periods.\footnote{Ibid, 13-19; Sue Powell, \textit{Assessment of Environmental Contingency Allocation Release in the Lower Gwydir Wetlands: Dec 2002 - Jan 2003, Preliminary Report} (2003), 4.} The once ephemeral distributaries also now flow continuously to supply irrigation and stock and domestic water, changing their ecology extensively.\footnote{Morrison and Bennett, above n 12.} The construction of levees and other structures to protect crops and harvest overland flows, and channels to
deliver stock and domestic water has also changed patterns of flooding and reduced inflow to the wetland system.\textsuperscript{21}

Third, the very high reliance on accessing unregulated flows and storing them on-farm in large private dams has proven highly detrimental to the wetlands. Prior to the introduction of the environmental flow regime, only small amounts of water from unregulated tributary inflows reached the wetlands, largely by chance, when upstream water users had not drained the system dry.\textsuperscript{22}

These changes have impacted significantly on wetland ecology. For example, the extent, floristic composition and community structure of vegetation in the wetland is strongly linked to the pattern of flooding over time. Reduction in small floods and general reduced inflow have led to a contraction of the core wetland area with large areas now transitional between semi-aquatic and terrestrial ecosystems.\textsuperscript{23} The changed regime has also contributed to an increase in exotic species, such as Lippia, which are able to out-compete native aquatic vegetation when flow conditions are altered from natural.\textsuperscript{24}

The value of the wetlands as habitat for aquatic birds has long been acknowledged.\textsuperscript{25} It is a particularly significant site for bird breeding on a regional scale, as flooding is not always synchronous with flooding in other wetlands of the northern MDB.\textsuperscript{26} Available research suggests that river regulation has contributed to a decline in diversity and abundance of water birds. The reduced frequency and duration of flooding means that the habitat, foraging and breeding requirements of water birds are now less frequently met.\textsuperscript{27} For example, to ensure successful completion of a bird breeding event, adequate depths of water must be maintained in the rookery; a sufficient area must be inundated to provide the required food resources for adult and

\textsuperscript{21} McCosker and Duggin, above n 9, 5; Keyte, above n 15, 7-8, 43-48; Davis et al, above n 15, Appendix IX, 2.
\textsuperscript{22} Keyte, above n 15, 19-21.
\textsuperscript{23} McCosker, above n 10, 6; Keyet, above n 15, 21-31; Davis et al, above n 16, 143; Mawhinny, above n 16.
\textsuperscript{24} Ibid.
\textsuperscript{25} Allan and Lovett, above n 15, 27.
\textsuperscript{27} Ibid; McCosker, above n 10, 7; Keyte, above n 15; Davis et al, above n 16.
juvenile birds, such as tadpoles, frogs and insects; and vegetation to provide suitable material and sites for nest construction and shelter from predators is required.28

2 Resource Conflict and Polarisation of Competing Users

The existing resource allocation serves a set of established economic interests deeply embedded in existing systems of resource management and economic activity. The Gwydir irrigation industry focuses on high value, annual crops with precise water requirements, such as cotton. High levels of over-allocation, the private nature of water access, and supplementary harvesting arrangements, all contribute to a climate of intense competition and conflict between water users. Indeed there is a long history of compliance issues related to opportunistic access to unregulated flows.29

The interests of irrigators not only conflict with many environmental imperatives, but also with the interests of non-irrigator landholders downstream who have relied on flooding regimes to support valuable native pastures for grazing.30 This suggests a highly contested context for processes to reallocate the resource to more sustainable levels, considered against Element Two of the framework later in the chapter.

Competition for water resources in the Gwydir valley is often portrayed as a contest between the flooding requirements of wetland graziers, which in many ways is compatible with conservation of these areas, and the demands of upstream irrigators. While this is a strong theme of the water conflict in this valley, land use in the wetland is far from homogenous. Indeed, wetland landholders are increasingly being forced or choosing to move away from traditional grazing enterprises no longer viable under reduced flooding regimes, towards land uses such as cultivation, which are far less compatible with conservation objectives.31 This has implications for the practical

28 Keyte, above n 15, 31-34; McCosker, above n 10, 13.
30 Keyte, above n 15, 19; Pigram, above n 4, 186; Allan and Lovett, above n 15, 29; McCosker, above n 10, 10.
31 McCosker, above n 10, 11; Keyte, above n 15, 34; This is supported by comments raised in interviews conducted with staff from the natural resource agency involved in the implementation of the Gwydir environmental water regime (August 2006).
management status of EWA and operational management procedures to deliver environmental water to the wetlands, explored in more detail against Element Three.

3 Future Risks to Water Availability: Climate Change

According to the most recent, available estimate of future water availability across the MDB, which takes into account a range of potential climate scenarios and other risks to water availability such as the expansion of interception activities,\(^\text{32}\) water availability in the Gwydir is more likely to decrease than increase. On best estimates of future climate and current levels of water development, a 9% reduction in mean annual runoff is expected by 2030, with corresponding implications for surface water availability, and diversions. As a consequence, the frequency of wetland inundation is not expected to change greatly, however average annual flooding volumes are likely fall considerably, with consequent impacts on wetland vegetation and their use by water birds for breeding.\(^\text{33}\) This has implications for the both the volumes of water needed to achieve environmental outcomes and the status and protection accorded environmental water under current regulatory schemes, discussed in Element Three.

The northern MDB has not been affected by the very significant drop in rainfall and run-off experienced over the last decade in the southern MDB, including the Victorian case study, which has placed considerable pressure on all water users and changed the context of EWA considerably.


\(^{33}\) Ibid.

For an assessment of the implications of climate scenarios for water resources in the catchment neighbouring the Gwydir to the South, see Roger Jones et al, Future Impacts of Climate Variability, Climate Change and Land Use Change on Water Resources in the Murray Darling Basin: Overview and Draft Program of Research (2002).
II ELEMENT ONE - OVERARCHING LEGAL SETTINGS

With the considerations raised in Chapter Three in mind, this section explores legal settings for water allocation and management in NSW to determine their value in establishing a purposeful set of institutions that can contribute to effective EWA. A detailed analysis of the relevant provisions of the Water Management Act suggests a tentative attempt, at least at the time of its introduction, to set standards and priorities, and impose duties within the legislation in the pursuit of ecologically sustainable levels of allocation, and effective EWA. Yet the analysis in this chapter of the legal effect of these provisions suggests that a tighter statutory scheme, with more emphasis on articulating substantive objectives and outcomes, and linking these to critical institutions of water management through enforceable rules of law, would better contribute to effective EWA. This is supported by the experience of implementation of key aspects of the legislation, such as allocation planning discussed in Element Two, which arguably would have benefited from clearer, substantive guidance on desired outcomes through policy and legislation.

This discussion has two parts. First, it comments on the use of strategic statutory mechanisms to establish clear purpose for EWA. Emphasis is given to whether and how water legislation expresses environmental objectives and desired outcomes; including whether they focus on outcomes and/or processes; whether they are expressed substantively; and how they manage inherent trade-offs between competing interests. Second, it considers whether these mechanisms are employed to guide and constrain key statutory processes and functions surrounding environmental water allocation, protection and management. This includes consideration of the way in which objectives and outcomes are linked by duties and rules of law to key statutory processes and functions, and whether these key processes are designed to reflect environmental objectives and desired outcomes.
A  Setting Strategic Direction: Objects and Stated Outcomes

The objectives of the Water Management Act provide:

… for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations and, in particular:
(a) to apply the principles of ecologically sustainable development, and
(b) to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality, and
(c) to recognise and foster the significant social and economic benefits to the State that result from the sustainable and efficient use of water…  

At an overarching level, these objects contain a strong focus on environmental and sustainability policy goals. Indeed, provision for the recognition and fostering of socio-economic benefits of water use is situated clearly within a context of sustainable and efficient use. Yet there is no specific recognition at this level that many existing resource allocation and use patterns are unsustainable, and therefore achieving the broad environmental outcomes covered by s 3(b) depends on very significant changes to the status quo of allocation and management. There is no explicit goal of moving towards an ecologically sustainable allocation and management of water or identification of the approach to be taken to this task. A stronger substantive expression of sustainability outcomes and required processes to address inevitable trade-offs between achieving objective s 3(b) and s 3(c), at this level would better frame the legislation to achieve environmental outcomes.

The Act does, however, employ two further mechanisms to add substance to the objects and to provide a series of desired outcomes: water management principles and a State water management outcomes plan [SWMOP]. Both are linked to broad statutory duties, and the SWMOP specifically provides for outcomes across a range of statutory functions.

34 Water Management Act 2000 (NSW), s 3.
35 Ibid, s 5.
36 Ibid, s 6.
Water Management Principles: At a general level the principles resemble a wish list of broad policy outcomes not unlike the objects clause, albeit again with a strong environmental and sustainability focus covering environmental protection and restoration,\textsuperscript{37} and promoting the institution of management approaches designed to support sustainability outcomes such as adaptive management.\textsuperscript{38} There is also a principle aimed at maximising social and economic benefits to the community of water use.\textsuperscript{39} At this level, no attempt is made to articulate a clear substantive goal for water allocation and management, nor provide direction on the treatment of competing interests in reaching this goal.

Yet these principles also provide specifically for various areas of water management including water sharing (the allocation of water between competing users).\textsuperscript{40} These more specific principles come closer to contributing binding legal rules with the ability to shape and constrain key statutory functions. In relation to water sharing, the principles provide that the sharing of water from a water source \textit{must} firstly protect the water source and its dependent ecosystems and, secondly, basic landholder rights to water\textsuperscript{41} over and above the sharing or extraction of water under any other right.\textsuperscript{42} Thus, at this level, they establish a clear priority for the provision of water to protect water sources and dependent ecosystems, over the provision of water for consumptive use.

The Act then establishes a positive duty on all persons exercising functions under the legislation to take all reasonable steps to do so in accordance with and so as to promote the water management principles.\textsuperscript{43} Specific emphasis is given to the duty to give priority to the protection of water sources and their dependent ecosystems over all other uses of water.\textsuperscript{44}

\textsuperscript{37} Ibid, s 5(2)(a) and (b).
\textsuperscript{38} Ibid, s 5(2)(b).
\textsuperscript{39} Ibid, s5(2)(g).
\textsuperscript{40} Ibid, s 5(3).
\textsuperscript{41} Ibid, Dictionary. The Act defines basic landholder rights to include water for stock and domestic use, harvestable rights, or native title rights.
\textsuperscript{42} Ibid, s 5(3)
\textsuperscript{43} Ibid, s 9(1).
\textsuperscript{44} Ibid, s9(1)(b)
Subsequent discussion considers the legal effect of these priorities and duties in guiding and constraining key statutory processes such as the allocation of water between competing users through the preparation of water sharing plans.

**State Policy for Water Management:** The Act seeks to give further content to its objects by directing the preparation of a specific water management policy.\(^{45}\) The SWMOP sets the over-arching policy context, targets and strategic outcomes for the management of the State’s water resources, and guides the many functions under the legislation.\(^{46}\) The Act establishes a positive duty on all persons involved in its administration to exercise their functions in a manner that gives effect to the SWMOP.\(^{47}\) Specifically, it requires that management plans developed under the Act must be consistent with the SWMOP.\(^{48}\) Thus, at a formal level, this is a clear and potentially effective use of the type of strategic mechanisms considered in the evaluative framework. Yet subsequent discussion of the implementation of this mechanism, particularly in the context of water allocation planning, suggests that its potential was not fully realised.

### B Guiding and Constraining Institutions for Environmental Water?

One of the key parameters for an effective environmental water governance framework raised in Chapter Three is the link between strategic statutory mechanisms and key statutory functions and processes related to environmental water allocation, protection and management. The following discussion considers whether the Water Management Act creates such a matrix of binding duties and rules of law to support effective EWA.

\(^{45}\) Ibid, s 6.  
\(^{46}\) *State Water Management Outcomes Plan Order 2002* (NSW), Chapter 1, Part 1.  
\(^{47}\) *Water Management Act 2000* (NSW), s 9(2).  
\(^{48}\) Ibid, s 16(1)(a).
1 Allocating Water to the Environment

Gardner has previously considered whether the Water Management Act creates enforceable duties to make EWAs; to make them at a certain level; and to make them in priority to the allocation and delivery of water to consumptive purposes.\(^{49}\) This discussion draws on Gardner’s work to explore the legal effect of the duties and priorities noted above when applied to water allocation planning under the Act. It also considers the extent of statutory and policy guidance on substantive outcomes for the conduct of these processes provided through the statutory scheme.

(a) Legal Effect of Duties and Priorities

Under the statutory scheme, the making of a water sharing plan for a water source, such as a regulated river, is the principal forum in which a potential re-allocation of the resource to achieve more sustainable levels of allocation is envisaged. The legislation is clear that water sharing plans must contain environmental water rules that provide for environmental water requirements.\(^ {50}\) It also provides for a progressive implementation of water sharing planning, firstly to prioritised water sources, and following this to all remaining water sources as soon as practicable.\(^ {51}\) In Gardner’s terms, this amounts to a duty to make EWA according to the timeframes of the legislation. However, in terms of this analysis of the effectiveness of resulting EWA, it is critical to look at whether the legislation also establishes standards and priorities to guide and constrain this planning function.

Gardner suggests that, in its original form, the Act did establish a tentative statutory standard for a certain level of EWA to be achieved through water sharing plans.\(^ {52}\) This was achieved by providing that environmental water rules were to include a class of environmental water referred to as environmental health water. This was defined as “water that is committed for fundamental ecosystem health at all times, and may not


\(^{50}\) Water Management Act 2000 (NSW), ss 8, 20(1)(a)

\(^{51}\) Ibid, ss 7, 8(1A)(3)

\(^{52}\) Gardner (2006), above n 49, 10324.
be taken or used for other purposes.”53 According to the priorities established for environmental water through the principles and duties noted above, rules relating to the extraction of water for consumptive use must have regard to the rules for environmental water and the provisions for basic landholder rights in that order.54 This complex combination of provisions suggests a legislative intent to prioritise a basic level of EWA for fundamental ecosystem health, above any allocation to consumptive users.

However, when the Act was amended in 2004, this standard for EWA was arguably weakened. The Act now required environmental water rules under a management plan to commit water for “fundamental ecosystem health or other specified environmental purposes, whether generally or at specified times or in specified circumstances, and that cannot to the extent committed be taken or used for any other purpose.”55 Gardner argues that this replaced “a statutory prescription of a basic EWA that was to be maintained at all times… [with] a mere requirement that a management plan commit water for fundamental ecosystem health at a level that the minister saw fit.”56

The priority accorded EWA was not affected by the amendments, however without some kind of corresponding substantive standard this priority is arguably of little worth. The Act now merely requires that the level of EWA resulting from the planning process be prioritised in the allocation of water between competing users, which is naturally of negligible value if the level of EWA is inadequate. These amendments represent a concerted attempt by the legislature to remove any statutory standard for EWA and to leave the substance of EWA to executive discretion. The amendments were clearly linked to legal proceedings discussed below, which sought to test the validity of the Gwydir Water Sharing Plan on the basis of its environmental water rules. The redefinition of environmental water thereby achieved was arguably intended to legitimise the approach to environmental water provision in the Gwydir and other management plans.

53 Water Management Act 2000 (NSW), ss 8(1)(a), 8(1)(b), 20(1)(a), amended by Water Management Amendment Act 2004 (NSW), s8.
54 Water Management Act 2000 (NSW), ss 20(1)(e), 20(2)(f)
55 Water Management Amendment Act 2004 (NSW), ss 8(1)(a), 8(2).
The central question of the challenge to the Gwydir plan was whether the environmental water rules met the standard and priorities established by the legislation. The case, therefore, provides some indication of the legal effect of the original provision in the Act for EWA. The Nature Conservation Council of NSW (the peak State environmental organisation) argued that the plan failed to establish rules for the identification, establishment and maintenance of *environmental health water* which is committed to fundamental ecosystem health at all times and which may not be taken for other purposes. Further, the approach taken to EWA did not satisfy the requirement that water sharing must protect the water source and its dependent ecosystems over all other uses of water. They argued that the environmental rules within the plan which purported to comply with these obligations were expressed in terms of a volume of water in excess of a long term extraction limit, which was set according to levels of existing consumptive use. In their view, this was not a rule for water committed to fundamental ecosystem health. The operation of the rule meant that in any one year the extraction limit could be exceeded thereby limiting the residue left over for environmental water, and in some years there may be very little or no water at all remaining in the system. Additionally, if environmental water was merely the residue remaining after consumptive use had been provided for, the rule was established having regard to consumptive use of the resource, and assuming that water be taken for other purposes. It, therefore, subverted the statutory priority granted to environmental water rules.

On appeal, the NSW Court of Appeal accepted this argument that a rule expressed in terms of an amount in excess of an extraction limit was not a rule for the identification, establishment and maintenance of water within the meaning of the Act and consequently did not meet the standard set by legislation. Further the court found that the rule had subverted the statutory requirements to establish rules for consumptive use of water with regard to environmental water rules. As such, the plan was inconsistent with the original provisions of the legislation.

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58 Under *Water Management Act 2000* (NSW), s 8(1)(a), prior to the 2004 amendments.
59 Ibid, s 9.
60 Ibid, ss 20(1)(e), 20(2)(f).
Yet, despite such textual indicators pointing to a conclusion of invalidity, the court applied the reasoning of the High Court of Australia in *Project Blue Sky Inc. v Australian Broadcasting Authority*,\(^62\) to find that Parliament did not intend the particular inconsistency with the Act to result in invalidity of the plan. In this case the test of validity relies on ascertaining Parliament’s intention “by reference to the language of the statute, its subject matter and objects, and the consequences for the parties of holding void every act done in breach of the condition.”\(^63\) The judgement specifically notes that courts are reluctant to hold that parliament intended an act in breach of legislation to be invalid if serious public inconvenience would result.\(^64\)

In this context, all the plans for regulated rivers in the inland catchments of NSW contained a similar environmental water rule formula, based on a long term extraction limit. Therefore, a finding of invalidity would require all those plans that were developed using a similar formula to be revisited and remade. As such, the administrative consequences of a finding of invalidity may have influenced the judgement. However, Gardner argues, “the risk of public inconvenience here should not have been significant because a statutory time limit of three months in which to challenge a management plan ensured there would be no delay in addressing legal challenges (s 47). Moreover, the express statutory time limit acknowledges that parliament did anticipate judicial review of the validity of plans.”\(^65\)

The Court of Appeal appeared also to be influenced in this decision by the factual context of the plan. The judgement noted that the effect of the long term extraction limit in the plan was to ensure a substantial flow of water (56% of estimated long term average annual flow) remained in the system as environmental water, and that this would satisfy Parliament’s intention to provide for EWA.\(^66\) This reference to factual context is curious given that the challenge was brought in judicial review and, as such, there was no scientific evidence put before the court about the actual volume of water and associated management arrangements that were required to maintain fundamental

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\(^63\) Ibid, 389. See discussion in, Gardner (2006), above n 49, 10325.
\(^64\) Ibid, 392.
\(^65\) Gardner et al (2009), above n 49, 360.
ecosystem health in the system. Indeed, if such evidence had been admissible, it would have potentially demonstrated the inadequacy of the nature and volume of water reserved under this rule. Gardner comments that “with respect, the Court of Appeal may have found too easily that the inconsistency of the plan with the Act did not render the plan invalid.”

Special leave was granted to the Nature Conservation Council to appeal this finding to the High Court on the basis of the standard and priority to be given to determining the EWA under the Act, and the application of the principles in Project Blue Sky. However, this appeal was never heard due to targeted amendments to the Water Management Act, which inserted a provision to retrospectively validate any management plans already gazetted and thereby overcome the potential outcomes of an adverse High Court finding.

This consideration of the statutory scheme together with available judicial interpretation suggests that the Water Management Act may have created a tentative standard to guide the provision for EWA within management plans. It is arguable that the Project Blue Sky reasoning allowed the Court to avoid making a definitive Statement on the existence of an enforceable standard in the Act, perhaps because doing this would have strayed dangerously close to a merits review of the plan. Yet on the other hand, it is also arguable that the court relied on Project Blue Sky precisely because the Act conveyed no clear enforceable standard that could be interpreted so as to invalidate a management plan. If the legislative intent was to set a standard for management plans at a level of EWA which maintained fundamental ecosystem health, clearer guidance in law and policy would be required. This is particularly so if courts are to play a role in reviewing plans on this basis.

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68 Gardner (2006), above n 49, 10325.
70 Water Management Amendment Act 2005 (NSW)
72 Judicial review of administrative decision-making under legislation concentrates on the way decisions were reached and whether they were lawful, not the merits of the decision itself. Courts are very wary of straying into a review of the policy behind a decision. See discussion of the scope of judicial review and merits review in Douglas E Fisher, Environmental Law: Text and Materials (1993), 353; Ross Ramsey and Gerard C Rowe, Environmental Law and Policy in Australia: Text and Materials (1995), 798.
The progression of the Gwydir case in the context of subsequent legislative amendment also emphasises the argument that strong law is worthless without a commitment to implementation. This attempt to test the strength of the legal provision for EWA resulted in a concerted attempt by the NSW Government to amend the legislation so as to remove any substantive standard for EWA and retrospectively validate a planning process that had arguably failed to achieve desired environmental outcomes.

(b) Substantive Guidance for Planning Processes

As noted above, an innovative mechanism of the Water Management Act is the SWMOP, a Statement of outcomes to guide and constrain key functions, and the requirement that management plans must be consistent with this overarching policy guidance. Yet to be of any effect, such guidance must include measurable, substantive targets to be applied in relevant processes; must be supplied in a timely way and be applicable to all relevant functions under the Act; and must be subject to a process whereby consistency is reviewed and upheld. The execution of the SWMOP in NSW shows that the potential of this mechanism, as applied to water sharing planning, was only partially realised.

For example, in addition to broad long term objectives for the State, the plan included more specific and tangible five year water management targets which outline the practical tasks necessary to achieving the long term outcomes.\(^{73}\) Some of these are quantitative, measurable targets, and therefore provide substantive guidance and constraint to the implementation of the Act.\(^{74}\) For example, Chapter Two has established that reinstating key aspects of the natural flow regime is critical to effective EWA. One of the key ecological targets in the SWMOP addresses this issue by providing for the protection or reinstatement of flows across the spectrum of flow classes (low, medium and high flows) to at least the level equivalent to 60% of their natural frequency. Where the frequency of daily flows is less than 60% of pre-development levels, this should be increased by at least 10% of the pre-development levels...

\(^{73}\) State Water Management Outcomes Plan Order 2002 (NSW), Chapter 2.

\(^{74}\) For example, Targets 23-23c, relating to removal and modification of impeding structures.
frequency.\textsuperscript{75} This target has its origins in an assumption that a river maintaining 60\% of its natural flow has a high probability of sustaining a healthy ecology over the long term.\textsuperscript{76} No comment is made here on the adequacy of such a target; however, the value of such substantive, measurable standards at an overarching level is underscored. Subsequent discussion of the water allocation planning processes against Element Two suggests a broader use of this approach would have contributed to greater environmental outcomes.

There was, however, considerable delay in the preparation of the SWMOP.\textsuperscript{77} This important policy guidance was only provided to river management committees assigned the task advising on the preparation of water management plans towards the end of the planning process. Indeed, the Act contains an express commitment to expedite management plans for priority rivers within a twelve month period,\textsuperscript{78} which effectively by-passes the opportunity to apply the policy guidance and constraints potentially provided by an instrument such as the SWMOP through the planning process. Although the actual plans were later revised centrally to achieve greater consistency with the SWMOP on key provisions, its value as a policy guideline to the process of negotiating potential re-allocation of the resource was significantly reduced due to these timing inconsistencies.

Additionally, despite the statutory requirement for all functions exercised under the Act to be in accordance with the SWMOP,\textsuperscript{79} the SWMOP itself States upfront that many of its targets may not be met due to social and economic impacts; relative management priorities, risks, and costs; and relative environmental importance. Instead, it aims for continuous improvement towards the targets, and only requires water sharing plans to indicate the degree to which they contributed to the SWMOP targets, not demonstrate compliance.\textsuperscript{80} An overview of a selection of water sharing plans for the inland rivers of NSW indicates that consistency with some of the targets of particular ecological significance was far lower than for other targets in the SWMOP. The target noted above aiming for reinstatement of flows to at least 60\% of

\textsuperscript{75} State Water Management Outcomes Plan Order 2002 (NSW), Target 4a.
\textsuperscript{76} State Water Management Outcomes Plan Order 2002 (NSW), 44-50.
\textsuperscript{77} It was gazetted at the end of 2002, when the planning process began at the beginning of 2001.
\textsuperscript{78} Water Management Act 2000 (NSW), s 7(4).
\textsuperscript{79} Ibid, s 9(2).
\textsuperscript{80} State Water Management Outcomes Plan Order 2002 (NSW), Chapter 1, Part 4.
pre-development levels was one which was only partially achieved. This permissive implementation standard has considerably lessened the environmental benefits of the mechanism.

2 Facilitating and Protecting Environmental Water

The Water Management Act is less developed in its use of legal settings to establish duties and set standards for the facilitation and protection of environmental water. Although the Act contains high level priorities applying to EWA discussed above, it does not effectively link such priorities through the legislation with the legal definition of mechanisms to facilitate EWA, or with constraints on decision-making powers and statutory functions which potentially affect the status and protection accorded environmental water.

Chapter Three argued that the way in which environmental water is defined in legislation is an important indicator of status and protection. The Act establishes the range of legal mechanisms that can be used to provide environmental water. This covers environmental water provided through water sharing plans on a rules basis, as a volumetric allocation, or as the excess remaining after consumptive uses have been provided; and by way of conditions on access licences, which allocate water to the environment for specified purposes, at specified times or in specified circumstances.

The current breadth of definition of EWA includes some instruments that potentially convey little protection to environmental water once allocated. For example, under section 8(1A)(c) as amended, planned environmental water can be committed by reference to the water that remains after commitments to basic landholder rights and for sharing and extraction under any other rights have been met. It was this approach to defining EWA that was contested in the Gwydir case. As argued in Chapter Three,

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82 Water Management Act 2000 (NSW), s 8.

83 Ibid, ss 8(1)(a), 8 (1A)(2).

84 Ibid, ss 8(1)(b), 8B, 8C, 8D,8E.
extraction limits which do not reference ecological water needs, and which fail to specify and protect remaining environmental water, render environmental water highly vulnerable under both natural variability and climate change scenarios. Application of Element Three of the framework later in the chapter further illustrates how available legal mechanisms for EWA convey little status and protection to environmental water in a practical management context.

In terms of constraints on decision-making, it is also important to consider the breadth of statutory discretion to vary or qualify rights to access water in situations of water scarcity. The exercise of such a power may be of significant and adverse impact on environmental water. Under section 49A, a management plan may be partially or wholly suspended if there is a severe water shortage in relation to a particular water management area. This discretion has been exercised under current drought conditions in a number of inland rivers in southern NSW, yet not the Gwydir.85 This power conveys a wide discretion to the responsible Minister. It does, however, contain some minor safeguards compared to the corresponding Victorian power.86 As the Gwydir case study has not been affected by the exercise of this power, this issue will not be discussed in detail in this chapter, but will be explored more fully in the Victorian case study.

Finally, statutory provision to maintain EWA over time, consider its ongoing effectiveness in light of identified future threats to water availability, and respond through water re-allocation processes, are important functions which can be designed to reflect environmental objectives and desired outcomes. The Water Management Act uses the status of statutory instruments of allocation (water sharing plans) combined with processes of audit,87 review88 and amendment89 to implement this important adaptive management function. However, the provisions lack clear standards and duties which reflect environmental objectives.

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86 An exercise of this power does require the concurrence of the Minister for Climate Change and Environment (s49A(2)) which does add some additional scrutiny. Section 60(3) also provides rules for prioritizing competing users in the making of available water determinations, in the situation where a management plans is suspended under this power.
87 Water Management Act 2000 (NSW), s44.
88 Ibid, s 43A.
89 Ibid, s 42.
Water sharing plans are of ten year duration, at which point a review process is triggered, through which the water sharing provisions may be subsequently renewed or altered.\textsuperscript{90} This review is to be conducted by the NSW Natural Resources Commission, a body of some independence from relevant agencies, against Statewide targets and standards.\textsuperscript{91} It can recommend changes to the water allocation balance either to restore water to the environment due to a natural reduction in inflow as a result of climate change, drought, or bushfire; or to provide additional water to the environment as a result of the development of more accurate scientific knowledge that demonstrates that the amount previously allocated is inadequate.\textsuperscript{92} Yet this review is structured around very broad natural resource management standards and targets, rather than specific performance indicators targeted at measuring the implementation and effectiveness of EWA.\textsuperscript{93} Although the relevant Minister has clear powers to extend a management plan for a subsequent ten years on multiple occasions following such a review,\textsuperscript{94} there is no specific provision for how they are to deal with a review which recommends that such a plan be changed to reflect environmental objectives. There is provision for the amendment of plans, yet these are not clearly linked to the results of a review.\textsuperscript{95} This imbalance arguably favours security for existing entitlements holders over the commitment to adaptive management to ensure effective EWA over time.

3 Managing Environmental Water

Chapter Three suggests that it may also be appropriate to use legislation to set the parameters for roles and responsibilities of environmental water management. The Water Management Act does not provide much direction on the combination of actors and expertise to be used to manage rivers once EWA is in place, nor clear parameters

\textsuperscript{90} Ibid, ss 43, 43A.
\textsuperscript{91} NSW Natural Resources Commission, \textit{About the NRC} <http://www.nrc.nsw.gov.au/AbouttheNRC.aspx> at 19 October 2009; \textit{Water Management Act 2000} (NSW), s 43A(3)(a).
\textsuperscript{92} \textit{Water Management Act 2000} (NSW), s 43A(3A).
\textsuperscript{94} \textit{Water Management Act 2000} (NSW), ss 43A(1), (2).
\textsuperscript{95} \textit{Water Management Act 2000} (NSW), s 42.
to guide related roles and responsibilities. This has meant that management arrangements in practice have evolved gradually on a case by case basis, from the pre-existing institutional framework in which State Water and the relevant natural resource agency at the time took a lead role in implementing fixed flow rules, towards more targeted and sophisticated arrangements which better cater for EWA. The arrangements in the Gwydir considered later against Element Four are illustrative. In comparison, the new federal legislation contains explicit provision for an environmental water holder with considerable detail on the role and associated responsibilities.

Legislation can also influence subsequent management of rivers with EWA by providing for certain key management functions such as monitoring the delivery and effectiveness of EWA, and establishing duties and mandatory standards around these functions. The Act does contain some provision in this direction. Yet it is arguable again that these functions could be elevated in importance through clearer statutory framing of standards and responsibilities. Case study experience considered against Element Four in this chapter suggests that this is an area where inadequate resources, confusion of responsibilities and lack of mandatory requirements contributes to less than adequate monitoring and reporting of environmental flows.

For example, the water management principles, discussed above, include a commitment to adaptive management, including that water management is responsive to monitoring and improvements in the understanding of ecological water requirements. Yet this is not clearly linked to key statutory processes and functions. For example, water sharing plans are loosely required to be consistent with these principles. In terms of providing for the format and content of plans, s 35 (1) provides a plan must include a vision Statement and objectives consistent with that vision Statement, strategies for reaching those objectives and performance indicators to measure the success of those strategies. This all implies the need for monitoring and reporting, but there is no separate legal duty to monitor and report on the

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96 The Act does include some enabling powers, providing for the involvement of Catchment Management Authorities in water management under the Act (s 398A). See also corresponding provisions of the Catchment Management Authorities Act 2003, for example s 30A.
97 Water Act 2007 (Cth), s104-117.
98 Water Management Act 2000 (NSW), s5(2)(h).
99 Ibid, s 9(1).
implementation of EWA from year to year, or account for environmental water that is released or taken, let alone its ecological effectiveness or a requirement to consider the results of such a review in adaptive management frameworks. Similarly, the plan review procedures involving the Natural Resources Commission described above arguably also presuppose a certain level of monitoring on the implementation and effect of plans. Yet they are not accompanied by explicit provision for a comprehensive program of monitoring and review to support such a function.

This discussion of the Water Management Act against Element One of the framework has uncovered legal settings for EWA which, at least in their original form, employed some of the mechanisms considered in Chapter Three to be important to a strong, purposeful governance framework for effective EWA. The analysis concentrated particularly on how duties, priorities, and Statements of outcome are used in the legislation to guide and constrain water allocation processes. Yet this discussion suggests that the Act does not create a substantive legal standard for EWA, particularly in light of subsequent amendments which result in a complex, in some ways conflicting, statutory scheme, which now leaves the substantive determination of EWA largely to executive discretion. Similarly, there is scope for further development of strategic statutory mechanisms related to environmental water protection and management. For example, a more targeted definition of EWA employing instruments which achieve appropriate status and protection, supported by duties and decision-making constraints which apply this in practice would greatly enhance the contribution of the Act to a governance model for effective EWA. Likewise, duties and standards applicable to critical adaptive management functions such as monitoring and reporting; and use of legislation to set parameters for roles and responsibilities of environmental water managers could be explored.

100 See also Gardner (2006), above n 49, 10332.
III ELEMENT TWO: PROCESSES TO ALLOCATE WATER BETWEEN COMPETING USERS

This analysis of processes to address water re-allocation in NSW draws on the case study research in the Gwydir Valley to explore the challenges in instituting a process which can deliver effective environmental outcomes.

The exploration of water allocation planning under the Water Management Act considers key issues of process scope and design raised in Chapter Three which have arguably influenced environmental outcomes. The Gwydir case study emphasises that clear, purposeful and substantive direction in overarching policy and legislation, and careful process design and implementation, are critical factors in progress on re-allocation. It also underscores the difficulties of designing and conducting a deliberative, participatory process which will deliver significant environmental outcomes in the context of a contentious resource re-allocation.

The more recent emphasis on market-based processes of re-allocation in NSW is also considered briefly. This explores some of the concerns about the effectiveness and efficiency of such approaches to environmental water recovery, which were raised in Chapter Three.

The case study research was conducted a few years after the negotiation of the Gwydir Water Sharing Plan, during the first years of the plan’s implementation. Although direct observation of the planning process was not possible, valuable insight into the conduct of the stakeholder process and its influence on environmental outcomes has been drawn from available documents, from interviews with stakeholders involved in the process, and from previous research in the area, including some empirical investigation of similar planning processes. More detail on the approach to this empirical research, including interview schedules and participants are included in Appendix A.

101 For example, policy guidance supplied to the planning committee and position papers produced by various stakeholder groups.
A Water Allocation Planning

1 Early Initiatives in the Gwydir

A brief overview of early initiatives to provide for EWA in NSW is used to introduce this discussion. These initiatives have arguably influenced subsequent progress on re-allocation under statutory planning processes. They highlight some important considerations of process scope and design which are used to evaluate these processes below.

In the early 1990s, some years prior to the introduction of the Water Management Act with its dedicated processes of water allocation planning, environmental flow rules were introduced in some of the inland regulated catchments of NSW, largely as a result of local initiative.103 In the Gwydir, an environmental flows committee including representatives of all key stakeholders was formed through the regional catchment management body in 1994, to respond to growing conflict between irrigator, conservation, and wetland grazing interests.104

The progress of this committee was slow and characterised by considerable conflict.105 Those involved from the perspective of wetland interests remember bitter disputes, and describe the process as a battle to change a frontier mentality, to undo a widely held belief that any water allowed to flow through to the wetlands was water wasted.106 After a period of about two years, the committee produced a consensus report recommending a set of flow rules which began to reinstate aspects of the natural flow regime, by limiting access to tributary and supplementary flows, and providing a volumetric environmental entitlement.107 Comments from those involved on both sides of the negotiation indicate that this initial resolution was seen as a trade-off. Conservation interests describe it as a ‘deal’ or ‘offer’ put forward by irrigators as

103 Similar initiatives were trialled in the Macquarie and Lachlan catchments. See discussion of the Lachlan in Tan, above n 102.
105 Ibid. This is supported by comments made in interviews with staff of both the nature conservation agency and natural resource agency involved in the process, August 2006.
106 Comments made in interviews with landholders, and staff of both the nature conservation agency and natural resource agency involved in the process, August 2006.
107 ECA Operation Advisory Committee, above n 104.
the changing political climate began to demand some change to the status quo; and irrigators saw it as ‘voluntary giving up’ of their water to reach a resolution.  

In 1997 as part of the water reform program, the State government released indicative environmental flow rules for each of the major regulated river systems in the State, and mandated a process whereby river management committees with broad stakeholder representation were to review these rules over a six month period and recommend a set of flow rules for the management area. Much of the groundwork had already been done in the Gwydir. The Environmental Flows committee became a River Management Committee with little change in membership, and the indicative rules provided to the committee were in essence the rules that had been negotiated over the past two years. The government set clear parameters for this negotiation: the flow rules were to aim to restore or enhance targeted flow events to improve river and wetland health but should have no greater impact than a 10% reduction in the long term average water diversions at the MDB Cap level. In the Gwydir, the impact of the flow rules represented an 11% reduction in annual average long term diversions.

This experience illustrates how a potentially divisive stakeholder negotiation can be bounded by substantive parameters – the release of indicative flow rules and a 10% target - which outline desired environmental outcomes and demonstrate a clear political commitment to achieve change. This, combined with considerable local initiative to address the issue, is arguably a key factor in the success of these early reforms.

It is important to note that, despite the comprehensive statutory planning processes subsequently instituted by the Water Management Act; these initial rules were only

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108 Comments made in interviews with landholders, representatives of nature conservation interests, and staff of both the nature conservation agency and natural resource agency involved in the process, August 2006.
109 Tan, above n 102, 172.
110 Comments made in interviews with staff of both the nature conservation agency and natural resource agency involved in the process, August 2006.
marginally improved under statutory water sharing plans. For example, in the Gwydir, the passing flow rules remained essentially the same, however the volume and management flexibility of the environmental entitlement were improved. Yet the comments from participants and key stakeholders noted above suggest that only a certain level of re-allocation is possible without a commitment to fund associated adjustment: irrigators were only prepared to ‘give up’ a certain level of their resource rights. Consequently, the scope to achieve further re-allocation beyond the 11% reduction already achieved, through a participatory planning process under the Act without targeted adjustment programs, was arguably minimal.

2 Water Sharing Planning under the Water Management Act

With the introduction of the Water Management Act in 2000, statutory parameters for water allocation changed dramatically. Preceding discussion has introduced some of the central statutory provisions governing the allocation of water between competing users, and focused on the extent to which these provisions establish substantive guidance for EWA. Closer consideration of the planning processes set up by the legislation, and its application to the Gwydir context underscores how the scope and design of processes of re-allocation influences environmental outcomes.

Part Two of the Water Management Act provides for the constitution of water management areas, and the establishment of management committees, which can be required to perform a broad range of water management planning functions including preparation of draft management plans on any aspect of water management, including water sharing, and advising the Minister on matters relating to water management. The Act provides terms of membership for such management committees, aimed at ensuring balanced representation of relevant stakeholders,

\[114\] Water Management Act 2000 (NSW), s 11.
\[115\] Ibid, s 12.
\[116\] Ibid, ss 14, 15.
\[117\] Ibid, s 14.
community and government. They must include: at least 2 representatives of environmental protection groups, at least 2 representatives of water user groups, at least 2 representatives of local councils, at least one representative of catchment management authorities, at least 2 representatives of Aboriginal persons, and various staff members of relevant government agencies. A preference for the appointment of persons who reside within the water management area is expressed. Provision is also made for an independent chairperson.

The Water Management Act provides for the content and format of water sharing plans and a procedure for plan making. At the conclusion of this process the Minister retains the discretion to make a management plan in accordance with the draft prepared by the committee, or with such alterations as the Minister thinks fit. The Minister may also decide not to proceed with the draft plan.

The combination of duties, priorities and Stated outcomes, and provision for plans to contain environmental water rules under the Water Management Act contributes a certain degree of substantive guidance to the planning process, however the extent to which these provisions amount to a substantive standard for a certain level of EWA is questionable.

Despite this detailed procedural provision, the Water Management Act also contains a way in which these provisions may be substantially circumvented: the Minister may make a Minister’s Plan for any water management area or water source, and such a plan must only deal ‘in general terms’ with any matters that a management plan is required to deal with. Generally, the required content and format of such a plan is

\[118\] Ibid, s 13.
\[119\] Ibid, s 13(3).
\[120\] Ibid, s 13 (1)(i).
\[121\] Ibid, s 20(1).
\[122\] Ibid, s 35.
\[123\] Ibid, ss 36-40.
\[124\] Ibid, s 41.
\[125\] Ibid, s 41(1)(d).
\[126\] This has been discussed in the preceding section against Element One of the framework.
\[127\] Water Management Act 2000 (NSW), 50(1).
\[128\] Ibid, s 50(2).
similar to that of a management plan, however the Minister may dispense with the process of public exhibition and consultation.\textsuperscript{129}

In practice, management committees were created under these provisions across NSW, to advise the Minister on water sharing rules to form a statutory water management plan, with an initial focus on key regulated systems classified under section 7. However, instead of committees preparing a draft water sharing plan under section 14, the plans were characterised under the legislation as Minister’s plans,\textsuperscript{130} with committees officially having only an advisory role. This is an important distinction in terms of the scope of the planning process, and the weight given to public participation, discussed below.

\textit{(a) Scope of Water Sharing Planning}

Chapter Three highlighted two important considerations relating to the scope of planning for re-allocation. First, a distinction was drawn between those processes which had the potential to directly address the allocation balance between environmental and consumptive water through shaping a new instrument of allocation; and those set at a more strategic level, which outline approaches to revisit existing allocation instruments or achieve EWA via alternative mechanisms such as buy back, but do not negotiate direct changes to the instruments themselves. The timing and sequencing of such processes relative to the introduction of reforms to achieve heightened security and certainty for consumptive users, is arguably a significant determinant of environmental outcomes.

Under the Act, water sharing planning had considerable potential to address the status quo of resource allocation, as it structured a statutory planning process around a central instrument of allocation, which was required to provide for environmental water. The consumptive use reforms noted above were effectively contingent on the finalisation of a water sharing plan for a given area.\textsuperscript{131} The design and conduct of the

\textsuperscript{129} Ibid, s 50(2A).
\textsuperscript{130} Ibid, s 50, s 7(5).
\textsuperscript{131} Mark Hamstead and Jan Gill, \textit{Implementing the Water Management Act 2000} (2004), 1. The new access licensing and approvals system, to implement the NWR agenda, only comes into force when an
planning process, discussed in the next section, however illustrates the failure to realise this potential in practice.

The second key factor which will influence environmental outcomes of re-allocation processes is the extent of substantive guidance and prescriptive direction for planning outcomes provided through the legislation and accompanying policy. This is closely related to previous consideration of the most appropriate forum to make substantive decisions on a water re-allocation, and the spectrum of public involvement in substantive policy development. Central questions include whether participatory processes are appropriate to a resource re-allocation context; and, if so, how much scope is to be given to stakeholder committees to develop substantive policy? Or alternatively, how much central direction on desired outcomes should be provided to structure the negotiation and manage inevitable trade-offs?

In this respect, the Act establishes a somewhat conflicting scheme, particularly in light of the approach taken to implementation. On one hand, the Act contemplates quite a depth of public participation in drafting management plans. This is of course subject to a ministerial veto, and certain key guiding provisions for plan content and form. Although the Act provides a range of guiding parameters for this process (priorities, duties and Statements of outcome), earlier analysis has shown that this did not amount to unequivocal substantive provision for environmental outcomes, and considerable discretion would remain for planning committees to make substantive decisions on the allocation balance achieved.

Yet on the other hand, the conduct of Minister’s Plans offers a way around a reasonably structured participatory planning process, and a far less significant role for management committees. In practice, management committees were only used in an advisory capacity for the development of Minister’s plans. Nonetheless, the Minister went to the trouble of constituting full committees, and financing their operation over a number of years. This gave committee members, particularly non-government representatives, the impression that they were preparing a plan and had a major influence over its content. When plans were revised at the conclusion of the process area is covered by a water sharing plan. In areas not covered, licensing continues under the Water Act 1912.
so as to gain ministerial approval, there was much dissatisfaction among participants that plans were substantially changed, thereby devaluing their long commitment to participation. In the end result the planning process in NSW amounted neither to quality public participation in the substantive development of policy nor to a tightly constrained, centrally run process, but was a complex and conflicting combination of approaches.

(b) Design of Water Sharing Planning

Chapter Three suggested that, if high levels of public participation are employed in the context of a highly contested resource re-allocation, a number of important questions of process design and conduct arise. The Gwydir experience underscores the importance of structured and purposeful process design, particularly if a participatory approach is to be employed.

(i) Effective Representation of Public Environmental Interests

Effective representation of affected parties and interests is one of the key challenges of creating institutions of adaptive governance, with the potential to contribute to effective EWA. Ensuring legitimate, meaningful involvement of affected groups requires a consideration of who should be represented, with what resources and with what authority. In a natural resource management context, there is a danger that organised economic interests dominate, and it is very difficult to effectively represent public interest environmental values. A number of issues concerning effective representation arose in the context of the Gwydir negotiation, including the skills base of committees; and whether environmental interests were adequately represented in light of strong representation of existing socio-economic interests.

Community members of the NSW planning committees were appointed on the basis of their representation of stakeholder interest groups rather than skills to deal with the

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132 Comments made in interviews with representatives of nature conservation interests and irrigation interests, and other landholders involved in the process, August 2006.
134 Lyster, above n 102, 41-48.
onerous technical task at hand. Committees did include representatives of relevant
government agencies, whose appointments were more focused on potential skills
contribution. Yet, this still left a majority of lay people on the committee. Concern
was expressed by most categories of participant on the Gwydir committee, including
community members themselves, about the magnitude of the technical task assigned
to them, and the degree of knowledge and skill required.135 This contributed to
increased decision-making times as community members needed to be educated to
enable informed decision-making, and a perception on the part of some community
members that decisions were really made by the experts anyway, that they were
merely present to rubber-stamp them.136

Government agency representatives were expected to contribute the necessary skills
base and policy positions required to complete the planning task. Yet, as later
discussion shows, no clear policy guidance was available to guide the planning
process. In addition, the skills base of agency staff was not necessarily
comprehensive. For example, many involved in the process lamented the lack of
independent scientific representation on the committee that was uncompromised by
agency allegiances. The participation of agency staff was seen as highly politicised.137
Those involved in the current implementation of the environmental water regime from
an operational perspective have also suggested that a significant omission from the
negotiating table was a representative with skills and experience in the operational
management of the regulated system.138 They argue that this would have helped
ensure that the proposals put forward in the plan were the most efficient and effective
way to achieve the desired outcomes within the constraints of the operating system.139

Additionally, while the full suite of representation contemplated by the Act had the
potential to achieve a relatively balanced negotiating committee, in practice this was
difficult to realise. Previous research by Tan into similar stakeholder committee

135 Comments made in interviews with landholders, representatives of nature conservation interests,
and staff of both the nature conservation agency and natural resource agency involved in the process,
August 2006.
136 Ibid.
137 Comments made in interviews with landholders, representatives of nature conservation interests
involved in the process, August 2006.
138 Comments made in interviews with water authority staff (State Water) involved in the
implementation of the environmental water regime, August 2006.
139 Ibid.
processes used in early environmental flow reforms in 1997 identified concerns that representatives of the irrigation industry dominated the process, particularly as local government and catchment body representatives tended to be local landholders who also supported irrigation interests.\(^\text{140}\) In the Gwydir committee, this imbalance was accentuated by the presence of vocal observers, who were not committee members nor entitled to formal participation rights, yet were allowed to attend meetings and exerted considerable influence on committee deliberations in favour of irrigation interests. This created a difficult climate for environmental representatives to voice their interests.\(^\text{141}\) Planning committees also characteristically encountered considerable difficulties in supporting and sustaining Indigenous representation; a factor that can be linked to the very minimal recognition of Indigenous interests in water in resulting plans.\(^\text{142}\)

**(ii) Establishing Acceptable Parameters for Negotiation**

Given the highly contentious context of resource re-allocation, clearer policy guidance on the way in which competing interests were to be treated in the negotiation would have been very beneficial. In a situation where committees were not skills-based, but dominated by lay members, the imperative to provide clear policy guidelines to structure and guide decision-making was rendered even more important. This could have been in the form of targets for environmental water recovery, such as an extension of the target of a maximum of 10% reduction in average annual extractions to recover water for the environment, employed in the previous round of negotiations in NSW. Although the legislation itself was equivocal on this matter, it left room for government policy to provide such guidance through the preparation of targeted government policy (State Water Management Outcomes Plan, SWMOP), and the requirements that plans be consistent with this.\(^\text{143}\)

\(^{140}\) Tan, above n 102, 173. This is supported by interviews conducted with committee members involved in the Gwydir planning process, August 2006.

\(^{141}\) Comments made in interviews with representatives of nature conservation interests and other committee members involved in the process, August 2006.

\(^{142}\) Comments made in interviews with staff of the natural resource agency leading the process, August 2006.

\(^{143}\) This has been discussed above against Element One of the framework. See *Water Management Act 2000* (NSW), ss 6, 9(2).
The timing, and permissive implementation standard applied to the SWMOP, have been noted above. These factors rendered it of little value to the planning committees. Similarly, policy advice on contentious and technical issues prepared for committees was provided on an individual issue basis. Receiving fragmented policy on a staged basis was noted by all involved in the process as one of its major downfalls. Comments by participants indicated that policy was being developed as the planning process was undertaken; policy was continually changing; and this made it impossible to resolve difficult issues at the committee level. Agencies developing policy were under considerable political pressure, which, in the opinion of some participants, contributed to various inappropriate decisions and restrictions placed on committees. At the end of the process, State policy was applied retrospectively to ensure plans had some level of consistency across the State. Yet this rendered obsolete many of the committee’s deliberations aimed at producing locally relevant plans.

An interesting comparison was drawn, by various participants, with the planning in the Border Rivers water management area which was undertaken some time after the majority of plans in northern NSW. The timing of this process enabled a formulated policy to be applied upfront, which contributed to a smoother process, and lessened the scope for heated debate on such controversial issues.

One of the key aims of the planning process was to provide for environmental water needs. Therefore, the availability of credible scientific information pertaining to environmental water allocation, and the way this was used in the negotiation process, particularly in comparison with the use of socio-economic information, is a significant factor in evaluating the process used to draft the water sharing plan. Key conservation stakeholders across the broader environmental flows debate have argued that scientific recommendations on environmental water needs should be given a

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144 Advice for River Management Committees on key policy areas was prepared on a whole of government basis. These advisory notes are still available at: NSW Government, Advisory Notes <http://www.water.nsw.gov.au/Water-Management/Water-sharing/Advisory-notes/default.aspx> at 20 October 2009.
145 Comments made in interviews with committee members involved in the Gwydir planning process, August 2006.
146 Ibid.
147 Comments made in interviews with staff of the natural resource agency leading the process, August 2006.
predominant role in such decision-making if the outcome is to be an ecologically sustainable allocation of the resource. Yet the experience of stakeholders involved in the negotiation process in the Gwydir suggests that such scientific information is more important to establish the political context for change, and to set initial policy targets to guide such a planning process. Within the highly politicised setting of a stakeholder negotiation, unless scientific recommendations for environmental water needs have been used to set the framework of the negotiation, they become just one side of a hotly contested debate. The comments below are drawn largely from the observations of participants, particularly those with a scientific background.

Generally, there appeared to be consensus that a lack of scientific information was not a factor influencing the outcome of the negotiation process. While many conceded that available information in the Gwydir focused almost exclusively on the water requirements of the wetlands, not the upper river reaches nor in-stream values, and that certain information gaps remained, there was general agreement that enough was known to justify environmental water recovery to support restoration of aquatic ecosystems, particularly if this was managed in an adaptive manner. There was, however, some concern as to the lack of independent scientific expertise available to the process. Independent scientific bodies were not consulted by the relevant agencies to help set ecological objectives and parameters for water planning, which perhaps could have benefited the process, and given the scientific recommendations more of a prominent role in the negotiations.

The process used to access relevant scientific information on environmental water needs differed from committee to committee. In some committees an expert panel technique was applied for a rapid and up to date assessment of environmental flow requirements. However, in other catchments, such as the Gwydir, this process was not used and, instead, the committee relied on available research, largely sourced and

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149 Comments made in interviews with committee members with representatives of nature conservation interests and staff from nature conservation agencies involved in the Gwydir planning process, August 2006.
150 Comments made by scientific expert members of the ECA Operations Advisory Committee, August 2006.
presented to them by the agency committee members.\textsuperscript{151} This contrasts with the targeted preparation of scientific recommendations for environmental flows in a format that could be easily applied to a water allocation planning process, used in Victoria.

\textit{(iii) Designing Processes to Manage Inevitable Conflict}

In her analysis of participatory natural resource planning processes in NSW, Lyster has drawn attention to different levels of conflict inherent in water management planning disputes.\textsuperscript{152} For example, \textit{data conflict} occurs when there is a lack of information or misinformation about an issue. It may also arise when parties have different interpretations of the information available and its relevance to the negotiation, or different ways of expressing or assessing data.\textsuperscript{153} As noted in Chapter Two, water allocation disputes, like many environmental conflicts, are underpinned by very technical and scientific data, with levels of complexity and uncertainty operating as further complicating factors. Committee members were required to understand, interpret and apply complex technical information. Arguments were often raised in the committee process that there was insufficient scientific evidence to justify further environmental water recovery. Such arguments proved to be an effective stalling technique in the negotiations for those who opposed environmental water recovery.\textsuperscript{154}

Lyster also identifies the very apparent issue of \textit{structural conflict} in water management committees, which is linked to unequal control over, ownership or distribution of resources, or unequal power and authority. It may also result from geographical and environmental factors and time constraints, which influence a party’s ability to participate.\textsuperscript{155} Lyster argues that, where power imbalances and cultural differences are not recognised and properly dealt with, the plans will not reflect the true plurality of interests on the committee. For example, she identifies

\begin{flushleft}
\textsuperscript{151} Comments made in interviews with staff from nature conservation agencies, or representatives of nature conservation interests involved in the Gwydir planning process, August 2006.
\textsuperscript{152} Lyster, above n 102.
\textsuperscript{153} Ibid, 43–44.
\textsuperscript{154} Comments made in interviews with staff of nature conservation agencies involved in the process, August 2006.
\textsuperscript{155} Lyster, above n 102, 45–46.
\end{flushleft}
water users as the interest group with the most power in the committee setting, as they represented the status quo of resource allocation and could access the greatest financial and technical resources to enable effective participation.\(^{156}\) One long time participant in the process contrasted progress in the Macquarie Valley to the south of the Gwydir with that in the Gwydir, suggesting that environmental concerns were given more weight and at an earlier stage in the Macquarie, and environmental stakeholders had more leverage in negotiations, due largely to a history of public land and water ownership by conservation agencies. In the Gwydir, where there are no publicly owned nature reserves, nor such a long history of environmental water allocation, the negotiating position of environmental stakeholders was thought to be considerably weaker.\(^{157}\)

Given such inevitable and high levels of conflict, sophisticated processes to manage conflicting interests are required. While ensuring effective representation and bounding a negotiation within parameters of acceptable outcomes will both contribute substantially to lessening conflict and structuring its resolution; decision-making procedure, including conflict resolution, was also arguably given inadequate recognition in the NSW process.

The NSW process required decisions to be made on a consensus basis.\(^ {158}\) Yet the difficulty of achieving this should not be understated. In the Gwydir, there was a concerted effort made to achieve consensus, however if this was not possible, the debate was taken as far as possible, each stakeholder was asked to put forward a position, and eventually a decision was made – either it came down to a vote, or was referred to higher level inter-agency working groups, or ministerial staff to adjudicate.\(^ {159}\) The agency leading the planning had no active process for dealing with conflict, which meant that they relied heavily on the skill of the independent chair to manage often volatile situations. Some committees across the State were able to

\(^{156}\) Ibid.

See also Tan, above n 102. This is supported by comments made in interviews with staff of the nature conservation agency involved in the process, August 2006.

\(^{157}\) Comments made in interviews with staff of the nature conservation agency involved in the process, August 2006.

\(^{158}\) Comments made in interviews with staff of the natural resource agency leading the process, August 2006.

\(^{159}\) Comments made in interviews with committee members involved in the Gwydir planning process, August 2006.
access an independent facilitator to progress negotiations on certain issues, but this was not uniformly available, and depended on the initiative of and resources available to the particular committee.\textsuperscript{160}

The one issue which caused the most heated debate in the planning process was the volume of the Environmental Contingency Allowance (volumetric environmental entitlement).\textsuperscript{161} On this issue, consensus proved to be impossible. Environmental representatives, including those from government conservation agencies, supported a much higher volumetric environmental allocation and various scientific papers were produced to support these arguments. Irrigator representatives were reluctant to change the status quo, raising the data conflict type arguments noted above. They were supported by various aligned government agencies and local government representatives, and allegedly threatened a legal challenge to the plan. The stand off was only resolved when irrigators were granted certain concessions in order to get negotiations moving again, and by way of the political pressure exerted by the Minister.\textsuperscript{162} As such, a volume with no particular scientific basis was arrived at, clearly well below the amounts sought by environmental stakeholders, yet some improvement on the previous provision.

(iv) Facilitating Required Changes in the Status Quo

Under the Water Management Act, committees were required to consider the socio-economic implications of the water sharing plan.\textsuperscript{163} However, there were no programs in place to manage the socio-economic impacts that would accompany the level of resource re-allocation recommended by scientists to achieve improvements in river health. In a catchment such as the Gwydir, where water is a valuable resource, and where there is little movement of water between different industries in a market context due to the high-value dominant use in cotton production, further changes to the status quo without considerable adjustment assistance would appear to be very

\textsuperscript{160} Comments made in interviews with staff of the natural resource agency leading the process, August 2006.
\textsuperscript{161} Comments made in interviews with committee members involved in the Gwydir planning process, August 2006.
\textsuperscript{162} Comments made in Interviews with staff of the natural resource agency leading the process and other committee members, August 2006.
\textsuperscript{163} Water Management Act 2000 (NSW), s 18(1).
difficult to realise. This is particularly the case considering the history of environmental flow planning which had already achieved an 11% reduction in water available to consumptive uses without any compensation. The lack of targeted mechanisms to accompany planning was a serious constraint to achieving changes to the status quo through these processes.\textsuperscript{164}

\textbf{B Alternative Approaches to Environmental Water Recovery}

In line with broader trends across the MDB, as administrative allocation planning processes have failed to deliver significant environmental outcomes, governments have invested in water savings from infrastructure improvements and market-based programs to buy back water from willing sellers in order to facilitate environmental water recovery.

There have been considerable investments in infrastructure savings in NSW under the NWR framework;\textsuperscript{165} and already the Commonwealth buy-back program introduced in 2007 is making substantial purchases in NSW.\textsuperscript{166} These federal initiatives will, however, be discussed in Chapter Six. Two additional NSW programs are briefly outlined here. Their impact will be comparatively limited due to funding availability. Nonetheless, their conduct raises some important issues about the most effective and efficient approaches to water recovery.

The NSW Wetland Recovery Plan targets two significant wetland systems, including the Gwydir, with money allocated to purchase water licences and the remainder for revised ecological mapping of the wetlands, management planning, and infrastructure works.\textsuperscript{167} It is anticipated that this program will provide an opportunity to consolidate


\textsuperscript{165} A number of these projects have been funded under the Living Murray Initiative. See Murray Darling Basin Commission, \textit{Water Recovery Progress Report, July 2008} <http://thelivingmurray.mdbc.gov.au/programs/water_recovery/progress> at 20 / 10 / 2009.


and improve management frameworks for the Gwydir wetlands, and address many of
the operational issues associated with delivering water to intended destinations which
will be discussed in following sections of this chapter. The broad focus of this
program underscores the importance of accompanying environmental water recovery
with detailed planning and management works, to ensure purchases are targeted to
ecological priorities and subsequent water use is efficient and effective.

Riverbank is a program exclusively focused on purchase of entitlements from willing
sellers. The Gwydir is one of four priority inland rivers initially targeted by the
program. Riverbank prioritises its acquisition on the basis of the conservation and
cultural significance of rivers and wetlands; and the water supply risks currently
posed to those values. Buy-back appears to be considerably more targeted and
carefully guided by upfront priorities than the current federal scheme.

Of the additional considerations used by Riverbank to prioritise purchases, two are of
particular relevance to the Gwydir context, and may well preclude substantial
investment in this catchment. First, Riverbank considers the statutory security of any
rights that may be purchased, and the risk that any benefits accrued will be diminished
by other influences outside the control of Riverbank. This is of relevance to the
Gwydir in the context of extensive and poorly regulated floodplain harvesting and
other supplementary water access, which potentially undermine the integrity of
existing entitlements. Another consideration is the strength of institutional
arrangements for environmental water management and relationships with key
landholders and managers at targeted assets which provide confidence that water
allocation can achieve the required environmental outcomes. Given the extent of
operational difficulties encountered in delivering EWA to the Gwydir wetlands

168 Comments made in interview with natural resource agency staff involved in implementation of
EWA in the Gwydir, August 2006.
169 NSW Department of Environment Climate Change and Water, NSW Riverbank: Buying Water
170 NSW Department of Environment Climate Change and Water, New South Wales Riverbank
171 Ibid.
172 Interviews with staff of the nature conservation agency involved in EWA negotiation and
implementation in the Gwydir, suggest that such factors make investment in environmental water
recovery in the catchment considerably less attractive, August 2006.
173 NSW Department of Environment, Climate Change and Water, above n 170, 13.
discussed in the following section, this consideration may also discourage investment in the Gwydir.

The discussion in this section has illustrated a number of flaws in the design and conduct of the water allocation planning process in NSW. Given the inherent levels of conflict and political polarisation associated with water re-allocation, it seems only a very well planned participatory process directed by a clear policy of measurable targets and outcomes, supported by financial incentives to achieve the desired levels of resource re-allocation, and potentially employing independent mediation, could have achieved a greater change to the status quo. Conducting such a process without these supporting structures in place was doomed to do little more than replicate the status quo of resource allocation. When combined with reforms to strengthen consumptive entitlements, this failed process has also served to further entrench unsustainable levels of resource allocation. Following a failure to achieve significant environmental outcomes, alternative mechanisms of environmental water recovery are now being pursued. This discussion has raised some concerns about their conduct, which will be revisited in the context of the more substantial federal environmental water recovery programs discussed in Chapter Six.
IV ELEMENT THREE: LEGAL MECHANISMS TO FACILITATE AND PROTECT ENVIRONMENTAL WATER

This section illustrates how the legal mechanisms used to facilitate and protect environmental water in the Gwydir, and their situation within the broader regulatory framework, are important determinants of environmental outcomes. In addition to the legal status and characteristics of direct mechanisms for EWA conferred by governing legislation and planning instruments, this discussion considers how these mechanisms are applied in a practical management context, and whether this impacts on the status and protection of environmental water. In this task, the empirical case study work, particularly interviews with current operational and environmental water managers, is of particular value.

Additionally, as discussion in Chapter Three has highlighted, the effectiveness of EWA depends significantly on the broader regulatory context. Key elements of the regulatory framework for consumptive water use in the Gwydir, which influence the status and protection accorded environmental water, are explored. This emphasises the importance of effective legal mechanisms to limit consumptive use and broaden and tighten the regulatory framework to effectively cover all forms of water harvesting.

A Direct Legal Mechanisms for Environmental Water

There are a range of legal mechanisms available to facilitate EWA under the Water Management Act.\textsuperscript{174} All of these mechanisms were used to varying degrees in the water sharing plans negotiated for regulated rivers under the Act.\textsuperscript{175} In addition to long term extraction limits, which will be discussed below as a key element of the broader regulatory framework rather than a direct rule of EWA, the Gwydir plan contains two operational rules for passing flows (rules-based environmental water)

\textsuperscript{174} Water Management Act 2000 (NSW), s 8 – 8E.
and a volumetric environmental entitlement, known in NSW as an Environmental Contingency Allowance [ECA].

The two operational rules aim to preserve some degree of the natural variability in the system, particularly for smaller flood events, and protect a proportion of the inflow to the wetlands:

**Protection of first 500ML/day of tributary inflow.**

The first 500ML / day of inflows to the Gwydir river from three key tributaries below Copeton Dam may not be extracted and is allowed to flow through to the wetlands.

**Limits on accessing supplementary flows:**

The plan allocates licences to water users to access supplementary flows. These are defined as flows that are in excess of the water needed to meet the environmental provisions of the plan, basic landholder rights, and water orders placed by entitlement holders. Such flows occur when there is a significant rainfall event downstream from Copeton Dam. Access is limited to 50% of the flow event. This effectively means that 50% of unregulated flows entering the system which exceed the 500 ML/day mark, and which exceed all other demands on the system, must not be extracted and remain effectively as ‘environmental water’ within the system. While the rationale behind this rule is clearly environmental, it is not included formally in the plan as an environmental rule, and is defined with reference to consumptive use.

The plan also provides for a volumetric allocation (ECA) in Copeton Dam of 45000ML per year. This entitlement receives water allocated to it at the same rate as general security consumptive entitlements. Therefore, the volume available in any year will be the percentage allocation credited to these entitlements.

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176 NSW Government Department of Infrastructure Planning and Natural Resources, above n 81, cl 14.
177 Ibid, cl 48.
178 Whether the environment receives the full allocation in any given year depends on whether irrigators receive 100% of their access entitlement. If they are only able to access 75% of their entitlement for example, then the environmental account will be credited with only 75% of 45000ML.
ecological condition of the wetland system; others relate to in-stream and more general river health.

Adaptive Environmental Water is another category of volumetric entitlement under the Act, which caters for water recovered through buy-back or infrastructure projects subsequent to the finalisation of a water sharing plan. A water use plan must be made for each adaptive water entitlement, however in practice they will generally be managed conjunctively with other environmental water in the catchment. The original Gwydir plan contained no such entitlements, however they are beginning to emerge in NSW as a result of considerable investment in water recovery, through programs such as Riverbank.

1 Legal and Practical Management Status

Discussion in Chapter Three questioned whether NWR commitments to ensure environmental water has similar legal status and protection to other entitlements in the system has been achieved in practice and, further, whether such a standard was sufficient in a practical management context to achieve effective environmental outcomes. The differing characteristics of the range of mechanisms used for EWA in the Gwydir plan translates to a range of different levels of legal status relative to consumptive entitlements. In many cases this status is diminished by the practical management context for EWA.

For example, of the three mechanisms listed as environmental water rules in the plan, only one appears to be a secure rule which takes precedence in the operation of the regulated system: the first passing flow rule, protecting 500ML/day of tributary inflow to the wetlands. The relative status of the other rules is discussed below.

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179 For example, to support a colonial nesting native bird breeding event that has been initiated in the Gwydir wetlands following natural flood inundation (cl 15(d)(i)), and to provide additional inundation in the Gingham and Lower Gwydir Wetlands during or following periods of extended dry climatic conditions. (cl 15(d)(ii)).
180 For example, to provide inundation of higher level benches in the upstream river reaches (cl 15(d)(iii)), and to support native fish populations and habitat (cl 15(d)(vi)), invertebrates and other aquatic species (cl 15(d)(vii)), and a general objectives to maintain aquatic ecosystem health (cl 15(d)(ix)).
181 Water Management Act 2000 (NSW), s 8B-E.
182 Ibid, s 8E(7).
The long term extraction limit is defined around permissible consumptive use, and does not protect a given volume of water for the environment. The practical effect of the rule is a variable amount of water left in the system, depending on permissible levels of consumptive use under various scenarios of water availability. Although allocations against consumptive entitlements are also variable, the fact that this environmental water is defined only as the residue after these entitlements are met, gives it little legal status relative to competing users.

The ECA is treated very similarly to consumptive use entitlements in that it is only credited with water through the available water determination process at the same rate as general security entitlements, after basic rights and high security licences have been credited to 100% of their allocation. It is therefore equally vulnerable to reduced inflow and changing water availability on a yearly basis, an issue of increasing relevance in light of climate change scenarios. There are some differences between this entitlement and general security entitlements which give it more management flexibility. For example, carry-over provisions are more generous than for general security licences, and there is no limit on the amount of water that can be released from the account in any one year. These provisions will allow for some more tailored management according to prevailing climatic conditions, and arguably give it a slightly prioritised status at a formal level.

Similarly, adaptive environmental water entitlements, as they become available, would retain a similar legal status to the original consumptive entitlement from which they are sourced and, therefore, in the case of general security entitlements would be subject to the same low levels of reliability pertaining to the Gwydir given high levels of over-allocation. Yet it appears they would also be subject to limited carry-over and annual use rules pertaining to their source entitlements.

It is, however, also important to review the practical management status of these instruments, particularly in light of implementation difficulties associated with

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183 NSW Department of Infrastructure Planning and Natural Resources, above n 81, cl 15(c).
184 Ibid. The ECA may be carried over in storage up to a maximum of 90000ML.
operational constraints in a regulated river; managing competing consumptive use interests; and prevailing management practices and culture.

For example, in relation to the one secure operational rule protecting a certain volume of tributary inflow, uncertainties and complexities surrounding water accounting systems mean that, under current management practices, this water is vulnerable to erosion through basic rights extractions and high delivery losses. This may undermine its environmental benefit. State Water, the operational managers of the system, note the problematic nature of this rule: tributary inflow is measured upstream of the designated delivery point for this water, which is on average four days delivery time downstream. Significant losses often occur over this distance, and water is extracted for basic rights. In the common situation of dry conditions when no releases are being made, if a small high flow event occurs in the system that would qualify for protection under this rule, it is consequently difficult to ensure this volume of water reaches the delivery point at the entrance to the wetlands. In the absence of regulatory guidance to the contrary, current State Water interpretations of this rule allow for such attenuation of the flow event, rather than ensuring additional water is released to account for these losses and basic use rights. Thus, the practical circumstances of the rule will yield less water to the wetlands than appears to be intended through the plan unless specific provision is otherwise made.

Similar operational difficulties plague the delivery of the Gwydir ECA and undermine its status. One of its key objectives is to provide flows to the wetland system. The wetland occurs on a large floodplain of very low gradient. The movement of water over this area is significantly influenced by any change in topography, and can be adversely impacted by stock and domestic channels, roads, informal vehicle tracks and minor earthworks. Additionally, many wetland landholders no longer desire the flooding associated with the natural flow regime as they have converted land from pasture to cultivation. This combination of factors means that it is increasingly difficult practically, and also highly controversial among landholders, to deliver water.

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185 Comments made in interviews with water authority staff (State Water) involved in the implementation of the Gwydir plan, August 2006.
186 Comments made in interviews with staff of the natural resource agency involved in the implementation of the Gwydir plan, August 2006.
187 See discussion in Keyte, above n 15, 44-45; McCosker and Duggin, above n 9, 10-11; Allan and Lovett, above n 15, 33.
to certain areas of the wetland efficiently and effectively. Anecdotal evidence suggests considerable interference with the progression of floodwater for these reasons. Some of the Ramsar sites within the watercourse are located 70-80km from the last point of regulation, on land that is now much less frequently flooded. To reinstate the type of natural flooding required by these areas poses very complex and contested management decisions.

Some of the other objectives of the ECA also have significant potential operational limitations. For example, water may be released to wet high level benches upstream in the system, to improve carbon and nutrient cycling throughout the river. Yet the volumes required to inundate these benches may be too great for the current gauge capacity of dam. While retrofitting is possible, this is not on the agenda in the foreseeable future and involves considerable expense. Even if the infrastructure allowed, achieving this objective may conflict with management imperatives for delivering water for irrigation. For example, if water levels are required to drop quickly after wetting to mirror a natural flood pulse, this may be difficult to achieve in the context of the more continuous delivery requirements of consumptive users.

The way in which environmental water may be treated if its delivery requirements conflict with the delivery of consumptive water is another issue of concern, highlighting uncertain status in practice. The most likely situation in which such a conflict would occur surrounds the delivery of the ECA. For example, if environmental water was required along a distributary channel where there are irrigation licences, issues of insufficient channel capacity may arise if the timing of delivery coincided with irrigation releases. Such a direct conflict has not yet arisen, yet managers describe it as a conceivable situation. Little guidance is provided by

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188 Comments made in interviews with staff of the natural resource agency involved in the implementation of the Gwydir plan, August 2006.
189 Allan and Lovett, above n 15, 33.
190 NSW Department of Infrastructure Planning and Natural Resources, above n 80, cl 15(d)(ii). The term benches refers to channel features in the river bank and riparian zone, which are wet to different levels at different frequencies as part of the natural flow regime.
191 These comments were made by water authority staff (State Water) interviewed in August 2006, and supported by comments made by other interviewees involved in the implementation of the environmental water regime.
192 This may occur on the distributary channels of the lower Gwydir or Malawa.
193 Comments made in interviews conducted with staff from the water authority and natural resource agency involved in the implementation of the Gwydir environmental water regime (August 2006).
governing legislation or the plan on the resolution of such a conflict. This effectively means that the decision would be left to the discretion of State Water as operational manager of the system. Discussion in Element Four illustrates that, in the current management context, it is unlikely that a delivery priority would be accorded to environmental water over consumptive water without specific direction to that effect.

This discussion has shown how the selection of legal mechanisms to provide for environmental water is a strong determinant of resulting status and practical effect. Operational rules for passing flows are used very minimally in the Gwydir plan, especially in comparison to the Victorian case study discussed in the next chapter. Yet, under the statutory scheme and in the practical management context, these rules are potentially the most secure and prioritised water. The ECA is also defined in this case with slightly higher status than general security consumptive water entitlements due to carry-over and other management flexibility provisions. Yet it is similarly vulnerable to changing water availability as other consumptive entitlements in the system, and its use is considerably constrained by the practical management context.

**B Corresponding Regulation of Consumptive Use**

1 *Limits on Consumptive Use*

In all regulated rivers in NSW, including the Gwydir, a long term extraction limit is used as the basis for water sharing. Concerns about the use of extraction limits to set water aside for the environment have been raised in Chapter Three and include the lack of ecological basis used to establish limits to date, and the way in which remaining environmental water may be vulnerable if not adequately specified and protected, particularly given considerable threats to future water availability and difficulties effectively regulating all forms of water harvesting and interception activities. The NSW application of this instrument in water sharing plans has not effectively overcome these flaws.

For example, similar to the MDB Cap, long term extraction limits have no ecological basis, but merely limit extractions to the level of development at a certain point in
time. NSW policy applying to water sharing planning did require that these limits improve on previous limits set under the Cap. Yet given the impact of early initiatives to provide for environmental flows prior to the introduction of the Water Management Act outlined above, this was achieved relatively easily without necessitating further reductions in water available for consumption under water sharing plans. The 10% improvement, while significant, lacked any ecological basis, and given such existing high levels of extraction still resulted in limits of arguably little ecological value.

NSW limits were also expressed as long term averages. Yet this approach fails to address the natural flow variability of the system and ignores temporal and seasonal issues critical to natural flow regimes. For example, of the average flows protected, the majority of flow may quite conceivably occur during times of high flow, meaning that low to medium flows, essential for the maintenance of riverine health are poorly protected. This is an issue of particular significance for the Gwydir, where there is high natural variability and consumptive use patterns have essentially eliminated small floods and high flow events from the system. It highlights the importance of setting limits at ecologically significant levels and ensuring remaining environmental water is specified and protected so that enough is available to allow managers to provide for these values. Previous discussion of direct legal mechanisms of EWA in the Gwydir does not suggest this was necessarily achieved.

Significantly, under the water sharing plans, in the calculation of the limits and auditing compliance with it, the full range of water extractions and harvesting is to be included. This includes floodplain harvesting extractions estimated to be taken for use in conjunction with extractions authorised from the water source. This is an important attempt, in response to identified flaws of the MDB Cap, to broaden the reach of the limit and thereby boost the protection of existing entitlements and remaining environmental water. This research has not investigated the implementation of this measure, however the considerable difficulties associated with regulating such

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194 State Water Management Outcomes Plan Order 2002 (NSW), Target 1a.
195 For example, NSW Department of Infrastructure Planning and Natural Resources, above n 81, cl 30(3).
activities in practice discussed below, foreshadow substantial implementation challenges.

2 Tightening and Broadening Regulatory Coverage

In practical terms the status of environmental water, and indeed of all other entitlements, also depends on the level of compliance generally within the system. In the mid 1990s a comprehensive independent investigation of water management in the river valleys of north western NSW highlighted serious deficiencies in compliance and enforcement. In the Gwydir particularly, water metering was found to be highly inaccurate due to the inferior quality and condition of meters, meter tampering, meter accuracy and unauthorised changes to metering installations. Breaches of licence conditions were also detected. These findings were attributed to poor standards of monitoring and surveillance by the responsible agency at the time. The situation was worsened by a general limited documentation and recording of flow data which made it difficult to account for the amount of water being used.\textsuperscript{196}

Research conducted for this thesis suggested that efforts have since been made to tighten compliance, encouraged by the NWR agenda and particularly the institutional separation of regulatory and operational water management functions in NSW. Yet there is ongoing concern among some water managers and community members that poor compliance remains an issue threatening effective, efficient management of the system, and that significant breaches still occur.\textsuperscript{197} This appears to be a result of a fractured approach to water use regulation, and insufficient resources allocated to compliance activities.

For example, although State Water is responsible for reading meters and ensuring their accuracy, it is the responsibility of the licence holder to purchase and install the

\textsuperscript{196} North West Rivers Audit (Sept 1995) and River Meters Audits (May 1995) prepared by consultants for the NSW Dept of Water Resources. These reports are referenced in Allan and Lovett, above n 15, 30-31; McHugh, above n 15, 179. 
For governmental acknowledgement of the problem, see NSW Department of Land and Water Conservation, above n 2, 17-18.

\textsuperscript{197} Comments made in interviews with landholders and representatives of nature conservation interests involved in the implementation of the environmental water regime, conducted in August 2006, suggested compliance activity is weak and that this is evidenced by the very few prosecutions carried out under the Act. Anecdotal evidence of water fraud persists in the community.
meter. This split of responsibility is of significant concern. For example, meters may be installed in places where they become in-operative during a large flow event, for example, below the level of flow associated with higher flow events, thereby facilitating fraudulent extraction. This is potentially an issue of significance for enforcing limits on access to supplementary water, so important to the overall environmental water regime. Meters are also easy to disable, and anecdotal evidence of unauthorised extraction through meter tampering persists in the community. Again, any such unauthorised pumping could undermine the delivery of environmental water, particularly in the context of a supplementary water event, where environmental water must be clearly distinguished from water available for extraction.

In 2005, a State Water Extraction Monitoring Policy and accompanying standards were developed to increase active monitoring of water extraction. Yet, this policy focused largely on introducing metering to unregulated rivers and groundwater sources, stating that, in the regulated rivers, extraction monitoring is generally at an acceptable level. The standards addressed, inter alia, the capability of the flow meter including measures to prevent manipulation and tampering, and the situation of the meter to ensure comprehensive recording of all extractions, even in times of high flow. At the time of the empirical research, local State Water staff suggested, however, there was a significant discrepancy between these standards and conditions on the ground in the regulated section of the Gwydir, and noted insufficient institutional capacity to implement the standards. Subsequently, compliance powers have been streamlined and expanded, with targeted amendments to the Water

198 NSW Department of Infrastructure Planning and Natural Resources, NSW Water Extraction Monitoring Policy (2005).
199 Above, n 197. See also McHugh, above n 15, 179.
200 NSW Department of Infrastructure Planning and Natural Resources, above n 195; NSW Department of Natural Resources and State Water, NSW Water Extraction Monitoring Standards (2005).
201 NSW Department of Infrastructure Planning and Natural Resources, NSW Water Extraction Monitoring Policy (2005), 5.
202 Comments made in interviews with water authority staff (State Water) involved in the implementation of the environmental water regime, conducted in August 2006.
Management Act introducing tougher penalties, new offence provisions, and improved investigatory and enforcement powers, to better prevent and police water theft and other illegal activities that might impact water supplies.203

In the Gwydir context, one particular area where the regulation of consumptive use must be effectively broadened is in relation to floodplain harvesting. This is currently a significant loophole in the regulation of water extraction, particularly in the northern MDB, and poses particular regulatory challenges.

Quantifying the extent of floodplain harvesting is very difficult due to the opportunistic nature of the extraction, the diversity of structures and methods used to harvest water, and the considerable overlap of such extraction with harvesting rainfall run-off,204 and managing irrigation return flows. Nonetheless, current estimates suggest that it accounts for a very significant portion of total water extracted in the valleys of northern NSW such as the Gwydir.205 In the Gwydir, floodplain harvesting reduces the beneficial environmental impact of downstream flows, particularly in the terminal wetlands. In this respect it may undermine the effectiveness of environmental water set aside in the plan, for example requiring far greater volumes of managed water releases to enable effective flooding of the wetlands.

Attempts are being made to better account for floodplain harvesting.206 Under the Water Management Act, such activities require a water extraction licence.207 The first generation of management plans under the Act has not addressed this issue, other than to provide that water diverted through floodplain harvesting is explicitly included in

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204 For a discussion of rules relating to capturing and storing rainfall runoff in NSW (regulated by the harvestable rights provisions under the Water Management Act, ss 53, 54), see Gardner et al (2009), above n 49, 207-213.
205 Comments made in interviews with staff of the nature conservation agency involved in the implementation of the environmental water regime, August 2006.
206 This is an important aspect of National Water Reform discussed in Chapters Two and Three: Council of Australian Governments, above n 5, cl 55-57.

Floodplain harvesting works and water extractions clearly fall into those activities that may only be undertaken by way of a license. The Act also requires such licensing to consider the ecological functioning of floodplains. Previous legislation, the Water Act 1912 (NSW), also provided powers for licensing but these were never applied as there was generally no requirement to restrict total overall water extractions.
the long term extraction limit. The government has, however, concurrently developed a Statewide policy on floodplain harvesting, which provides that all existing works and extractions will be licensed, and that licensing will focus initially on controlling structures, but will later move towards specifying volume limits and flow related conditions, including metering of pumps. No new works that result in additional diversion of water will be authorised. Any diversions associated with works in place prior to 1994, will be considered as within the MDB Cap, and appropriate steps will be taken to keep diversions to Cap levels. The magnitude of the task is not under-stated, and the policy provides no time frame for the completion of these tasks.

If licensing occurs as planned, then any diversions beyond 1994 MDB cap levels would indicate a growth in water usage, necessitating reductions in other types of extraction to maintain Cap compliance. In the context of the Gwydir Water Sharing Plan, this would necessitate staged reductions in access to water under other entitlements, beginning firstly with a reduction in water available to supplementary access licence holders. Nonetheless, it seems as though it will be some time before the regulatory activities of the responsible agency actually reach the point of limiting such extractions. Initially, much must be done to understand the extent of the issue, and devise ways to regulate an extraction of water which is highly episodic and where individual structures and works are very different. In the meantime, this remains an attractive source of additional water, as it is water that is neither accounted nor paid for.

The Gwydir experience in implementing the EWA regime under the water sharing plan to date therefore supports arguments raised in Chapter Three for considerable refinement of the legal mechanisms used to facilitate and protect environmental water, and better tailoring of the broader regulatory framework to support environmental outcomes. A range of direct legal mechanisms for EWA has been used. However, this exploration of their legal characteristics and relative status to consumptive

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208 NSW Department of Infrastructure Planning and Natural Resources, above n 81, cl 30(3).
210 Ibid.
entitlements and their application in a practical management context has highlighted that the resulting status and protection does not adequately support effective EWA. Similarly, challenges encountered in tightening and broadening the regulatory framework act to undermine all entitlements in the system, but particularly environmental water that is not adequately specified and protected as such.

Status and protection can be improved by focusing on selected legal mechanisms for EWA, such as secure fixed rules or volumetric entitlements of adequate magnitude and management flexibility; and by addressing remaining discretion in the system with clearer guidance and constraint for river managers on how to balance competing considerations. Yet these findings also support arguments for a more fundamental refinement of the mechanisms used for EWA and broader water regulation to improve enforceability and the ability to deliver effective environmental outcomes, combined with corresponding changes in the practical management context for EWA, discussed in the next element.
V Element Four: Processes to Manage Rivers with Environmental Water

Throughout previous discussion, much reference has been made to the practical management context of EWA, and its influence on environmental outcomes. Even once environmental entitlements are in place with formal legal status, water governance arrangements – how rivers are managed and by whom – are critical to realising effective EWA. The management context for EWA in regulated rivers is one of largely competing consumptive interests, and considerable operational constraints. It is a context where the institutional history and mandate of predominant management organisations has been, until recently, managing resources for consumptive water use. Targeted governance arrangements for managing rivers with EWA are only beginning to evolve.

This analysis of institutional arrangements for managing rivers with EWA in NSW draws on the empirical work conducted for the Gwydir case study to explore how current institutional arrangements balance competing management considerations and manage operational constraints; whether new more targeted institutional forms for the role of environmental water manager would better support environmental outcomes; and finally whether requirements for an adaptive management approach have been institutionalised and applied.

A Institutions for Environmental Water Management in NSW

Two key institutional players cover the majority of water allocation and management functions in rural NSW, and exert considerable influence on the management of EWA. State Water, a State-owned corporation, is responsible for operational and commercial water management functions. This involves the ownership and management of dams, weirs and regulators; delivery of water to customers; and delivery of environmental flows on regulated rivers in rural areas. 211 Although EWA obligations have been added to their brief in recent years, there is a clear commercial

mandate, and the institutional history of the organisation lies in servicing water users. Indeed, at the level of river management, State Water does not specifically employ staff with a unique focus on implementing environmental water rules. It is arguable that, as an organisation, State Water therefore lacks the institutional capacity necessary to support full and effective implementation of the environmental water regime.

Regulatory and policy functions relating to water allocation and management are conducted by the relevant natural resource agency. Since NWR began in the mid 1990s, this agency has undergone numerous restructures and amalgamations. Following the finalization of water sharing plans for the vast majority of the State, there was a severe reduction in departmental expertise and capacity in the area of water resource management, which cannot but have compromised its ability to fulfill its responsibilities effectively.

With respect to the implementation of the environmental water rules under water sharing plans, these institutional arrangements mean that State Water is the body responsible for the operational implementation of the rules including release of flows, flow measurement and reporting on their delivery. The natural resource agency is responsible for overseeing the implementation of the water sharing plan, and ensuring compliance with the operating rules, by, for example, checking State Water operational reports against available hydrological data. Until recently, the administration of management arrangements for the ECA was also conducted by this agency.

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212 Interviews conducted with water authority staff (State Water) involved in the implementation of the Gwydir water sharing plan, August 2006.
213 Since water reform began in the 1990s, the agency with responsibility for the implementation of key water management legislation has had six different configurations: Department of Land and Water Conservation, Department of Infrastructure, Planning and Natural Resources, Department of Natural Resources, Department of Energy and Water, and currently the Office of Water within the Department of Environment, Climate Change and Water.
214 Comments made in interviews with staff of natural resource and nature conservation agencies and landholders involved in the negotiation and implementation of the Gwydir environmental water regimes, August 2006.
215 Comments made in interviews with staff of natural resource and nature conservation agencies involved in the implementation of the Gwydir environmental water regimes, August 2006.
216 Ibid.
The water sharing plans themselves contain little operational and implementation detail. The Act does, however, provide for the preparation of implementation programs to set out the means with which the objectives of management plans are to be achieved.\textsuperscript{217} Yet there were considerable delays in the preparation of these programs, no doubt linked to decreased agency capacity in recent years.\textsuperscript{218} Comments below highlight that there are a number of implementation issues with the environmental water rules that, according to responsible water managers, remain ambiguous, and would greatly benefit from clear implementation guidelines. With no Implementation Program in place for the first few years after plans were introduced, much discretion was left to State Water as operational manager of the system.\textsuperscript{219}

In some areas covered by the water sharing plans, including the Gwydir, novel institutional arrangements, involving management committees with a strong stakeholder and skills base, have been established to manage the delivery of volumetric entitlements.\textsuperscript{220} The advisory committee for the Gwydir ECA is described in more detail below. There has also been a corresponding increase in the influence of conservation agencies in EWA management. For example, the nature conservation agency has recently taken over the administration of ECA management committees, and also administers environmental recovery projects such as Riverbank. These are important developments towards more targeted institutional capacity to manage for environmental outcomes.

\textbf{B Balancing Competing Management Imperatives at the Operational Scale}

This discussion briefly highlights some examples in the practical management context of EWA where conflicting interests and operational constraints suggest that EWA delivery may be compromised, particularly in a management context where

\textsuperscript{217} Water Management Act 2000 [NSW], s 51.
\textsuperscript{218} Comments made in interviews with staff of the natural resource agency involved in the implementation of the Gwydir environmental water regime, August 2006. See also NSW Department of Infrastructure Planning and Natural Resources, \textit{Annual Report 2004-05} (2005), 55.
\textsuperscript{219} Comments made in interviews with water authority staff (State Water) involved in the implementation of the Gwydir environmental water regime, August 2006.
\textsuperscript{220} Committee management arrangements for the Gwydir, Macquarie and Lachlan regulated rivers were developed as part of water sharing plans.
substantial discretion remains with the operational water authority. It is in these situations that it becomes important to consider who is making management decisions and on what basis, and how this may impact on environmental outcomes.

As noted above, the Gwydir plan limits extraction of water made available through a supplementary water event to 50% of the event, effectively protecting the remainder in the system as environmental water. Implementation of this rule is a good example of the remaining discretion within the system and how decision-making in the current management context may not necessarily benefit the environment. State Water staff describe this rule as a particularly ‘grey area’ in the implementation of the plan. In practice, a decision is made on the basis of the best available information at the time as to the volume available for extraction under the rule, and a substantial degree of discretion remains with State Water. Demand for surplus water and the capacity to extract it and store it on farm far outweigh its availability in the Gwydir. Hence there is much pressure from water users to allow access to every last drop of water. Considering this pressure, and the commercial mandate and institutional culture of State Water, a tighter process is required to govern the implementation of this rule. The approach used prior to the water sharing plan, which required flows to pass a certain threshold before a supplementary water event was declared, arguably offered greater protection for the environmental component of the flow event.

Similarly, considerable discretion remains with the operational water authority in situations where the delivery requirements of environmental water conflict with the delivery of consumptive water, a situation discussed briefly in the preceding section. State Water suggests that they treat the ECA like any other legitimate water user, and such situations would best be resolved on a case by case basis, with reference to the urgency of the ECA request – for example whether timely delivery was required to support a breeding event in the wetlands. Yet the potential political fall out of monopolising channels for environmental water delivery during the irrigation season, particularly for cotton which is a crop with very precise water requirements, make it

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221 NSW Department of Infrastructure Planning and Natural Resources, above n 81, cl 48.
222 Comments made in interviews with water authority staff (State Water) involved in the implementation of the Gwydir environmental water regime, August 2006.
223 Ibid.
224 Ibid.
questionable whether a delivery priority would be accorded to environmental water over consumptive water in the current institutional context without specific direction to that effect.

Finally, the Gwydir ECA is theoretically available for a range of environmental objectives, not limited to wetland watering.\textsuperscript{225} Yet, in practice, it has been almost exclusively employed in the wetland area. Conservation representatives involved in the process attribute this limited application to a strong resistance on the part of the natural resource agency and State Water to employ the water for any other objective, or indeed to contemplate how the system can be used creatively to also deliver environmental objectives.\textsuperscript{226} Such observations suggest that current institutional arrangements for EWA continue to be dominated by the view that the primary purpose of the system is to supply water for extraction, and that environmental water rules have to be grafted onto this existing system, without disrupting its operation. This is no doubt linked to the institutional history and past focus on water management and supply, and the need to develop institutional expertise targeted to managing for environmental outcomes.

\textbf{C The Role of Environmental Water Manager}

The Water Management Act does not specifically address the distribution of authority, resources, skills and expertise to deliver effective EWA. In practice a range of institutional actors are involved. Yet the management arrangements for the Gwydir ECA illustrate how a shift to a more sophisticated adaptive governance approach, as indicated in Chapter Three, may overcome many of the constraints to effective EWA.

The role of the Gwydir ECA Operations Advisory Committee is to advise on annual watering plans for the ECA; the making of releases during a water year; and the

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\item[\textsuperscript{225}] NSW Department of Infrastructure Planning and Natural Resources, above n 81, cl 15(d).
\item[\textsuperscript{226}] For example, opportunities may present to piggy-back ECA water onto irrigation releases in order to achieve multiple objectives of the ECA with one release: wetting of high level benches upstream in the catchment, and various objectives downstream in the wetlands. Such options should be attractive to operational managers as they represent a way to reduce otherwise high losses.
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development of a long term river and wetland health plan.\textsuperscript{227} The committee does not have the direct authority to order a release of water, but must make a recommendation for a release to the natural resource agency, who then places the order with State Water. This committee combines independent scientific expertise with broad stakeholder representation. It includes two independent scientific representatives, one representative of both the Irrigation industry and the nature conservation movement; and two representatives from landholders in significant wetlands areas. It also has agency representatives from the various relevant departments, as well as a representative from State Water.\textsuperscript{228}

Prior to the establishment of the committee, the implementation of the ECA in the Gwydir was problematic and controversial, and some argue that, as a result, it was not used to its capacity. There was substantial resistance to its release within the community and the few times that it was used were associated with bird breeding events in the wetlands. To the frustration of conservation interests, the other broader objectives for which a release could be ordered remained untested.\textsuperscript{229}

In the summer of 2004 / 2005, a release of the ECA was ordered to sustain a bird breeding event which had been initiated with a natural flood. At this time, the ECA committee was not yet operational and its functions were being conducted by the relevant natural resource agency in conjunction with the State nature conservation agency. Not all species of bird recorded in this event bred successfully. This was attributed by many to a failure to deliver adequate water from the ECA account to the wetland area.\textsuperscript{230} Anecdotal evidence suggests that State Water was reluctant to deliver the required amounts, and that ECA water was made available for extraction, rather than delivered as requested.\textsuperscript{231} Undoubtedly, a range of factors contributed to the failure such as understaffing over the Christmas holiday period, and operational problems associated with delivering water efficiently in the unregulated wetland area.

\textsuperscript{227} NSW Department of Infrastructure Planning and Natural Resources, above n 81, cl 15(g)-(j).
\textsuperscript{228} Ibid, cl 15(h)-(i).
\textsuperscript{229} Comments made in interviews with landholders, representatives of nature conservation interests, and staff of the nature conservation agency involved in the negotiation and implementation of the Gwydir environmental water regime, August 2006.
\textsuperscript{230} Ibid. See also Millar, above n 67.
\textsuperscript{231} Comments made in interviews with landholders, representatives of nature conservation interests, and staff of the nature conservation agency involved in the negotiation and implementation of the Gwydir environmental water regime, August 2006.
Nonetheless, as a result of the surrounding controversy, the initial work of the ECA committee has focused on establishing a transparent, accountable and adaptive management framework to avoid a repeat of such an event.

The institutional arrangement, incorporating independent skills and community representatives, seems to have been instrumental in laying the groundwork for the fuller, more regular implementation of the ECA in the future. The combination of a strong independent and respected scientific skills base, coupled with stakeholder representation to provide important local knowledge of the system and likely responses to ECA releases, appears to present a strong and effective management team. Specifically, the emphasis on independent scientists and operational involvement addresses many of the concerns raised about representation on earlier water planning committees. Given the lack of environmental expertise within State Water, their involvement in such a committee undoubtedly also serves to improve understanding and acceptance within the organisation of the rationale behind the environmental water rules, and exposes them to a certain degree of additional scrutiny, which may translate positively to improved implementation. Albeit very difficult to apply to the highly contentious issue of water re-allocation discussed in Element Two, such a participatory, adaptive governance model appears to offer considerable potential in this management role.

**D Creating Adaptive Management Capacity**

Earlier discussion has established the importance of building institutional capacity for adaptive management, with crucial significance given to monitoring and reporting programs which cover not only compliance with rules, but also assess their effectiveness over the long term and provide opportunities to adapt management responses accordingly. In Chapter Three it was suggested that greater emphasis on statutory provision for such key management functions would direct resources and give important status to such activities. This discussion identifies some concerns with processes used to date in the Gwydir to report on the environmental rules, and monitor their effect, and highlights ways in which both accountability and adaptive management capacity could be improved.
Monitoring compliance with the operational flow rules has been conducted to a large extent internally between State Water and the natural resource agency. Given the ambiguities and difficulties associated with the rules noted above, and the institutional history of the organisations involved, such minimal independent oversight should be addressed. The only public reporting on compliance with these rules occurs in the annual reports of these two organisations. Such macro-scale reporting means that much of the compliance detail is lost. For example, the annual report from the relevant natural resource agency for 2004/5, the year in which the first round of water sharing plans, including the Gwydir, were commenced, reported on the implementation of environmental water rules in regulated rivers in the following very general terms: “despite the drought conditions across much of inland NSW, the environmental flow rules in the water sharing plans were implemented in all but one of the seven regulated river systems.”

No further detail on the particular flow rules was supplied. Similarly, the annual reports of State Water over recent years include little detailed reporting on environmental water rules. This scale of reporting is of little value in understanding whether and how the environmental flow rules were implemented, and glosses over the kind of implementation difficulties associated with the flow rules discussed in the previous section.

The reporting arrangements are more advanced for volumetric entitlements such as the Gwydir ECA, due both to the clear cut nature of the entitlement, and the efforts of the ECA advisory committee. State Water maintains a water account for the ECA similar to those held by water users. This records the account balance, including any debits (incurred by release) or credits (incurred as the account is credited in line with allocations to general security access licences). The account is publicly accessible on

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232 These rules protect the first 500ML of tributary inflow to the wetlands, and limit access to supplementary flows to 50% of a flow event. See discussion above in Element Three.
234 State Water Corporation, State Water Annual Report 2002-03 (2003), 33-35; State Water Corporation, State Water Annual Report 2003-04 (2004), 32-35. These reports merely State the proportion of total flows that were protected for the environment, and that were recorded at the end of the system. The following year’s report (State Water Corporation, State Water Annual Report 2004-5 (2005), 51) devotes more space to reporting on environmental water delivery, however there is still little detail, and the reporting is quite selective.
the NSW Water Register. NSW is also currently developing an environmental water register to make publicly available the details of adaptive environmental water licences, including volumes, locations and intended use.

The ECA advisory committee has devoted much time to developing decision-making protocols to ensure the management of the ECA is both transparent and accountable. These include important innovations in reporting and monitoring. An implementation manual for ECA releases has been developed which provides a step by step guide to the process required for release of the ECA. This covers the coordination of roles and responsibilities of the three parties involved in orchestrating a release; monitoring responsibilities for the hydrological and ecological responses to the ECA; and associated reporting requirements. What is however striking about these developments is that they were largely initiated by the committee, rather than required by statutory or policy guidelines. Thus, for example, it is the committee who is making the decision on whether such reports should be publicly available. The first annual release program for the ECA was finalised for application in the 2007/2008 water year. This was the first such plan achieved in NSW, some five years after the finalisation of the water sharing plans. This indicates a very gradual development of institutional capacity for adaptive management, and highlights greater potential role for legislation in setting parameters for such important functions.

One area where a lack of resources is a particular constraint in establishing institutional capacity for adaptive management is monitoring the delivery of EWA. Accurate measurement of water level in the wetland is required to enable effective

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238 Such issues were discussed in the meeting of the ECA advisory committee, observed in Moree, August 2006.

239 ECA Operations Advisory Committee, above n 104.
environmental water delivery, as water depth and the extent of inundation are critical to ensuring desired vegetation and other ecological responses. Yet, since the wetland system is naturally so dynamic, river gauges are often found to be inappropriately sited, and there is insufficient data available to monitor water depth and tailor releases accordingly. More gauges and more capacity to regularly review their placement are required.\textsuperscript{240}

In terms of monitoring the ecological effect of environmental flows over the longer term, there has been a program in the major regulated river systems in NSW since initial flow rules were first introduced in the late 1990s.\textsuperscript{241} This focused initially on testing the various general hypotheses on which the flow rules had been based.\textsuperscript{242} In the Gwydir, it tested the effect of reinstating river freshening flows, small floods and consequent overland flows to the wetlands.\textsuperscript{243} More recently the program in the Gwydir has begun to focus on monitoring the outcomes of independent flood events, including those involving the release of the ECA, which will feed into the adaptive management approach of the ECA committee, including the preparation of annual water release plans.\textsuperscript{244}

As such, gradual improvements in institutional capacity for adaptive management are evident, most notably driven by the ECA advisory committee. There remains, however, a distinct lack of institutional processes and structures to comprehensively coordinate monitoring and reporting on the delivery and effectiveness of all components of the EWA regime, and to link this information clearly to processes of review and re-allocation. Again, more effective use of legislation to set parameters for these management functions, would build important institutional capacity in this area.

\textsuperscript{240} Comments made in interviews with staff of the natural resource agency involved in the implementation of the environmental water regime, conducted in August 2006.
\textsuperscript{242} For example by measuring changes in the hydrology, habitats, animals, plants and ecological processes in the major regulated river systems following the introduction of the flow rules, and using this information to test the relationships over time between flow regime and ecosystem responses.
\textsuperscript{244} Comments made in interviews with staff of the natural resource agency involved in the implementation of the environmental water regime, conducted in August 2006.
The discussion against Element Four of the framework has illustrated a gradual shift away from the situation where EWA responsibilities were added to the brief of management organisations potentially biased and better equipped to manage for consumptive outcomes; towards the evolution of a dedicated environmental water manager with the capacity to manage adaptively and deliver more effective EWA. Yet the discussion has raised many issues in the institutional management context where this transition could be strengthened and hastened. For example, at a policy and statutory level, a clearer mandate to manage system for environmental outcomes, which addresses lingering ambiguities with environmental water rules and how to manage conflicts of interest at an operational scale is important. As management arrangements continue to evolve it is also important to build on the strength of successful institutional forms already in place, such as the Gwydir ECA committee, particularly in terms of its combination of skills, experience and independence at the practical management scale.
VI CONCLUSION

This chapter set out to consider whether the developing law, policy and practice of EWA in NSW has moved beyond merely grafting new institutional forms onto an already flawed system; towards the extent of institutional change associated with a governance model for effective EWA.

The Water Management Act represents a comprehensive attempt to integrate environmental water considerations into processes of water allocation and management. Yet there are a number of areas where legal settings could be strengthened in the pursuit of more effective environmental outcomes. For example, although strong substantive standards applicable to water allocation planning raise difficult issues of legal enforceability, illustrated through the legal challenge to the Gwydir plan, there is considerable scope within the NSW legislation to achieve a tighter, more defensible legal framing of relevant standards and duties. This analysis has, however, underscored the challenges associated with achieving such strong legal provision for environmental water in practice. Even the tentative standard for EWA in the Act has been gradually eroded over time through amendment, and there has been very poor commitment to implement it in practice.

The conduct of water allocation planning in NSW has highlighted that processes employing high levels of public participation in substantive policy development are very difficult to apply to a highly contentious issue of resource re-allocation. Without a broad political commitment and well developed processes of implementation, including strong policy and statutory guidance on expected environmental outcomes and adjustment mechanisms to manage associated socioeconomic impacts, the NSW process has done little more than further entrench an unsustainable level of water allocation. As market mechanisms are increasingly embraced as the solution to water re-allocation, this approach should be viewed not as an alternative to administrative planning, but an indication of a failure to devise and conduct a targeted planning process. This experience supports the argument for developing targeted processes for re-allocation, designed and conducted to achieve desired outcomes. An important source of such purpose and structure is overarching legislation.
Legal mechanisms to facilitate EWA, and their situation within the broader regulatory framework for water allocation, have also been shown to be key determinants of environmental outcomes. The empirical case study research was particularly helpful in illustrating how current mechanisms fall short of guaranteeing even similar legal status to consumptive users and, in many cases, their application in a practical management context translates to a considerably compromised status for environmental water. This analysis sets the scene for ongoing consideration of how these legal instruments and settings could best be refined to deliver appropriate status and protection.

Finally, the need to strengthen and hasten developments towards more targeted adaptive management arrangements for EWA is clear. The foundations of a sophisticated adaptive management structure are gradually developing in the Gwydir. This represents considerable improvements on the situation where environmental water management functions were merely grafted onto the responsibilities of existing institutions, with very different and often conflicting management mandates. The Gwydir case study specifically underscores the value of an adaptive governance approach to resource management at the local management scale, once contentious issues of resource re-allocation have been resolved, and processes can be focused on delivering effective environmental outcomes over time. This transition to more effective environmental water management could be supported and hastened by more effective use of law and associated policy to achieve a distribution of duty and authority that supports environmental objectives and establishes institutional capacity to deliver this in practice.
CHAPTER FIVE:
ENVIRONMENTAL WATER ALLOCATION IN VICTORIA -
A CASE STUDY OF THE LODDON REGULATED RIVER

The developing law, policy and practice of environmental water allocation [EWA] in Victoria provides a different context for the exploration of institutional parameters for effective EWA raised in the analytical framework of Chapter Three. Similar to the previous chapter, this analysis covers both the legal and policy settings for EWA in Victoria and the practical experience of reform implementation, through a case study of the negotiation and implementation of EWA in the Loddon regulated river in northern Victoria.¹

This chapter helps to test and further explore various arguments raised in the analytical framework. First, the investigation of overarching legal settings, particularly as they relate to processes to re-allocate the resource (Element One of the framework), illustrates a largely procedural statutory basis for EWA. For example, there are no clear substantive standards or related duties to achieve a sustainable allocation balance, nor strong links made to allocation planning processes which are designed to support such outcomes. This is quite contrary to the thrust of the argument put forward in Chapter Three for strategic use of statutory mechanisms to set tight substantive parameters for EWA. It also provides quite a different legal setting to the NSW case study, where environmental objectives have been more closely integrated into overarching purposes and key processes in governing legislation. This presents an opportunity to reconsider the influence of legal settings on progressing environmental water reforms.

Second, the Victorian case study offers a different approach to the scope, design, and conduct of processes to re-allocate water to that taken in NSW (Element Two of the

¹ The case study involved quite extensive empirical work, including a series of interviews with parties involved in the negotiation and implementation of the environmental water regime, and observation of key management processes. Appendix A details the approach taken the empirical work for the case studies. It also provides further information on the way that reference is made to this work in this chapter so as to protect the identity and respect the wishes of participants. This empirical work was largely conducted in mid 2008.
framework). In the context of a prevailing policy position to respect existing consumptive rights to water, and given the timing of legislative change in Victoria relative to the National Water Reform [NWR] process, a staged approach to water reallocation has emerged. This has postponed any substantial administrative reallocation of water to after existing consumptive rights to water have been clarified and secured, in the meantime relying on market-based mechanisms to recover water for the environment in a way that respects existing rights. There has been considerably less emphasis on statutory planning processes to directly re-allocate the resource at the local management scale. Again, this provides a context to consider how different levels of public participation, legal and policy guidance on reallocation, and investment in water recovery, have influenced resulting environmental outcomes.

Finally, the practical experiences of reform implementation in the areas covered by Elements Three and Four of the framework, contribute important insights for the later development of recommendations for a more targeted and effective governance model in these areas. For example, the exploration of legal mechanisms to facilitate and protect environmental water uncovers both strengths and weaknesses in the Victorian regime. On one hand, provision to protect environmental water over the long term by providing for an adaptive management framework, with opportunities to re-allocate the resource according to changing circumstances, responds to concerns raised in Chapter Three. Yet, the experience of implementing EWA in the Loddon by way of the direct legal mechanisms available under current water legislation suggests a need for more targeted and flexible mechanisms and stronger guidance on their application to provide appropriate levels of protection for environmental water in the context of extreme resource pressure. Similarly, although management practices for EWA are evolving along comparable lines to NSW, the Loddon case study highlights the need for ongoing emphasis on developing sophisticated, adaptive management practices and institutional capacity for rivers with EWA and employing legislation to this purpose.
I A CONTEXT FOR ANALYSIS

A number of issues in the institutional and the biophysical context of water allocation and management in Victoria, and specifically the Loddon case study area, have influenced the pace and nature of environmental water reform to date and will continue to shape its future direction and emphasis. In some cases, these distinguish the Victorian experience from the previous case study or offer different insights or points of emphasis for institutional development. For example, the Victorian case study is particularly useful in exploring the design of instruments and management frameworks to protect environmental water and facilitate effective EWA in a context of extreme resource pressure under prolonged drought or climate scenarios.

A Institutions of Water Allocation and Management

Water allocation and management in Victoria is governed principally by the Water Act 1989 [Water Act]. This legislation was introduced following a major overhaul of water management at a State level\(^2\) and predates NWR by some years. The history and timing of legislative change, relative to NWR, in Victoria has important implications for environmental water governance.

The primary focus of the legislation and its early implementation was to clarify existing rights to water to achieve greater certainty for water users and facilitate the development of a water market. Environmental considerations were included in the Water Act and there was potential to allocate water to the environment.\(^3\) Yet, at this stage, targeted legal instruments to allocate and protect environmental water and institutional structures to support this in practice were not well developed.


\(^3\) Tan, above, 162 – 174; Pigram and Mulligan, above, 92.
While the Water Act has been progressively amended in response to NWR commitments and the capacity to provide for and protect environmental water has been thereby improved, there has been no integrated response to the various environmental reform imperatives of NWR. Rather, reforms to provide for EWA have been grafted onto the existing statutory system of water allocation and management, which at its fundamental level is designed to support consumptive use. Later discussion will explore the implications of this approach in terms of the strength and purpose of legal settings for effective EWA.

There are three key institutional players in the allocation and management of water in Victoria and, more specifically, the case study area. They are introduced briefly here to assist exploration of their roles and responsibilities relevant to EWA throughout the chapter. First, the Department of Sustainability and Environment combines natural resource management and nature conservation functions, including the regulation of water allocation and management under the Water Act and policy development for both consumptive and environmental water use. The agency is largely responsible to the Minister for Water, however, in some instances, including certain EWA functions, to the Minister for Environment. There is a clear division within the organisation between the functions of water resource allocation and river health.

Second, water authorities, operating on a commercial basis, manage infrastructure for water storage and delivery, hold bulk entitlements and manage the delivery of water to individual customers. Goulburn Murray Water is the water authority in northern Victoria whose operations cover the State’s main irrigation districts. Third, similar to NSW, regional, community-based Catchment Management Authorities have a role in

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4 Key amendments in 2002 and 2005 are discussed as relevant throughout the chapter.
6 Predecessor Agencies with similar responsibilities in chronological order include, Department of Conservation and Environment, Department of Conservation and Natural Resources, Department of Natural resources and Environment.
8 Water Authorities are regulated under the Water Act 1989 (Vic), ss 85-122.
developing and implementing catchment programs for river health and have been increasingly involved in environmental water management, particularly where specific environmental entitlements have been provided.\(^\text{10}\) Participatory stakeholder committees have also been involved to a certain degree in the negotiation and implementation of EWA.

### B Loddon Case Study: Environmental Objectives

The Loddon River is one of Victoria’s tributaries to the Murray River. It rises on the Great Dividing Range near Trentham and flows north through Serpentine where it enters a wider floodplain and branches into a number of anabranches and distributary streams. Much of this floodplain is highly influenced by the hydrology of the Murray. A number of significant wetlands occur in the north of the catchment.\(^\text{11}\) This case study focuses on a string of wetlands, known as the Boort district wetlands, occurring to the west of the river in the mid-lower reaches. These are managed as part of the Loddon catchment and have been identified as environmental assets for targeted EWA.\(^\text{12}\)


Map 3: Loddon Catchment, Northern Victoria
Much of the Loddon river is highly regulated and the level of entitlement to extract water is very high.\textsuperscript{13} There are a number of storages and weirs from which water is diverted for irrigated agriculture, urban, and stock and domestic consumption. The main irrigation areas are on the riverine plains in the north of the catchment. Water is supplied by an extensive channel system, predominantly for pasture-based dairying.\textsuperscript{14} While some irrigation water is supplied from the Loddon, a large proportion is transferred from neighboring catchments through the Waranga Western Channel, which carries water largely from the Goulburn valley across Victoria.\textsuperscript{15} Given rainfall is lower and more variable than other Victorian catchments, and salinity levels in the Loddon are relatively high, this infrastructure has enabled irrigation to establish in this area based on imported water. This is illustrative of the highly inter-connected nature of water infrastructure in northern Victoria, and, as later discussion shows, offers some opportunities for flexible environmental water management.

The regulation of the Loddon and high levels of extraction have resulted in a significantly changed flow regime, which contributes to poor and deteriorating river health.\textsuperscript{16} A comprehensive assessment of environmental water needs in the catchment, conducted as part of NWR in Victoria and used as the ongoing basis for the negotiation and implementation of an environmental water regime, identified a number of flow-related causes of declining river health.\textsuperscript{17}

For example, similar to many regulated catchments in the southern MDB, there has been a reversal of the seasonal flow pattern. In areas upstream of Loddon Weir - the major diversion point for irrigation water - the seasonal pattern of flow in the Loddon has been reversed. During the irrigation season flows are higher than natural. At other times of the year flows are lower than natural as a result of water storage.\textsuperscript{18} During irrigation releases in summer and autumn there is very low variability in flows. Water

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\textsuperscript{13} CSIRO, \textit{Water Availability in the Loddon-Avoca - Summary of a Report to the Australian Government from the CSIRO Murray Darling Basin Sustainable Yields Project} (2008), 3-5.
\textsuperscript{14} Loddon River Environmental Flows Scientific Panel, above n 11, 11-12.
\textsuperscript{15} Ibid.
\textsuperscript{16} Ibid, 73.
\textsuperscript{18} Loddon River Environmental Flows Scientific Panel, above n 11, 23-33.
resource development has also decreased the frequency and magnitude of small and moderate winter floods that benefit riparian and floodplain ecosystems along the lower Loddon river. There has also been an increase in undesirably low flows in lower Loddon during winter-spring with consequences for the habitat values in this area.

The study made a series of flow recommendations designed to mitigate the effect of these changes on key river health variables and, therefore, improve river health. For example, native fish have experienced a very significant reduction in range as a consequence of artificial barriers in the system, changed seasonal stream-flow volumes and variability, and cold water releases. Flow recommendations addressed a major related issue – the in-filling of important habitat pools with sediment. One component of a response to this is to reinstate high flows required to restore the natural pool/run structure to provide fish habitat. Low flows to assist fish movement, particularly in lower reaches downstream of Loddon Weir, and some timed river freshening flows and pulsed medium sized flows to assist spawning were also recommended.

C Future Risks to Water Availability: Climate Change

Northern Victoria has experienced a decade of extreme drought. The Loddon is one of the most affected catchments. Average annual rainfall and run-off over the last ten years has reduced by 11% and 52% respectively against long-term climate averages from over a century. Recent comprehensive assessment of climate change predictions for the MDB considers a range of climate scenarios including the continuation of the climate of the preceding decade in northern Victorian catchments. On best estimates of future climate in the Loddon, run-off is likely to reduce by 16%, reducing surface water availability by 18%. Yet, if the climate of the preceding decade were to continue, average surface water availability would be

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19 Ibid; CSIRO, above n 13, 4.
21 Ibid, 74. See also discussion in North Central Catchment Management Authority, above n 12, 26-27.
22 CSIRO, above n 13, 4
reduced by 50% with severe implications for water users and the environment. For example, the average period between small winter floods that benefit riparian and floodplain systems in the lower catchment would increase by 43% and average flood volume would decrease by 65%. These conditions would also lead to undesirably low flow conditions in 58% of winter-spring months, further degrading native fish habitat.²⁴

²⁴ CSIRO, above n 13, 4. See also water availability scenarios in, Victorian Department of Sustainability and Environment, Sustainable Water Strategy: Northern Region - Draft for Community Comment (2008), 50-51.
This section considers legal settings for EWA in Victoria to determine their value in establishing a purposeful set of institutions that can contribute to effective EWA. First, the strength of statutory provision for EWA in the Water Act and accompanying policy is explored. Particular emphasis is given to the use of strategic mechanisms to set clear and substantive parameters for EWA. Second, the discussion looks in more detail at how the Water Act influences the governance of environmental water in the three key areas of allocation, protection and management, in terms of setting standards, prescribing outcomes and establishing related duties and functions.

A Setting the Strategic Direction – Objects and Stated Outcomes

The original Water Act predates what has been referred to in Chapter Three as modern natural resources legislation, with its deliberate use of objectives and related duties.25 It also predates the expansion of understanding and awareness of the ecological implications of river regulation and high levels of extraction, which gained considerable currency in the 1990s and was instrumental in coalescing NWR. As such, compared to the Water Management Act 2000 (NSW), the original Water Act was far less developed in the use of strategic statutory mechanisms generally and, particularly, in its provision for environmental water needs.

The Water Act provides a long list of purposes. Those of relevance to ascertaining strategic statutory direction on environmental water allocation, protection and management include:

“… (c) to promote the orderly, equitable and efficient use of water resources;
(b) to make sure that water resources are conserved and properly managed for sustainable use for the benefit of present and future Victorians;
…(g) to provide better definition of private water entitlements and the entitlements of Authorities;

…(j) to provide formal means for the protection and enhancement of the environmental qualities of waterways and their in-stream uses;

… (m) to continue in existence and to protect all public and private rights to water existing before the commencement of the relevant provisions of this Act.”

Tan has previously analysed these objectives to gauge the legislative intent regarding the relative treatment of environmental and consumptive interests. She suggests a marked difference in the resolve of the legislature in their consideration of environmental versus consumptive use. Those purposes related to EWA are largely procedural – providing for formal means to protect and enhance environmental values rather than a substantive commitment to protect and enhance those values. In contrast, those purposes focused on consumptive use and protecting existing consumptive rights are clearer and more substantive.

This differential treatment at a statutory level is a clear reflection of the policy position that has predominated in Victoria through the NWR period: to respect and protect existing rights to water. The effect of this policy is that a comprehensive re-allocation of the resource has not been entertained. Environmental water needs have, to date, only been able to be met through processes which respect existing consumptive rights – for example environmental water recovery through investment in additional water savings through infrastructure improvements. Later discussion of the way the legislation guides and constrains key processes of water allocation is particularly useful in illustrating this effect.

Significant amendments to the Act were passed in 2005, including clear statutory recognition of water reserved for the environment as the Environmental Water Reserve and a range of related measures to plan for longer term water security and more sustainable allocation between consumptive use and the environment. It is important to consider whether these developments have made a notable contribution.

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26 Water Act 1989 (Vic), s 1.
27 Tan, above n 2, 163-4.
28 Ibid.
29 For example, this policy position is clearly articulated in the following recent documents, Victorian Government Department of Sustainability and Environment, Securing our Water Future Together: Victorian Government White Paper (2004), 18, 44; Victorian Department of Sustainability and Environment, Sustainable Water Strategy: Central Region - Draft for Community Comment (2006), 45; Victorian Department of Sustainability and Environment (2008), above n 24, 70.
to the overall strategic legal setting; whether they introduce standards, statements of desired outcomes, and related duties that will contribute to a clearer and more purposeful institutional setting for effective EWA.

First, the new provisions have been grafted onto the existing legislation with no changes made to the guiding purposes considered above. The purposes of the amending legislation itself are expressed procedurally and contain no substantive commitment regarding EWA.31 Second, the statutory definition of the Environmental Water Reserve introduced in 2005 is also procedural rather than substantive. It merely specifies the ways in which water may be allocated to the reserve:

The environmental water reserve comprises water that is set aside for the environment –

(a) as an environmental entitlement; and

(b) through the operation of –

(i) conditions on any bulk entitlement, or any license, permit or authority issued under this or any other Act, or regulations made under this or any other Act; and

(ii) any management plan under this Act;

(iii) any other provision of this Act, the Murray-Darling Basin Act 1993 or the Groundwater (Border Agreement) Act 1985 or any regulations made under this Act or those Acts.32

While an objective is provided for the Environmental Water Reserve, this is confined to the maintenance and protection of the reserve once water is allocated to the environment. It makes no statement on the desired standard for the reserve, such as an ecologically sustainable level of extraction or an allocation balance representing a low level of environmental risk.

The Environmental Water Reserve objective is the objective that the environmental water reserve be maintained so as to preserve the environmental values and health of water ecosystems, including their biodiversity, ecological functioning and quality of water and the other uses that depend on environmental condition.33

31 Ibid, s 1, “The purposes of this Act are – a) to amend the Water Act 1989 to make further provision for the management of water resources including (i) providing for further processes for planning the management of water resources, including processes for the development of sustainable water strategies; and … (iii) establishing an environmental water reserve…”
32 Water Act 1989 (Vic), s 4A.
33 Ibid, s 4B(1).
As such, these new amendments leave the original priority given to consumptive uses unchallenged and offer little improvement in terms of a clear, purposeful expression of desired outcomes for effective EWA.\(^{34}\)

**B Guiding and Constraining Institutions for Environmental Water**

1 *Allocating Water to the Environment*

Drawing on the considerations raised in Chapter Three and, particularly, previous work by Gardner,\(^{35}\) this discussion explores whether the Water Act and associated policy creates enforceable duties to allocate water to the environment and sets substantive standards for EWA for application through water allocation processes.

Two generations of allocation planning processes are discussed here: Bulk Entitlement conversions carried out from the early 1990s to the early 2000s; and the Sustainable Water Strategies introduced with the 2005 round of amendments. This analysis does not consider the introduction, in 2002, of a statutory management planning process for water supply protection areas.\(^{36}\) While such plans can be used for any river or part thereof,\(^{37}\) and were introduced ostensibly in response to the planning requirements of NWR, it is government policy to focus their use on unregulated catchments where there are no Bulk Entitlements. Additionally, these provisions have been only minimally applied to date.\(^{38}\) Although not originally intended as the planning mechanisms to balance competing interests in water allocation as envisaged by NWR, Bulk Entitlements remain the primary instruments of water allocation for regulated rivers in Victoria. As an instrument, they have been gradually broadened to better accommodate NWR planning commitments.


\(^{36}\) *Water Act 1989* (Vic), Part 3, Division 3.

\(^{37}\) *Water Act 1989* (Vic), s 27(1),(2), 32A(2)

\(^{38}\) See discussion of these provisions and their practical application in, Foerster, above n 34, 162-5; Gardner et al (2009), above n 35, 312, 368-9.
(a) Bulk Entitlement Conversions

The key process established by the Water Act to clarify and protect existing rights to water was the conversion of previously poorly specified bulk annual average volumes to irrigation schemes into a formal Bulk Entitlement allocated to water authorities. Bulk Entitlements establish a legal right for water authorities to divert water and sell it on to individual customers, such as irrigators, whose individual rights are also specified under the instrument.39

The general statutory and policy bias towards protecting existing consumptive rights to water has already been documented. The specific statutory parameters for the conversion process and the policy positions developed to guide these processes both take a similar stance.

Although not precluded by the legislation there is no duty to use the process to allocate water to the environment and no attempt at all to set a standard for the level and substance of EWA. In a highly procedural section, Part 4, Division 1 of the Water Act sets out the formal legal process for Bulk Entitlement conversion. The only reference to environmental considerations comes with a requirement that the Minister administering the legislation consider an extensive list of matters before approving a Bulk Entitlement.40 This list includes the need to protect the environment, including the riverine and riparian environment;41 any adverse effect that the allocation or use of water under the entitlement is likely to have on a waterway or aquifer;42 and the conservation policy of the government.43

Yet, the section contains no detail on whether these matters should be integrated into the process of developing a Bulk Entitlement, nor dedicated processes to achieve this, such as the water sharing planning process under NSW water legislation. As such, the overarching statutory purpose – to provide formal means for the protection and

40 Water Act 1989 (Vic), s 40(1).
41 Ibid, s 40(1)(g).
42 Ibid, s 40(1)(d)(ii).
43 Ibid, s 40(1)(i).
enhancement of the environmental qualities of waterways and their in-stream uses - is hardly well-supported with duties, standards, or targeted processes within the legislation.

A range of policy documents followed the introduction of the Water Act, and articulated more detail on the process to be applied to conversions and desired outcomes.\textsuperscript{44} The stance taken on allocating water to the environment via this process has been through several iterations. According to Ladson and Finlayson the policy rhetoric immediately following the introduction of the Act was that Bulk Entitlements were an important method of allocating water to the environment.\textsuperscript{45} Yet it appears that this emphasis changed over time, and the dominant policy focus became the rapid conversion of existing entitlements with little concern for environmental issues.\textsuperscript{46}

Indeed, the 1995 documentation of the process followed in the first conversion for the Goulburn River, which was used to guide subsequent conversions, clearly States that “the Bulk Entitlement conversion program will not be reducing water allocations to current users to reallocate to environmental uses.”\textsuperscript{47} The document proclaims the environmental credentials of the process as putting in place a water allocation framework that maintains current environmental values of rivers; allowing for the reallocation of water for environmental purposes through market mechanisms; and, ensuring that future water developments will be subject to assessment so that the environmental of river system are adequately met.\textsuperscript{48} This focus on clarification of existing rights, rather than processes to achieve re-allocation, parallels the stop-gap approach taken with the introduction of the MDB Cap discussed in Chapter Two, which was critical in halting further expansion of extractions, but made no attempt to re-allocate the resource to a more sustainable basis.

\textsuperscript{45} Ibid, 558. See also Tan, above n 2, 167-174.
\textsuperscript{46} Ibid.
\textsuperscript{48} Ibid.
(b) **Sustainable Water Strategies**

A long-term water resource planning process was introduced to the Water Act in 2005. This level of strategic planning at a regional scale is non-existent in NSW. While it offers a number of advantages, discussed in more detail against Element Two, these amendments arguably neither create a specific duty to allocate water to the environment, nor establish a clear standard for the substance of such allocation.

The Water Act now grants the Minister discretion to prepare a Sustainable Water Strategy.\(^{49}\) While this is not mandatory, the current government has committed to a staged planning process to cover the State. If prepared, such a strategy must:

- Identify threats to the reliability of supply and quality of water for both environmental and consumptive uses in the region, and identify ways to improve this reliability; and
- Identify ways to improve the maintenance of the Environmental Water Reserve in accordance with the Environmental Water Reserve objective, and ways to increase the volume of water in the reserve to improve the environmental values and health of water ecosystems;
- Include an implementation plan, setting out timelines or targets for implementing key actions.\(^{50}\)

There is, therefore, some substantive commitment regarding EWA built into these planning provisions. This is, however, not unequivocal, as these commitments are set in a context of potentially competing objectives related to increasing reliability of consumptive supply. No guidance is provided in terms of resolving such potential conflict.\(^{51}\) This is a situation where a substantive standard for EWA would be very useful to guide such trade-offs. These arguments are supported by the experience of implementation of these provisions discussed in Element Two.

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\(^{49}\) *Water Act 1989* (Vic), s 22B.

\(^{50}\) Ibid, s 22C(1).

\(^{51}\) See also Foerster, above n 34, 169.
Chapter Three identified statutory mechanisms to set standards and establish duties for the facilitation and protection of environmental water. These include tailoring the legal definition of instruments to facilitate EWA and establishing parameters and constraints for decision-making and statutory functions so as to achieve appropriate status and protection for environmental water. Relevant provisions of the Water Act are considered here.

Prior to the 2005 amendments, the Water Act contained little detail on the legal form through which EWA was to be facilitated and protected. In practice, there was some minimal provision for environmental water requirements through passing flow rules within Bulk Entitlements, and the water remaining in the system after permitted extraction was notionally environmental water yet not quantified nor legally protected as such. It was also possible to have a volumetric entitlement for environmental purposes, characterised as a separate Bulk Entitlement, with associated legal status.52

The introduction of the Environmental Water Reserve was intended to give better legal recognition to environmental water and provide legal status, equivalent to water entitlements for consumptive use, according to NWR commitments.53 Yet, it is questionable whether this commitment has been effectively delivered. The definition of the Environmental Water Reserve provides that water may be set aside for the environment in a number of ways including: as an environmental entitlement; or through the operation of conditions on instruments of allocation for consumptive use such as Bulk Entitlements, or direct licenses; or through the operation of a management plan; and finally through water remaining in the system above limits imposed by obligations under the MDB Cap.54

This broad definition encompassing different sources of environmental water perpetuates the situation prior to the amendments where different types of

52 Tan, above n 2, 174-178; Foerster, above n 34, 154-167.
54 Water Act 1989 (Vic), s 4A.
environmental water yielded different status and protection. Volumetric entitlements provided through Bulk Entitlements or the new environmental entitlements may have equivalent or, in some cases, slightly higher formal legal status to consumptive entitlements. Some minimum passing flow rules specified through Bulk Entitlements may qualify for prioritised status, in that they are required to be delivered prior to any allocation made to consumptive rights. However unallocated water above limits, such as the MDB Cap, is highly vulnerable to changing water availability and has a far lower status than consumptive entitlements. In addition, practical outcomes under water scarcity and current management scenarios may diverge considerably from this formal legal status. These concerns are canvassed in more detail later in the chapter against Element Three.

The amendments did however create a new targeted instrument for EWA in the form of the environmental entitlement. Environmental entitlements can be made for the purposes of maintaining the Environmental Water Reserve in accordance with its objective or for improving the environmental values and health of water ecosystems, including their biodiversity, ecological functioning and water quality, and the other uses that depend on environmental condition. Where an entitlement is made, the legislation provides that the instrument may be specified by quantifying the amount of water in some way and/or with reference to water accounting procedures, conditions and the class of reliability of the entitlement. Thus, the entitlement appears to be of a similar nature and status to consumptive entitlements, which are also specified in similar fashion. There are some additional features provided in the statutory definition which may contribute to a heightened status. For example, the Minister is given a broad discretion to impose conditions on the operation and management of the entitlement. This provision provides scope for tailoring entitlements to targeted outcomes, for example, determining rules for carry-over of unused water in storage and delivery rights to improve management flexibility and maximise environmental outcomes. Additionally, once allocated such an entitlement is specifically protected from any amendment which would reduce its volume or reliability.

55 Water Act 1989 (Vic), s 48B (2).
56 Ibid, s 48I(a).
57 Ibid, s 48I.
58 Ibid, s 48J(2).
59 Ibid, s 48K(2).
The Act also now offers a certain level of additional protection to the Environmental Water Reserve by ensuring that the objective of the reserve is considered in a variety of decision-making procedures under the Act so that these decisions do not result in its erosion. For example, the Minister administering the Act must refuse an application for the transfer of a Bulk Entitlement from one water authority to another if the transfer is likely to have an adverse effect on maintenance of the reserve.\(^\text{60}\)

In terms of the influence of legal settings on the status and protection accorded environmental water, it is also important to consider how environmental water may be treated in situations of water scarcity. For example, is it adequately protected in the context of changing water availability predicted under climate scenarios?

In terms of short term protection in a management context of extreme water scarcity, the Water Act contains a very broad discretionary power to temporarily qualify (suspend, reduce, increase and otherwise alter) any rights to water in times of declared water shortage, including environmental water expressed through a Bulk Entitlement or as a specific environmental entitlement.\(^\text{61}\) This power is essentially unrestricted. The Minister may make such a declaration if of the opinion that the volume or quality of water available in the system to satisfy any rights to water is or will shortly be inadequate for any reason.\(^\text{62}\) There is no further definition provided of what may constitute a water shortage, how competing users should be treated in such circumstances or, for a transparent process surrounding such a declaration. In comparison, the Water Management Act 2000 (NSW) offers some additional scrutiny and guidance by requiring concurrence of the Minister for the Environment for such a declaration and providing rules for prioritising competing users in the making of available water determinations in the situation where a management plans is suspended under this power.\(^\text{63}\) As later discussion, against Element Three, shows, these powers have been exercised extensively in the recent prolonged drought in northern Victoria and have been highly detrimental to existing EWA.

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\(^\text{60}\) Ibid, s 46(5). For similar protections see, ss 55(2B), 56(1)(a)(va), 62(5), 64H(3).

\(^\text{61}\) Ibid, s 33AAA.

\(^\text{62}\) Ibid, s 33AAA(2). In practice, this power has been exercised by relevant water authorities acting as the Minister’s delegate.

\(^\text{63}\) Water Management Act 2000 (NSW), s 49A(2) and 60(3).
In terms of longer term protection of the proportion of water set aside for the environment, the Water Act makes specific provision to maintain EWA once allocated and consider its ongoing effectiveness over time. This is particularly important in light of future threats to water availability, for example, under climate scenarios, which, depending on the way EWA is defined and protected, may impact disproportionately on environmental water.

The Act now requires the Minister to commence an assessment of the status of the resource base and river health within twelve years of the commencement of the legislation and every fifteen years thereafter. The assessment must identify:

- any decline in the long term availability of surface water or groundwater and whether the decline has fallen disproportionately on the Environmental Water Reserve or on the allocation of water for consumptive purposes; and
- any deterioration in waterway health for reasons related to flow.

If the review does identify a decline in the long-term availability of water resources which has a disproportionate effect on environmental or consumptive water rights, or a deterioration in waterway health, then the Minister must conduct a further review to determine the action required to restore the balance between environmental and consumptive water rights, and to restore the health of waterways.

Where the Minister endorses the recommendations of the review, a program of implementation must be determined within six months. In implementing the review the Minister may exercise his or her power to permanently qualify rights under s 33AAB of the amended legislation. This ministerial power is constrained to situations where there has been no other permanent qualification of rights in the preceding fifteen years. It is important to stress that this is the only circumstance in which permanent administrative qualification of rights can occur under the Act. There is no entitlement to compensation arising from such permanent qualification of rights under

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64 Water Act 1989 (Vic) s 22K.
65 Water Act 1989 (Vic) s 22 L.
66 Water Act 1989 (Vic) s 22Q–T.
67 Water Act 1989 (Vic) s 22V.
68 Water Act 1989 (Vic) s 33AAB(2)(b).
this section. Importantly, no such permanent qualification can occur within the first fifteen years of the operation of the Act.

This is a very important provision which explicitly addresses the likelihood of disproportionate impacts on the environmental water share under climate scenarios and the need to revisit the effectiveness of the Environmental Water Reserve in an adaptive management context. Yet, given the time frames applicable to the processes, its utility in contributing to effective EWA really depends on the starting point for the assessment. If an attempt has been made to achieve a sustainable allocation balance and an effective Environmental Water Reserve, then it appears very reasonable for consumptive users to be provided with a term of security for their entitlement before the allocation balance is revisited. However, if the reserve is still vastly inadequate at the start of the assessment program, as is arguably the case in many Victorian rivers where no comprehensive attempt at re-allocation has been made, these provisions are really just locking in an unsustainable level of allocation for a further fifteen years, and postponing any comprehensive consideration of its impact.

3 Managing Environmental Water

Legislation can set parameters around the roles and responsibilities of environmental water management, including the distribution of authority and institutional capacity to manage rivers once EWA is in place. It can also structure the implementation of key adaptive management functions, such as monitoring and reporting. These are important considerations for delivering governance arrangements in this area to better cater for EWA. The relevant provisions of the Water Act are considered here.

Managing rivers for environmental outcomes is a relatively recent approach to river management. As such, similar to NSW, setting parameters for the delivery and management of environmental water and creating institutional capacity in this area is

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70 Water Act 1989 (Vic) s 33AAB(2)(a).
a new and developing field in Victoria. Currently there is not extensive targeted provision at a statutory level for environmental water management, however, some important policy commitments and proposed reforms are on the table. The influence of both existing and proposed management arrangements on achieving environmental outcomes in practice is discussed in Element Four.

In terms of statutory provision for key adaptive management functions, prior to the 2005 amendments, there was only general provision related to the content of instruments of water allocation with scope for including monitoring and reporting requirements. For example, the Act provides that a Bulk Entitlement instrument may specify the obligations of the Storage Manager, Resource Manager and Environmental Management; or may provide for water accounting procedures; for the installation of metering equipment; and for the conduct of a metering program. Yet, there was no explicit reference to monitoring and reporting on the implementation and effectiveness of EWA. Monitoring and reporting responsibilities provided at the level of individual allocation instrument characteristically focused on quantifying water extracted and lacked detail on EWA delivery and effectiveness. However, later instruments with greater provision for EWA, such as the Loddon Bulk Entitlement, have contained more detail on targeted monitoring and reporting responsibilities.

The 2005 amendments have also added some statutory monitoring and reporting responsibilities. Of most significance is the introduction of the fifteen year, long-term assessment of the resource base, discussed above, as a catalyst for a long term monitoring and reporting program. The Minister is given a specific duty to ensure a continuous program of assessment of the water resources of the State is undertaken across a range of variables, including the availability of surface and groundwater, the Environmental Water Reserve, and water quality. Yet, this statutory duty is expressed broadly and, arguably, lacks sufficient focus and explicit links to the

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72 Water Act 1989 (Vic) s 43(c).
73 Ibid, s 43 (f) – (h).
74 For example, see discussion of monitoring under the Bulk Entitlement for the Goulburn river, in, Finlayson and Ladson, above n 44, 562. See also Gardner (2006), above n 35, 103333-4.
75 This is discussed against Element Three later in the chapter.
76 Water Act 1989 (Vic), Part 3, Division 1C.
77 Ibid, s 22.
available review processes to contribute to targeted purposeful institutions for effective EWA. For example, the Minister may collect, collate, analyse and publicise information about the Environmental Water Reserve, but the Water Act contains no requirement to monitor and report on its delivery and effectiveness, nor does it specify the institutional capacity required to facilitate this.\(^{78}\)

The discussion in this section has outlined a statutory framework which, even with recent amendments, makes little use of strategic statutory mechanisms to set standards, establish duties, and support targeted processes for effective EWA. Particularly with respect to the allocation of water, the statutory style is highly procedural. Legislation provides the machinery for water allocation with little substantive direction on balancing competing interests thereby leaving the matter largely for executive discretion. Given the difficult socio-economic context of environmental water reforms, it is arguable that such procedural legislation favours a preservation of the status quo. Additionally, this is not neutral procedural legislation. A bias towards protecting existing consumptive use, at least prior to the 2005 amendments, has been identified within the legislation, compared to very little provision to integrate environmental considerations appropriately into decision-making frameworks. Such an approach to statutory design is arguably reflective of the timing of legislative change in Victoria relative to NWR and the increasing prominence of environmental water reform objectives. Yet, even recent amendments have not achieved strong substantive parameters for achieving a more sustainable allocation balance.

Statutory parameters to facilitate and protect environmental water are however more developed in some areas with particularly strong provision for the long-term review of the allocation balance and targeted duties to respond to the outcomes of this review.

The application of these legal settings through the key areas of environmental water governance considered against the remaining three elements of the framework allows

\(^{78}\) Ibid, s 22(2).
some further consideration of whether and how the lack of substantive direction in law and policy on various aspects of EWA has stymied progress on environmental water reforms in Victoria.
This section explores the two planning processes – Bulk Entitlement conversions and Sustainable Water Strategies - which have addressed the allocation of water between environment and consumptive users in regulated rivers in Victoria in the reform period, with particular reference to the experience in the Loddon. With the points of analysis raised in Chapter Three in mind, the scope, design and conduct of these processes are considered to gauge their influence on environmental outcomes achieved.

The case study research was undertaken some years after the negotiation of the Bulk Entitlement conversion for the Loddon and during the period in which the Sustainable Water Strategy planning process for northern Victoria was conducted. Direct access to either planning process as an observer was not possible: the timing of research precluded access to the former, and access to high level negotiations surrounding the latter process was requested but not possible due to political sensitivities. The analysis here is therefore drawn from a range of sources: interviews with stakeholders involved in both processes; available documents; and previous research on similar processes in other northern Victorian rivers. Together these sources provide important insights into the conduct of these processes and allow conclusions to be drawn on how their scope, design and conduct have influenced resulting environmental outcomes.

A Loddon Bulk Entitlement Conversion

The centrality of the Bulk Entitlement conversion process to the Water Act has been outlined in the previous section. It has also been established that the Water Act did not establish clear, substantive standards for EWA to guide this allocation planning process, nor contemplate a comprehensive re-allocation of the resource to achieve a more sustainable allocation balance. At the time of its introduction, the Act focused
largely on clarifying and protecting existing consumptive use rights to establish the basis of a water market. Little detail on the conversion process was provided by the Act and much relied on associated implementation policy. However conversions occurred over a long period and, during this time, guiding policy and associated expectations developed considerably. This discussion documents a gradual evolution of the planning process, in terms of the levels of public participation and range of interest groups involved and, attention given to accessing scientific knowledge on EWA and articulating related management requirements. As such, in the later conversion processes such as for the Loddon, despite the general statutory and policy constraints, the scope to address environmental concerns through this process had broadened significantly. The Loddon is one of the few catchments in Victoria where a specific environmental Bulk Entitlement was negotiated. 81

1 Scope of planning process

Chapter Three argued that an allocation planning process, which centers on negotiating a new legal instrument of allocation and which is introduced as part of the condition of moving towards more secure and flexible rights for consumptive users, offers considerably more potential to achieve a change in the status quo of resource allocation towards a more sustainable allocation balance, than having to revisit entrenched rights through later strategic planning processes. While Bulk Entitlements are direct instruments of allocation that were introduced to phase in more secure consumptive rights and establish a water market, they were not subject to a planning process which integrated environmental objectives. Rather, the statutory and policy settings focused on clarifying existing consumptive rights to water and the design of the process, discussed below, supported this approach.

It is arguable that the scope of the process broadened over time and that later conversions were approached in a way that envisaged broader environmental outcomes. In the original Bulk Entitlement conversion on the Goulburn river, the process focused on ensuring a “fair and reasonable conversion of existing rights.”82 By the time the Loddon conversion was conducted, the rhetoric surrounding the scope

81 Bulk Entitlement (Loddon River – Environmental Reserve) Order 2005
82 Victorian Government Department of Conservation and Natural Resources, above n 47, 17.
of the process was concerned with improving environmental water provision but only
to the extent of minimal impact on security for existing consumptive users. Yet, there
was never a formal, quantified expression of the extent to which security for
consumptive users could be reduced so as to improve EWA. Rather, participants have
quite different recollections of the process parameters.

Participants from the natural resource agency leading the process and the involved
water authority recall a process in which claw back of water was not appropriate but
there was significant scope for better managing flows and better using unallocated
water for environmental outcomes. A ‘minimal impact on security’ so as to achieve
environmental improvements was envisaged.\textsuperscript{83} Environmental representatives had
higher expectations of the process, at least at the beginning.\textsuperscript{84} The absence of a clear
articulation of substantive process parameters arguably favoured the status quo of
resource allocation and seriously constrained potential environmental outcomes,
particularly in light of process design factors, such as unbalanced representation,
discussed below.

The extent of public participation used to contribute to substantive policy
development regarding water re-allocation is another key consideration of process
scope raised in Chapter Three. In terms of public involvement in the Bulk Entitlement
conversion process, the Water Act provided only in quite general terms for notice
requirements and the taking of submissions on an application for a Bulk Entitlement
once it had been submitted by a water authority.\textsuperscript{85} A policy decision was, however,
made early on to adopt an informal consultation process whereby contact groups
consisting of water authorities applying for Bulk Entitlements and representatives of
key interest groups were established.\textsuperscript{86} Later discussion shows how the breadth of
representation within these groups expanded over time. This expansion influenced the
scope of the process by broadening potential for negotiating environmental outcomes.

\textsuperscript{83} Comments made in interviews conducted with staff from the water authority and the natural resource
management agencies, involved in the conversion process, June – September 2008.
\textsuperscript{84} Comments made in interviews conducted with staff from the Catchment Management Authority and
nature conservation agencies, involved in the conversion process, June – September 2008.
\textsuperscript{85} Water Act 1989 (Vic), ss 36-39.
Tan discusses the process used in practice in the Goulburn and Murray conversions. See Tan, above n 2, 168-70.
\textsuperscript{86} Victorian Government Department of Conservation and Natural Resources, above n 47, 17-18.
Yet, within the tight formal policy context of Bulk Entitlement conversions, with its explicit rejection of administrative re-allocation of rights, many environmental representatives questioned the integrity of the participatory process. With little scope for negotiating environmental outcomes, the participatory planning process was increasingly perceived as a political farce, conducted to give the impression of community consultation.\(^8\)

### 2 Design of Planning Processes

Despite the constraints noted above, in terms of the scope within the Bulk Entitlement process to negotiate a re-allocation of the resource to reflect more sustainable water use patterns, the design and conduct of the Loddon process, especially when compared to earlier conversions, has been influential in resulting environmental outcomes. Broader representation in the consultation process and increased emphasis on scientific input on environmental water requirements are two important improvements which have contributed positively to outcomes.

**\( \text{(a) Effective Representation of Public Environmental Interests?} \)**

For the Loddon conversion, resources were allocated to establishing a consultative committee who met regularly over a couple of years. The presence of environmental advocates was undoubtedly influential in resulting environmental outcomes.

For example, environmental representatives were successful in negotiating a volumetric entitlement for the Boort wetlands, even though the expert scientific flow recommendations on which the negotiation was based had not made recommendations beyond in-stream flows. In practice, committed advocates for such an entitlement were able to make a case that these wetland values had been sustained over many years as they were linked into the irrigation network. In more recent years they had been cut off from the irrigation network. Therefore they needed a secure entitlement to maintain their values. Their arguments were boosted by a lobby group of local

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\(^8\) Comments made in interviews conducted with representatives of nature conservation interests, and staff from nature conservation agencies involved in the conversion process, June – September 2008.
government and landholders advocating for an entitlement for the lake in the township of Boort. This group was very strongly present on the committee. While their focus was more on recreational and amenity values for the township, the attention drawn to wetland values no doubt boosted the environmental position for a broader wetland entitlement.88

Discussion in Chapters Three and Four has emphasised that effective representation demands far more than merely a seat at the negotiating table. In order to ensure legitimate, meaningful involvement, consideration not only of who is represented, but also with what resources and what authority, is important. Although the breadth of representation on the Loddon consultative committee was a vast improvement on the “closed, elitist forum,”89 heavily weighted in favour of consumptive interests, which characterised the first conversion on the Goulburn river;90 in practice, consumptive interests continued to dominate the committee.

Environmental representatives involved in the Loddon conversion have commented that the process was strongly controlled by the Water Group within the Department of Sustainability and Environment. The departmental River Health team had far less influence. The Water Group provided the committee chair, and the majority of technical support for the process. Their focus was on achieving no impact on existing entitlements.91 Environmental representatives also note the influence of the water authority, Goulburn Murray Water, on the conduct of the process and its broader acceptance in the community. Well-resourced to participate effectively, and well-placed to negotiate around the highly technical modeling of various resource allocation scenarios, Goulburn Murray Water was also in a position to communicate broadly with their constituency and conducted extensive public consultation themselves. In contrast, Catchment Management Authorities were unable to achieve

88 Comments made in interviews conducted with representatives of nature conservation interests and staff from nature conservation agencies involved in the conversion process, June – September 2008.
89 Tan, above n 2, 170.
90 See also Finlayson and Ladson, above n 44, 560.
91 Comments made in interviews conducted with representatives of nature conservation interests and staff from both the Catchment Management Authority and nature conservation agencies involved in the conversion process, June – September 2008.
such broad and successful community consultation so as to build understanding and support for environmental flows. 92

(b) Establishing Acceptable Parameters for Negotiation

An important factor in establishing parameters for negotiation of EWA is the availability of credible scientific information on environmental water requirements and direction on its application to planning processes.

The later Bulk Entitlement conversions differed considerably from early conversions in that a formal process of accessing independent expert scientific opinion on the environmental water needs pertaining to the management area was conducted as preliminary work. 93 Thus environmental representatives did have a comprehensive assessment of environmental water needs, which was quantified into flow volumes for river reaches at various temporal scales. These recommendations had significant legitimacy in the process. They were prepared by independent experts according to a state-endorsed methodology and were targeted to the planning process needs with its focus on modeling different flow scenarios. Their availability, at least, provided environmental representatives with a resource to argue for environmental improvements and a negotiating tool which suited the conversion process. 94 It also placed them in a better position than comparable environmental representatives in many of the NSW water sharing planning processes, discussed in Chapter Four, who had to negotiate on the basis of scattered, often outdated, and far from comprehensive research on environmental water needs.

Yet, despite the positive influence of the availability of such a resource, there was an obvious lack of substantive policy or statutory direction on how it should be integrated into the process - what weight and value should be given to these

92 Ibid.
93 A method for determining environmental water requirements in Victoria was developed in 2002, Sinclair Knight Merz, State Method - FLOWS - a Method for Determining Environmental Water Requirements in Victoria (2002). This method was applied to the Loddon conversion process. See Loddon River Environmental Flows Scientific Panel, above n 11; Loddon River Environmental Flows Scientific Panel, above n 17.
94 Comments made in interviews conducted with staff from the Catchment Management Authority, and expert scientists involved in the conversion process, June – September 2008.
recommendations when considered against the push to maintain reliability of supply for existing consumptive users?

A key issue here is the difficulty of reconciling the nature of scientific recommendations for EWA with information on likely impacts for consumptive users. Scientific experts are characteristically reluctant to make definitive statements of risk and quantify flow relationships given inherent uncertainties and complexities in the science. Information about the impact of different flow scenarios on established consumptive use is by contrast more easily quantifiable.\(^95\) A failure to guide the use of scientific information, including how to manage such uncertainties and complexities, has substantially diminished its value to the process.

Similar to the NSW context, it is, therefore, arguable that such information is better applied in setting clear parameters for a stakeholder negotiation, such as re-allocation targets and guidelines for environmental water management. Merely providing environmental representatives with such information in a negotiation context, so heavily weighted against achieving a change to the status quo of resource allocation, was not sufficient to overcome the bias against environmental outcomes.

Additionally, these scientific flow recommendations were not uncontested. Many environmental and landholder representatives felt that the expert process did not adequately access local knowledge and experience about the river and its complex behaviour over time, and questioned certain assumptions upon which recommendations were made.\(^96\) Participants felt there was no scope for contributing this type of lay knowledge into the Bulk Entitlement conversion process.\(^97\) In hindsight, it appears that this was a significant flaw in the approach taken to negotiating environmental flows. Indeed, certain of the contested flow recommendations have since been revised under current environmental water

\(^95\) This was identified as a key difficulty in the negotiation context by representatives of nature conservation interests and staff from nature conservation agencies involved in the conversion process, June – September 2008.

\(^96\) Comments made in interviews conducted with landholders, representatives of nature conservation interests, staff from the Catchment Management Authority and some staff from natural resource agencies involved in the conversion process, June – September 2008.

\(^97\) Ibid.
management arrangements, effectively validating some of these local community concerns.98

B Sustainable Water Strategies

The development of regional Sustainable Water Strategies has been positioned within the statutory and policy scheme as the next stage of water allocation planning in Victoria, with the capacity to better accommodate environmental water needs. The focus of this discussion is the scope and likely environmental outcomes of the Sustainable Water Strategy process in northern Victoria. It considers how the statutory parameters, described in Element One, have been interpreted in the practical planning context of extreme water scarcity and increasing understanding of climate change scenarios. Considerations of process design, such as the level of stakeholder engagement and influence, are not discussed in any detail here, given the limited access to the high level planning process.99

The Sustainable Water Strategy is not a direct instrument of allocation, but a strategic overarching plan, which sits above the existing allocation instruments, such as Bulk Entitlements, which have for the most part already entrenched existing unsustainable levels of consumptive use, increased certainty and introduced transferability for water users. Requiring environmental water considerations to be addressed in this context is very different to addressing competing demands on water resources in an integrated fashion as part of a direct allocation planning process which will also introduce benefits for consumptive users such as transferability. The staged Victorian approach to water allocation planning is attributable in part to the timing of legislative response to NWR. Victoria had introduced comprehensive new water legislation, which met many of the NWR parameters – particularly those relating to security and flexibility

98 Comments made in interviews conducted with staff from the Catchment Management Authority involved in the implementation of the Bulk Entitlement, June – September 2008. Such issues were discussed in the meeting of the Loddon Environmental Water Advisory Group, observed in Hently, June 2008.

99 Process requirements under the Water Act include high level stakeholder consultation in the development of the strategy, with some formal consultation through a public submission process. See ss 22D – 22G.

For discussion of the process employed for the Northern Sustainable Water Strategy, see Victorian Department of Sustainability and Environment (2008), above n 24, 70.
for consumptive users - just prior to the articulation of NWR in 1994. However, without careful attention to ensuring later processes properly integrate environmental considerations and revisit prior allocation decisions accordingly, this approach considerably lessens the scope to negotiate trade-offs which will result in significant environmental outcomes.

The policy which led to the 2005 amendments to the Water Act positioned the Sustainable Water Strategy as a new layer of planning through which the government would begin to redress the allocation balance between consumptive and environmental water. These strategies were, *inter alia*, to identify priority regulated rivers where the Environmental Water Reserve was to be enhanced, the volumes of water to be recovered and the most effective combination of projects to achieve this.\(^{100}\) Importantly, however, there was no contemplation of a comprehensive administrative re-allocation of the resource and, indeed, a strong reiteration of the prevailing policy to respect existing consumptive rights.\(^{101}\)

As noted above, one of the major substantive commitments of the 2005 amendments was that a Sustainable Water Strategy must identify ways to increase the volume of water in the Environmental Water Reserve to improve the environmental values and health of water ecosystems.\(^{102}\) It must also identify ways to improve security of supply for all water users.\(^{103}\) The way these parameters have been interpreted in the implementation of the northern Sustainable Water Strategy process to date suggests that the experience of prolonged drought and associated extreme water scarcity in recent years in northern Victoria has had a significant and detrimental influence on the scope of the process to achieve environmental improvements. It has proven politically difficult to negotiate any significant change to the status quo of resource allocation that would worsen the situation for existing resource users already experiencing extreme resource stress. The likely environmental outcomes of the process appear to be substantially compromised.

\(^{100}\) Victorian Department of Sustainability and Environment (2004), above n 29, 47.
\(^{101}\) Ibid, 18, 44.
\(^{102}\) Water Act 1989 (Vic), s 22C(1) (c), (d).
\(^{103}\) Ibid, s 22C(1) (a), (b).
The draft strategy proposes a further staged approach to increasing the Environmental Water Reserve. It acknowledges the ample evidence of poor condition of Victorian rivers due to over extraction.\(^{104}\) It documents how, under climate change scenarios, environmental flows will be reduced significantly more than water available for consumptive use because the majority of environmental flows are currently unprotected as unallocated flows and, therefore, highly vulnerable to changing water availability.\(^{105}\) Yet, this reality is not used as a reason to fundamentally rethink the way water is shared between the environment and consumptive users, nor to justify taking significant steps towards addressing this prior to the fifteen year review.

Rather, the draft strategy takes a very measured and conservative approach to strategies to increase EWA. It breaks down environmental flow recommendations into categories of potential environmental outcomes, from Category One, which would provide only enough water to protect drought refuges, to Category Six where full environmental flows would be delivered, representing not a pristine, but an ecologically health condition. It then considers how much water would be required to meet each category under a range of different climate scenarios, from historical average climate to the worst case scenario of a continuation of the last 11 years of extremely low inflows.\(^{106}\)

From this basis, the draft strategy proposes environmental water recovery targets to guide future recovery efforts. It is at this point that considerable trade-offs of environmental values are made. The strategy proposes that the Environmental Water Reserve for each river system be increased only to a Category Four healthy working river outcome under historic flow conditions. Under a continuation of the climate of the last 11 years, it proposes that rivers be maintained only at Category One or Two, as drought refuges in survival mode.\(^{107}\) While this recommendation is accompanied by a comment that managing rivers at drought flow levels (Category 1 – 2) is not an ongoing solution, the strategy suggests that an acceptable response would be to

\(^{104}\) Victorian Department of Sustainability and Environment (2008), above n 29, 45.
\(^{105}\) Ibid, 51.
\(^{106}\) Ibid, 96.
\(^{107}\) Ibid, 102-3.
rationalise environmental management objectives under the fifteen year long term water resource review scheduled for 2019.\textsuperscript{108}

To be fair, the draft does note that increasing the Environmental Water Reserve would also be an acceptable response. However, it devotes far more time and space to detailing the above option and, in contrast, includes very little detail on practical strategies to increase EWA. Indeed, no additional concrete proposals for water recovery to meet these targets are introduced via the strategy. A very clear preference is expressed for recovery mechanisms with a low impact on existing users, such as improving the efficiency of existing environmental water through carry over, re-use of return flows and use of consumptive water en-route to meet environmental objectives.\textsuperscript{109}

In some ways, the recent introduction of the federal statutory water planning process and accompanying investment program creates a hiatus for State driven processes like the Sustainable Water Strategy. The lack of initiative to improve EWA documented above suggests political positioning to ensure Victoria benefits from current federal environmental water recovery programs.

The suggestion that, under the extreme climate scenarios predicted for the region, it may not feasible to continue protecting existing assets has drawn considerable criticism from environmental advocates.\textsuperscript{110} They argue that such an approach will have disastrous consequences for river health. Even in the best case scenarios (historic rainfall and inflow conditions), basic environmental flows to maintain minimum river health will not be provided and rivers will continue to degrade. Additionally, this focus on making environmental trade-offs contradicts the intent of the fifteen year legislative review. The relevant statutory provisions do not contemplate changing environmental objectives to respond to a change in water availability, but rather focus on adjusting the balance between competing users in such circumstances, which in the

\textsuperscript{108} Ibid 102 - 104. 
\textsuperscript{109} Ibid. See also Environment Victoria, Submission to the Draft Northern Region Sustainable Water Strategy (2008).
\textsuperscript{110} Environment Victoria, above.
current situation would necessitate significant re-allocation of the resource to the environment.\textsuperscript{111}

On a positive note, the scale of planning contemplated by the Sustainable Water Strategy mechanism responds to considerations of linkages across institutional scales raised in Chapter Three.\textsuperscript{112} In relation to EWA, this scale of planning offers considerable opportunities to coordinate environmental water recovery and manage existing environmental water more efficiently on a regional scale. Given the interconnected nature of the water supply system in northern Victoria, these opportunities are particularly relevant.

\textbf{C Alternative Approaches to Environmental Water Recovery}

Throughout the NWR period, there has been a consistent preference expressed in Victorian water policy for delivering environmental improvements through water recovery projects which left existing rights to water intact, rather than administrative re-allocation through planning.\textsuperscript{113} Investment in water savings through irrigation infrastructure improvements has been a considerable focus and a range of major water recovery projects in northern Victoria have been committed to over the reform period.\textsuperscript{114} These have been characterised as the subsequent phase once existing water entitlements have been clarified through Bulk Entitlements. This discussion considers some examples and suggests that, in light of recent experience of extreme water scarcity and likely climate scenarios, their potential to contribute to a more sustainable resource allocation has been substantially diminished.

For example, as part of the Living Murray Initiative noted in Chapter Two, a commitment was made to allocate 20\% of a new low reliability entitlement to the environment for use in Victorian tributaries and for Living Murray icon ecological

\textsuperscript{111} Ibid.
\textsuperscript{112} Integration across different policy scales, is a key theme in the adaptive governance literature. See Stephen Dovers, \textit{Environment and Sustainability Policy: Creation, Implementation, Evaluation} (2005), Ch 10.
\textsuperscript{113} Victorian Department of Sustainability and Environment (2004), above n 29, 47-50; Victorian Department of Sustainability and Environment (2008), above n 24, 103-4, 124-130.
\textsuperscript{114} Ibid.
assets. This was a condition of converting previous discretionary ‘sales’ water (an additional allocation made available to holders of water rights and licenses in years of average and high water availability) to a separate legally recognized, and independently tradable, entitlement. Yet, due to the low reliability of this entitlement and its consequent vulnerability to changing water availability, very little of this water has been available since this commitment was made. For these reasons, under climate scenarios, it is unlikely to make a significant practical contribution to the Environmental Water Reserve in northern Victoria.

Another water recovery project which has received considerable State and federal funding and attention is the Northern Victorian Irrigation Renewal Project. This invests in water savings through channel lining and automation and other infrastructure improvements throughout the Murray, Goulburn, Campaspe and, to a lesser extent, Loddon system. These works are intended to produce savings to be shared between urban and rural users and the environment. The project provides an example of the difficulty of estimating savings given prolonged drought conditions and climate uncertainties. In this case, the project was justified and commenced on the basis of what has proven to be significantly over-inflated estimates of potential water savings. The focus on efficiencies and tightening the irrigation system may also have undesired environmental impacts: for example, reducing system outflows may ‘save’ water in that area of the system, but may also reduce water that would otherwise have been available to the environment locally to support wetlands and other values. Whether these losses can be offset by the increased environmental water available in storage is an open question and will depend very much on the practical management context.

115 Victorian Department of Sustainability and Environment (2004), above n 29, 49.
116 Environment Victoria and Australian Conservation Foundation, Submission to the Northern Region Sustainable Water Strategy Discussion Paper (2008), 13. They argue that water from the Sales Deal will only be fully available 2 years out of 100.
117 Victorian Department of Sustainability and Environment (2008), above n 24, 124-5.
These examples highlight how market-based approaches must be carefully targeted in order to contribute to re-allocation towards a more sustainable allocation balance. They must focus on recovering water that will actually provide environmental water managers with opportunities to deliver environmental outcomes. A range of levels of entitlement security are appropriate within an environmental water portfolio, particularly considering the likely value of low reliability water into the future.

The discussion in this section has described a staged approach to processes to re-allocate water to more sustainable levels. First, Bulk Entitlement conversions were to clarify existing rights to water. In the later conversions, scientific recommendations for environmental flows were produced and some level of EWA was achieved. Second, strategic work to identify ways to increase the Environmental Water Reserve was to be undertaken under the Sustainable Water Strategies. The fifteen-year review of water allocation discussed in Element One provides a third stage opportunity to re-allocate the resource administratively, including potential to adjust the allocation balance to better provide for river health objectives. Along the way, various market-based projects were to achieve environmental water recovery without affecting existing consumptive rights to water.

Yet, given the experience to date of the first two stages of this process (Bulk Entitlements and Sustainable Water Strategies) and the concerns raised about alternative approaches to water recovery above, it is evident that the approach of grafting on a new legal entitlement for environmental water without a corresponding, integrated process to achieve re-allocation has had limited effect to date. Extreme water scarcity over the last decade has justified the further postponement of action to achieve a more sustainable resource allocation. Much now rests with the federal planning and investment program. This in itself underscores the importance of scale in institutional developments in this area and the difficulties of achieving substantial resource re-allocation unilaterally at a State level within the MDB, even within the context of a NWR policy agenda.
IV ELEMENT THREE: LEGAL MECHANISMS TO FACILITATE AND PROTECT ENVIRONMENTAL WATER

This discussion explores the level of protection and status accorded environmental water through the direct legal mechanisms used to facilitate EWA in the Loddon, and their broader regulatory context. Similar to the NSW case study, the Loddon experience demonstrates how status and protection can be undermined by the practical management context of regulated rivers, which impedes the realisation of desired outcomes. In light of recent experience of water scarcity and likely future climate scenarios, much attention is given to the treatment of environmental water in the context of extreme resource pressure.

The case study highlights that the mechanisms used to facilitate and protect environmental water in the Loddon require considerable refinement to better contribute to effective EWA, specifically in terms of ensuring scope for flexible adaptive management and adequate protection in situations of scarcity. It also identifies the importance of tightening the regulatory framework to constrain and better account for interception activities, such as farm dams, which are already impacting significantly on water availability in the catchment.

A Direct Legal Mechanisms for Environmental Water

According to the statutory definition of the Environmental Water Reserve, it may be composed of water from a number of sources. These include targeted instruments which set aside a volumetric environmental entitlement in storage; instruments which provide for passing flow rules which address environmental objectives; and water that is not allocated for consumption within the basin, such as tributary inflows which enter the river below storages and cannot be regulated.

120 Water Act 1989 (Vic), s 4A.
This discussion focuses largely on targeted instruments for EWA – volumetric environmental entitlements and rules-based environmental water (passing flows). It is, however, important to acknowledge that unallocated water is understood to account for much of the total Environmental Water Reserve in northern Victoria. Only 4% of the reserve is composed of volumetric entitlements. The remainder is either provided through rules-based passing flows or is unallocated water. Unallocated water is not effectively specified and protected as environmental water and is, therefore, highly vulnerable in practice to changing water availability under climate scenarios. It is also very difficult to access data about this component of the Environmental Water Reserve, making it hard to comment on its extent or management for specific catchments.

The three components of the Loddon Environmental Reserve Bulk Entitlement are described below to introduce key characteristics which influence their status and protection.

1 Rules-Based Environmental Water

The Bulk Entitlement provides for variable passing flows for five river reaches in the regulated portion of the Loddon. For each reach, two types of flow are provided – minimum passing flows and river freshening flows. The volume, timing, duration and frequency are prescribed.

These flows are subject to certain restrictions and conditions. For example, both minimum passing flows and river freshening flows are generally subject to natural flow calculations. If flows emanating upstream of the relevant monitoring point are less than the specified minimum passing flow, then the natural flow is provided. For example, in Reach One in the Upper Loddon, specified minimum flows from May to October are 35ML/day. Yet if the natural flow entering the storage is only 10ML/day,

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124 Ibid, Schedule 1.
only 10ML is delivered.\textsuperscript{125} Similarly, three prescribed river freshening flows in this reach of an additional 35ML per day for seven consecutive days need not be provided if the natural flow at the time is less than the specified flows.\textsuperscript{126} Minimum flows are also subject to storage levels, and if the combined storage capacity of the two main Loddon dams – Cairn Curran and Tulleroop – is below a certain volume, then the minimum passing flow will be reduced accordingly.\textsuperscript{127}

There is, however, provision for any minimum flows not delivered under these restrictions to be stored in a deficit and reimbursement account.\textsuperscript{128} There is a maximum limit of 20000ML to the amount that can be stored.\textsuperscript{129} The account can only be accessed by the environmental water manager when the combined storage capacity of Cairn Curran and Tullaroop is equal to or greater than 80,000ML,\textsuperscript{130} yet there are no limitations on the use of this water.\textsuperscript{131} As such, when available it may represent an opportunity to provide some of the natural flow components, such as higher and over-bank flows which were recommended by the environmental flows study but not provided for in the Bulk Entitlement.

\textbf{2 Volumetric Environmental Entitlement}

The Bulk Entitlement provides a 2000ML / annum entitlement for the Boort District Wetlands, which can also potentially be used for other priority wetlands in the district upon the discretion of the environmental water manager.\textsuperscript{132} This entitlement can be carried over in storage up to a total of 2000ML. However, carry-over water cannot be accessed when the wetland allocation is less than 100\%, and will be forfeited when Cairn Curran or Tulleroop reservoirs spill.\textsuperscript{133} This entitlement has the same reliability of supply as irrigation entitlements and is similarly subject to seasonal water
determinations against the entitlement.134 Thus the entitlement will only be fully available when the irrigation allocation for the Loddon River reaches 100%.

There is considerable flexibility in the use of this entitlement. The Bulk Entitlement merely provides that water should be supplied so as to maximise the flora and fauna values within the wetlands and to the highest environmental use.135 Use of the entitlement is, however, expressly restricted by channel capacity, and can only be supplied when there is spare channel capacity available after meeting all the consumptive demands from the system waterway.136

3 Limited Access to Unallocated Water for the Environment

Although not defined in the Bulk Entitlement by volume, duration or timing, unallocated water may also be used for limited environmental purposes.137 Such water becomes available through rainfall induced storage spills or rainfall rejections (where irrigation deliveries are not used due to a rainfall event). At the Loddon weir, such water can be intercepted and diverted down the western Warranga Channel to the wetlands or allowed to continue to flow down the river. It can be used to replenish wetlands or to provide a higher in-stream flow event in the lower reaches of the Loddon. There is no capacity to store such water and its potential to contribute to the Environmental Water Reserve is, therefore, highly opportunistic.

B Legal and Practical Management Status

The characteristics of the above instruments are now considered in terms of their formal legal status and also their ability to deliver environmental outcomes in a practical management context (practical management status). This discussion clearly demonstrates how formal legal status can be diminished in practice, in light of the various conditions and restrictions on the use of environmental water, general operational limitations within the regulated system and the management response to

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134 Schedule 3, cl 4.
135 Schedule 3, cl 1.
136 Schedule 3, cl 3.3.
137 North Central Catchment Management Authority, above n 12, 25, 32.
extreme water scarcity. This supports the contention in Chapter Three that NWR commitments to ensure environmental water has similar status and legal protection to consumptive use entitlements has not necessarily been achieved in practice. Considerable refinement of the legal mechanisms for EWA to achieve adequate status and protection is warranted.

1 Rules-Based Environmental Water

At a basic level, it is important to consider how well passing flow rules respond to environmental reform imperatives in re-introducing important aspects of the natural flow regime. The Loddon example illustrates the difficulties encountered in achieving flow rules which conflict with the way that rivers are now managed to supply water for consumptive use. The passing flow rules of the Loddon Bulk Entitlement do respond to some of the flow recommendations of the environmental flows study noted earlier. Generally, however, only those flows which did not threaten existing management practices and existing levels of consumptive use were implemented. As such, the recommendations for higher flows and over-bank flows were not included. Research conducted for this case study suggested that the Bulk Entitlement replicated flows which were largely achieved anyway under existing management practices, at least during times of reasonable water availability experienced until the recent drought.

It is also important to note that full delivery of the flow rules in the Bulk Entitlement, does not necessarily mean that the environmental objectives targeted by the flow recommendations will be appropriately addressed. For example, the river freshening flows may be achieved wholly or in part through management of the irrigation system, which may in many cases result in greater volume, duration, and frequency of flows than the prescribed freshes. While such flows might ostensibly comply with the Bulk Entitlement rules in that they meet and often exceed prescribed volumes, they do not provide the regime recommended in the environmental flow

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138 Loddon River Environmental Flows Scientific Panel, above n 17.
139 Comments made in interviews conducted with staff from the Catchment Management Authority, nature conservation agencies and landholders involved in the negotiation of the Bulk Entitlement Conversion, June – September 2008.
140 North Central Catchment Management Authority, above n 12, 23, 29.
determination, and evidence the difficulty of managing the seasonal inversion of the natural flow regime present in many working rivers in the southern MDB.

Minimum passing flow rules are generally regarded as highly secure environmental water. They are treated as base flows provided before water can be allocated to any other uses. The operating strategies of water authorities usually provide conservatively for the capacity to deliver such flows over the longer term.\footnote{This is achieved in the Loddon through making the supply of water to consumptive entitlements contingent on first meeting the flow rule requirements of the Loddon Environmental Reserve Bulk Entitlement. See \textit{Bulk Entitlement (Loddon System – Goulburn-Murray Water) Conversion Order 2005}, cl 5 and 10.1. This is also supported by comments made in interviews conducted with staff from the Water Authority involved in the implementation of the Bulk Entitlement, June – September 2008.} Yet, as noted above, the flow rules used in the Bulk Entitlement, which encompass both minimum flows and a range of other flow components, are subject to a range of restrictions and conditions: they can only be fully delivered when certain volumes are secure in storage for consumptive use, and are reduced when natural flows are lower than specified flows.

These conditions were developed in the negotiation of the Bulk Entitlement to lessen the impact of the environmental water provisions on consumptive use in a situation of growing concern over prolonged drought and climate change. They protect opportunities to harvest water and maintain storage levels.\footnote{Comments made in interviews conducted with staff from the Water Authority involved in the implementation of the Bulk Entitlement, June – September 2008.} Yet, they effectively undermine the status of the passing flow rules and operate as serious constraints to the effectiveness of EWA. Ironically, the way the rules include in-built responses to climatic factors makes these flows far more vulnerable to changing water availability under low rainfall climate scenarios.\footnote{Comments made in interviews conducted with staff from the Catchment Management Authority involved in the implementation of the Bulk Entitlement, June – September 2008.} Recommended flows have in fact rarely been implemented since the introduction of the Bulk Entitlement.

As noted above, a deficit and reimbursement account is established to preserve environmental flows not delivered as a result of these restrictions for later use. Yet, the restrictions on the use of this water based on storage levels noted above are considered by environmental water managers to be major constraints to facilitating...
recovery after drought. In the years immediately following drought, when environmental recovery will be a major priority for managers and storages begin to gradually build up their supply, these rules preclude access to this water.

Another concern with the effectiveness of this approach to providing for EWA is the lack of management flexibility associated with fixed flow rules. The Bulk Entitlement contains quite extensive provision for flow rules, but a relatively small volumetric entitlement with far greater management flexibility. Environmental water managers argue that, although secure passing flow rules are very important in an environmental flow regime, far greater management flexibility would be achieved by redefining more of the Environmental Water Reserve as discretionary volumetric entitlements, or at least adapting flow rules to allow intervention by managers in pursuit of an adaptive management approach.

2 Volumetric Environmental Entitlement

The volumetric wetland entitlement described above appears, at a formal level, to have similar legal status to consumptive entitlements, with additional provisions for carry-over enhancing this status through added management flexibility. There are, however, a number of operational constraints which may undermine the realisation of effective environmental outcomes in practice. For example, the Bulk Entitlement expressly restricts the use of the entitlement to situations where channel carrying capacity is available and prioritises consumptive entitlements in accessing such capacity. This is of particular significance as the Boort district wetlands have largely been isolated from the natural floodplain and can only now effectively be supplied by irrigation channels.

According to environmental water managers, this prioritisation may undermine the status of the wetland entitlement and reduce its effectiveness. For example, while channel capacity may not have been a constraint under historical irrigation practices

144 Ibid.
145 Comments made in interviews conducted with staff from the Catchment Management Authority and nature conservation agencies involved in the negotiation and implementation of the Bulk Entitlement, June – September 2008.
146 North Central Catchment Management Authority, above n 12, 12.
given generally divergent timing requirements for irrigation water and environmental water in this area, these practices may be changing over time in response to changing climatic conditions. Under drought conditions, irrigators are increasingly concentrating water use in Spring and Autumn when they can maximise pasture outcomes instead of irrigating through the summer. This may conflict with the objectives of environmental water managers who would generally prioritise environmental wetland watering in these seasons and therefore require channel access.\textsuperscript{147}

A significant operational constraint associated with using this entitlement is the limited channel outfall capacities. Water takes a very long time to be delivered to the wetlands. While this is far from optimal from an environmental management perspective, it also potentially increases the likelihood of experiencing channel capacity restrictions as outlined above. If these outfall capacities could be improved, the potential for a direct conflict of interest with consumptive users would be lowered.\textsuperscript{148}

Addressing channel outfall capacity is a current priority of environmental water managers. Yet, because environmental water managers do not currently have an ongoing revenue stream, their ability to efficiently address such constraints is limited.\textsuperscript{149} The current focus on streamlining and modernising irrigation channels throughout northern Victoria, described in the previous section as a tool of environmental water recovery, ironically focuses exclusively on irrigation efficiencies to yield savings, not on redesigning infrastructure to also allow more efficient and effective environmental water delivery.\textsuperscript{150}

In the lower reaches of the Loddon, including around the wetlands, there are a number of unregulated river customers who hold supplementary access entitlements, which allow opportunistic access to unallocated water. While flows supplied as part of the wetland entitlement are not legally available for other consumptive uses, managers

\textsuperscript{147} Comments made in interviews conducted with staff from the Catchment Management Authority involved in the implementation of the Bulk Entitlement, June – September 2008.
\textsuperscript{148} Ibid.
\textsuperscript{149} Ibid.
\textsuperscript{150} Victorian Department of Sustainability and Environment (2008), above n 24, 124-5.
note that in practice these users may access environmental water unless expressly informed of its nature.\textsuperscript{151} In such a case, protecting environmental water would rely on timely communication, through water authorities, with such customers, and associated compliance strategies. Institutional arrangements to support such outcomes are discussed in Element Four.

3 **Limited Access to Unallocated Water for the Environment**

Given its opportunistic nature and the short period of time in which such water may become available and effectively re-routed to the wetlands, the effectiveness of the rule allowing access to unallocated water relies largely on having an appropriate and timely process in place to facilitate its swift application. Current water managers have commented that the implementation of this rule involves considerable operational work to be undertaken by water authorities. They express concerns about its implementation given the small volumes involved, tight decision-making timeframes, and the fact that their considerable labour and other expenses are uncompensated by environmental water managers.\textsuperscript{152} These comments suggest that, in the current practical management context, procedures have not been refined to the degree necessary to facilitate the allocation of such water to the environment. Consequently, the responsible water authority may tend to favour making such water available to consumptive users in the lower river reaches for which processes are already established.

4 **Qualification of Rights**

The environmental flow provisions of the Loddon Bulk Entitlement were temporarily qualified, under s 33AAA of the Water Act, shortly after the Bulk Entitlement was formalised in response to a declaration of extreme water scarcity.\textsuperscript{153} This was,

\textsuperscript{151} Comments made in interviews conducted with staff from the Catchment Management Authority, nature conservation agencies and natural resource agencies involved in the implementation of the Bulk Entitlement, June – September 2008. Such issues were also discussed in the meeting of the Loddon Environmental Water Advisory Group, observed in Hently, June 2008.

\textsuperscript{152} Comments made in interviews conducted with operational staff from the Water Authority involved in the implementation of the Bulk Entitlement, June – September 2008.

\textsuperscript{153} Water Act 1989 (Vic) - Declaration of Temporary Qualification of Rights in the Loddon System, 31 October 2006.
admittedly, an emergency management response to a situation not previously experienced and should, therefore, be judged in this light. Yet, it is important to understand the extreme impact of the response on environmental water provisions and use this understanding to reconsider the levels of protection achieved for environmental water under current instruments and management practices. The discussion below charts a progressively severe reduction of environmental flow provisions under qualification of rights.

For example, under the first qualification in late 2006, minimum passing flows were reduced to zero in three of the five river reaches and to only 5ML/day in the reach below Tulleroop Dam. Minimum flows below Loddon Weir were altered from a daily flow requirement to a maximum volume available to that reach over the six month period of qualification. All river freshening flows were removed.\(^{154}\)

In a further qualification in mid 2007,\(^{155}\) all flows except those reduced flows below Tulleroop were ceased.\(^{156}\) This caused a cease-to-flow situation below Loddon Weir, reducing the river in this reach to a series of pools. However, under this qualification, the storage operator was to maintain a record of all flows that would otherwise be released as environmental flows under passing flow rules to be made available for later use through the Deficit and Reimbursement account.\(^{157}\) Specifically, those flows that would have been released below Loddon Weir in the lower reach of the river were to be made available, also in a staged manner for discretionary release by the environmental water manager, with little limitation on the reach or purpose for which they could be used.\(^{158}\)

A further amendment to the qualification, made in May 2008, removed the only remaining passing flow requirement below Tulleroop reservoir and replaced these

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\(^{154}\) Ibid.


\(^{156}\) Ibid, cl 12 (a)(i), (ii), (iii).

\(^{157}\) Ibid, cl 12(a)(iv).

\(^{158}\) *Water Act 1989 (Vic) – Amendment to Temporary Qualification of Rights in the Loddon Water System, April 2008,* cl 4(a).
flows with a volumetric entitlement available to the environmental water manager, the volume of which depended on the storage capacity of the Tulleroop system.\textsuperscript{159}

As such, under qualification of rights, environmental passing flows were considerably impacted. While consumptive users have also experienced very severe reductions in water allocations and even difficulties supplying stock and domestic water in certain areas,\textsuperscript{160} the nature of the mechanisms used to facilitate and protect environmental water has left it arguably more vulnerable to qualification than other entitlements in the system. Given environmental water is the most likely to be remaining in storage in times of looming shortage, due to more conservative management over longer horizons and more permissive carry over water rules, this water is likely to be the most severely impacted under such a management response.

In practice, the above qualifications were agreed through a process of consultation between Goulburn Murray Water, as the water authority requesting the qualification, the North Central Catchment Management Authority, as environmental water managers, and the Department of Sustainability and Environment. Input from the expert scientific panel who had prepared the original environmental flows study was also made available.\textsuperscript{161} While the environmental impact of qualification in the Loddon is not to be underestimated, it is important to note that environmental water managers felt that they were able to negotiate the best possible results in the circumstances.\textsuperscript{162} They note that, under the qualification, available water was targeted at mitigating major risks to the habitat values of priority reaches; and that water not delivered as environmental flows was at least accrued and made available to assist in recovery following drought. In Reach Four they were able to trial a management response of alternating cease-to-flow periods with freshening flows instead of the minimum passing flow prescribed under the Bulk Entitlement. The flows in this reach had been

\textsuperscript{159} Water Act 1989 (Vic) – Amendment to Temporary Qualification of Rights in the Loddon Water System, May 2008, cl 4(g).

\textsuperscript{160} Victorian Department of Sustainability and Environment (2008), above n 24, 71.

In the Loddon, very minimal allocations were available for consumptive entitlement holders, targeted originally at maintaining permanent horticultural plantings which were judged to be otherwise highly vulnerable to the impacts of qualification.


\textsuperscript{162} Comments made in interviews conducted with staff from the Catchment Management Authority, nature conservation agency, and Water Authority involved in the implementation of the Bulk Entitlement, June – September 2008.
a highly contentious issue during Bulk Entitlement negotiations, with many local landholders and community representatives favouring pulsed flows rather than a standard minimum flow recommended by the expert panel, which they argued increased siltation problems.\textsuperscript{163}

In this respect, the qualification gave environmental water managers an opportunity to facilitate an adaptive management approach not previously available to them under the fixed rules of the Bulk Entitlement.\textsuperscript{164} This experience underscores the importance of both flexible flow rules and the establishment of an active, independent, well-resourced environmental water manager with the capacity to participate effectively in such adaptive processes. The role of environmental water manager is explored in more detail in the subsequent section of the chapter.

These events resulted in a flurry of policy development in this area. For example, an interim policy on principles and processes for the qualification of rights specifically recognises that the water authority will contribute towards managing environmental risks associated with the qualification.\textsuperscript{165} In a situation where a volumetric environmental entitlement is usurped under qualification by a water authority for immediate use of that water to meet critical human needs, a financial contribution reflecting the market price for such water and any costs associated with mitigating the environmental risk is required.\textsuperscript{166}

\begin{flushright}
\textsuperscript{163}Comments made in interviews conducted with landholders and staff from the Catchment Management Authority involved in the negotiation of the Bulk Entitlement, June – September 2008. Such issues were discussed in the meeting of the Loddon Environmental Water Advisory Group, observed in Henty, June 2008. See also North Central Catchment Management Authority, \textit{Bulk Entitlement (Loddon River - Environmental Reserve) Order 2005, Compliance Reporting (Nov 2005-June 2007), Implementation of the Loddon Environmental Water Reserve (2007)}, 11.
\textsuperscript{164}Comments made in interviews conducted with staff from the Catchment Management Authority, nature conservation agency, and Water Authority involved in the implementation of the Bulk Entitlement, June – September 2008.
\textsuperscript{165}Comments made in interviews conducted with staff from the Catchment Management Authority, involved in the implementation of the Bulk Entitlement, June – September 2008, discussing an Interim Policy for the Qualification of Rights, prepared by the Victorian Department of Sustainability and Environment. Such issues were discussed in the meeting of the Environmental Water Reserve Network (a grouping of environmental flows officers from CMAs across Victoria, and relevant support staff from the Department of Sustainability and Environment), Melbourne, April 2008.
\textsuperscript{166}Ibid.
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The recent draft northern Sustainable Water Strategy, discussed in the preceding section, also devotes considerable attention to furthering policy development in this area. It focuses on avoiding the need for qualification by requiring water authorities to implement more conservative reserve and seasonal allocation policies. This would involve setting enough water aside to be able to meet passing flow obligations over a longer period of low inflows.  

While tightening processes around qualification and avoiding the need for qualification in the first place are both important policy developments, what has been absent in the policy development to date has been a more fundamental rethink of the allocation system and the mechanisms used to provide environmental water. The experience of recent years has illustrated the fragility of current provision for environmental water. It has highlighted the gap between formal legal status and practical management status and effectiveness in a practical management context. There is, therefore, considerable scope to refine instruments of EWA so as to better deliver environmental outcomes. Suggestions for enhancing status and protection are developed in Chapter Seven.

C Broader Regulatory Context

The importance of tightening and broadening regulatory coverage of all types of water harvesting was identified, in Chapter Three, as a significant component of a governance model for effective EWA. The discussion here briefly considers the regulation of interception activities which pose a significant threat to general water availability and to the status and effectiveness of EWA in northern Victorian catchments, such as the Loddon. Much of the Environmental Water Reserve in northern Victoria is unspecified unallocated water and not clearly defined and

167 Victorian Department of Sustainability and Environment (2008), above n 24, 70-85.
protected through either rules-based passing flows or volumetric entitlements. Although all entitlements, including the different forms of EWA discussed above, are affected by generally reduced water availability, this unallocated water is particularly vulnerable to reduced inflows through interception activities. In the Loddon and neighboring catchments, the interception activity of most concern is the expansion of catchment farm dams associated with rural land subdivision in the upper catchment.

Amendments to the Water Act, in 2002, partly addressed the impact of these dams on water availability. Prior to 2002, the capture of overland flow in a catchment dam was treated as a basic landholder right, with no licensing restrictions related to the use of such water. The amendments, however, removed the right to capture overland flows in a farm dam and use the water for irrigation or other commercial purposes. Bringing irrigation and commercial dams within the regulatory framework had the effect that licences for such new dams would not be allocated unless the landholder could demonstrate they could purchase water for such purposes. Dams solely used for stock and domestic purposes, or small aesthetic dams, were left as unrestricted basic landholder rights under the Act, with associated water harvesting remaining unregulated.

Previously, the interception impact of these non-irrigation catchment dams was not deemed to be of sufficient concern to justify the expense and upheaval of introducing a more comprehensive licensing regime. However, in the context of increasing water scarcity and rapid expansion of such dams in some areas in recent years, their potential impact on river inflows has since been acknowledged. Current estimates suggest that unlicensed dams capture 6% of surface water available in northern Victoria. At a local level their impact can be far greater, particularly under climate scenarios.

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169 Victorian Department of Sustainability and Environment, above n 121, 29, 57.
170 Water (Irrigation Farm Dams) Act 2002 (Vic).
171 This was achieved by amending s 8 of the Water Act 1989 (Vic), which is concerned with continuing private rights to water. With the insertion of s 8(5A), catchment dams used for irrigation or other commercial purposes were excluded from this basic rights protection.
173 Ibid.
174 Victorian Department of Sustainability and Environment (2008), above n 24, 46, 164-166.
For example, anecdotal evidence suggests that the capacity of catchment dams in the Loddon is as high as 70000ML. This equates to a very significant potential impact on water reaching the river, particularly in dry years. Similarly, in the upper catchment of the Campaspe, a region neighbouring the Loddon which experiences similar land use pressures, farm dams intercept 11% of stream flow under long term average climate, yet under a continuation of recent low inflows would intercept 26%. The vast majority of this reduction is attributed to unlicensed farm dams.

In light of NWR commitments to better account for significant interception activities, and the new federal water legislation which requires the regulation of interception activities which have a significant impact on water resources, it is likely that regulation will be tightened in this area. Any increased regulation of long held basic landholder rights will undoubtedly be highly contentious. Current Victorian policy suggests that genuine stock and domestic access will be protected as a basic landholder right, however, limits will be placed on dams associated with lifestyle developments. Distinguishing such uses and finding ways to deal retrospectively with the cumulative impacts of existing dams will raise considerable challenges.

This discussion has illustrated that the current approach to facilitating and protecting EWA is far from adequate. Environmental water is provided largely through mechanisms which afford limited adaptive management capacity. The level of protection achieved through these mechanisms is inadequate, particularly to protect environmental values in times of extreme resource pressure. In addition to lacking adequate volumes set aside for the environment, environmental water rules contain in-built conditions and restrictions which diminish their status in favour of protecting consumptive interests. Finally, there are lingering issues in the broader regulatory context with very significant potential to undermine existing provision for environmental water. While increasing the extent of volumetric entitlements available

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175 Interview conducted with member, Water Services Committee, Goulburn-Murray Water, September 2008.
176 Victorian Department of Sustainability and Environment (2008), above n 24, 46, 164.
177 Council of Australian Governments, above n 53, cl 25 (xi), 55-57.
178 *The relevant provisions of the Water Act 2007* (Cth) are discussed in Chapter Six.
179 Victorian Department of Sustainability and Environment (2008), above n 24, 166.
to the environment through buy-back and other recovery measures is critical, this experience also underscores the need for redefinition of environmental water in a fashion which brings it securely within the allocation and management system, and ensures a certain level of EWA to maintain overall system health and function.
In this section, the management arrangements for EWA in the Loddon are explored against the considerations raised in Chapter Three. Current and developing institutions are evaluated in terms of their ability to appropriately balance and deliver on the often competing management considerations of EWA and consumptive water use; and, in terms of how they support an adaptive management approach. This evaluation contributes to a broader understanding of whether greater emphasis on guiding and constraining management through statutory standards and duties and/or shifting roles and responsibilities would better deliver environmental outcomes in practice.

A Institutions for Environmental Water Management in Victoria

There are currently three key roles with respect to the implementation of a Bulk Entitlement containing environmental water rules.

Under the Water Act, the Minister for Water may appoint a Storage Operator and Resource Manager for the implementation of a Bulk Entitlement. The role of Storage Operator is to maintain and operate the infrastructure of the regulated system, and release water according to the rules within the Bulk Entitlement, including EWA provisions such as passing flows. An important component of this role is providing flow measurement data and reporting information. A Resource Manager is appointed to manage the implementation of Bulk Entitlements. They must prepare annual water accounts, report on whether entitlement holders comply with the conditions of the instrument, and report on any significant unauthorised use of water. The focus of this role is, therefore, regulatory oversight of the activities of the Storage Operator and Bulk Entitlement holders.

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180 Water Act 1989 (Vic), s 43A(1)(a), (b).
181 See discussion of these roles in the Loddon context in North Central Catchment Management Authority, above n 12, 18-21. Part 4 of the Bulk Entitlement (Loddon River – Environmental Reserve) Order 2005 details metering, monitoring and reporting roles.
In the few specific environmental Bulk Entitlements, such as the Loddon, where there is a volumetric environmental entitlement and therefore some scope for active environmental water management, Catchment Management Authorities have been appointed as Environmental Managers\(^{182}\) and given a more direct management role. They are to prepare an Environmental Operating Strategy, Annual Watering Plans and conduct a third layer of compliance reporting on the delivery of environmental water.

Throughout northern Victoria, including the Loddon catchment, the water authority Goulburn Murray Water is appointed as both Storage Operator and Resource Manager. As later discussion shows, this dual appointment raises some concerns regarding transparency and accountability. The North Central Catchment Management Authority is appointed as the Environmental Manager for the Loddon Bulk Entitlement and employs a staff member to this purpose. This role is supported by an overarching environmental flows coordinator position, operating across all the catchment authorities in northern Victoria, and an advisory committee of community members and agency staff with knowledge and experience in river management for environmental outcomes.\(^{183}\) Similar to the advisory committee arrangements described for the Gwydir River in the previous chapter, the broadening of skills and expertise available to environmental water managers through such an institution is of considerable value to optimising environmental outcomes from EWA. In the Loddon case study, this committee specifically provides an avenue for the input of local community experience and lay knowledge. This input was widely seen as lacking in earlier determinations of environmental flow requirements. It has, arguably, been instrumental in negotiating adaptive responses to recent qualification of rights in the Loddon that have trialed a range of measures focused on ensuring the resilience of the system.\(^{184}\)

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\(^{182}\) This is provided for in the Water Act 1989 (Vic), s 43A, and the Bulk Entitlement (Loddon River – Environmental Reserve) Order 2005, cl 7.

\(^{183}\) Loddon Environmental Water Advisory Group

\(^{184}\) Comments made in interviews conducted with staff from the Catchment Management Authority involved in the implementation of the Bulk Entitlement, June – September 2008. This is supported by observations made during the meeting of the Loddon Environmental Water Advisory Group, Hently, June 2008.
B Balancing Competing Management Imperatives at the Operational Scale

As provision for environmental water in Victoria has become more comprehensive and necessitated a greater degree of active management, institutional arrangements have evolved and become more sophisticated, and the role of the environmental water manager is gradually being established. Yet, within the institutional framework described above, environmental water managers remain positioned as another ‘water user,’ sitting beneath the water authority with only limited influence over the operation of the system with regard to environmental water delivery. Goulburn Murray Water, whose institutional history and current commercial mandate centers around providing water for consumptive use, continues to take a leading role. This discussion seeks to gauge whether these arrangements adequately balance competing management demands of consumptive and environmental water use, and to identify situations where these arrangements may not be conducive to achieving optimal environmental outcomes.

For example, although poor compliance with Bulk Entitlement conditions was not raised as a significant concern in any of the interviews conducted for this research, the lack of transparency and accountability surrounding compliance monitoring and reporting for the Loddon Bulk Entitlement exemplifies a situation where a shift in roles and responsibilities may support more effective EWA. As noted above, the water authority Goulburn Murray Water is appointed as both Resource Manager and Storage Operator. Thus, it is responsible for metering and measuring compliance, overseeing this compliance activity, and reporting on this to the Minister. This overlap of functions within one organisation, which has, until recently, focused largely on servicing consumptive users, is highly inappropriate. At the time of this research, no reports had been submitted by Goulburn Murray Water in their role as Resource Manager for the Loddon Bulk Entitlement, despite it being in operation since 2005.\(^{185}\) While this may be attributed to the very high reporting obligations on Goulburn Murray Water and recent water shortages which have focused management capacity

\(^{185}\) Interviews conducted with staff from the water authority involved in implementation of the Bulk Entitlement, June-September 2008. Goulburn Murray Water is obliged by the provisions of the Bulk Entitlement to report on key elements of Bulk Entitlement compliance in their annual report. This is at a very broad scale. See for example, Goulburn Murray Water, *Goulburn-Murray Water Annual Report 2008/9* (2009), Appendix A8.
on immediate priorities, it is arguable that this particular reporting role should be prioritised.

In situations, such as the Loddon, where there is a specific environmental Bulk Entitlement, Catchment Management Authorities as Environmental Water Managers, also have an additional compliance reporting role. Yet, this additional reporting does not appear to enhance accountability in this area substantially. For example, the reporting parameters set out in the Bulk Entitlement are very general. To date, one report has been prepared, which included little analysis with regard to the level of compliance achieved. Instances of non-compliance were merely reported and attributed to difficulties managing the river during low flows and dry conditions. Additionally, Catchment Management Authorities rely on data supplied by the storage operator to produce this report, meaning that its independence is somewhat limited. This lack of detail may well indicate generally good compliance and good working relations between particular staff involved in these roles. Yet, the arrangements are a poor template for accountable and transparent compliance reporting.

Generally in the Loddon, environmental water rules are more tightly defined and supported by operating policy than, for example, the NSW Gwydir case study discussed in Chapter Four, where quite significant discretion remains with the water authority regarding the implementation of certain rules. Yet, there are some instances in the management of Loddon where Goulburn Murray Water retains considerable discretion and, depending on the circumstances, may not necessarily exercise this discretion for optimal environmental outcomes.

For example, the potential conflict of interest between environmental water needs and consumptive user demands with respect to delivery of the wetland entitlement has been discussed in Element Three. The rules expressly prioritise consumptive use. In this area there is, however, considerable potential to manage the system so as to avoid such a conflict. For example, given the interconnectedness of the water grid in northern Victoria and the fact that considerable amounts of water from the Goulburn

187 North Central Catchment Management Authority, above n 163.
188 Comments made in interviews conducted with staff from the nature conservation agency involved in the implementation of the Bulk Entitlement, June – September 2009.
valley are transferred into the Loddon irrigation areas anyway, there are opportunities to design a timely and effective environmental release by applying a flexible approach to the sourcing of environmental water. Water sourced from the Goulburn that is potentially more readily available may be substituted temporarily for Loddon water to enable a timely release and to avoid any conflict of interest.\textsuperscript{189}

To do this effectively, good lines of communication between environmental water managers and water authority staff are required. Operational staff within Goulburn Murray Water would also require a good understanding of environmental water requirements and how to best deliver these. They need to perceive that effective delivery of EWA is a key part of their mandate. Such conditions may well be developing within the current framework, particularly through good working relationships between current key staff. Yet, it is also worth considering whether such sophisticated, multi-faceted management is best supported by the current spread of roles and responsibilities or whether a different configuration would enable better and more creative management of competing demands on the system.

Similarly, with respect to the limited environmental access to unallocated water provided in the Bulk Entitlement, effective implementation of this rule to redirect water to the wetlands relies on a swift, integrated and cooperative process between water authorities and environmental water managers. As noted above, there is some concern within Goulburn Murray Water at an operational level regarding their involvement in the implementation of this rule. There is also considerable local pressure to access such water for other uses.\textsuperscript{190} It is worth considering whether another institutional configuration would be more appropriate to implement such a rule.

\textsuperscript{189} Comments made in interviews conducted with staff from the Catchment Management Authority involved in the implementation of the Bulk Entitlement, June – September 2008.
\textsuperscript{190} Comments made in interviews with operational staff from the water authority responsible for the implementation of the Bulk Entitlement, June- September 2008.
C The Role of Environmental Water Manager

The management arrangements for environmental water in the Loddon, combining a dedicated environmental water manager positioned in the Catchment Management Authority with an advisory committee, have, arguably, contributed to a more balanced and adaptive approach to managing the competing demands of environmental and consumptive users. Further improvement is promised by a recent policy commitment to introduce an independent statutory body to hold all volumetric environmental water entitlements and coordinate their management across northern Victoria.191 Given the interconnected nature of the water grid in northern Victoria, there will be opportunities to use environmental water that might be achieved through infrastructure savings in one area, such as the Goulburn where the majority of funding will be targeted, in other catchments, such as the Loddon. Having an environmental water manager positioned at an overarching scale will be critical to accessing such opportunities.

Despite the promise of these important reforms, there is, arguably, still remaining scope to institutionalise a more appropriate allocation of roles and responsibilities for river management within a governance model for EWA. This could be achieved by working within existing institutions, but tightening statutory parameters around the functions of water authorities and increasing the role and influence of environmental water managers in overall river management. Alternatively, creating a more neutral river manager and operator to fulfill the river management and delivery functions currently filled by Goulburn Murray Water would overcome the current situation where management potentially favours consumptive outcomes and potentially treats the environment as a subordinate water user. Giving such a manager the responsibility and capacity to achieve both good environmental and consumptive outcomes would arguably put them in a position to better maximise use of water for multiple purposes, and coordinate the often competing demands of environmental and consumptive use.

191 Victorian Department of Sustainability and Environment (2008), above n 24, 138-9.
D Creating Adaptive Management Capacity

Key to an adaptive management approach to environmental water delivery are programs of monitoring and reporting which cover not only compliance with rules but also assess their effectiveness over the long term so as to add to scientific understanding of environmental water needs and allow ongoing refinements of the allocation balance. Earlier discussion, in Element One, has described overarching statutory functions associated with the fifteen-year review of the allocation balance, yet also illustrated the lack of explicit, targeted provision for supporting monitoring and reporting functions. Instruments of allocation, such as Bulk Entitlements, provide for certain monitoring and reporting functions centering on compliance. In cases where environmental water managers are in place to manage more flexible environmental entitlements, there is more scope under the instrument to provide for targeted monitoring, reporting and adaptive planning functions. These functions are very important to providing the detail for the broader adaptive processes, such as the fifteen-year review envisaged by the Water Act.

For example, the Loddon Bulk Entitlement requires the preparation of an environmental operating strategy within twelve months of its commencement. Prepared by the Catchment Management Authority, this provides considerable guidance to the implementation of the Bulk Entitlement in areas where there is some management discretion available. It also sets the scene for various adaptive management and planning procedures such as the preparation of Annual Watering Plans and monitoring the effectiveness of environmental water delivery. The Catchment Management Authority also undertakes to report annually to stakeholders on the previous year’s environmental water deliveries and the results of monitoring.

Monitoring environmental water delivery to gauge its impact and effectiveness at a broader level is to be conducted through a comprehensive Statewide program, coordinated by the Department of Sustainability and Environment with independent expert scientific input. The Victorian Environmental Flow Monitoring and

193 North Central Catchment Management Authority, above n 12, 33-38.
194 Victorian Department of Sustainability and Environment (2008), above n 24, 104.
Assessment Framework has been designed to test the assumptions behind the methodology upon which original environmental flow recommendations were made and determine whether the Environmental Water Reserve is achieving the desired biodiversity objectives.\textsuperscript{195} The implementation of the program has been constrained in some respects due to the drought and broad qualification of environmental water provisions over recent years. While there have been no environmental flows to be monitored, the program has proceeded on the basis that even under such conditions there will be certain flow components that can be covered. In the Loddon, data collection has focused on water quality parameters.\textsuperscript{196} A long-term commitment to such monitoring will be an important source of adaptive management data. However, securing ongoing revenue for such activities is characteristically problematic.\textsuperscript{197}

The targeted environmental water management arrangements in the Loddon have also triggered a formal review of the original flow recommendations, focusing particularly on recommendations for the lower river reaches in light of the management experience over recent years of water scarcity.\textsuperscript{198} This underscores the value of more targeted management institutions in supporting an adaptive management approach.

Similar to NSW, this exploration against Element Four of the framework, has illustrated an evolving institutional framework for environmental water management, which is moving beyond relying on water authorities to implement fixed flow rules, towards more targeted management capacity, which supports an adaptive approach and more effective environmental outcomes in practice. The emergence of a new statutory body to coordinate environmental water management across the region holds considerable promise, particularly in northern Victoria, which is a far more interconnected water delivery system than many parts of NSW. It is, however, important that the value added at the local management scale by committees of stakeholders and

\textsuperscript{195} Peter Cottingham, Mike Stewardson and Angus Webb, \textit{Victorian Environmental Flows Monitoring and Assessment Program: Stage One Statewide Framework} (2005).
\textsuperscript{196} Issues discussed at the meeting of the Loddon Environmental Water Advisory Group, observed at Henty, June 2008.
\textsuperscript{197} Jane Doolan (Victorian Department of Sustainability and Environment), ‘State Government example of how a water plan is achieving environmental outcomes,’ (Presentation delivered at the Environmental Water Allocation Forum, National Museum of Australia, ACT, 28-29 May 2009).
\textsuperscript{198} Comments made in interviews with staff from the Catchment Management Authority involved in the implementation of the Bulk Entitlement, June – September, 2008.
experts be preserved and applied more broadly in the evolving framework. At a more
basic level, there is also arguably scope to revisit the central continuing role played by
water authorities, either by tightening independent scrutiny of their operations to
better provide for environmental outcomes and enhancing the role of environmental
water managers in broader river operations, or instituting a more neutral river
manager/operator with well defined responsibilities to supply water to both
consumptive and environmental purposes. There is a central role for more targeted
use of legislation to set parameters for these roles and responsibilities and build
institutional capacity for more effective environmental water management.
VI CONCLUSION

As the thesis proceeds in the next chapter to consider the potential of the new federal water management regime and ultimately to propose recommendations for ongoing institutional change in Chapter Seven, the experience of water reform at the State level in Victoria adds a number of important insights to the analysis.

First, lack of a strong statutory framework for EWA, particularly for processes to re-allocate the resource to more sustainable levels, combined with a policy favouring protection of existing consumptive entitlements, has arguably set a poor context to achieve a more sustainable resource allocation through statutory processes. The deferral of re-allocation to water recovery processes outside the statutory planning framework, without clear guidance and targets, appears to have yielded only slow and, in many cases, ineffective progress on water re-allocation. It has proven very difficult to negotiate any improvement to EWA through the Sustainable Water Strategy in the context of increasing scarcity. Finally, while the fifteen-year review of the water allocation balance is an admirable adaptive management provision for protecting environmental water values in a long-term context, its application is an example of using such a measure to further postpone difficult issues of re-allocation. Within these legal and policy settings, it has proven very difficult to achieve significant water re-allocation at the State level.

Second, the investigation of legal mechanisms used to facilitate and protect environmental water in the case study has illustrated the often considerable gaps between apparent legal status and practical management status. Current mechanisms provide neither adequate protection nor the required management flexibility to achieve effective EWA in a practical management context. Additionally, various issues in the practical management context (such as operational limitations within the regulated system and lack of targeted management arrangements) further undermine the status of environmental water, particularly the ability of instruments to deliver environmental outcomes. This discrepancy is not just an issue of the application of these mechanisms in that insufficient volumes have been set aside for environmental use. It is also an issue of the nature and characteristics of the mechanisms themselves. The experience in the Loddon highlights the need for considerable refinement of these
mechanisms, guidance on their application as instruments of EWA and corresponding improvements in the broader regulatory context to achieve more appropriate status and protection for environmental water. Management requirements for environmental and consumptive needs differ so considerably that using similar legal mechanisms with ostensibly similar legal status to consumptive users is not necessarily enough to deliver environmental outcomes in practice. Rather, mechanisms must be specifically tailored to achieving environmental outcomes.

Finally, the case study also emphasised the influence of river management arrangements on environmental outcomes. It underscored the importance of developing institutional capacity in the form of an independent, appropriately skilled and resourced environmental water manager with the authority to influence river management accordingly, supported by provision for the conduct of key management functions necessary to an adaptive approach. Specifically, for more effective environmental water governance, overarching river managers/operators must be responsible to achieve both consumptive and environmental outcomes, and institutional capacity for environmental water management should span relevant management scales. With a new layer of environmental water management now in place through the new federal water regime, introduced in the following chapter, integration across the basin, regional and the very important local management scale will be a key challenge.
CHAPTER SIX:
ENVIRONMENTAL WATER ALLOCATION AT THE RIVER BASIN SCALE

Until now, this thesis has focused on progress on environmental water allocation [EWA] in a State jurisdictional context following a national policy program of water reform, as this has been the predominant institutional model to date. Yet, as established in Chapter Two, federal tensions over the management of the shared water resources of the Murray Darling Basin [MDB] have been, and continue to be, a major determinant of water allocation and management outcomes; and the governance arrangements straddling Commonwealth and State interests to date have not supported sustainable basin-wide management.1 The National Water Reform [NWR] process was an attempt to achieve a coordinated, common approach across State jurisdictions.

While significant gains have been made, the varying pace and quality of implementation by States of the reform agenda,2 and the poor progress on reform issues of particular contention between States,3 underscore the continuing difficulties in addressing federal challenges. These are intensified in situations of water scarcity across the Basin.

With respect to the environmental water reform agenda, there are two key areas in which federal tensions have arguably contributed to poor progress in implementation and/or where a different governance model for managing competing interests in the

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3 Progress on environmental water reforms such as addressing over-allocation and over-use, and achieving an open water market between the States, have been particularly contentious. For further discussion of State progress on environmental reforms, see Anita Foerster, ‘Progress on Environmental Flows in South-Eastern Australia in Light of Climate Change’ (2009) 39(5) ELR News and Analysis 10426. For discussion of State progress on market reforms, and concerns about artificial trading barriers, see National Water Commission, Australian Water Reform, 2009 - Second Biennial Assessment of Progress in Implementation of the National Water Initiative (2009), x.
MDB context may be called for. Perhaps the most critical issue has been the difficulties faced by States in unilaterally reducing consumptive water entitlements to achieve a more ecologically sustainable resource allocation, albeit under the policy framework of the NWR. The experience of State-level allocation planning processes, documented in the two case studies, supports the argument that clear, substantive overarching legal and policy settings on re-allocation, supported by well-targeted planning and adjustment measures, are required. It also underscores the difficulties in achieving re-allocation towards sustainable levels at a State level within the MDB context. Stronger, more centralised governance on issues such as re-allocation is, therefore, of considerable potential value to achieving more effective EWA. Additionally, taking a whole-of-basin approach to the management of available environmental water promises significant potential gains in efficiency and effectiveness, particularly important given climate change scenarios of reduced water availability.

In 2007, a new chapter of water reform was introduced at a federal level to progress key areas of NWR and, specifically, to overcome constraints associated with the federal system and achieving a governance framework for managing MDB water resources in the national interest. A key driver was the pressure on shared water resources created by prolonged drought conditions and the spectre of climate change. The Water Act 2007 (Cth) [Water Act] establishes a new institutional regime, whereby federal institutions will take a lead role in setting and enforcing the parameters for sustainable water allocation and management across the MDB. An accompanying investment program has allocated considerable funds to achieving

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5 Sandford Clark, ‘Prosper the Commonwealth? The Constitution and the Murray-Darling Basin’ (Synopsis from presentation delivered as part of the Guest Lecture Series, Melbourne University Law School, 27 October 2009); Gardner et al, above n 1, 134.
reform outcomes associated with addressing over-allocation and improving efficiency and security for consumptive users.⁶

This chapter considers the potential of this new federal regime to contribute to achieving effective EWA throughout the MDB. This assessment is guided by the analytical framework used throughout the thesis and informed by the experience of water reform to date at a State level as presented in previous case studies. Given the new federal regime is only in the early stages of implementation, the discussion is necessarily limited to assessing its potential contribution and commenting on initial directions in implementation. As such, this chapter focuses largely on the overarching legal settings established for EWA by the new federal legislation, and concludes by raising considerations for ongoing implementation of the reform package.

In a similar vein to the case studies of Chapters Four and Five, the new federal regime provides another context in which to explore the considerations and refine the arguments posed in Chapter Three’s analytical framework, with the purpose of moving towards an articulation of a governance model for effective EWA in Chapter Seven. Indeed, the Commonwealth regime embodies some of the legal and institutional settings considered in Chapter Three to be important in providing strategy and structure for such a governance model. It is, for example, particularly strong in setting clear substantive statutory parameters for the re-allocation of water to sustainable levels. In this way, the regime illustrates an application of elements of the suggested governance model and underscores its significance. There are, however, areas in which the regime could be strengthened in line with the breadth of institutional change anticipated in Chapter Three.

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⁶ Above n 4. Under the National Plan for Water Security, $10.05 billion was committed to modernizing Australia’s irrigation infrastructure; addressing over-allocation in the MDB, reforming management of the MDB; and new investments in water information. Under Water for the Future, $12.9 billion is committed for similar priorities.
I THE NEW FEDERAL WATER MANAGEMENT REGIME

There are a number of components to the Water Act which substantially change existing governance arrangements for environmental water allocation and management, and are of particular relevance to this analysis. First, the Act introduces a basin-wide water allocation and management planning function. An overarching Basin Plan is to be prepared centrally and States are required to ensure that their water resource plans, at the scale of water management units for surface and groundwater, comply with the Basin Plan. One of the fundamental parameters to be provided by the central Basin Plan is a Sustainable Diversion Limit. This will limit the water available for extraction in each water management unit across the MDB at a level that represents an ‘environmentally sustainable level of take.’ The Basin Plan will also include an Environmental Watering Plan, which will provide the parameters for coordinated management of environmental water throughout the MDB.

Second, the Water Act, together with a revised Murray-Darling Basin Agreement between the States and Commonwealth, shifts roles and responsibilities within the institutional framework for the MDB in terms of policy development, decision-making and key management functions. Previous governance arrangements, discussed in Chapter Two, had relied largely on consensus and cooperation between States. Agreeing on and implementing contentious reforms was often hindered however by parochial State politics. This recent reform package was promoted as a less politicised, more expert-based water governance regime, situated federally to enable Basin water resources to be managed in the national interest. Central to this reform was the creation of a new federal statutory body, the Murray-Darling Basin

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7 Water Act 2007 (Cth), Part 2.
8 Ibid, s 22(1), Item 6, and s 23.
9 Ibid, s 22(1) Item 9, and 28. The Basin Plan must also include a water quality and salinity management plan (s22(1) Item 10), and rules for the trading of water rights (s22(1) Item 12).
10 Above n 4.
12 Clark, above n 1; Scanlon, above n 1; Gardner et al, above n 1, especially 133.
Authority [the Authority],\textsuperscript{14} to implement the water planning and management functions described above.

The Authority is composed of independent experts and supported by a staff of Commonwealth public servants.\textsuperscript{15} It is accountable to the Commonwealth Minister administering the Water Act [the Minister] with respect to functions conferred under the Act.\textsuperscript{16} This includes the preparation and implementation of the Basin Plan. For example, the Basin Plan and advice on the accreditation of State water resource plans under the Basin Plan must be adopted by the Minister.\textsuperscript{17}

At least at a formal level, State ministers and agencies now have less influence over policy development and decision-making, and are to play an advisory role under the Act. For example, the Basin Ministerial Council, a body made up of relevant Ministers from each State or territory within the MDB,\textsuperscript{18} has one formal opportunity to refer matters of contention within the Basin Plan back to the Authority for further consideration.\textsuperscript{19} The Basin Officials Committee, consisting of representatives of State and territory governments within the MDB drawn from key ministries,\textsuperscript{20} has the statutory role of advising the Authority about its functions, particularly in relation to engaging Basin States in the preparation of the Basin Plan and facilitating cooperation and coordination between the Authority, Commonwealth and State governments in managing Basin water resources.\textsuperscript{21}

\textsuperscript{14} Water Act 2007 (Cth), Part 9.
\textsuperscript{15} Ibid, ss 171-179, 206-208. Section 178(2) provides for the composition of Authority. Members must have a high level of expertise in one or more of following areas – water resource management, hydrology, freshwater ecology, resource economics, irrigated agriculture, public sector finance, financial management. Members of advocacy groups are excluded.
\textsuperscript{16} The Authority also assumes certain key functions previously carried out by the Murray-Darling Basin Commission, and provided for in the Murray-Darling Basin Agreement 2008, namely measuring and monitoring over the whole of the Basin, and operation of the River Murray system. For these functions the Authority is subject to the oversight of the Ministerial Council and Basin Officials Committee, not the federal minister. See Gardner et al, above n 1, 138.
\textsuperscript{17} Water Act 2007 (Cth), s 41-44.
\textsuperscript{18} Water Act 2007 (Cth), s 18 A; Murray-Darling Basin Agreement 2008, Part III. This body has replaced the previous Ministerial Council.
\textsuperscript{19} Ibid, s 43A.
\textsuperscript{20} Water Act 2007 (Cth), s 18 A; Murray-Darling Basin Agreement 2008, Part IV. This body has replaced the previous Murray-Darling Basin Commission.
\textsuperscript{21} Ibid, s 201-201C. There is also provision for a basin community committee (s 202), to provide advice on engaging community in developing the Basin Plan, and other community matters relevant to Basin water resources. Section 203 provides the capacity for the Authority to appoint other advisory committees to assist in conducting their functions. Further detail on respective roles and responsibilities
There is, however, considerable concern among commentators that these arrangements will not effectively insulate decision-making from MDB politics.\textsuperscript{22} For example, Clark has recently questioned whether it is “reasonable to assume that a Commonwealth body, which is responsible to a Commonwealth Minister, could also independently perform tasks … which have profound political consequences, without reference to the Commonwealth’s preferences,” which are also inescapably influenced by State-driven politics.\textsuperscript{23} Later discussion of the planning process to set Sustainable Diversion Limits provides a salient example of the limited practical independence of the Authority and the challenges associated in implementing an expert-based approach to such politically contentious issues.

Another key institutional development introduced under the Act is the role of the Commonwealth Environmental Water Holder,\textsuperscript{24} a new statutory function to be situated within the Commonwealth department administering the Act.\textsuperscript{25} The role focuses on managing environmental water held by the Commonwealth in conjunction with State-based management regimes and in accordance with the Environmental Watering Plan under the Basin Plan as it comes into operation.

Finally, a key part of the reform package introduced alongside the legislation, was a substantial allocation of federal funding directed primarily to modernising irrigation infrastructure to increase water use efficiency and addressing over-allocation through buy-back of entitlements.\textsuperscript{26} This investment will potentially result in a significant increase in Commonwealth environmental water holdings and is positioned as a transition mechanism to smooth the adjustment in irrigation communities to the lower diversion limits expected under the Basin Plan.\textsuperscript{27}


\textsuperscript{23} Clark above n 5.

\textsuperscript{24} Water Act 2007 (Cth), Part 6.

\textsuperscript{25} Commonwealth Department of Environment, Water, Heritage and the Arts

\textsuperscript{26} Above, n 6.

The introduction of the new federal water regime is an unprecedented entry by the federal government into the direct regulation of water resources. Under the Australian Constitution, the Commonwealth lacks *direct* constitutional power to legislate in relation to water, land and biodiversity. There is also an express constitutional protection of the right of States to the reasonable use of the waters of rivers for conservation or irrigation.\(^{28}\) As such, the Water Act depended for its validity on a referral of State powers to legislate,\(^ {29}\) and / or various specific powers in the Constitution, upon which matters the Commonwealth does have the authority to legislate.\(^ {30}\)

Negotiations between the States and Commonwealth about a referral of powers to facilitate the Water Act were highly contentious.\(^ {31}\) As a consequence, the original form of the legislation was passed in 2007 without obtaining a referral. It was, therefore, based solely on specific Commonwealth constitutional powers. For example, the legislation relies on the Commonwealth power to legislate with respect to external affairs,\(^ {32}\) which has been progressively interpreted to support Commonwealth legislation in the implementation of international agreements relating to environmental protection.\(^ {33}\) Although a referral of State powers was eventually

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\(^{28}\) *Commonwealth of Australia Constitution Act*, s 100.  
For an outline of how this protection is read down for the purposes of the Water Act, see s 11.  

\(^{29}\) *Commonwealth of Australia Constitution Act*, s 51(xxxvii).  

\(^{30}\) *Commonwealth of Australia Constitution Act*, s 51.  

\(^{31}\) For example, the State of Victoria initially refused to refer powers to enable the Commonwealth to legislate, and put forward their own alternative reform agenda. After considerable negotiations, and a change of federal government, Victoria signed up to the new regime.  

\(^{32}\) *Commonwealth of Australia Constitution Act*, s 51 (xxix).  

Section 9 of the Water Act 2007 (Cth) notes the other relevant constitutional powers upon which the legislation relies.  

\(^{33}\) See Gardner et al, above n 1, 94-5; Fisher, above n 28, 40.  
Following the *Tasmanian Dam* case (1983) 158 CLR 1, it is open for the Commonwealth to legislate for the management of water resources in Australia under the external affairs power (s51 (xxix)) to the extent that the legislation appropriately and proportionately implemented Australia’s international obligations under the relevant international conventions. Relevant international conventions are listed in section 4 of the Water Act, and include the *Convention on Wetlands of International Importance*, Ramsar, 2 February 1971; and the *Convention on Biological Diversity*, Rio de Janeiro, 5 June 1992.
achieved, and the Act was amended as a consequence in 2008,\textsuperscript{34} this initial reliance on specific Commonwealth constitutional powers to support the legislation has, arguably, resulted in environmental measures of considerable strength and specificity.

\textsuperscript{34} Water (Amendment) Act 2008 (Cth).
A focal point of the analysis thus far has been the nature and strength of statutory provision to guide and structure institutional arrangements for effective EWA across the three key governance areas of allocation, protection and management of environmental water. This analysis of the new federal statutory scheme uncovers an unprecedented use of substantive standards and duties, particularly to guide the allocation of water between competing users. Such strong legal provision was advocated in Chapter Three as a key component of a stronger governance regime for environmental water. The strength, potential and likely workability of these new standards for EWA are examined here.

**A Setting Strategic Direction - Objects and Stated Outcomes**

The Water Act employs a number of mechanisms to set clear strategic direction for the allocation and management of water resources. The objects of the Water Act are reproduced in part below.

The objects of this Act are:

(a) to enable the Commonwealth, in conjunction with the Basin States, to manage the Basin Water resources in the national interest; and

(b) to give effect to relevant international agreements (to the extent to which those agreements are relevant to the use and management of the Basin water resources) and, in particular, to provide for special measures, in accordance with those agreements, to address the threats to the Basin water resources; and

(c) in giving effect to those agreements, to promote the use and management of the Basin water resources in a way that optimises economic, social and environmental outcomes; and

(d) without limiting paragraph (b) or (c):
   (i) to ensure the return to environmentally sustainable levels of extraction for water resources that are over-allocated or overused; and
(ii) to protect, restore and provide for the ecological values and ecosystem services of the Murray-Darling Basin (taking into account, in particular, the impact that the taking of water has on the watercourses, lakes, wetlands, ground water and water-dependent ecosystems that are part of the Basin water resources and on associated biodiversity); and

(iii) subject to subparagraphs (i) and (ii) to maximise the net economic returns to the Australian community from the use and management of the Basin water resources; and

(e) to improve water security for all uses of Basin water resources; and …\textsuperscript{35}

This provision establishes substantive and purposeful objectives for EWA within a general context of managing MDB water resources in the national interest and so as to optimise economic, social and environmental outcomes. Two specific substantive commitments are made: to return water resources to environmentally sustainable levels of allocation;\textsuperscript{36} and to protect, restore and provide for the ecological values and ecosystem services of the MDB.\textsuperscript{37} The objective to maximise net economic returns from the use and management of Basin water resources\textsuperscript{38} is explicitly made subject to these clear substantive environmental objectives. It is arguable that the objective to improve water security for all uses of Basin water resources\textsuperscript{39} does not diminish the strength and predominance of these environmental objectives as it written to apply to all uses, including the environment. As such, this combination of objectives sets the scene for considerable changes to the way water has been allocated and managed to date so as to address unsustainable levels of resource use.

The statutory objectives are translated to more tangible commitments of expected outcome by also providing a statement of purpose for key statutory mechanisms, such as the Basin Plan:

The purpose of the Basin Plan is to provide for the integrated management of the Basin Water resources in a way that promote the objects of this Act, in particular by providing for:

\textsuperscript{35} Water Act 2007 (Cth), s 3.
\textsuperscript{36} Ibid, s 3(d)(i).
\textsuperscript{37} Ibid, s 3(d)(ii).
\textsuperscript{38} Ibid, s 3(d)(iii).
\textsuperscript{39} Ibid, s 3(e).
...(b) the establishment and enforcement of environmentally sustainable limits on the quantities of surface water and groundwater that may be taken from the Basin water resources (including by interception activities); and

(c) Basin-wide environmental objectives for water-dependent ecosystems of the MDB and water quality and salinity objectives: and

(d) the use and management of the Basin water resources in a way that optimises economic, social and environmental outcomes; and

...(g) improved water security for all uses of Basin water resources.40

Additional strategic direction is added by providing for the general basis on which the Basin Plan is to be developed. This provision focuses on giving effect to relevant international agreements to the extent that they are relevant to the use and management of Basin water resources.41 It illustrates the reliance on Commonwealth constitutional powers to legislate with respect to external affairs, which underpins much of the legislation. For example, in reference to the Convention on Biological Diversity,42 the Basin Plan must be prepared having regard to “the fact that the use of Basin water resources has had, and is likely to have significant adverse impacts on the conservation and sustainable use of biodiversity; and the fact that the Basin water resources require, as a result, special measures to manage their use to conserve biodiversity;”,43 and so as to “promote the sustainable use of the Basin water resources to protect and restore the ecosystems, natural habitats and species that are reliant on the Basin water resources and to conserve biodiversity.”44 This statutory recognition of the need to initiate major changes to the way water has been allocated and managed in the past is also highly significant.

Subject to these overriding commitments to give effect to international agreements, several general duties pertaining to the preparation of the plan are established for the Authority and the Minister. They must, for example, act on the basis of the best

40 Water Act 2007 (Cth), s 20.
41 Ibid, s 21(1)
42 Above, n 33.
43 Water Act 2007 (Cth), s 21(2)(a).
44 Ibid, s 21(2)(b). Similar reference to key commitments under the Convention on Wetlands of International Importance 1971 (Ramsar Convention) is made in section 21(3).
available scientific knowledge and socio-economic analysis and must have regard to a range of existing policy instruments, such as the National Water Initiative, existing State water management objectives and State water sharing arrangements within the Basin, and a range of relevant considerations such as the diversity and variability of the Basin water resources and the need to adapt management approaches to that diversity and variability. The way these duties are expressed, however, casts them as additional considerations or inputs to the planning process, subordinate to duties related to implementing relevant international agreements.

Prolonged severe drought conditions and consequent historical low inflows in the southern MDB over the last decade have prompted recent amendments to the Water Act which add an important additional parameter to the basis upon which the Basin Plan is to be developed. The Act now provides that the Basin Plan must be prepared having regard to the fact that “critical human water needs are the highest priority water use for communities who are dependent on Basin water resources; and in particular that to give effect to this priority in the River Murray System, conveyance water will receive first priority from the water available in the system.” The extent to which this prioritisation may affect setting standards for EWA and protecting environmental water once allocated is discussed further below.

Having established this relatively strong general strategic direction for achieving sustainable water allocation and management in the MDB, the discussion now turns to the use of more specific standards, duties and rules of law, to guide and constrain three key areas of environmental water governance: allocation, protection and management.

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45 Water Act 2007 (Cth), s 21(4)(b).
46 Ibid, s 21(4)(c)(i).
47 Ibid, s 21(4)(c)(iv) and (ix).
48 Ibid, s 21(4)(c)(iii).
49 Water (Amendment) Act 2008 (Cth).
50 The River Murray System, within the MDB is defined in section 86A(3). It refers generally to the River Murray in South Australia, the main stem of the Murray River upstream of the South Australian border, including tributaries upstream of Albury, and key Murray storages.
51 Water Act 2007 (Cth), s 86A.
B Does the Water Act Guide and Constrain Institutions for Environmental Water?

1 Allocating Water to the Environment

Two central questions of Gardner’s recent work on EWA are again used here to guide this discussion. Do the provisions of the Water Act create an enforceable duty to allocate environmental water? Does the legislation set a substantive standard for such allocation?52

On the first question, there is a clear commitment in the Act, made at a number of different levels, to set Sustainable Diversion Limits for the Basin as a whole, and for water resource plan areas within this, which reflect “an environmentally sustainable level of take.”53 Although defined by reference to levels of extraction, by inference, once such limits are in place, the water available above the limit will be environmental water. There is also a clear allocation of responsibility to the Authority to develop these limits in the preparation of the Basin Plan and to accredit State water resource plans against the parameters established by the Basin Plan, of which the Sustainable Diversion Limit will be central.54 The Act contains no time frame for the preparation or implementation of the initial Basin Plan. However the federal government has committed to a tight time frame, with the draft plan due for release for consultation mid 2010 and a finalised plan in place by early-mid 2011.55

The apparent strength of the statutory provision for Sustainable Diversion Limits across the Basin is, however, undermined by a significant delay in the Basin Plan taking legal effect. The Act provides a clear procedure for the accreditation of State water resource plans against the parameters of the Basin Plan. This includes a power for the Authority to step in and make a water resource plan if a State fails to do so in

53 This is present in the legislative objectives (s 3(d)(i)); in the purpose Statement for the Basin Plan (s 20(b)); in the list of mandatory content for the Basin Plan (s 22(1) Item 4(c) and 6); and in the requirements for State water resource plans (s 22(3)(b) and (c)).
accordance with these parameters. Yet, despite this detailed provision, existing State-based water resource plans which, in practice, cover much of the Basin, are preserved under the Act until they expire or come up for review under relevant State legislation. For example, in Victoria, the level of consumptive entitlement authorised through existing planning instruments is preserved until 2019.

Existing plans are characterised as transitional water resource plans and accredited automatically without alteration under the Basin Plan until the specified date of transition. During the transition period, they are to prevail over the Basin Plan to the extent of any inconsistency between the two. A similar provision is made for interim water resource plans which are developed under State water legislation between January 2007 and the commencement of the initial Basin Plan.

The Authority may also provide, through the Basin Plan, for additional temporary diversion provisions for a water management area. In order to provide a transition period to minimise social and economic impacts, where the proposed Sustainable Diversion Limit is lower than the long term average quantity of water that has been taken from the water resource, an additional five years may be granted before full implementation of the limit is required. Combined with already permissive timelines for accreditation of State plans, these additional transitional provisions considerably weaken the statutory duty to provide for a Sustainable Diversion Limit.

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56 The process for the accreditation of State water resource plans is provided in ss 63 – 72. Under s 22(1) Item 11, the Basin Plan must provide for the requirements that a water resource plan must comply with to be accredited under the Basin Plan. Certain requirements are specified in s 22(3).
57 Water Act 2007 (Cth), s 241, Schedule 4. Relevant plans for NSW, South Australia, and Queensland are listed in Schedule 4. Specific regulations are to provide for Victorian arrangements, however have not yet been finalised.
58 Tony McLeod, above n 55. These provisions have the effect that by 2014, approximately 60% of surface water resources in the Basin will come under the Basin Plan (this is the point at which current allocation instruments in NSW, SA and Qld expire). The remaining 40% (Victorian share) will not come under Basin Plan until 2019.
60 Ibid, s 243, s 245. Schedule 4 to the Act provides the scheduled date of transition.
61 Ibid, s 245.
62 Ibid, s 242. These plans are to expire on the later of 31 December 2014 or five years from the making of the plan.
63 Ibid, s 22(1) Item 7.
64 Ibid, s 24.
Previous examination of two State-based water resource plans in chapters Four and Five illustrates the potential gap between current provision for EWA and a Sustainable Diversion Limit reflecting ‘an environmentally sustainable level of take’ and, therefore, the potential magnitude of the reduction in consumptive entitlement required to achieve the Sustainable Diversion Limit. On one hand, prolonging the implementation of very significant environmental reforms will be highly detrimental in light of the increasingly urgent need for environmental water reform across the Basin. Continued political will to implement these reforms over such long times frames cannot be guaranteed. On the other hand, it is also arguable that introducing the Basin Plan into a vacuum with some years before it is to take legal effect and, therefore, some years to adjust to any new limits, may in fact boost the courage of the Authority and Minister to introduce tougher limits.

In terms of Gardner’s second question – does the Act establishes a substantive standard for EWA - the new federal legislation arguably sets a clear standard for the setting of Sustainable Diversion Limits and, by default, the allocation of water to the environment, in its requirement that the limit must reflect an ‘environmentally sustainable level of take.’ This is defined as the level at which water can be taken from a water resource which, if exceeded, would compromise:

a) key environmental assets of the water resource; or  
b) key ecosystem functions of the water resource; or  
c) the productive base of the water resource; or  
d) key environmental outcomes for the water resource.\(^{65}\)

Environmental assets are defined to include water-dependent ecosystems, ecosystem services, and sites with ecological significance.\(^{66}\) The definition of key environmental outcomes includes biodiversity; water quality; ecosystem function, for example, through the periodic flooding of floodplain wetlands; and water resource health, for example, by mitigating pollution and limiting noxious algal blooms.\(^{67}\)

When read in conjunction with the statutory objects and purpose clause for the Basin Plan, discussed above, this amounts to a comprehensive and ambitious statutory

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\(^{65}\) *Water Act 2007* (Cth), s 4.  
\(^{66}\) Ibid.  
\(^{67}\) Ibid. The lack of a specific definition provided for ecosystem functions or productive base is curious.
standard for EWA. The use of the joiner “or” rather than “and” means that the level of water extraction in a management area need only compromise one of the list of attributes used in the definition. The list of attributes and further definitions also evidences a very significant expansion beyond a previous concentration on environmental assets such as significant wetlands, to also consider the systemic ecosystem functions on which such assets depend, and the links between healthy ecosystems and productive use of the resource.

Recent amendments introducing a statutory priority for the allocation of water for critical human needs and the conveyance water required for this purpose may, however, create some ambiguity around the standard of ‘environmentally sustainable level of take’ and restrict the level at which the limit can be set.

Critical human water needs are defined in the Water Act as the minimum amount of water that can only reasonably be provided from Basin water resources to meet core human consumption requirements in urban and rural areas; and those non-human consumption requirements that a failure to meet would cause prohibitively high social, economic or national security costs. Water for such purposes is to be made available in the River Murray system by giving conveyance water first priority from the water available in the system. Conveyance water is that required to deliver water to meet critical human water needs. The volume of water to meet critical human needs in each State must be specified in the Basin Plan, along with the risk management approach for inter-annual planning relating to arrangements for critical human water needs in future years. This will involve setting parameters around decision-making about whether water is made available in a particular year for uses other than meeting critical human needs, or set aside for critical human water needs in future years. It is unclear how such a priority will operate in conjunction with the

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68 The tendency to focus EWA on icon sites has been discussed in Chapter Two.
69 The importance of broadening the approach to EWA in this way was emphasised in a recent presentation by Professor Richard Kingsford (University of NSW). See Richard Kingsford, ‘Managing the remnant environmental flows in our regulated rivers – what should we be doing?’ (Presentation delivered at the Environmental Water Allocation Forum, Canberra, ACT, 28-29 May 2009).
70 Water Act 2007 (Cth), s 86A(2).
71 Ibid, s 86A(1).
72 Ibid, s 86A(4).
73 Ibid, s 86B.
74 Ibid, s 86C (1)(c) and (2). See also Council of Australian Governments (2008), above n 21, Part 7.
standards applicable to Sustainable Diversion Limits, however, it appears that such conveyance water would be allocated prior to the water required to deliver the standard of ‘an environmentally sustainable level of take’ in situations of extreme water shortage.\textsuperscript{75}

Whether such a prioritisation will result in detrimental environmental outcomes depends on numerous factors, for example, measures to prepare, plan and provide for dry years so that environmental assets and outcomes are not irreversibly damaged. The proposed inter-annual risk management planning provides a potential forum to provide for such outcomes. However protecting environmental water, and the components of an environmentally sustainable level of take, may be better supported by broadening the concept of first priority water beyond this narrow focus on critical \textit{human} needs to also consider the critical importance of maintaining basic ecosystem function to support such human needs over the long term. Previous discussion of rules-based environmental water, in the Victorian case study in Chapter Five, suggested that these legal mechanisms could potentially offer enhanced legal status to a certain component of first priority EWA. Discussion in Chapter Seven will consider whether using such mechanisms to provide for both critical human and ecosystem needs as a first priority allocation of the resource, beyond which shares for consumptive and other more discretionary environmental use are allocated, would provide an allocation model more supportive of effective EWA.

\textit{(a) Are these Statutory Standards and Duties Workable and Enforceable?}

Under the statutory standard, the Authority, in the exercise of their planning function, is left discretion to make a judgement on what is considered a “key” environmental asset, ecosystem function or environmental outcome, and what may amount to a “compromise” of this attribute. While this leaves some scope for a trade-off of the competing interests and values inherent in any determination of EWA, this trade-off is set within a context of relatively tight statutory parameters, which have a strong focus

\textsuperscript{75} Gardner et al also draw attention to the potentially conflicting requirements regarding preparation of the Basin Plan. Under s 86A(1) and s 21, the Act provides that the preparation of the Basin Plan, having regard to critical human needs water, is not to limit the obligation to give effect to the relevant international agreements. They comment, “in times of severe water shortage, it is difficult to see that the two will not conflict.” See Gardner et al, above n 1, 409.
on environmental outcomes. It is nonetheless important to consider the workability of this standard, in light of the process established by the legislation for its implementation and likely potential constraints to be encountered in this process; and also its potential legal enforceability, particularly, in light of previous, albeit limited, experience in setting and enforcing statutory standards for EWA in NSW.

First, it is important to consider how the statutory standard of ‘environmentally sustainable level of take’ may be interpreted and implemented by the Authority in the practical context of preparing the Basin Plan.

A recent discussion paper released by the Authority proposes a three step method for applying the standard of ‘environmentally sustainable level of take’ in the determination of Sustainable Diversion Limits. Initially, key environmental assets, functions and outcomes (characteristics of an environmentally sustainable level of take) will be identified. Following this, the Authority will make a relative assessment at a catchment and Basin scale of the comprehensiveness, adequacy and representativeness of the resulting network of assets, functions and outcomes. Finally, the environmental water requirements for these characteristics will be determined. From this understanding of environmental water requirements, options to determine the diversion limit will be proposed and considered in conjunction with assessments of likely social and economic impacts of these options. Such socio-economic information is intended to be used to inform “how, where and when water can be delivered to meet environmental requirements at least social and economic cost.”

The overall approach to defining the standard in terms of environmental water requirements appears to be quite rigorous and draws on the recent and growing scientific expertise for determining environmental water requirements. Yet, at a

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78 Ibid, 19. This approach is based on contemporary conservation planning frameworks applied for example to protected areas to ensure the reserve network is comprehensive, adequate and representative.
80 Ibid, 24.
81 Ibid, 20.
general level, it is important to recognise that in determining what are “key” environmental assets, outcomes and ecosystem functions or the required river health levels for a productive ecosystem base across such a large area as the MDB, and what may constitute a “compromise” of these attributes, available science will be patchy and incomplete.\(^8^2\) Given the political commitment to a very tight planning timeline, there is little scope to conduct targeted further research to contribute to an articulation of what may constitute ‘an environmentally sustainable level of take’ across the Basin.\(^8^3\) This underscores the importance of opportunities to review the application of the standard in adaptive management processes over time. Relevant provisions in the Water Act will be considered later in the chapter. However, it is important to note previous observations, made in the context of the State case studies, highlighting the danger that, in the face of scientific uncertainties and considerable political pressure against re-allocation, the availability of such adaptive management processes is used to further postpone difficult decisions on re-allocation.\(^8^4\)

In this light, it is important to note that, although the public rhetoric surrounding the introduction of the Commonwealth regime focused on creating an expert-based institution able to transcend parochial MDB politics, under the Act the Authority is accountable for key statutory functions to a political master in the form of the Commonwealth Minister. The Basin Plan must be approved and adopted by the Minister\(^8^5\) and the Minister has the power to direct the Authority to make modifications to the plan.\(^8^6\) This power is limited to some extent in that the Minister must not make a direction on any aspect of the Basin Plan that is of a factual or scientific nature;\(^8^7\) on certain elements listed as mandatory content for the Basin

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\(^8^2\) Peter Ker, ‘Murray Chief Warns of Patchy Science’, The Age (Melbourne), 26 May 2009. This was a key theme of discussions at the Environmental Water Allocation Forum, Canberra, ACT, 28-29 May 2009. See Tony McLeod, above n 55; Stuart Bunn, ‘How can you maximise and monitor environmental outcomes using water planning’ (Presentation delivered at the Environmental Water Allocation Forum, Canberra, ACT, 28-29 May 2009); Richard Davies, ‘Concluding Comments,’ (Presentation delivered at the Environmental Water Allocation Forum, Canberra, ACT, 28-29 May 2009).

\(^8^3\) Ker, above 82.


\(^8^5\) Water Act 2007 (Cth), s44. See also s 175, under which the minister may give directions to the Authority.

\(^8^6\) Ibid, s 44(3)(b)(ii).

\(^8^7\) Ibid, s 44(5)(a).
Plan; or measures in the Basin Plan dealing with the allocation of risk for reductions in the Sustainable Diversion Limit or reliability of water entitlements.

The articulation of the Sustainable Diversion Limit is likely to be of considerable political controversy given probable impacts on water users already under significant resource stress as a result of prolonged drought and the threat of climate change. The list of plan content expressly protected from ministerial interference does not include the Sustainable Diversion Limit. The articulation of a Sustainable Diversion Limit in the Basin Plan may however be protected to some degree by its scientific nature. Indeed, in ministerial communication about the reforms, the Sustainable Diversion Limit is referred to as a new “scientifically-based limit on water use.” Yet, given scientific uncertainties and the level of discretion remaining within the standard of ‘environmentally sustainable level of take,’ it is unlikely that this limitation would be of any import in restricting the Minister’s statutory power to made modifications to the plan. Additionally, in a practical context, the Authority and the Minister will undoubtedly work together to ensure the Basin Plan is politically tenable.

Within the process of consultation on the draft Basin Plan, the Basin Ministerial Council (composed of State and territory Ministers) is also given the express opportunity to review the draft plan, in conjunction with advice on its potential socio-economic impacts, and refer matters of contention, such as diversion limits, back to the Authority for further consideration. As Clark has argued, the political reality of the planning task is inescapable.

Second, in terms of broader legal enforceability, it is important to consider whether there are opportunities for third parties to challenge the articulation of Sustainable Diversion Limits by the Authority and, if so, consider how the statutory standard of ‘an environmentally sustainable level of take’ may be interpreted by the judiciary.

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88 Ibid, s 44(5)(b)(i). This refers to items 1, 2, 3 and 8 of the table of mandatory plan content in s 22(1). Importantly these are all fairly general and procedural elements of the Basin Plan, unlikely to be politically contentious.
89 Ibid, s 44(5)(b) (ii) and (iii).
90 For example, Senator, the Hon Penny Wong, Minister for Climate Change and Water, ‘Strong Results on Government Water Purchase’ (Press Release, 24 July 2009).
91 Water Act 2007 (Cth), s 43A.
92 Clark, above n 5.
Unlike other major Commonwealth environmental legislation, and some equivalent State water legislation, there is neither express provision in the Water Act for interested persons to make an application for an injunction against an alleged breach of the Act, nor an express definition of standing for these purposes. This may potentially make it more difficult for a third party, such as an environmental advocacy group, to challenge an articulation of the Sustainable Diversion Limit either for the Basin as a whole or for an individual water resource management area. It is arguable that this lack of express third party recourse to judicial review significantly undermines the provision of a strong statutory environmental standard for water allocation planning by constraining its potential enforcement.

There is also, however, the question of how a decision to approve a diversion limit would be characterised. Gardner suggests it is unlikely that judicial review of a decision to adopt a Basin Plan would be available under federal legislation for the review of administrative decision-making, because such a decision may be characterised as legislative and not of an administrative character and, thus, not a decision to which the Act applies. Although available via common law, judicial review of a legislative decision is subject to tougher standards than review of an administrative decision.

If a third party was successful in gaining legal standing to bring an action in judicial review concerning the adoption of the Sustainable Diversion Limit, potential grounds for challenge would depend on the circumstances of the determination and the strategy of any potential applicant. Gardner considers some possible grounds of review, including that the statutory criterion of ‘an environmental sustainable level of

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93 For example, Environmental Protection and Biodiversity Conservation Act 1999 (Cth), s 475.
94 For example, Water Management Act 2000 (NSW), s 47.
95 Amendments to provide such standing and review options were proposed during the debate of the legislation in 2007, and later in 2008 when the Act was amended, however were rejected on both occasions.
98 Gardner et al, above n 1, 411-12.
99 Ibid. Via an application for review under the Judiciary Act 1903 (Cth), s 39B; or by application for a declaration under the Federal Court of Australia Act 1976 (Cth), s 21.
take’ is a jurisdictional fact and that the Minister does not have the authority to approve a Basin Plan that does not meet this criterion. Yet, he concludes that these would be very difficult lines of argument to make. 100 Specifically, the remaining discretion within the statutory standard, involving the inherent value judgements as to what constitutes a ‘‘key’’ attribute and what may amount to a ‘‘compromise’’ of this attribute, would no doubt constitute difficult legal terrain; and raise arguments relating to the limited scope of judicial review, which focuses on the legality rather than the merits of decision-making.

Previous discussion of the Gwydir case in Chapter Four provides an illustration of a comparable judicial review challenge to a determination of EWA, in which it was argued that the statutory standard and process for such a determination had not been met. 101 Judicial reasoning, and the ultimate finding in the case, illustrated the reluctance of the judiciary to stray into merits review and entertain the possibility of a substantive statutory standard for environmental protection. The statutory standard concerning the substance of EWA in the Water Management Act 2000 (NSW) was, however, quite tentative in comparison to the clearer use of substantive concepts in the Commonwealth legislation. The stronger statutory standard in the Water Act may encourage a court to more seriously engage with substantive standards for environmental protection. 102

2 Facilitating and Protecting Environmental Water

Discussion in Chapters Three, Four and Five has established that the design of legal mechanisms to facilitate EWA, and their setting within the broader regulatory framework, exert significant influence on the status and protection of environmental

100 Ibid, 412. Other potential grounds considered include that the approval is unreasonable or there is no evidence to justify the decision to adopt the particular diversion limit.


102 Gardner et al, above n 1, 413. Gardner comments, ‘‘Notwithstanding the difficult task that a court would face in undertaking judicial review of a Basin Plan, parliament’s direction should be given some effect because of the fundamental importance of achieving sustainability in the MDB and the clear legislative concern with that goal displayed in the Act’s objects and the Statement of Basin Plan purposes (s3(d)(i) and 20(b)).’’
water relative to other entitlements. The new federal Water Act does not expressly seek to influence the choice of legal mechanisms for EWA, nor does it create any new form of environmental entitlement, thereby deferring to existing State statutory schemes. Yet, there may be opportunities to influence the way environmental water is allocated and protected through the design of the Sustainable Diversion Limits.  

This discussion considers the potential form and scope of these limits. In addition, some important elements of the new statutory scheme which will indirectly influence the maintenance and protection of environmental water once the Basin Plan is in place are noted. These elements include statutory provision for enforcement of the Basin Plan; measures for ongoing review and amendment of the Plan to ensure environmental water is not disproportionately affected by changing water availability over time; and, the extent of discretion to vary or qualify rights in times of water shortage so as to supply critical human needs and the potential impact of this power on EWA.

(a) Form and Scope of Sustainable Diversion Limits

The Act defines the Sustainable Diversion Limit by reference to levels of extraction and refers to the limit as a long-term average limit. There is no statutory reference to how environmental water remaining above this limit should be dedicated and protected as such. Yet, the Act also places no restriction on the form the Sustainable Diversion Limits may take. As such, it is theoretically possible for the limit to be designed in such a way that it more effectively dedicates the water remaining above the limit as environmental water and achieves greater protection for this water.

Previous limits on extraction, such as the MDB Cap and its application through State water allocation instruments, have been generally expressed in the form of long-term

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103 The Environmental Water Plan under the Basin Plan, discussed in the subsequent section may also be employed to such purposes to a certain degree.
104 There is a reference to protecting and safeguarding existing environmental water, however this addresses a different issue. See, Water Act 2007 (Cth), ss 21(5), 28(1).
105 Ibid, s 23(2). This provides that a long-term average sustainable diversion limit may be specified as a particular quantity of water per year; or as a formula or other method that may be used to calculate a quantity of water per year; or in any other way that the Authority determines to be appropriate.
The effectiveness of such a limit depends largely on the level at which it is set. As such, setting the Sustainable Diversion Limit against the ambitious statutory standard of the Water Act using a volumetric limit would potentially improve the allocation balance in the MDB considerably.

However, volumetric limits do not automatically protect the water above the limit as environmental water, nor do long-term averages adequately respond to key environmental water reform imperatives such as protecting temporal and spatial variability of flow. Consequently, in terms of achieving protection for environmental water, it is often argued that it is important to dedicate this water as a share of the overall resource pool to ensure it is not disproportionately vulnerable to reduced water availability under climate scenarios. Young and McColl have argued consistently for the design of the new Sustainable Diversion Limits along these lines, so that the environment would hold a share of the available water resource of comparable character and status to the consumptive share. In terms of delivering effective environmental outcomes, any division of available water via limits or shares must be accompanied by management capacity and flexibility pertaining to the environmental share to allow managers to respond to imperatives, such as temporal and spatial variability. As discussion in previous chapters has shown, this can be achieved both through the design of legal mechanisms to facilitate EWA and their management arrangements.

Early indications on the form that the Sustainable Diversion Limit may take under the Basin Plan suggest many of these concerns are being addressed. A recent discussion paper proposes a highly sophisticated process for the specification of diversion limits, both on an annual and long-term basis, which is to be matched to the environmental water requirements for particular water resources. These water requirements will be pre-determined by the application of the standard of ‘environmentally sustainable

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106 The use of long term average limits in NSW Water Sharing Plans is discussed in Chapter Four.
107 These difficulties have been discussed in Chapters Three and Four.
level of take’ outlined above.\textsuperscript{109} The paper recognises that limits expressed as simple long-term average volumes will not be appropriate for regulated river systems as they are not responsive to the uncertainties of climate change and do not provide a mechanism to deliver environmental water requirements.\textsuperscript{110} It proposes, instead, the use of river system models to specify limits on the long-term average amount of water that can be taken; on the annual variability of take within the long-term average limit; and on the way in which long-term average diversions share the risk of climate change, so that environmental water requirements are able to be achieved. The paper recognises that this modelling will need to be based upon assumptions about the way in which environmental water is to be dedicated and protected – specifically the mix of held environmental water (volumetric entitlements) and planning environmental water (rules-based flows).\textsuperscript{111} It appears, therefore, that in determining the limits, the nature and mix of legal mechanisms to achieve environmental water requirements will also be determined to some degree.

In terms of the scope of the Sustainable Diversion Limit, earlier discussion in both the NSW and Victorian case studies has illustrated that, if interception activities, such as floodplain harvesting and catchment dams, are not effectively regulated, this will undermine the integrity of all entitlements in the system. Environmental water that is not adequately specified within the formal allocation system is particularly affected. As such, it is important to ensure that diversion limits effectively cover all forms of water harvesting, including interception activities, or are at least combined with effective supplementary regulatory tools to achieve full regulatory coverage. Young and McColl, for example, argue that all forms of water harvesting should be metered and accounted for where possible and otherwise offset within the overall allocation scheme.\textsuperscript{112}

The provisions of the Water Act are somewhat equivocal with regard to the scope of the diversion limits, particularly interception activities.

\textsuperscript{109} Murray-Darling Basin Authority, above n 76, 36 – 41.
\textsuperscript{110} Ibid, 37.
\textsuperscript{111} Ibid, 40.
\textsuperscript{112} Young and McColl (2008 a), above n 108, 17.
On one level, there is a clear reference to including interception activities within the Sustainable Diversion Limit. The purposes of the Basin Plan provide specifically for the establishment and enforcement of environmentally sustainable limits on quantities of surface and ground water that may be taken from Basin water resources (including by interception activities).113 The Sustainable Diversion Limit is to be set according to the standard of an ‘environmentally sustainable level of take’114 and the concept of “take” is defined very broadly to include all forms of water harvesting and extraction, including interception.115

Yet, on another level, the Act also expressly provides that the provisions of the Basin Plan have effect only to the extent that they relate to the use or management of Basin water resources and have no effect to the extent to which they directly regulate land use and management of natural resource other than water.116 This suggests an intention to exclude coverage of interception activities, such as plantation forestry, but presumably still cover floodplain harvesting and farm dams, activities with more direct links to water use and management.

Additionally, the specific parameters of the Basin planning process do not explicitly include interception activities within the concept of the Sustainable Diversion Limit, suggesting that such activities would be better regulated through setting parameters for continued and expanded regulation by States. The Basin Plan must only ‘identify’ risks to the condition or continued availability of Basin water resources, including interception activities, climate change, and changes to land use;117 and include strategies to be adopted to manage or address, theses risks.118 State water resource management plans are required to address the regulation of interception activities with

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113 Water Act 2007 (Cth), s 20(b).
114 Ibid, s 22(1) - Item 6, and s 23.
115 Ibid, s 4. Taking water from a water resource is defined to mean removing water from, or reducing the flow of water in or into, the water resource including by any of the following means: pumping or siphoning water from the water resource; stopping, impeding or diverting the flow of water in or into the water resource; releasing water from the water resource; permitting water to flow from the water resource; and includes storing water as part of, or in a way that is ancillary to any of the processes or activities referred to above.
116 Water Act 2007 (Cth), s 22(9).
117 Water Act 2007 (Cth), s 22(1), Item 3.
118 Ibid, s 22(1) Item 5.
a significant impact on Basin water resources. Such measures may include requirements that interception activities of significance be assessed to determine consistency with the water resource plan before approval or may require water access rights to be held for specified kinds of interception activities.

Again, an early indication of the likely approach to this issue is provided in a recent discussion paper released by the Authority. This outlines a number of categories of take which will be limited through the Sustainable Diversion Limit. These include licensed take (taking water under a license or entitlement issued under State law); authorised take (take that is permitted or not prohibited under State law, but for which no license is needed, such as a stock and domestic right); licensed interception (which differs from licensed take in that the water is intercepted prior to it reaching a watercourse or storage, for example some floodplain harvesting is licensed in this way); authorised interception (water interception that is permitted or not prohibited, but for which no license is needed, such as catchment farm dams discussed in Chapter Five); incidental interception (such as afforestation activities which can incidentally intercept both surface and groundwater); and unauthorised take or interception. This suggests a broad and encompassing approach to the scope of the diversion limits.

It is further proposed that different types of take demand different types of regulatory mechanisms within the overarching Sustainable Diversion Limit. Interception activities that are identified as being significant and above a certain threshold will be managed according to the nature and extent of the activities, through setting parameters for State regulation through water resource plans. Some of these activities may be best regulated through licensing the volume intercepted, in which case, they will be more directly the subject of the consumptive pool regulated under the diversion limit. The case studies have underscored the need for significant improvements in State regulation of interception. In this respect, parameters set through the Basin Plan and increased federal oversight will be critical.

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119 Ibid, s 22(3)(d).
120 Ibid, s 22(7)(a) and (b).
121 Murray-Darling Basin Authority, above n 76.
122 Ibid, 29.
123 Ibid, 36.
125 Ibid. See also Gardner et al, above n 1, 411.
(b) Enforcement

The Water Act gives effect to the Basin Plan by requiring Commonwealth and State governments, agencies, authorities and water access right holders to act consistently with the plan.\(^{126}\) Responsibility for enforcement of the Basin Plan and accredited State water resource management plans is given to the Authority,\(^{127}\) and a wide range of civil and criminal enforcement mechanisms are provided, including powers to investigate potential breaches.\(^{128}\) While centralised enforcement of a basin-wide plan and its components is highly desirable, there is no guarantee that this shifting of responsibilities will improve compliance. First, increasing resources for compliance activities and prioritising improvement and coordination in necessary monitoring and reporting will be critical to improvements in this area. Second, in practice, the Authority is likely to rely heavily on State arrangements for the provision of compliance information and will, to this degree, be captive of State agencies.\(^{129}\)

For example, compliance with the Sustainable Diversion Limit is central to protecting environmental water. The Basin Plan is to specify a method for determining compliance with the limit, in addition to water accounting procedures and timelines.\(^{130}\) States must use this method to report to the Authority on compliance.\(^{131}\) When considering the potential of these provisions, it is important to note that previous attempts to centrally regulate compliance with the MDB Cap were plagued with difficulties.\(^{132}\) This is attributed to both the highly complex formula for the Cap, rendered even more complicated in practice due to a long history of poor record keeping and significant variety in the management regimes in place across the Basin;

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\(^{126}\) *Water Act* 2007 (Cth), s 33 - 35.

\(^{127}\) Ibid, s 137.

\(^{128}\) Ibid, Part 8, Part 10.

\(^{129}\) Monitoring and reporting responsibilities are discussed in the next section of the Chapter. The Act does however signal such reliance by providing that in exercising its own functions, the Authority may adopt measurements, records and conclusions made by a Basin State or may request Basin State to carry out monitoring functions (s 172(2)).

\(^{130}\) *Water Act* 2007 (Cth), s 22(1), Item 8.

\(^{131}\) Ibid, s 71.

and very poor progress in implementing the necessary compliance procedures, particularly raising monitoring standards for key water attributes and completing modelling tools to monitor and report on compliance. Additionally, the Cap arrangements included no strong enforcement measures, the main sanction for poor compliance being exposure and political pressure.

The discussion above, of the proposed approach to articulating the Sustainable Diversion Limit, has outlined a complex mechanism, expressed and targeted differently to different forms of extraction. While such complexity appears inevitable in the articulation of an ‘environmentally sustainable level of take’ across such a range of different water extraction scenarios, the practical compliance task will be considerable and undoubtedly highly complex and inaccessible for public scrutiny. The key difference between this and the MDB Cap mechanism, however, is the significant enforcement powers now available to the Authority to compel compliance.

(c) Review and Risk Allocation

To provide for an allocation of water that is responsive to changing water availability under climate change and new information on ecological water requirements, it is critical to institutionalise opportunities for the Sustainable Diversion Limit to be reviewed and amended, and establish processes to deal fairly with resulting impacts on entitlement holders. The Act contains the following broad provisions for the review and amendment of the Basin Plan.

A formal review of the Basin Plan is to be undertaken by the Authority every ten years. There is no specific statutory direction as to the issues to be focused on in such a review; rather these may be determined by the Authority through the preparation of a discussion paper. Additional statutory direction on the focus of the review could have added clarity and strength to these important provisions, especially with regard to ensuring protection of the environmental water component against

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133 Ibid.
134 Water Act 2007 (Cth), s 50(2) and (3). The Plan may be reviewed more frequently upon the request of either the Minister or all of the Basin States (but not within first five years after it takes effect or within the first five years following the previous review)
135 Ibid, s 51.
changing water availability; and reviewing the application of the standard of ‘environmentally sustainable level of take.’ For example, the provisions of the *Water Act 1989* (Vic) for the fifteen year review of the allocation balance, discussed in Chapter Five, include very specific parameters to this effect.\textsuperscript{136}

A review may lead to the amendment of the Basin Plan,\textsuperscript{137} although an amendment may also be prepared by the Authority at any time following the procedures specified in the Act.\textsuperscript{138} These procedures include a requirement that the Authority consult extensively on the proposed amendment.\textsuperscript{139} A specific consultation process is provided for the Basin Ministerial Council, whereby considerable opportunity is given to the Council to comment on any proposed amendment, including the long-term average Sustainable Diversion Limit proposed by the amendment.\textsuperscript{140} This role, however, remains advisory and the power to adopt an amendment to the Plan and to make a direction on such amendment rests solely with the Minister.\textsuperscript{141}

If, as a result of review and amendment, there is a reduction in the Sustainable Diversion Limit, the Act also provides for the allocation of risks associated with a resulting reduction in entitlements\textsuperscript{142} or the reliability of entitlements.\textsuperscript{143} The risk allocation formula applied generally follows the provisions of the National Water Initiative. This assumes that the National Water Initiative regime, including commitments to address over-allocation and over-use through State-based water planning, has been fully implemented by 2014. Beyond 2014, risks are to be shared between entitlement holders and State or Commonwealth governments, depending on the cause attributed to the reduction in entitlement.\textsuperscript{144} As such, water access entitlement holders are to bear the risks from any reduction in entitlement or reliability arising from reductions in the consumptive pool as a result of seasonal or long term changes in climate and periodic natural events, such as bushfire or

\textsuperscript{136} *Water Act 1989* (Vic), s 22K, 22L.
\textsuperscript{137} *Water Act 2007* (Cth), s 52
\textsuperscript{138} Ibid, s 45-49.
\textsuperscript{139} Ibid, s 46-7.
\textsuperscript{140} Ibid, s 47A.
\textsuperscript{141} Ibid, s 48.
\textsuperscript{142} Ibid, s 75.
\textsuperscript{143} Ibid, s 80.
drought. However, for reductions attributable to bona fide improvements in the knowledge of a water system’s capacity to sustain a particular extraction level or, to changes in government policy (for example the adoption of new environmental objectives), governments bear the majority of risks.

The Water Act, including amendments stemming from the 2008 Agreement on MDB reform, has altered this formula slightly. In addition to reductions resulting from a change in Commonwealth government policy, the Commonwealth will now assume State liabilities for reductions arising from changes in the knowledge component, providing that the State agrees to implement the said risk allocation procedures. This undertaking applies from the time at which the Basin Plan is implemented through accredited State water resource management plans. If a reduction is reasonably attributable to the Commonwealth’s risk under the formula, payments are available to affected entitlement holders under the Act. The Basin plan is to specify both the extent of any reduction in the long term average sustainable diversion limit for a water resource plan area and the amount attributable to the Commonwealth’s undertaking of risk, according to the formula described above.

It is important to consider how these provisions will apply where a transitional or interim water resource plan is in place when the Basin Plan takes effect and whether they may indirectly affect the planning process. For example, the likelihood of Commonwealth liability for substantial payments following the introduction of the Basin Plan could significantly influence the Authority and responsible Commonwealth Minister in the process of setting the Sustainable Division Limit.

The provisions of the Water Act in this area are highly complex. They suggest that reductions in the Sustainable Diversion Limit, resulting from the transition from

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146 Ibid, cl 48, 49, 50. The only exception is that entitlements holders bear the first 3% of risks arising from the changes to knowledge component, up to 2014.
147 Council of Australian Governments (2008), above n 21.
148 Ibid, Part 10. This is reflected in the Water Act 2007 (Cth), s 74A. At present only NSW has legislated to implement the said risk allocation formula.
149 For South Australia, NSW and Queensland the transition date is generally mid 2014, for Victoria, 2019. See Gardner et al, above n 1, 401-3.
150 Water Act 2007 (Cth), s 77.
151 Ibid s 75.
transitional or interim water resource plans to plans fully accredited under the Basin Plan, will be potentially compensated, according to the above formula, in the situation where a State has also agreed to apply the formula.\textsuperscript{152} Given that existing State plans are generally considered to have made only slight progress towards more sustainable limits, the likely magnitude of the changes involved in transitioning to the Sustainable Diversion Limit is considerable. This will, of course, depend on the impact of interim environmental water recovery processes, such as entitlement buy-back, intended to move towards these new limits. The extent to which Commonwealth and State governments would be liable to make payments to affected parties would depend on how any reduction in water available for consumptive use is characterised.\textsuperscript{153} The introduction of the statutory Basin Plan with its Sustainable Diversion Limits may be characterised under these provisions as a change in Commonwealth government policy and, therefore, the Commonwealth may be liable accordingly.

(d) Discretion to Qualify Rights in times of Water Shortage

As noted above, the Water Act now includes a clear priority for water to supply critical human needs and provides for the development of processes to realise this priority within the Basin Plan, particularly with respect to the River Murray system in the southern MDB. The statutory definition and relevant provisions have been introduced earlier in the chapter.\textsuperscript{154} State case studies have illustrated the considerable and arguably disproportionate impact on environmental water of the recent exercise of broad discretionary statutory powers to qualify rights in times of water shortage. As such, it is important to consider how this statutory priority for critical human needs in the Water Act may influence the status and protection of environmental water.

The provision of a definition and opportunity to specify a transparent process for a progressive application of this priority in different water availability situations\textsuperscript{155} is a significant improvement on the very broad discretionary powers in State legislation. Yet, the definition would arguably benefit from clearer guidelines and examples as to

\textsuperscript{152} Ibid, s 75(4).
\textsuperscript{153} For discussion of lingering questions surrounding interpretation of the risk allocation formula, see, Gardner et al, above n 1, 402.
\textsuperscript{154} Water Act 2007 (Cth), Part 2A.
\textsuperscript{155} Ibid, especially ss 86A – 86C.
what constitutes core human consumption requirements and what types of non-human consumption activities might be of such social, economic or national security value that they qualify for the priority. It is also, as yet, unclear how this priority will interact with provisions to set a Sustainable Diversion Limit reflecting an ‘environmentally sustainable level of take,’ and how environmental water set aside under the limit will be treated in the application of the critical human needs priority and processes. In the development of this process to apply the priority under the Basin Plan, it is critical that the disproportionate and severe impact on environmental water in recent qualification of rights for critical human needs in a State context is considered and rectified.

3 Managing Environmental Water

The new statutory scheme introduces some important measures for dedicated management of environmental water at a Basin scale and improved monitoring and information management for water resources. Setting such statutory parameters around roles and responsibilities for environmental water management and providing for key adaptive management functions are important developments identified in Chapter Three which may contribute to an improved governance framework for effective EWA. The discussion of some of the key reforms below focuses on whether this approach will improve the effectiveness and efficiency of EWA and contribute valuable institutional capacity and resources to an adaptive management approach.

(a) Environmental Water Holder

The Act establishes a new statutory role of Commonwealth Environmental Water Holder to manage the Commonwealth’s environmental water holdings, primarily for the purposes of protecting or restoring the environmental assets of the MDB so as to give effect to relevant international agreements. Water held by the Commonwealth in the MDB must be managed in accordance with the Environmental Watering Plan of the Basin Plan, as it comes into force.

156 Ibid, s 104.
157 Ibid, s 105.
158 Ibid, s 105(4)(a). For transitional arrangements prior to the Basin Plan, see s 248.
This role is focused fairly narrowly on the management of Commonwealth-held tradeable volumetric water entitlements; rather than rules-based environmental water or indeed the total environmental water reserve. It is intended to facilitate the use of the increasing environmental water share of flexible volumetric entitlements achieved through current Commonwealth environmental water recovery programs. As such, existing State institutions for environmental water management are preserved. States will continue to hold volumetric environmental entitlements in their own right and regulate the management of rules-based environmental water, consistent with the Basin Plan. This means that coordination and cooperation between the various holders of environmental water will be critical to efficient and effective outcomes. The Environmental Watering Plan within the Basin Plan, discussed below, is intended as the mechanism to develop such an approach.

Adding a new player to the already complex institutional regime for environmental water management has the potential to be cumbersome. As water recovery programs progress, it is also likely that Commonwealth environmental water holdings will quickly outstrip State holdings and the balance of power and influence over management decisions will rest with the Commonwealth. Yet, as this occurs, it is arguably very important to preserve and support emerging local institutions for environmental water management discussed in the case studies. These adaptive governance models, with their combination of locally relevant expertise and management experience, have proven to be particularly valuable in achieving the most effective use of water and instituting adaptive management processes at the practical management scale.

There are already some examples of coordinated use of different pools of environmental water and co-management between the Commonwealth environmental

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160 Gwydir ECA Operations Advisory Committee; Loddon Environmental Water Advisory Group.
161 The findings from the case studies are also supported by comments made by Young and McColl on the appropriate management scale for EWA. See Young and McColl (2008 a), above n 108; Mike Young, “What does research tell us about which policy instruments work best for environmental water planning?” (Presentation delivered at the Environmental Water Allocation Forum, Canberra, ACT, 28-29 May 2009).
water holder and State-based institutions, which show the promise of these arrangements.\textsuperscript{162} Nonetheless, achieving the right mix of institutional scales and processes for coordination will be a significant challenge in the development of the Environmental Watering Plan.

\textbf{(b) Environmental Watering Plan}

A key component of the Basin Plan is the Environmental Watering Plan. Its purpose is to safeguard existing environmental water; plan for the recovery of additional environmental water; and, coordinate the management of environmental water in order to protect and restore the wetlands and other environmental assets of the MDB, protect biodiversity dependent on the Basin water resources, and achieve other environmental outcomes for the MDB.\textsuperscript{163} Significantly, this plan is to address all environmental water held in the Basin, not just the tradeable volumetric entitlements held by the Commonwealth described above.\textsuperscript{164} Thus, it will seek to influence the management of State-held environmental water and also, presumably, State-managed rules-based environmental water, although this will be limited to where there is management flexibility built into the relevant rules. This plan is an essential compliment to the Sustainable Diversion Limit mechanism as it will influence how environmental water is provided and managed so as to achieve the statutory standard of ‘environmentally sustainable level of take.’

The Act envisages the development of periodic environmental watering schedules in consultation with all holders and managers of environmental water.\textsuperscript{165} Given the different sources of environmental water and different management arrangements noted above, this is potentially a mechanism to promote coordinated, integrated and adaptive management, particularly if combined with a comprehensive monitoring and reporting program which addresses management interventions over the short and long term.

\textsuperscript{162} Ian Robinson (Commonwealth Environmental Water Holder), ‘Water Policy and other instruments – Introduction’ (Presentation delivered at the Environmental Water Allocation Forum, Canberra, ACT, 28–29 May 2009).
\textsuperscript{163} Water Act 2007 (Cth), s 28.
\textsuperscript{164} Ibid, s 28(2)(c).
\textsuperscript{165} Ibid, ss 29, 30, 31.
It is, however, important to note the constraints to the planning process imposed by the tight time frames, extensive knowledge gaps, and the massive scale of the task of developing a plan over such a large area and variety of biophysical environments. In this situation, it is likely that at least the first iteration of the Environmental Watering Plan is rather strategic than detailed in its provision for new management arrangements.

(c) Monitoring, Reporting, Water Information Collection

There is considerable potential to improve the standard and coverage of monitoring and reporting on EWA. Current gaps, many of which have been well illustrated through the State case studies, include a lack of independent assessment of compliance; monitoring the effectiveness of management interventions over the long term; and the general lack of meaningful public reporting on EWA.\(^{166}\) The Act provides for an expansion of federal involvement in a range of key adaptive management functions, with the potential to result in more transparent and accountable management, and access to an improved quality of information resources.

For example, in terms of general water information management, the national Bureau of Meteorology is now charged with a range of new functions surrounding the collection, holding, management, interpretation and dissemination of Australia’s water information.\(^{167}\) This body may also now issue national water standards relating to all aspects of water information, which are to guide the collection, management and interpretation of such information on a national basis.\(^{168}\) An offence of non-compliance with the standards is also created.\(^{169}\) Given past difficulties in achieving common quality standards for monitoring and reporting on water attributes across the Basin States,\(^ {170}\) this is a significant development.

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166 Some of these issues were covered in the following presentations at the Environmental Water Allocation Forum, Canberra, ACT, 28-29 May 2009. See Stuart Bunn, above n 82; Jane Doolan, ‘State government example of how a water plan is achieving environmental outcomes’ (Presentation delivered at the Environmental Water Allocation Forum, Canberra, ACT, 28-29 May 2009).
167 Water Act 2007 (Cth), s 120, Part 7, Division 3.
168 Ibid, s 130.
169 Ibid, s 133.
In terms of more specific monitoring and reporting targeted to support adaptive planning and management, the Act provides that the Basin Plan must include a program for monitoring and evaluating its effectiveness, including reporting requirements for Commonwealth and State parties.\textsuperscript{171} States are given quite onerous water accounting reporting requirements, including relating to compliance with the new Sustainable Diversion Limits.\textsuperscript{172}

Measuring, monitoring and recording water information is positioned as central to the Authority’s functions.\textsuperscript{173} Although the Authority may adopt Basin State records and request Basin States to undertake such monitoring,\textsuperscript{174} the explicit statutory allocation of responsibility to a central body to coordinate these activities may add additional impetus to achieving common standards of monitoring and reporting between States, and building a body of accessible quality water information.

\textsuperscript{171} Ibid, s 22\textsuperscript{(1)} Item 13.
\textsuperscript{172} Ibid s 71.
\textsuperscript{173} Water Act 2007 (Cth), s 172.
\textsuperscript{174} Ibid, s 172\textsuperscript{(2)}.

This is also recognised by the National Water Initiative. See Council of Australian Governments (2004), above n 129, cl 80-89.
CONCLUDING REMARKS AND OBSERVATIONS ON IMPLEMENTATION

The Water Act displays extensive and unprecedented use of strategic statutory mechanisms to set clear and purposeful direction for reform of the MDB water governance regime. The combination of a substantive environmental standard with clear duties to set the parameters for water allocation and management against this standard, through a new institution at the federal scale, offers considerable potential to contribute to more effective EWA. There is particular potential in critical areas of poor progress to date, such as achieving a re-allocation of the resource to sustainable levels, where constraints to progress have included weak statutory and policy provision and difficulties surmounting federal challenges.

In some areas of environmental water governance, notably the allocation of water between competing users, the Commonwealth assumes more direct regulatory responsibility. In others, such as environmental water protection and management, the new regime results in a layered governance framework where existing State institutions continue to play a significant role, albeit often subject to federally-set parameters. In the latter circumstances, the contribution of the new regime to effective EWA will depend largely on coordination and integration across the spheres of government.

As with any law or policy, gaps between law on the books and law in practice are common.175 Already there is extensive provision for delaying full implementation of the Sustainable Diversion Limits; and the enormity of the planning task in the time frame provided, and its highly contentious nature, suggests that the planning approach will be compromised accordingly in practice. This discussion summarises the potential of the new regime in the three key areas of environmental water governance and makes some observations about likely directions in implementation.

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A Processes to Allocate Water between Competing Users

The new water allocation planning process differs from earlier State-based processes in a number of ways, particularly in the designation of the appropriate forum for substantive decision-making on the allocation of water between competing users and the design of these processes. In this area of environmental water governance particularly, the new regime implements key measures raised in Chapter Three’s analytical framework for a stronger more effective governance regime.

First, the new regime introduces a highly centralised planning process closely guided by substantive statutory parameters. Once parameters for water allocation are set through the Basin Plan, States are required to comply through State water resource management plans and the Act provides a number of mechanisms to ensure such compliance. Along the spectrum of public participation discussed in Chapter Three, there is far less opportunity for the direct public input into policy development at a local management scale that was attempted under the Water Management Act 2000 (NSW), and to a lesser extent the Water Act 1989 (Vic). Although significant efforts are being made to consult on key issues, the tight planning timeframes will necessarily limit broader public input.

This transition to more centralised planning is arguably justified and supports the strong statutory standard in a number of ways. For example, poor progress on addressing over-allocation through previous reform efforts, and the increasing urgency of this issue, justifies relocating planning to a federal institution with the capacity to plan for the whole Basin. This approach can also be seen as a response to some of the constraints to environmental reforms identified through the case studies, such as the time and resources devoted to participatory processes at local scales that failed to deliver environmental outcomes and the difficulties encountered in effectively representing environmental interests in such processes. However to realise Sustainable Diversion Limits, which reflect an environmentally sustainable level of

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176 Holder and Lee, above n 96; Ramsey and Rower, above n 96.
177 The Sustainable Water Strategy planning process, discussed in Chapter Five, was also centralized, with largely high level consultation through recognized interest groups.
178 See, for example, Murray-Darling Basin Authority, above n 76.
179 Under section 42 of the Water Act, the Authority has considerable scope to employ a range of different approaches to consultation.
take, considerable input from established environmental water expertise at State and local scales is critical. The need for strong processes of implementation to ensure integration and coordination across these institutional scales has been emphasised in this chapter.

Second, the parameters for the new allocation planning process are expressed substantively, through the duty to set a Sustainable Diversion Limit against a statutory standard of ‘an environmentally sustainable level of take.’ While various considerations of workability and legal enforceability have been raised in this discussion, this is nonetheless a very significant development in setting strong, strategic direction for environmental reform, which was notably weak or, indeed, absent in previous State water legislation and policy under NWR. To achieve this standard in legislation required considerable political will. Following through with full and effective implementation will depend on maintaining this political momentum. Yet, there are already indications that implementation will be compromised through very permissive transitional provisions for the accreditation of State water resource plans. In the current situation of prolonged and severe drought and climate change scenarios, the socio-economic impacts of environmental reforms are keenly perceived and will undoubtedly operate as serious political constraints to reform.

Third, unlike State water planning processes, the re-allocation of water resources envisaged through the new regime is accompanied by a considerable funding package to contribute to associated socio-economic adjustment. At present, this is targeted at transitioning to the lower diversion limits expected under the Basin Plan, via direct buy-back of entitlements from willing sellers; and, to a lesser extent, allocating a proportion of water saved through infrastructure upgrades to the environment.\(^{180}\) Buy-back has, to date, focused on permanent purchase of water entitlements. This has yielded significant gains in Commonwealth water holdings.\(^{181}\) Some of this water has

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\(^{181}\) Senator, the Hon Penny Wong, Minister for Climate Change and Water, ‘Strong Results on Government Water Purchase’ (Press Release, 24 July 2009).
already been available for use by the Commonwealth Environmental Water Holder.182 Yet a number of concerns remain about whether this is the most efficient and effective approach to the necessary adjustment.

For example, starting the adjustment process as soon as possible while planning proceeds over a longer time frame appears justified, particularly given the urgency of the reforms and the fact that the direction and magnitude of required adjustment is generally well understood and, therefore, in this respect, any increase to environmental water holdings is a positive contribution towards effective EWA. Yet, it is also arguable that such market-based approaches to resource re-allocation work best when firmly situated within a framework of well-articulated objectives, such as a substantive expression of limits on resource use and an articulation of environmental objectives, where they are treated as tools to achieve these limits and objectives over an agreed time frame. Without such a strong framework, there is a danger that purchases do not target the types and distribution of entitlements that will most efficiently and effectively deliver on objectives. The Commonwealth water purchase program continues to evolve and is arguably gaining considerable structure and purpose over time.183 Nonetheless, it is important to recognise that ongoing political momentum and associated allocation of funds to address the problem is not guaranteed. Therefore, it is important to use these resources as effectively and efficiently as possible.

182 For example, Senator, the Hon Penny Wong, Minister for Climate Change, ‘Commonwealth Water for Murrumbidgee Wetlands,’ (Press Release, 28 October 2009); Senator, the Hon Penny Wong, Minister for Climate Change and Water and Gavin Jennings, Victorian Minister for the Environment and Climate Change, ‘Hattah Lakes Wetlands receive Environmental Water’ (Joint Press Release, 30 October 2009).

183 For example, a recent independent review of the program has made recommendations for its future development. See Hyder Consulting, above n 180; A stakeholder consultative committee and an expert scientific committee have been appointed to advise on the conduct of the program and use of water purchased. See Senator, the Hon Penny Wong, Minister for Climate Change, ‘Scientific Experts to advise on water use for Murray-Darling Basin Rivers and Wetlands,’ (Press Release, 18 November 2008); Senator, the Hon Penny Wong, Minister for Climate Change, ‘Review of Government’s Water Purchase Program Released,’ (Press Release, 19 November 2009).

The Government has also commissioned a Productivity Commission study into alternative approaches to buy back of entitlements. See, Minister for Climate Change and Water, and Assistant Treasurer, ‘Productivity Commission Study into Mechanisms to Purchase Water Entitlements’ (Joint Press Release, 24 July 2009).
In this respect, there is, for example, particular concern that the buy-back program has focused exclusively on purchasing entitlements to date and has not considered more sophisticated market mechanisms, which might be more effective in delivering environmental objectives.

The recent Commonwealth purchase of large entitlements on unregulated portions of the Darling River is illustrative.\textsuperscript{184} Entitlements in unregulated rivers are not defined as a share of an available water resource as in regulated systems but, rather, as rights to extract water depending on stream conditions, for example, when certain pre-determined flow conditions are met.\textsuperscript{185} This means that it is difficult to ensure the passage of new environmental water (purchased as an entitlement within the system) to the intended environmental asset, as downstream entitlement holders have similar rights to direct extraction when the water is available. In this case, complex shepherding arrangements have had to be developed to safeguard the purchased water.\textsuperscript{186}

Alternative approaches to achieving environmental outcomes, which may be more effective than outright purchase of entitlements, are available. For example, options contracts could be negotiated with a group of irrigators to purchase a certain type of flood event in certain circumstances. Another option would be to alter water licenses on relevant systems to better protect natural flood pulses through restricting access beyond certain flow thresholds and accompany this with commensurate compensation.\textsuperscript{187} Indeed, in a recent independent review of the first year of the Commonwealth water purchase program, it was recommended that, in order to remain effective, the program should consider broader approaches to achieving environmental objectives, such as temporary purchase of water; competitive sourcing

\textsuperscript{184} The Commonwealth Government together with the NSW Government purchased Toorale Station on the Darling River in northern NSW in September 2008. Water rights were transferred to the Commonwealth Environmental Water Holder. See NSW Minister for Climate Change and the Environment, Carmel Tebbutt, and Australian Government Minister for Climate Change and Water, Penny Wong, ‘Commonwealth and NSW purchase Toorale’ (Joint Press Release, 10 September 2008).

\textsuperscript{185} Hyder Consulting, above n 180, 6.

\textsuperscript{186} Ibid 6.

\textsuperscript{187} These issues were also discussed at the Environmental Water Allocation Forum, Canberra, ACT, 28-29 May 2009. See especially, Robyn Watts, ‘Environmental Outcomes of Pulsed Flows in unregulated rivers,’ (Presentation delivered at the Environmental Water Allocation Forum, Canberra, ACT, 28-29 May 2009).

\textsuperscript{187} Ibid.
of water for environmental assets; and buying environmental water outcomes (such as flood events in certain circumstances) rather than entitlements per se.\textsuperscript{188}

\textbf{B Mechanisms to Facilitate and Protect Environmental Water}

The legal status and protection accorded environmental water is influenced by the design and selection of direct legal mechanisms for EWA and the effectiveness and coverage of the broader regulatory framework for water allocation, for example, its responsiveness to changing water availability, general standards of compliance, and coverage of all forms of water harvesting.

Discussion in this chapter has shown how the new federal scheme centralises a number of processes and activities in the broader regulatory framework that will potentially contribute to improved protection of environmental water. For example, enforcement capacity is centralised and boosted, and an adaptive management process is envisaged, whereby the Basin Plan and its Sustainable Diversion Limit will be reviewed every ten years by the Authority.

Yet, the new regime does not directly address the mechanisms used to facilitate and protect EWA, through clear expression of its status and targeted definition. It is also unclear how environmental water set aside through the Sustainable Diversion Limits will be treated relative to overriding priorities to provide water for critical needs.

There is, arguably, potential to partially address these concerns through the yet-to-be determined form and scope of the Sustainable Diversion Limit. In the development of these limits and the associated Environmental Watering Plan, it is important that opportunities be taken to influence the way environmental water is legally characterised and protected through legal mechanisms for EWA under State legislation. Similarly, careful provision within the Basin Plan for the operation of the critical human needs priority is required so that the severe environmental impacts that have characterised the use of similar powers in State legislation are not perpetuated. For example, it may be appropriate to consider limiting the application of this priority

\textsuperscript{188} Hyder Consulting, above n 180, vii.
to ensure that critical ecosystem needs are also appropriately protected, and the achievement of the overarching statutory standard is not compromised in the long term. Rules of law constraining decision-making regarding the application of such a priority could ensure that the decision-maker considers and provides for long-term ecological viability in the exercise of this power. This could result in some critical ecosystem needs being prioritised in times of water shortage as well to ensure overall ecosystem resilience. Such measures would greatly enhance the value of the diversion limits in setting aside and protecting water of the required volume and characteristics to deliver an ‘environmentally sustainable level of take’ in practice.

C Processes to Manage Rivers with Environmental Water

The proposed reforms to the environmental water management framework introduce mechanisms to coordinate the management of environmental water across the Basin. In light of climate scenarios of significantly reduced water availability, the ability to consolidate available water and allocate it to priority environmental objectives over a large area is very important. Yet, the reforms also result in a layered governance framework, which has the potential to be complex and cumbersome. Success will rely considerably on coordination between various holders and managers of environmental water and there is, undoubtedly, scope for some institutional rationalisation here.

As the Commonwealth begins to assume the predominant role of environmental water holder throughout the Basin, an imbalance in management scales, not necessarily conducive to effective EWA, may result. It is, therefore, critical to preserve and expand upon emerging models of environmental water management documented through the case studies, which both access locally relevant experience and expertise, and achieve coordination at a regional level. There is, arguably, considerable potential to consolidate the current complex range of environmental water management arrangements into a three-tier arrangement, with Commonwealth coordination through the Environmental Water Planning process; independent environmental water managers set as a regional level where appropriate (such as in northern Victoria) to negotiate management with the other two tiers; and local management committees.
The above conclusions and suggestions for the enhancement and implementation of the Commonwealth regime will be used to further refine recommendations made at a more general level for a governance model for EWA in the following chapter.
CHAPTER SEVEN:
A GOVERNANCE MODEL FOR
EFFECTIVE ENVIRONMENTAL WATER ALLOCATION

The objective of this research was to conduct a critical analysis of the developing law, policy and practice of environmental water allocation [EWA], in order to develop recommendations for ongoing institutional change to better realise environmental reform imperatives. From an understanding of the scientific basis and legal and policy context for these environmental reforms, and from a review of key conceptual approaches to natural resource allocation and management, an original framework of institutional considerations to structure the analysis was posited in Chapter Three.

This analytical framework identified constraints and opportunities for achieving effective environmental outcomes in the legal and institutional frameworks for water allocation and management. Essentially, it established general parameters around an emergent governance model for effective EWA, focusing particularly on the role of law within this model. In itself, the framework represents a synthesis of pertinent
research and a conceptual refinement of previous approaches to water governance advocated in the literature and in the public policy debate. It has been applied throughout the thesis in a range of different jurisdictional and water management contexts to test and further refine its central propositions.

In this final chapter, the findings of this application of the framework in New South Wales [NSW], Victoria and with respect to the Murray-Darling Basin [MDB] are reviewed; and from this basis, seven key recommendations for further reform are distilled and consolidated as a proposed model of governance for effective EWA.

Emerging from these findings is an account of a reform process in which environmental outcomes have been significantly compromised, to date, by a failure to realise the required depth and breadth of institutional change. In the very difficult political and socio-economic context of water reform, progress on EWA has been tentative, compromised and, in many instances, ineffective. This poor progress is not limited to a failure to re-allocate the resource to a more sustainable balance between competing users; but also the need to design legal mechanisms and enhance institutional capacity to better protect environmental water and facilitate environmental outcomes in a practical river management context.

Water reform is an ongoing and increasingly urgent policy agenda in Australia, particularly considering the implications of climate change for water resources. Recent developments at a federal scale, outlined in Chapter Six, illustrate a significant step towards achieving governance arrangements to support more sustainable water allocation and management. The recommendations developed in this chapter are designed to advance this trajectory and contribute to the ongoing reform process in Australia.

Presenting the recommendations in the form of a governance model for effective EWA serves two purposes. On one level, it can be used as a template to measure ongoing progress in an Australian context. Many elements of this model are already present to some degree in water governance frameworks in Australia, particularly following the introduction of the new federal regime for the MDB in 2007. Some areas are, however, not well developed and illustrate the need for more far-reaching
institutional change or considerable refinement. On another level, expressing the findings and recommendations in this way demonstrates the broader relevance of the thesis to natural resource re-allocation processes in different contexts and as an exploration of the role of law in developing *institutions for sustainability*.

The thesis proposes that effective EWA necessitates a governance framework that shifts the underlying purpose of water allocation and management from resource exploitation to ecological sustainability. Such a shift requires overarching legal settings which:

- Establish clear substantive standards and accompanying duties to achieve sustainability outcomes across three broad areas of environmental water governance: allocation, protection and management;
- Facilitate and support processes to allocate water between competing users so as to achieve these outcomes;
- Provide enforceable, targeted legal mechanisms to facilitate effective environmental water outcomes and protect environmental water; and
- Guide, constrain and support the adaptive management of rivers for environmental outcomes.

The more substantive recommendations highlighted in the discussion below add further detail to this general structure. The resulting governance framework is represented diagrammatically following the articulation of these recommendations.
I UNDERSTANDING THE ROLE OF LAW WITHIN THE GOVERNANCE MODEL

Integral to the conclusions and recommendations of this thesis is the concept that law, enacted through statute, works at two distinct levels. On one level, legislation can play a central strategic and structuring role within a governance regime. Exploring this particular role has been the primary focus of the thesis. The central argument is that it is important use legislation to set clear, substantive objectives, and link these to tight parameters for the implementation of processes and functions, through targeted duties and rules of law. Legislation can also be instrumental in establishing institutional capacity, particularly through distributing roles and responsibilities so as to best support effective implementation. Together, such measures can contribute to a governance regime which will support the realisation of desired outcomes, thereby helping to address the “implementation deficit” prevalent throughout environmental protection law and policy.¹

Yet on another level, it is also important to consider the more traditional role of law and legal process, in terms of whether and how such statutory standards and parameters can be enforced, should there be a failure to implement the regime. Within the scope of this thesis, this role has been considered in key areas where enforceability is particularly relevant, such as setting statutory parameters for sustainable water allocation or designing legal instruments to facilitate EWA and protect environmental water. In this respect, it is important to emphasise that legal duties and rules of law, which are tightly expressed with considerable detail, are essentially more enforceable than those conveying considerable discretion to decision-makers.² Yet, expressing substantive concepts of sustainability and environmental protection in such a fashion often raises considerable challenges, particularly in terms of their political acceptability and the difficulties of reducing

complex outcomes to relatively discreet terminology. Further research exploring this role of law would complement and extend the findings of this thesis, particularly as the Water Act 2007 (Cth), with its strong, substantive standard for sustainable water allocation, is progressively implemented.

Throughout the thesis, the analysis has been conducted through a four-part framework of inter-related institutional considerations represented in the diagram above, including overarching legal settings; processes to allocate water between competing users; legal mechanisms to facilitate and protect environmental water; and processes to manage rivers with EWA. It has been helpful to separate out the analysis in this way, particularly to consider legal settings distinct from their application in a case study context; as this has contributed to an understanding of the broader context of law and its implementation. For example, both Chapters Four and Five, began with an in-depth analysis of applicable water legislation and then progressed to consider, in more detail, the practice of EWA under this legislation. Yet, as the findings are reviewed and recommendations are developed in this final chapter, the proposed governance framework is presented in a more integrated fashion, consistent with the way it would be put into effect in practice. The central role of law is not considered alone, but interwoven through the analysis of findings and the development of recommendations in the three key areas of environmental water governance: allocation, protection and management.
II Achieving Sustainable Water Allocation between Competing Users

Re-allocationing water resources to more sustainable levels is the most difficult and contentious issue within the water reform agenda and, indeed, the area in which reform progress has been particularly compromised. Chapter Three argued that overarching legal settings addressing water allocation between competing users could play a key role in a governance framework for effective EWA, by setting clear, substantive objectives for water re-allocation, and linking these objectives via explicit duties and rules of law, to dedicated processes to re-allocate the resource. The design and conduct of such processes was also identified as a potentially significant influence on resulting environmental outcomes. In this respect, legislation can establish and facilitate processes which are designed to achieve environmental outcomes. Arguably, the tighter and more targeted the statutory provision, the more influence over subsequent implementation. However, the conduct of these processes in practice is also a very significant determinant of outcomes, and the prevailing experience of considerable gaps between law on the books and law in practice is pertinent.

The findings of the thesis in this area are consolidated into two central recommendations for more strategic use of legislation, and targeted design and conduct of allocation planning processes, to contribute to more effective environmental water governance.

A Legal Settings for Sustainable Water Allocation

In terms of the nature and strength of statutory provision for the re-allocation of water towards sustainable levels, the State and federal statutory schemes considered in this thesis fall along a continuum. The diagram below illustrates a transition over time and institutional scale, from procedural legislation more focused on facilitating consumptive use, towards strategic use of legislation to set parameters for re-allocation to more sustainable levels, through the articulation of statutory standards for EWA and dedicated processes to achieve these standards.
At one end of the spectrum, the Victorian Water Act 1989 is a relatively procedural piece of legislation. Even following recent amendments, which have improved the statutory basis for EWA, the Act still lacks a clear substantive standard for EWA linked to processes to re-allocate water to achieve that standard.

The more recent NSW Water Management Act 2000 represents a partial use of the strong statutory framework for EWA advocated in Chapter Three. Yet, provisions which may amount to a standard for EWA are tentative and complex, and have been subsequently weakened through amendments targeted at removing any substantive environmental standard.

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3 Ibid, see especially, ss 4A, 4B(1), s 22B and C.
4 The relevant provisions of the Water Management Act 2000 (NSW) include priorities for allocating water to protect the water source and its dependent ecosystem over and above other uses of water, and duties to apply these priorities to dedicated planning processes. These were discussed in Chapter Four and include ss 5(3), 8, 9(1), and 20.
5 Legislative provision for EWA was significantly changed, and any applicable legislative standard weakened, through the Water Management Amendment Act 2004 (NSW), ss 8(1)(a), 8(2).
The new Commonwealth Water Act 2007 sits further still along the spectrum, with the strongest standards and duties for the re-allocation of water resources to sustainable levels to date. The Act establishes an allocation planning processes with clear corresponding duties to achieve an environmentally sustainable level of take. The articulation of this substantive environmental standard and its application through a dedicated planning process, results in a relatively strong statutory platform to justify a substantial re-allocation of water.

Achieving such a strong statutory position for water re-allocation at the Commonwealth level can be attributed to two particular factors: scale and timing. The State case studies have underscored the difficulties associated with achieving unilateral reduction in water available for consumptive use at a State level in the MDB context. The National Water Reform [NWR] framework set general parameters for re-allocation and relied on States to implement these within their own statutory and management frameworks. Consequently, the pace and nature of reform differed considerably between States, and advancement of contentious environmental reforms was particularly compromised. This is reflected in the varying strength of statutory provision for re-allocation to sustainable levels and generally poor progress implementing measures to address over-allocation and over-use.

The new Commonwealth regime is positioned at an institutional scale which, at least partially, overcomes such federal tensions. It also follows over a decade of minimal progress on environmental reforms and increasing evidence of their urgency. There is, therefore, arguably a broader political understanding and acceptance of the need for reform reflected in this legislation, albeit continuing contention about ways to achieve this and the acceptability of associated socio-economic impacts.

What are the implications of these legal developments in terms of supporting the achievement of more sustainable levels of water allocation?

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6 The relevant provisions of the Water Act 2007 (Cth) were discussed in Chapter Six and include ss 3, 20, 21(2)(a) and (b), 22(1), 22(3)(b) and (c).

Prima facie, given the centrality of law and legal change to creating and sustaining institutions for sustainability, the poor progress on water re-allocation achieved through both State statutory regimes does support the argument that a strong purposeful legal framework for EWA is a critical component of a governance model for effective EWA. In this respect, there is considerably more potential to achieve substantial re-allocation towards more sustainable levels under the new federal scheme.

Yet, given the range of institutional factors influencing reform progress, comparing these different approaches to statutory design in terms of environmental outcomes in practice is a complex task. For example, in the context of a highly contested resource re-allocation, it would be naïve to expect an ambitious statutory environmental standard for resource re-allocation to be achieved through statutory planning processes without also providing appropriate adjustment mechanisms to manage socio-economic impacts. Similarly, a direct comparison of environmental water outcomes achieved through the NSW and Victorian regimes would be somewhat meaningless given the gaps between law on the books and law in practice, particularly in the NSW context where promising statutory priorities and duties were undermined in practice due to a lack of ongoing political will to implement fully and effectively. This underscores the value of the comprehensive analytical framework used throughout the thesis, with its broad coverage of law, policy and practice.

For this reason, the discussion now considers the legal settings described above, in light of the experience of implementing the statutory allocation planning processes conducted under them. This allows a more contextual consideration of how legislation, in conjunction with a range of other factors in process design and conduct, has influenced progress on re-allocation. In many ways, this discussion centres on establishing the institutional capacity to realise effective water re-allocation processes. As the analytical framework of Chapter Three has identified, there is an important role for legislation in this endeavour.
B Design and Conduct of Processes to Re-allocate Water

Three broad phases can be discerned in the exploration in the thesis of processes used to allocate water between competing users in the MDB. First, State-based statutory allocation planning processes were conducted, under the umbrella of NWR, to provide for environmental water needs and introduce a range of reforms to secure consumptive water entitlements and establish a water market.\(^8\) Environmental outcomes have been minimal. Second, a range of market-based adjustment programs have been introduced.\(^9\) However, the extent of their contribution to achieving a sustainable allocation balance in a timely and efficient manner, particularly given the lack of clear regulatory parameters to guide their application, is questionable. Third, the new federal regime has introduced another round of allocation planning applicable to the Basin as a whole with tight statutory parameters addressed to environmental outcomes.\(^{10}\) Key characteristics in the design and conduct of these processes to re-allocate water which have influenced, or are likely to influence, resulting environmental outcomes are identified here.

\(^8\) The processes referred to here are water sharing planning under the *Water Management Act 2000* (NSW) and Bulk Entitlement conversion under the *Water Act 1989* (Vic). The Victorian legislation was introduced some years prior to the first articulation of NWR in 1994. It has subsequently introduced further planning processes, but as discussion in Chapter Five has demonstrated, these are not used as direct water allocation planning processes for regulated rivers.

\(^9\) Again, this is not a clear cut phase, in that such programs were operating prior to the finalisation of water allocation plans, and many are ongoing. However from 2004, there has arguably been concerted effort to address environmental water recovery in this fashion. For example,

- The Living Murray water recovery project – see Council of Australian Governments, *Intergovernmental Agreement on Addressing Water Over-allocation and Achieving Environmental Objectives in the Murray Darling Basin* (2004);

\(^{10}\) *Water Act 2007* (Cth), Part 2.
1 Phase One: State Water Allocation Planning

The case studies of Chapters Four and Five explored the experience of water allocation planning processes conducted under State legislation. A number of flaws in process design and conduct, which have contributed to poor environmental outcomes, were identified.

First, there was a distinct lack of overarching objectives to achieve environmentally sustainable water allocation and corresponding substantive targets for re-allocation. The limited use of legislation to establish substantive parameters for allocation planning processes at a State level was discussed above. Similarly, policy guidance on re-allocation has been weak. For example, NSW legislation did provide specifically for the development of detailed policy to guide statutory planning processes. Yet, in practice, this approach was poorly implemented, with considerable delays experienced in developing policy guidelines and reluctance to set and implement substantive parameters for key decision-making functions around EWA. A comparison can be drawn with allocation planning processes conducted in some NSW catchments, such as the Gywidr, prior to the introduction of the Water Management Act 2000 (NSW). In these processes a re-allocation target of 10% was used to structure negotiations and commensurate environmental outcomes were achieved. The later statutory process failed to improve considerably on these original outcomes. There is arguably now supporting science available to set far more sophisticated targets for re-allocation and associated management objectives. Yet, this experience in itself underscores the importance of a clear expression of targeted environmental outcomes for water allocation processes in law and policy.

Second, the timing of these processes and the integration of environmental objectives, relative to corresponding reforms for consumptive users, has meant that they have not been well positioned to realise environmental outcomes. In Victoria, the staged

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approach to water re-allocation ensured that existing consumptive use rights were entrenched via initial allocation planning processes and any re-allocation of the resource to achieve a more sustainable allocation balance was postponed to subsequent water recovery and review processes.\textsuperscript{13} The NSW process offered considerably more potential to achieve a level of re-allocation in conjunction with realising consumptive use reforms, as environmental reform goals were integrated, at a statutory level, into a planning process that would also deliver increased security and flexibility for water users and the establishment of a water market.\textsuperscript{14} There was, therefore, an opportunity to make the realisation of consumptive reform goals contingent on a certain level of environmental outcome. However, in end effect, the process did not substantially improve on the status quo of resource allocation. This can be attributed to the design and conduct of the planning process, particularly the failure to provide targets to guide re-allocation. Such experience supports the argument for targeted process design to support environmental outcomes.

Third, the extent and nature of public participation employed in planning processes is particularly relevant to establishing institutional capacity to undertake the required re-allocation, and has been a significant determinant of environmental outcomes.\textsuperscript{15} In Chapter Three, it was argued that it is difficult to realise significant environmental outcomes using a participatory planning approach to develop substantive policy (in this case levels of re-allocation to the environment) in a highly contested resource re-allocation where entrenched socio-economic interests support the preservation of the status quo. A certain level of participation is important to ensure the process delivers outcomes that are effective and relevant in a practical management context. Yet,

\begin{itemize}
\item \textsuperscript{13} This overarching policy position and related legislative processes are discussed in Chapter Five, and reflected, for example, in Victorian Government Department of Sustainability and Environment, \textit{Securing our Water Future Together: Victorian Government White Paper} (2004), 18, 44; Victorian Department of Sustainability and Environment, \textit{Sustainable Water Strategy: Central Region - Draft for Community Comment} (2006), 45; and Victorian Department of Sustainability and Environment, \textit{Sustainable Water Strategy: Northern Region - Draft for Community Comment} (2008), 70.
\item \textsuperscript{14} Mark Hamstead and Jan Gill, \textit{Implementing the Water Management Act 2000} (2004), 1.
\item Consumptive use reforms were effectively contingent on the finalisation of a water sharing plan for a given area. The new access licensing and approvals system, to implement the NWR agenda, only comes into force once an area is covered by a water sharing plan. In areas not covered, licensing continues under the \textit{Water Act 1912} (NSW).
\item \textsuperscript{15} Both initial State allocation planning processes employed a certain level of public participation: in NSW this was provided comprehensively at a legislative level \textit{Water Management Act 2000} (NSW), Part 2; in Victoria a broader participatory approach evolved over time as a policy measure (Victorian Government Department of Conservation and Natural Resources, \textit{The Bulk Entitlement Conversion Process} (1995), 17-18).
\end{itemize}
without clear substantive guidance on desired environmental outcomes and careful attention to the design and conduct of processes to support these objectives, such processes are more likely to entrench existing unsustainable levels of allocation, than deliver environmental outcomes. This argument is broadly supported by the experience of first phase of participatory planning processes in the case studies.

For example, these planning processes were essentially styled as stakeholder negotiations between competing interests at the practical management scale. Environmental advocates were allocated a seat at the negotiating table accordingly. Yet, this approach failed to address the power and influence variables embedded in a resource re-allocation of this nature where established socioeconomic interests stand to suffer considerably from any resulting reduction in water available for consumptive use. The failure to achieve significant environmental outcomes through these processes demonstrated that, if a participatory approach to planning is to be employed, it must be purposeful and structured to achieving environmental outcomes. Important characteristics of such a process include a clear expression of environmental reform objectives, and access to the time, resources and skills necessary to conduct a complex and contentious negotiation.

Finally, one of the most significant influences on progress on re-allocation has been the availability of linked adjustment mechanisms. Both State processes were considerably limited by a lack of targeted adjustment to manage the socio-economic impacts of potential water re-allocation. In hindsight, assuming that stakeholder committees at a local scale could negotiate major reductions in water available for consumption without some form of targeted adjustment and very clear process parameters has been a major flaw in the first phase of allocation planning.16

This experience of statutory water planning at the State level highlights the central strategic and structuring function of law in establishing processes capable of delivering environmental outcomes. In both cases, legislation could have been used more effectively to set process parameters, particularly clear objectives and targets for

re-allocation. It could also have been used to greater effect to establish more targeted institutional capacity to support desired outcomes, in this case more purposeful and structured public participation in planning. However, these findings also illustrate how issues of process design and conduct are highly influential in determining outcomes. Key issues here include the timely provision of policy guidance and key information resources to the process, and the availability of accompanying adjustment mechanisms.

2 Phase Two: Market-based Mechanisms

After the completion of first phase planning processes, buy-back of water entitlements from willing sellers and investment in irrigation infrastructure projects to deliver water savings to the environment have been embraced as a response to failed regulatory planning.

This thesis has raised a number of concerns about the potential contribution of this approach to achieving a sustainable allocation balance. For example, the mechanisms employed to date have been quite limited, tending to reflect the most politically tenable options rather than the most effective or efficient. There has been a heavy reliance on infrastructure projects to deliver savings, despite the expense and high levels of uncertainty regarding the magnitude of savings in light of climate scenarios. Recent experience with the Food-bowl modernization project in northern Victoria has illustrated difficulties in estimating and guaranteeing savings in such a context.

The focus on staged buy-back of entitlements from willing sellers is also increasingly proving to be a narrow response, where a more nuanced strategy would more effectively deliver environmental outcomes. This experience highlights a need for more sophisticated market mechanisms; or, indeed, in some situations, the relatively

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19 For more detail, see discussion in Chapter Six.
20 For example, options contracts to purchase a certain type of flood event in certain circumstances. These issues were discussed at the Environmental Water Allocation Forum, Canberra, ACT, 28-29
blunt, but swift and effective approach of decreasing consumptive entitlement across
the board and accompanying this with ‘just terms’ payments to affected water users.\textsuperscript{21}

In this light, it is inappropriate to view market-based mechanisms as a direct
alternative to allocation planning or indeed a response to failed regulatory planning.
First, the flaws in process design and conduct of the first phase of planning,
particularly the failure by the States to set clear substantive parameters for
environmental outcomes though policy and legislation, and accompany planning with
appropriate adjustment processes to achieve such outcomes, mean that these processes
do not provide a template for such comparison. Second, it is increasingly evident that
market-based mechanisms will contribute more effectively and efficiently when cast
as tools of adjustment within a regulatory framework that has set targets and
objectives for re-allocation through planning processes. Within such a framework, the
selection and application of available tools can be tailored specifically to achieving
desired outcomes.

3 Phase Three: The Promise of a New Federal Regime

The new federal water legislation has instituted a clear substantive statutory standard
for EWA - a critical ingredient to a strong purposeful governance model. Yet realizing
the potential of the new regime will depend on establishing the institutional capacity
to realise this standard in practice. In this respect, full and effective implementation
relies on managing, as far as possible, the interface between different levels of
government in a federal system; careful design of implementation processes; and
targeted use of available tools of adjustment.

It is difficult to insulate processes, such as the Basin-wide planning function under the
Water Act 2007 (Cth), from the contentious politics surrounding water re-allocation in
a river basin such as the MDB. Although creating a new federal institution and setting
clear parameters for central planning functions goes a long way towards supporting

\textsuperscript{21} Such an approach is for example supported by Mike Young and Jim McColl, \textit{A Future-Proofed
fuller and more effective implementation of statutory standards, this body is ultimately responsible to a political master.\textsuperscript{22} In a situation of considerable political contention, intensified by prolonged drought and the spectre of climate change, and in light of considerable knowledge gaps and uncertainties surrounding the planning task, the likelihood of achieving ambitious diversion limits through this institutional setting is diminished. Recent comments by Clark on what he labels, “the usual features of inter-jurisdictional water compacts” are pertinent here. Clark argues that “although all parties recognize the need for a supra-jurisdictional authority, they are so niggardly in their grant of powers, and establish such negatively conceived controls, that they deny it the ability to operate effectively.”\textsuperscript{23} While different, more independent institutional models could of course be proposed, it is difficult to see how they would be supported and realised in practice. As such, the suggestions below relate more to realizing the potential of the current arrangements.

One of the main weaknesses of the new regime, which reflects the difficulties of transcending federal tensions and political resistance to reform, is the very permissive transition mechanism that delays its legal effect considerably. Full compliance with the new Sustainable Diversion Limits, set through the Basin planning process, will not be required across the Basin until 2019, or indeed 2024 if additional transitional mechanisms are employed.\textsuperscript{24} This situation underscores the importance of strengthening and hastening the delivery of the associated adjustment package and ensuring it is employed, as recommended above, in the most efficient and effective way to move towards the new Sustainable Diversion Limits that will be articulated in the Basin Plan.

In the development of the Basin Plan and its subsequent implementation through State water resource management plans, it is critical that the Commonwealth work closely and effectively with States and more local management institutions. Full and effective

\textsuperscript{22} For example, under the Water Act, the Commonwealth Minister retains ultimate veto over the setting of diversion limits. See \textit{Water Act 2007} (Cth), ss 44, 175.

\textsuperscript{23} Sandford Clark, ‘Prosper the Commonwealth? The Constitution and the Murray-Darling Basin’ (Synopsis from presentation delivered as part of the Guest Lecture Series, Melbourne University Law School, 27 October 2009), 4.

\textsuperscript{24} \textit{Water Act 2007} (Cth), s 241, Schedule 4. Relevant plans for NSW, South Australia, and Queensland are listed in Schedule 4. Specific regulations are to provide for Victorian arrangements. An additional transition period of 5-10 years may also be available, under ss 22(1), Item 7, and s 24.
implementation will rely on strong integration across the jurisdic\ntional scales.\textsuperscript{25} For example, setting Sustainable Diversion Limits which reflect the statutory standard of \textit{environmentally sustainable level of take} through the Basin Plan will require considerable input from established State and local water management institutions, to both articulate key environmental assets, outcomes, and ecosystem functions and their water requirements,\textsuperscript{26} and then translate these requirements to a set of legal mechanisms (rules and entitlements for EWA) that provides managers with the capacity to achieve environmental outcomes in practice. Some of this work, particularly the articulation of key assets, outcomes and functions and their water requirements, may be coordinated centrally through the Basin Planning process. Yet, given tight timeframes and the complexity and scale of the planning task, subsequent refinement through implementation processes may be required. Attention should be given to establishing processes at a local management scale to ensure the new diversion limits are expressed through legal mechanisms and management arrangements for EWA in a way that is relevant and effective in the practical management context.

\textbf{C Key Elements of a Governance Model}

Two central recommendations for a governance model for effective EWA can be discerned from this analysis:

**Recommendation One:** A clear, substantive statutory standard directed to achieving ecologically sustainable water allocation is fundamental.

This should be given as much specificity as possible to enhance implementation and also eventual enforceability. However, the extent to which it is feasible and desirable


\textsuperscript{26} The legislative standard of environmentally sustainable level of take is defined with reference to these environmental attributes. See discussion in Chapter Six, and \textit{Water Act 2007} (Cth), s4.
to translate overarching standards to more tangible, quantifiable targets for re-allocation and corresponding management objectives through legislation is questionable. Provision for a secondary process to this effect may be required. The federal Basin planning process discussed in Chapter Six provides an example. This is particularly the case if the different situations in different rivers, especially differing socio-economic impacts associated with re-allocation, are to be taken into account. For example, some highly developed rivers may be maintained as working rivers, with less provision for EWA; others should be restored and protected within the landscape as key biodiversity resources and may, therefore, be subject to higher standards and targets. It is recommended, therefore, that the statutory standard be expressed to include the scope to arrive at different re-allocation targets for different rivers, yet aim overall for sustainability outcomes at a broader landscape scale.

The new Commonwealth standard of an *environmentally sustainable level of take*, defined with reference to key ecosystem assets, functions and outcomes and the productive base of the resource,²⁷ arguably provides a template for such a standard. Further refinement of the points of reference within this standard can be contemplated when there has been a chance to consider its implementation.

**Recommendation Two:** Statutory processes addressing re-allocation should be designed to support the achievement of the statutory standard for ecologically sustainable water allocation.

This necessitates substantive duties and clear allocation of responsibility to achieve the standard through dedicated processes. Legislation also has a role to play in developing the institutional capacity that will best support effective implementation. For example, it can be used to structure a participatory process at the local management scale so that it best supports the realisation of re-allocation targets; or, if more appropriate in the circumstances, establish a more centralised planning process. It could also be used to structure targeted adjustment measures to accompany planning and realise desired re-allocation outcomes.

The most appropriate strategy for process design will depend on the nature and scale of the resource allocation issues and a range of contributing institutional factors. For example, in the MDB, progress on environmental reforms at a State level has been inadequate; reforms supporting consumptive use have been largely entrenched; and environmental condition is increasingly threatened. In this context, strengthening institutional capacity for water allocation planning at an institutional scale that covers the whole Basin is critical. However full and effective implementation of both the central planning and the subsequent accreditation of State water resource management plans under the Basin Plan demands strong integration across State and local management institutions. Given the very permissive timeframes for implementation of the new sustainable diversion limits, progressing re-allocation in practice also depends on carefully linking existing adjustment measures to planning parameters, and ensuring these evolve to target the most effective and efficient tools available.
An ecologically sustainable water allocation balance must be supported by legal settings which provide specifically for the realisation of the environmental component of this balance. Targeted, enforceable legal mechanisms designed to facilitate effective environmental outcomes and protect environmental water, and supporting measures in the broader regulatory framework, are the necessary mechanics to deliver an overarching standard of *environmentally sustainable level of take* in practice.

This aspect of environmental water governance was covered by Element Three of the analytical framework, which argued that the design, selection and application of legal mechanisms for EWA; corresponding regulation of consumptive use; and prevailing management practices are all strong determinants of environmental outcomes and levels of protection for environmental water.

These arguments have been clearly substantiated by the empirical investigation in the case studies of how mechanisms for EWA are implemented in practice. Specifically, this work has highlighted the often considerable gaps between apparent legal status for environmental water and *practical management status*. The predominant legal mechanisms for EWA, as currently situated within broader legal settings and practices of water management, provide neither adequate protection nor the required management flexibility to achieve effective environmental outcomes in a practical management context. This is further undermined by difficulties in achieving comprehensive regulatory coverage of all forms of water harvesting including interception. These findings suggest there is considerable scope to refine and strengthen statutory provision in this area to achieve a stronger governance regime for environmental water.

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28 This concept has been developed throughout the thesis within Element Three of the Analytical Framework to consider the potential difficulties in applying instruments of EWA in a practical management context so as to deliver effective environmental outcomes.
Refining Legal Mechanisms for Environmental Water

The application of legal mechanisms currently available to facilitate EWA was illustrated in both case studies. This demonstrated a need for more targeted, enforceable legal mechanisms which will contribute to establishing institutional capacity to manage rivers for effective environmental outcomes, and stronger legal and policy guidance on their application.

At a basic level, it is critical to achieve legal recognition and protection for all environmental water. Much so-called environmental water is still not formally accounted for by the allocation system and characterised as unallocated water, above long-term extraction limits set through the MDB Cap and subsequent State water allocation plans. Yet, under reduced water availability scenarios of drought and climate change, because this water is not formally recognised through rules or entitlements, it simply ceases to exist. Difficulties encountered in effectively regulating interception activities, such as catchment farms dams, add considerably to this pressure on unallocated water by reducing system inflows.

In this context, using long-term averages, as a mechanism to provide for EWA, does not protect remaining environmental water effectively. This mechanism is also significantly limited in its potential to address environmental management imperatives, such as temporal and spatial variability within natural flow regimes. As such, long-term extraction limits must be supported by a clear specification of the environmental water component via direct legal mechanisms which facilitate the delivery of desired environmental outcomes.

There are two direct legal mechanisms which have been used to varying degrees in practice to achieve this legal status and deliver environmental water outcomes: rules-based environmental water (often referred to as passing flows); and volumetric entitlements.

For example, in northern Victoria it is estimated that only 4% of the total Environmental Water Reserve is composed of volumetric entitlements, with the remainder composed of passing flows and unallocated water. See Victorian Department of Sustainability and Environment, Sustainable Water Strategy, Northern Region - Discussion Paper (2008), 29, 57.

The issues associated with more effectively regulating interception activities, including opportunistic harvesting of overland flows, have been discussed in more detail in both Chapters Four and Five.
Rules-based environmental water as a mechanism has much potential to establish a certain level of EWA with a high legal status. Passing flows can be defined in legal instruments of water allocation as the first allocation priority, with water required to deliver such flows generally set aside before any further allocation to other entitlements. Consequently, such environmental water is considerably less vulnerable to changing water availability than EWA facilitated through other legal mechanisms.

Yet, this mechanism has not been effectively applied to respond to environmental reform objectives to date. For example, the passing flow rules of the Loddon Bulk Entitlement, considered in Chapter Five, only implemented scientific recommendations to reinstate important components of the natural flow regime to the extent that they did not impact substantially on consumptive use. Further extensive restrictions on the delivery of this environmental water were used to protect the reliability of consumptive entitlements. Environmental water managers also identified the lack of management flexibility within this mechanism as a serious constraint to responding to changing water availability and environmental priorities in an adaptive management framework. This experience suggests that this mechanism could be tailored to better achieve environmental outcomes by enhancing its management flexibility and by providing stronger direction on its application through relevant allocation planning processes.

The trend towards allocating environmental water as a volumetric entitlement responds to the concerns raised above about better tailoring legal instruments to achieving environmental outcomes. Such entitlements have considerable management flexibility, particularly when defined to also include storage carry-over potential to allow managers to build up sufficient volumes to deliver a timely watering event of appropriate magnitude; or specific delivery rights, in the situation where environmental water delivery requires use of irrigation channels and infrastructure.

Yet, volumetric entitlements are vulnerable to changing water availability. In situations of reduced water availability (under climate scenarios and accentuated by interception pressures), lower security entitlements will be of little practical value to environmental water managers due to the low levels of allocation against the
entitlement. The recent creation of a low security environmental entitlement in northern Victoria is illustrative: it is estimated that under a continuation of recent climatic conditions, this water will only be available in two of every 100 years.\textsuperscript{31} This experience also underscores the importance of providing clearer statutory guidance on the application of this mechanism for EWA through relevant statutory processes. Within the environmental component of the allocation balance, it is important to target a range of different levels of water security and ensure entitlements have appropriate characteristics, such as carry-over potential, which add management flexibility.

Additionally, both case studies have demonstrated how the formal legal status of volumetric environmental entitlements may be undermined by the practical management context of EWA. For example, in the Loddon and Gwydir rivers, delivery of volumetric entitlements for identified objectives is significantly constrained by the infrastructure design of the regulated river system and the way it is used to deliver water for consumptive uses. Overcoming these constraints involves expensive infrastructure improvements and more creative and flexible management of consumptive water delivery to support environmental outcomes. A clear expression of the status of environmental water and rules for its delivery, combined with reform of management frameworks for environmental water considered in the next section, will help to improve the \textit{practical management status} of such environmental water.

This experience of applying these existing legal mechanisms for EWA suggests that overarching legal settings can be used, to more effect, to provide targeted enforceable legal mechanisms that will contribute to effective environmental outcomes; and to guide their application to ensure they are used to realise the desired environmental protection standard.

Statutory provision for the mechanics of EWA in this way has been fairly minimal. State water legislation has generally listed the types of mechanisms that can be used for EWA, with little direction as to the most appropriate or effective mechanisms for these purposes, or their application. These definitions include mechanisms, such as

long-term extraction limits, which arguably convey little protection and status to the environmental water so dedicated, if not accompanied by other targeted measures.32

The approach taken in the new federal water legislation is to maintain State entitlement systems and provide some direction on their application. There is no express provision to ensure targeted and adequate legal provision for environmental water. There is some potential, however, to use the mechanisms of the Sustainable Diversion Limit and the Environmental Watering Plan to this purpose. Early indication of the approach to be taken to these functions is promising. For example, in a recent discussion paper, the Murray-Darling Basin Authority proposes articulating diversion limits in a way that ensures responsiveness to natural variability and changing climate, and so as to facilitate the delivery of environmental watering requirements to meet the statutory standard of an *environmentally sustainable level of take.*33 There is also some limited recognition of the need to indicate the mix of legal mechanisms (rules-based environmental water and volumetric entitlements) that should be used to facilitate environmental outcomes so as to realise this statutory standard.34 The Environmental Watering Plan, under the Basin Plan, also has the potential to influence such provision. Yet, given the lack of statutory guidance on this issue at a State level, more targeted use of statutory mechanisms at the federal level could have contributed to stronger governance in this area.

**B Supporting Measures in the Broader Regulatory Framework**

In terms of corresponding measures in the broader regulatory framework for water allocation and management to protect environmental water, three key issues of particular importance to environmental water governance are raised below.

32 For example, the relatively recent amendments to the *Water Act 1989* (Vic) introduced a comprehensive definition of the Environmental Water Reserve (ss 4A and 4B), positioned as a mechanism to guarantee appropriate status for environmental water. Yet this has again defined environmental water procedurally with a list of legal mechanisms that can be used to facilitate EWA, and little direction on their application.


34 Ibid, 40.
First, both case studies have illustrated the difficulties encountered in broadening and tightening the regulatory framework for water allocation to effectively cover interception activities, such as floodplain harvesting, catchment farm dams and land use change. Attempts, at a State level, to account for this water use within limits set by previous allocation processes have progressed very slowly and have been constrained by the nature of these activities and political resistance to their increased regulation.

The central legal mechanism to regulate consumptive use and provide for environmental water requirements under the new Commonwealth regime is the Sustainable Diversion Limit. An important characteristic of this mechanism is that it links the environmental standard for setting the limit to a very broad definition of water extraction including interception activities, thereby recognising the importance of comprehensive water regulation to achieving effective sustainable diversion limits. Applying extraction limits and environmental standards in such a broad fashion is valuable in strengthening environmental water governance in this area and will, hopefully, contribute to the development of more effective processes to account for and regulate interception activities.

Second, an important consideration for the protection of environmental water is the breadth of statutory discretion to qualify rights in situations of severe water shortage, intended to ensure the provision of water for critical human needs. Both NSW and Victorian legislation do not effectively limit these powers in any way. In practice, over the last few years of prolonged drought in the southern MDB, they have been exercised to the considerable detriment of environmental water. In the face of continuing drought and climate change scenarios, the new federal regime also introduces provisions to prioritise water for critical human needs over and above all other uses. The approach differs from the State regimes in at least providing a more transparent definition and accompanying process for its application. Yet, the definition of critical human needs is narrow and focuses on short term human needs.

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35 The concept of “take” is defined very broadly to include all forms of water harvesting and extraction, including interception. See Water Act 2007 (Cth), s 4.
36 Water Management Act 2000 (NSW), s49A; Water Act 1989 (Vic), s 33AAA.
37 Water Act 2007 (Cth), Part 2A.
38 Ibid, especially ss 86A – 86C.
It is unclear how this priority will interact with the statutory standard of *environmentally sustainable level of take* and water set aside under the diversion limit to meet this standard. Yet, it appears that water required for critical human needs will override environmental water provision in times of critical water shortage.

At a basic level, such a prioritisation is not disputed. However, the process of its application must ensure that environmental water, set aside to meet the standard of *environmentally sustainable level of take*, is protected as far as possible over the longer term, particularly given the likelihood of increasing incidence of drought under climate change. This could, for example, be supported by rules of law constraining decision-making regarding the application of such a priority, so as to ensure that the decision-maker considers and provides for long-term ecological viability consistent with the statutory standard of *environmentally sustainable level of take*. This could result in some critical ecosystem needs being prioritised in times of water shortage as well to ensure overall ecosystem resilience.

Given all consumptive water use relies in the longer term on a healthy functioning ecosystem, it is also worth considering alternative approaches to balancing critical human and critical ecosystem needs. One option would be to provide for differentiated status for different categories of environmental water. Within this, a *first cut* of the resource could be articulated so as to broaden the concept of first priority water to also include a basic ecosystem function component. Defining such a *first cut* would of course raise difficult value judgments and trade-offs. Such a process could, however, be appropriately incorporated into water allocation planning processes. The recent Victorian approach to categorising river health outcomes could be adapted to this purpose.\(^{39}\) This approach categorises environmental water outcomes according to different water allocation scenarios: the lowest category providing only enough water to protect drought refuges, and the highest providing for full delivery of environmental flows, representing not a pristine, but an ecologically healthy condition. Water judged essential for maintaining basic water quality and such key assets as drought refuges and critical populations may classify within the first cut of the resource to be prioritised with critical human needs in water allocation decisions.

\(^{39}\) Victorian Department of Sustainability and Environment, *Sustainable Water Strategy: Northern Region - Draft for Community Comment* (2008), 96.
Remaining environmental water would have more similar legal status to consumptive use entitlements and offer opportunities for opportunistic use depending on water availability.

Finally, provision to maintain an allocation of environmental water, and consider its ongoing effectiveness over time, particularly in the context of changing water availability under climate change, is another important protection mechanism for environmental water that could be more effectively covered in legislation. The State and federal regimes all provide for a regular review of the water allocation balance. However, the Victorian provision for a fifteen-year review is arguably superior in its explicit terms of reference which cover not only the proportional distribution of available water between competing users, but also seek to protect the ecological effectiveness of this distribution over time, and link this process to related duties to re-allocate the resource to maintain the desired allocation balance.40

C Key Elements of a Governance Model

A governance model for effective EWA must achieve appropriate status and protection for environmental water and support effective environmental outcomes. The following statutory mechanisms within a governance framework are recommended to this purpose.

**Recommendation Three:** The legal standard in Recommendation One, directed to achieving ecologically sustainable water allocation, must be linked to supporting standards for the environmental component of the water allocation balance. This should establish the status of environmental water within the allocation balance. It should also provide a definition of environmental water which ensures the availability of legal mechanisms which are enforceable and which will contribute to environmental outcomes in practice. Statutory guidance on the application of these instruments through relevant processes, such as water allocation planning, is also important.

40 See Water Act 1989 (Vic), ss 22K-22L.
As such, the legal standard for water allocation – an *environmentally sustainable level of take* – is conceptualised not only with reference to the level of permissible consumptive use, but also to substantive concepts surrounding the environmental component of the resource. To further articulate this recommendation it is helpful to borrow concepts and terminology from both the Victorian and Commonwealth legislation. For example, the *environmental water reserve*\(^{41}\) must be established to reflect an *environmentally sustainable level of take*,\(^ {42}\) through provision of sufficient volumes or a proportion of the resource to the environment, and its protection via legal mechanisms which are enforceable and which support desired environmental outcomes.

In terms of guiding the application of these mechanisms in water allocation planning processes, it may be appropriate to establish differentiated status for different levels of environmental water. Legislation could specify that the volumes of water necessary to maintain critical ecosystem health be supplied through secure rules-based passing flows (together with that water required for critical human needs) as a *first cut* of the resource. Some provision for enhanced management flexibility within this rules-based water may be warranted.

The remainder could be expressed as volumetric entitlements to ensure this environmental water does not suffer disproportionately in situations of scarcity and to add important management flexibility. *Prima Facie*, this second element would be of similar status to entitlements held by consumptive users. Yet, the application of this instrument should be further refined so that it more effectively supports targeted environmental outcomes and overcomes existing gaps between formal legal status and *practical management status*. Thus, the statutory definition of the environmental component could mandate a range of different levels of security within the environmental share and include provision for carry-over rules and delivery rights as

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\(^{41}\) The *Water Act 1989* (Vic) creates an Environmental Water Reserve, composed of all forms of environmental water (s 4A).

\(^{42}\) The *Water Act 2007* (Cth) employs this legislative standard for the articulation of Sustainable Diversion Limits. This is achieved through the legislative objectives (s 3(d)(i)); the purpose Statement for the Basin Plan (s 20(b)); the list of mandatory content for the Basin Plan (s 22(1) Item 4(c) and 6); and the requirements for State water resource plans (s 22(3)(b) and (c)).
appropriate. Together, the water allocated through these two instruments must achieve the overarching legal standard of an *environmentally sustainable level of take*.

**Recommendation Four:** The above standard should be defined to limit all forms of water harvesting, including interception activities.

The new Commonwealth water legislation provides a good template in its broad definition of the water extraction activities that must be encompassed by the mechanism of the Sustainable Diversion Limit, to which the environmental standard of *environmentally sustainable level of take* applies.

**Recommendation Five:** The above standard and accompanying definition of the environmental reserve should be supported by specific rules of law to guide and constrain decision-making relevant to maintaining appropriate status and protection for environmental water.

For example, if an overriding priority is to be maintained for water necessary for critical human needs, it is important to consider limiting the application of this priority to ensure that critical ecosystem needs are appropriately protected, and the achievement of the overarching statutory standard is not compromised in the long term. Rules of law constraining decision-making regarding the application of such a priority could ensure that relevant decision-makers consider and provide for long-term ecological viability in the exercise of this power.

Similarly, positive provision for regular review of the allocation balance and its ecological effectiveness over time, supported by associated duties and statutory processes to adjust this balance accordingly, is critical.
Managing regulated rivers for environmental outcomes represents major changes to the way water has been managed to date, and introduces management imperatives that are often at odds with the demands of consumptive water use. This necessitates quite fundamental changes to the institutions of river management.

The analytical framework explored the key functions and capacities crucial to an adaptive approach to river management that delivers environmental outcomes in practice; and the distribution of roles, responsibilities and institutional capacity that would best deliver such an approach.

The findings of the thesis in this area emphasise the importance of such institutional arrangements for river management in determining environmental outcomes of EWA. Although institutional arrangements have evolved greatly since the introduction of NWR and continue to do so, there is still considerable scope to further develop these arrangements to better support effective EWA. Legislation is an ideal vehicle to support a transition to more dedicated environmental water management arrangements. It provides a structure within which to clearly articulate roles and responsibilities with respect to key management processes, and also mechanisms such as duties and rules of law to implement relevant constraints on decision-making functions. Legislation can also situate environmental water managers within the institutional framework so that they have the required independence and authority to influence river management so as to support environmental outcomes.

A Institutionalising Key Adaptive Management Functions

An adaptive management approach to EWA requires monitoring and reporting on compliance with environmental water rules and delivery of environmental entitlements, and also the effectiveness of environmental water provision over the long term. This must be combined with opportunities to use this information to adjust the allocation balance between environmental and consumptive uses, or alter
management interventions. The way these functions have been approached in the three jurisdictions is incomplete.

For example, the State-based regimes have generally provided for monitoring and reporting functions in broad terms, or left detail to be determined in subordinate statutory instruments, such as water allocation plans. In both State case studies, after initial investment in planning processes to negotiate EWA, these ongoing functions have suffered from a lack of resources and a clear allocation of responsibility which promotes transparency and accountability.

For example, in both NSW and Victoria, compliance monitoring on the delivery of rules-based environmental water is conducted largely internally by the water authorities responsible for delivering these rules, with some oversight by regulators and very limited public reporting. While compliance with such rules may not be a pressing concern in most instances, the Gwydir case study does illustrate a situation where environmental water provided on a rules-basis may be very difficult to distinguish from water available to supplementary water extraction by consumptive users during high flow events, and where compliance during such events is generally problematic. This suggests that greater independent oversight of compliance is warranted.

Monitoring and reporting on the delivery of volumetric environmental entitlements has been more comprehensive. This is partly attributable to the nature of these entitlements, particularly their management flexibility, which allows a more adaptive approach, and also the more targeted management arrangements which have evolved for their delivery. Having dedicated environmental water managers in place has contributed to significant improvements in this area. Yet, resources for effective monitoring are generally lacking. For example, monitoring delivery of water to the Gwydir wetlands is impeded by a lack of monitoring gauges and staff capacity to ensure gauges are appropriately maintained and sited during a flow event.43

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43 Such resource constraints have been discussed in more detail in Chapter Four.
Monitoring the *effectiveness* of EWA management interventions to feed back into short term management planning and longer term review of the allocation balance involves a longer term commitment of considerable resources. There are such programs operating in both States, yet this is generally an area where resources are stretched and programs are, therefore, compromised in their coverage and conduct.

These are all issues which could be potentially improved through clearer description of key functions and designation of responsibility in legislation; an express statement of the importance of these functions to an adaptive management approach; and a clear application of the information generated through monitoring and reporting in processes of management planning and review. Such provision must, of course, be supported by a greater direction of resources to such functions.

The new Commonwealth regime seeks to raise standards for monitoring and reporting through increased federal oversight and coordination. As with much of the new regime, this adds another layer of standards to be met, increases potential scrutiny of State activities in these areas, and may attract additional resources for programs conducted at the practical management scale. The regime also introduces a targeted statutory planning process for adaptive management of environmental water throughout the Basin. The development of annual environmental watering schedules under an overarching Environmental Watering Plan provides a dedicated process to implement an adaptive management approach from year to year, and monitor the delivery and effectiveness of EWA across the MDB. These are very important developments in strengthening the adaptive management framework. Linking monitoring and reporting more clearly through legislation to processes which review

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45 For example, Jane Doolan (Victorian Department of Sustainability and Environment), ‘State Government example of how a water plan is achieving environmental outcomes,’ (Presentation delivered at the Environmental Water Allocation Forum, National Museum of Australia, ACT, 28-29 May 2009).

46 *Water Act 2007* (Cth), ss 28 – 32. The case studies have illustrated how such approaches were also evolving through committee management arrangements at the local management scale. These were however limited to specific volumetric entitlements.
the effectiveness of EWA - in this case the adequacy of the Sustainable Diversion Limit – over time, would further strengthen the new governance framework.

B The Role of Environmental Water Manager

The case studies have illustrated how the new management imperatives that accompany EWA have largely been added to the brief of existing management institutions. Water authorities, with their commercial imperative to maximise consumptive use of water, continue to dominate the institutional framework in terms of roles, responsibilities and capacities for managing rivers with EWA. Legislation has not been employed to establish the role of environmental water manager.

Water authorities deliver, monitor, report on, and, in some cases, also play the regulatory oversight role, for rules-based environmental water. In many cases, considerable discretion remains with water authorities in the implementation of such rules. More dedicated environmental water management arrangements are evolving where volumetric entitlements are in place: from stakeholder/expert committees at the local management scale, to the recent introduction of an independent Commonwealth statutory body to manage environmental water holdings. Yet, even such environmental water managers are positioned within the institutional framework as another water user, subordinate in many ways to water authorities who balance competing demands of consumptive and environmental water users on a day-to-day basis. Their influence on the management decision-making undertaken by water authorities is limited to advising on or requesting environmental water delivery.

This situation does not necessarily support effective EWA. The case studies have illustrated situations where environmental and consumptive demands on the system conflict and highlighted that water authorities are potentially more likely to preference

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47 For example, the rules-based environmental water provided through the Gwydir water sharing plan, as discussed in Chapter Four. See NSW Government Department of Infrastructure Planning and Natural Resources, Water Sharing Plan for the Gwydir Regulated River Source (2004), cl 14, 48. Additionally, at a general level, water authorities have considerable discretion with respect to decision-making about how much water to keep in storage for later delivery of such rules, and how much to make available for allocation to entitlements and other uses.

48 For example, the Gwydir ECA Operations Advisory Committee is discussed in Chapter Four, and the Loddon Environmental Water Advisory Group is discussed in Chapter Five.

49 Water Act 2007 (Cth), s 104.
consumptive water users in such situations. Without a clear mandate to manage for environmental outcomes and considerable environmental expertise within water authorities, or requirements to work closely with environmental water managers, opportunities to manage the delivery of consumptive water in ways which promote more effective environmental outcomes are unlikely to be realised. Merely relying on establishing good working relationships between environmental water managers and water authorities, as is arguably occurring at a local management scale where volumetric entitlements are in place, may not be enough to overcome this imbalance across the board.

The new Commonwealth Environmental Water Holder and the proposed independent statutory environmental water manager in northern Victoria\textsuperscript{50} are major advances in establishing the required expertise, and channeling resources to facilitate effective EWA. Yet, there are a number of ways in which these developments could be enhanced to institutionalise a more appropriate allocation of roles, responsibilities and capacities for river management.

First, although the influence of the Commonwealth Environmental Water Holder over managing rivers with EWA will increase with time as environmental water holdings increase through targeted water recovery, the new statutory role continues to be positioned as another water user within the system, subordinate to the role currently played by water authorities. The responsibility of water authorities to support environmental outcomes can be increased by tightening rules around environmental water delivery, more clearly expressing the status of different types of environmental water relative to competing entitlements as outlined in the above recommendations, and requiring more environmental expertise within these organisations. Yet, there may also be a place for more fundamental institutional reform.

For example, a more neutral river management authority could be instituted at the scale of current water authorities. Such a body would have a mandate to manage rivers for both consumptive and environmental outcomes, and could be supported by dedicated, yet subordinate, consumptive and environmental water managers to advise

\textsuperscript{50} Victorian Department of Sustainability and Environment (2008), above n 13, 138-9.
them in this role. A more neutral overarching river manager would complement mooted improvements in other key areas of the governance framework. For example, providing for management flexibility in rules-based environmental water relies on having an environmental water manager in place with both the capacity and the authority to influence its management according to prevailing conditions. If first priority critical water was defined to include both a human and environmental component, or if the application of the critical human needs priority was required to consider long term ecosystem viability (recommendations 3 and 5), consumptive and environmental water managers would need to work closely together to ensure complementary management. At a broader level, boosting the role of an environmental water manager within the institutional framework would increase the capacity of river managers to deliver consumptive water in a fashion that supports environmental outcomes as far as possible.51

Second, it is important to situate environmental water managers at an appropriate institutional scale. Current investment in environmental water recovery is set to substantially increase Commonwealth environmental water holdings and, as a result, the Commonwealth will become a very influential player in environmental water management in the MDB. States will, however, remain responsible for the delivery of rules-based environmental water and State-held volumetric environmental water for which locally relevant management arrangements have evolved, subject to any directions achieved through the federal Basin planning process. Consequently, a layered governance framework will emerge. Coordination between the different holders of environmental water and also between different levels of management expertise will be critical to establishing effective environmental water management. It is particularly important, given the successful use of stakeholder/expert advisory management committees at a local management scale illustrated through the case studies, to maintain, value and expand on this scale of management within the evolving scheme.

There is considerable potential to consolidate current arrangements into a three-tier management framework, with Commonwealth leadership and coordination through

51 For example, using consumptive water en route for environmental purposes.
the Environmental Water Holder and the Environmental Water Planning process; environmental water managers established as independent statutory authorities at a regional level where appropriate (such as in northern Victoria) to coordinate management with the other two tiers; and broader application of local management committees combining operational, community and expert input to manage water delivery on the ground.

Legislation can be instrumental in establishing such dedicated environmental water management arrangements. It can situate and empower environmental water managers through the distribution of duty, authority and powers related to relevant river management functions.

C Key Elements of a Governance Model

This discussion has identified two additional recommendations for more effective environmental water governance:

Recommendation Six: Water management legislation must articulate key inputs to an adaptive management approach and clearly indicate how such information should be used in management processes over different time scales – from annual watering plans, to the longer term review of the effectiveness of the allocation balance.

This will give important impetus to the conduct of such functions and help to attract commensurate resources. Additionally, roles and responsibilities for these functions, and standards for their conduct, can be clearly articulated through statutory duties and rules of law.

Recommendation Seven: The role of environmental water manager must be more effectively institutionalised. This involves locating this role at the appropriate institutional scale, and ensuring competing consumptive and environmental management imperatives are appropriately balanced through processes of river management. Other recommendations in the proposed model, such as a clearer articulation of the status of environmental water and tighter rules around its delivery (Recommendation 3), may contribute to greater practical management status for
environmental water. Yet, it is also important to consider more fundamental institutional reform, such as the proposed neutral overarching water manager outlined above.
A Model of Governance for Effective Environmental Water Allocation

Legislation sets overarching Strategy and Purpose = Sustainability

Central Statutory Standard = environmentally sustainable level of take

Processes to Manage Rivers with Environmental Water
- Maintenance role of environmental water manager
ek. statutory distribution of duty

Processes to Allocate Water between Competing Users
- Clear allocation of roles and responsibilities
- Measures to build institutional capacity to realise statutory standard
ek. structured and purposeful public participation through water re-allocation targets and adjustment mechanisms

Legal Mechanisms to Facilitate and Protect Environmental Water
- Definition of environmental reserve
- Provision of legal tools to facilitate and protect environmental water

Processes to Manage Water with Environmental Water
- Statutory articulation of key inputs to adaptive management approach
- Eg. duties, roles and standards for monitoring and reporting, and planning through annual watering plans and review of allocation balance

Provision of necessary information and institutional capacity to support adaptive legal mechanisms and review of allocation balance

Distribution of roles and responsibilities supports realisation of statutory standard through legal mechanisms for environmental water

Guidance on application of legal mechanisms to realise statutory standard eg. mix of mechanisms and rules regarding application
V A Governance Model for Effective Environmental Water Allocation

The governance model presented through the recommendations in this chapter, and represented in the diagram above, involves moving beyond grafting the environment onto an existing institutional framework more suited to facilitating consumptive water use. It involves progressing from employing legal mechanisms that are not well suited to achieving environmental outcomes in practice; and from relying on an existing distribution of institutional responsibility, authority and capacity for river management that does not support broad river health outcomes.

The proposed model is designed to strengthen and hasten a shift in the underlying purpose of water governance from resource exploitation to sustainability. Given existing institutional biases, it advocates a generally tight and highly structured framework to achieve this shift. Overarching objectives and substantive standards are used to set the parameters for a range of key allocation and management functions, through a matrix of duties and rules of law. Discretion is thereby carefully guided or constrained, and distributed carefully between decision-making parties in a way that supports desired outcomes. Institutional capacity to implement these functions is also addressed by legislation, as far as possible, to provide the best chances of full and effective implementation.

Yet, rather than viewing these proposals as the imposition of a tough regulatory approach to water allocation and management, they should be seen as a re-orientation of the underlying purpose of water governance. Essentially, the recommendations shift and broaden the direction and purpose of existing elements of the regulatory framework, which have, until recently, largely focused on resource exploitation. While the model does emphasise the importance of clear, substantive statutory standards and their tight application through relevant statutory processes and decision-making; it also embraces substantial institutional flexibility in various areas (such as legal mechanisms to facilitate environmental water) provided this is accompanied and supported by appropriate reforms to the institutions of river management. Indeed, such flexibility is critical to effective environmental water governance.
Realising such a governance model for effective EWA admittedly represents a massive institutional undertaking, which will encounter considerable expense and resistance. Some reform proposals will be more acceptable than others. Some are already reflected in the trajectories of the developing law, policy and practice of EWA documented in the thesis, for example, legal standards for water allocation planning processes under Commonwealth water legislation. As well as reinforcing the significance of aspects of the proposed model, this partial implementation will provide opportunities to further explore and assess the merits of the recommendations, against the ongoing experience of water reform implementation.

As the new federal regime is gradually embedded, opportunities should also be taken to compare approaches to environmental water governance on an international scale. Legal and institutional developments to provide for environmental water needs in Europe and South Africa were noted in Chapter One. There are parallels between these approaches and some of the proposals raised in this governance model. For example, the concept of a first cut of the resource to provide for critical ecosystem and human needs is conceptualised and realised as a public right under South Africa law. Detailed comparative analysis at an international scale, taking in the experience of implementing comparable regimes, would add considerable value to the proposals of this thesis.

Finally, this thesis comes at a critical time in the water reform process in Australia, with climate change projections foreshadowing considerable additional pressures for water management in the near future; water users facing unprecedented scarcity situations; and many aquatic ecosystems spiraling into potentially irreversible decline. In this context, this model for more sustainable water governance has immediate application to an issue fundamental to the future of Australian society.

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APPENDIX A:
CASE STUDY METHODOLOGY

I OVERVIEW OF CASE STUDY RESEARCH

A Justification for use of Case Studies and Empirical Approach

The analysis in this thesis addresses the developing law, policy and practice of environmental water allocation [EWA], and applies a law in context approach.\(^1\) As such, in addition to an evaluation of legal and policy developments to provide for environmental water needs, it also considers the implementation phase of reform. This is an important contribution in a field in which there has been considerable analysis of legal and policy models,\(^2\) yet, given the currency of the reform, little chance to evaluate the practice of EWA against these models. In order to do this effectively, the two case studies were designed to include an element of empirical research. Targeted interviews and observations provided valuable qualitative data to allow informed analysis of the implementation of various aspects of environmental water reforms in their real life context.\(^3\)

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The intention of the empirical research was not to establish a large sample to gauge and compare progress on environmental water allocation. Rather, in the tradition of qualitative research, the case studies sought to explore, in a practical management context, a variety of theoretical propositions pertinent to achieving effective EWA developed in Chapter Three as an analytical framework. As such, one case study in each jurisdiction of interest was used. For each, a small number of participants for the empirical component were selected on the basis of their skills and expertise, professional responsibilities, or representative role in the planning and decision-making process. The resulting empirical data has been used throughout the thesis to supplement the legal and policy analysis and, particularly, to highlight institutional constraints to achieving effective EWA through the reform framework.

B Nature of Empirical Research

In addition to document analysis, the case study research employed two empirical techniques: semi-structured interview and direct observation.

1 Interviews

Considerable preliminary research and document analysis was used to develop interview schedules for three key groups of participant:

- scientific experts and environmental advocates;
- stakeholder representatives participating in various planning and decision-making procedures; and
- water managers who were largely staff from government agencies or water authorities.

The interviews focused on obtaining expert opinion on the likely environmental outcomes of reforms; eliciting the position of stakeholder bodies on the progress of

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4 For a discussion of sampling approaches and rationale for qualitative research case studies see Bouma above n 3, 177; Yin above n 3, 10.
5 These research methods are discussed extensively in Yin, above n 3, 83-89; Fontana and Frey, above n 3, 645; Stake, above n 3, 435; Bouma, above n 3, 178-82; and Robert B Burns, Introduction to Research Methods (4th ed, 2000), 404, 423.
reforms and constraints to progress within the socio-economic context; clarifying government policy positions and interpretations of key issues; and understanding how environmental water was managed in practice in the context of competing demands of consumptive water use. Interview schedules were, of necessity, applied with some flexibility given the different expertise and experience of participants and the fact that, in some cases, participants served multiple roles. Interview schedules are reproduced below.

39 interviews of approximately 60 minutes duration were conducted for the case studies. The starting point for identifying potential participants was initial contact with agency staff working in the area. These initial contacts assisted in identifying and enabling contact with stakeholder representatives involved in the processes. Generally, however, where there has been a public stakeholder based planning process, this information was publicly available. With regard to scientific experts, some were identified as prominent scholars/commentators in the field through the literature review and analysis of background material relevant to the case studies. Where necessary, the relevant arms of government environment agencies provided further contacts.

2 Observation

Participant observation of relevant stakeholder-based committees involved in planning and/or implementing environmental water regimes was also undertaken to supplement the interview research and provide important data for the analysis of the practice of managing rivers with EWA. Observation focused on ascertaining the nature of matters discussed by the committee and appreciating the variety of viewpoints expressed by stakeholder members, in order to gain a fuller appreciation of the challenges inherent in managing environmental water. In some cases, committee members were also interviewed individually according to their expertise.

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6 Burns, above, 389. Burns describes snowball sampling as using key personnel to identify further participants, and theoretical sampling as guided by the gradual development of theory as the research progresses.


7 Burns, above n 6, 404. Participant observation is where the researcher’s identity is known to the hosts but the researcher remains a relative stranger.
and experience in the field. For each case study, it was possible to observe the processes of the committee on a small number of occasions only. This observation was supplemented by later analysis of material produced by the committee, for example, records of decisions taken, reporting on the use of environmental water, and scenario planning for future use. Additional follow-up interviews with committee convenors were conducted where necessary.

3 **Ethics Approval**

Ethics approval was granted for the conduct of this empirical research. All participants were approached personally by the principal researcher to obtain their informed consent to participate in the research. Contact was initiated through the provision of written background material describing the research and followed up by telephone to discuss any concerns and arrange interviews.

Committees observed in the research were approached initially through the Chair and/or Convenor of the committee. Consent for observation was however sought individually from each committee member and was a pre-requisite to the observation taking place.

For both the interviews and observation, data was collected by hand written notes. This was deemed satisfactory to record the qualitative data sought through the research. Upon completion of the interview / observation, sufficient time was set aside for the interviewer to check and collate notes taken. Participants were given an opportunity to ensure the material supplied by them through interview was used and attributed correctly in the thesis and subsequent published work.

Generally, references to this material used in the thesis do not attribute the information to an individual, but rather to a class of participant. These include for example, staff from natural resource or conservation agencies and water authorities; representatives of nature conservation interests; representatives of irrigation interests; or landholders. This approach to referencing was used to respect the wishes of some participants who did not want their individual identity used. It was also deemed an appropriate way to represent the nature of the information gained form the interviews.
In most cases, comments drawn from the interviews have been substantiated by more than one other participant, or represent information of a generally factual nature.
Interviews were conducted largely in person over a period of four days in August 2006, coinciding with the observation of a committee meeting of the Environmental Contingency Allowance Advisory Committee for the Gwydir Regulated River, on 29 August 2006 in Moree. Telephone interviews were used to obtain the input of additional participants.

For the purposes of referencing the material obtained in these interviews in Chapter Four of the thesis, interviewees have generally been grouped into a certain class of participant. This includes for example, staff from natural resource agencies (previously Department of Natural Resources, and Department of Water and Energy); nature conservation agencies (currently, Department of Environment, Climate Change and Water); staff from water authorities (State Water Corporation); representatives of nature conservation interests (Nature Conservation Council of NSW); independent scientific experts; representatives of irrigation interests, and wetland landholders.

A Interviews with river scientists and environmental stakeholders

1 Use of Scientific Recommendations for Environmental Water Requirements in Water Sharing Planning

- What was the extent of scientific inquiry into the environmental water requirements of the Gwydir system, available to the making of the Water Sharing Plan? Was there a consensus of scientific opinion on environmental water needs?
- To what extent was this information used to inform negotiations for the water sharing plan?
- What were the key flow-related management recommendations sought by environmental stakeholders in the planning process (both for achieving positive environmental outcomes, and in terms of limiting the management of consumptive use of water)?
• What was the nature of resistance encountered to the achievement of scientific recommendations for environmental water needs?

2 Water Sharing Planning – Process Issues

• Were there issues which arose in the planning process that divided the committee? How was conflict resolved on such issues? Could you please provide an example of such a situation?
• Government Policy guidance was provided in the form of targets (through the State Water Management Outcomes Plan) and objectives (such as River Flow Objectives). How effectively did this policy balance competing claims on the resource? How was it used to guide the planning process?
• What level of knowledge was there within the planning committee of the statutory parameters for water sharing planning established by the Water Management Act 2000? To what extent were the relevant provisions reinforced and used to guide the planning process?

3 Efficacy of Environmental Water Rules

• The negotiated Water Sharing Plan did not change previous environmental water rules considerably. Can you identify any reasons why the new statutory planning framework achieved so little change in environmental provisions?
• The Water Management Act 2000 contemplates a management planning process for a range of issues contributing to river and catchment health, including water sharing, floodplain management and environmental protection. In your opinion was it an appropriate decision to limit the committee planning process to the issue of water sharing? How well are other related processes addressing the broader integrated issue of river and catchment health?

Components of the Environmental Water Rules include:
• Long term average annual extraction limit – should this rule be classified as an environmental water rule? Is it an appropriate basis for a water sharing plan that must balance competing claims on the resource? How does the use of a long term average affect the achievement of environmental objectives such as to recapture natural variability?

• Minimum Flow through to wetlands – how does this rule account for appropriate distribution of water throughout the wetland, and natural variability within the system?

• Limits on access to supplementary water – Was there an ecological basis for this limit? How is it implemented? Are there flow thresholds to guide a declaration of a supplementary access period?

• Environmental Contingency Allowance – How was the volume agreed upon? What is the effective priority / legal status of the ECA given it only receives allocated water at the same priority as general security access licenses?

• Is water trading in the Gwydir having, or likely to have, an impact on the identified environmental values and objectives addressed by the Water Sharing Plan? How adequate in addressing these issues are the restrictions on trading imposed through the plan?

4 Management of Environmental Water

• How effective are the management arrangements for environmental water including the Environmental Contingency Allowance? Are there clear decision-making procedures and responsibilities outlined? Are these institutional arrangements appropriate to achieving desired environmental outcomes?

• How do you understand the legal status of environmental water rules compared with consumptive water rules? Are there situations where the delivery of consumptive water requirements and environmental requirements conflict? If so, how are these resolved?
• Has the Environmental Contingency Allowance been used to its capacity? If not, what have been the constraints on full implementation?

5 Identification of Compliance and Accountability Issues

• How, and by whom, is implementation of the various environmental flow rules monitored and reported?
• Are there particular accounting / compliance difficulties which arise in respect of the environmental water rules?

6 Priorities for improvement on provision for Environmental Water

• What type of environmental water recovery projects are most likely to succeed in the Gwydir – outright purchase of access licenses, leasing arrangements, efficiency gains? For what reasons? What should they target?

B Interviews with stakeholder representatives involved in the negotiation of and/or the implementation of environmental flows

1 Socio-economic impacts of environmental water rules

• Was there significant resistance within the community to the various environmental water rules? If so, what were the reasons for this resistance?
• Were there alliances and divisions within the community that arose from the water planning process?
• Has there been a gradual acceptance of the need for water sharing and environmental water rules?

2 Water Sharing Planning – Process Issues

• The planning process aimed to achieve balanced stakeholder representation. Were all stakeholders appropriately represented? Were there difficulties in
ensuring each stakeholder group was able to participate effectively in the process?

- Were there issues which arose in the planning process that divided the committee? How was conflict resolved on such issues? Could you please provide an example of such a situation?
- Government Policy guidance was provided in the form of targets (through the State Water Management Outcomes Plan) and objectives (such as River Flow Objectives). Do you think that this policy effectively balanced competing claims on the resource? Was it a useful guide to the planning process? How was it used in the planning process?
- Was there general understanding within the planning committee of the legal parameters for water sharing planning established by the *Water Management Act 2000*? To what extent were the relevant provisions reinforced and used to guide the planning process?
- How best could the process have been improved?

3 *Management of Environmental Water*

- How effective are the management arrangements for environmental water, including the Environmental Contingency Allowance? Are there clear decision-making procedures and responsibilities outlined? Is the institutional arrangement appropriate to achieving the desired environmental outcomes?
- Has the Environmental Contingency Allowance been used to its capacity? If not, what have been the constraints on full implementation? Could you please give me an example?

4 *Community Attitudes to further water recovery and improved environmental management*

- There is consensus that achieving healthy river systems in much of NSW will require further recovery of water for the environment and changes in the way it is managed, beyond the measures achieved through water sharing planning. What are community attitudes to further environmental water recovery?
• Is there potential in the Gwydir to using the market to recover further water for the environment? Would outright purchase or arrangements to lease water at certain times be most appropriate?
• Is there community resistance to buying back water for the environment?

C Interviews with water managers involved in the negotiation of and/or implementation of environmental flows

1 Efficacy of Environmental Water Rules

• The negotiated Water Sharing Plan did not change previous environmental water rules considerably. Can you identify any reasons why did the new statutory planning framework achieve so little change in environmental provisions?
• The Water Management Act 2000 contemplates a management planning process for a range of issues contributing to river and catchment health, including water sharing, floodplain management and environmental protection. In your opinion was it an appropriate decision to limit the committee planning process to the issue of water sharing? How well are other related processes addressing the broader integrated issue of river and catchment health?

Components of the Environmental Water Rules include:

• Long term average annual extraction limit – should this rule be classified as an environmental water rule? Is it an appropriate basis for a water sharing plan that must balance competing claims on the resource? How does the use of a long term average affect the achievement of environmental objectives such as to recapture natural variability?
• Minimum Flow through to wetlands – how does this rule account for appropriate distribution of water throughout the wetland, and natural variability within the system?
• Limits on access to supplementary water – Was there an ecological basis for this limit? How is it implemented? Are there flow thresholds to guide a declaration of a supplementary access period?

• Environmental Contingency Allowance – How was the volume agreed upon? What is the effective priority / legal status of the ECA given it only receives allocated water at the same priority as general security access licenses?

• Is water trading in the Gwydir having, or likely to have, an impact on the identified environmental values and objectives addressed by the Water Sharing Plan? How adequate in addressing these issues are the restrictions on trading imposed through the plan?

• There is consensus that achieving healthy river systems in much of NSW will require further recovery of water for the environment and changes in the way it is managed, beyond the measures achieved through water sharing planning. Are the outcomes of the water sharing process an appropriate ‘first step’ in securing healthy river systems? What form should future action take?

2 Water Sharing Planning – Process Issues

• The planning process aimed to achieve balanced stakeholder representation. Were all stakeholders appropriately represented? Were there difficulties in ensuring each stakeholder group was able to participate effectively in the process?

• Were there issues which arose in the planning process that divided the committee? How was conflict resolved on such issues? Could you please provide an example of such a situation?

• Was the planning process adequately resourced in terms of ensuring availability of adequate data and information, and allowing appropriate presentation to stakeholder members?

• Government Policy guidance was provided in the form of targets (through the State Water Management Outcomes Plan) and objectives (such as River Flow Objectives). Do you think that this policy effectively balanced competing
claims on the resource? Was it a useful guide to the planning process? How was it used in the planning process?

- What level of knowledge was there within the planning committee of the statutory parameters for water sharing planning established by the Water Management Act 2000? How were the relevant provisions reinforced and used to guide the planning process?
- How best could the process have been improved?

3 Management of Environmental Water

- How effective are the management arrangements for environmental water, including the Environmental Contingency Allowance? Are there clear decision-making procedures and responsibilities outlined? Is the institutional arrangement appropriate to achieving the desired environmental outcomes?
- How do you understand the legal status of environmental water rules compared with consumptive water rules? Are there situations where the delivery of consumptive water requirements and environmental requirements conflict? If so, how are these resolved?
- Has the Environmental Contingency Allowance been used to its capacity? If not, what have been the constraints in full implementation?

4 Identification of Compliance and Accountability Issues

- How, and by whom, is implementation of the various environmental flow rules monitored and reported?
- Is compliance monitoring linked to the performance indicators in the water sharing plan, and the monitoring of the impact of environmental flows through the IMEF program?
- Are there particular accounting / compliance difficulties which arise in respect of the environmental water rules?
- There are various catchment water management issues which pose a threat to general water availability and the realisation of environmental objectives in the Gwydir, for example floodplain structures and floodplain harvesting.
These issues are difficult to manage and account for. How can they be best addressed in the context of the Gwydir valley?
Interviews were conducted largely in person in June and September 2008, both in Melbourne and in the Loddon region. Supplementary telephone interviews were used to obtain the input of participants who could not be interviewed in person. For the purposes of referencing the material obtained in these interviews in Chapter Five of the thesis, interviewees have generally been grouped into a certain class of participant. This includes, for example, staff from natural resource agencies (Department of Sustainability and Environment – Water Group, Department of Primary Industries); nature conservation agencies (Department of Sustainability and Environment – River Health Group, Department of Primary Industries – Fisheries); staff from water authorities (Goulburn Murray Water); representatives of nature conservation interests (Environment Victoria); independent scientific experts; representatives of irrigation interests, and landholders.

A meeting of the Loddon Environmental Water Advisory Group, a stakeholder / expert committee who advises the Catchment Management Authority on the implementation of the environmental water regime, was observed on 8 June 2008 in Huntley. Additionally, a meeting of the Environmental Water Reserve Network, a grouping of environmental flows officers from Catchment Management Authorities across Victoria and supporting departmental staff was observed in Melbourne on 30 April 2008.

A Interviews with River Scientists/Environmental Stakeholders

1 Use of scientific recommendations for environmental water requirements in water sharing planning and management

- Expert Panel Environmental Flows Determination has been used as a basis for Bulk Entitlement and Sustainable Water Strategy planning process.
- How would you characterise this determination? Does it represent the minimum requirements for basic ecological health / function – to achieve
healthy working rivers? Does it already encompass a considerable trade-off? If so, do you think it is being appropriately treated as such in planning processes?

- The expert panel stated there was a lack of time and resources to apply methodology appropriately – how did this affect the end result? – was this common across Victoria?

- To what extent has scientific information (in the form of Environmental Flow determination and ongoing involvement of expert panel) been used to inform negotiations for the Bulk Entitlement and/or Sustainable Water Strategy? What influence has this information had? How was it treated in the inevitable trade-offs?

- What are the main points of conflict between Environmental Flow recommendations and the way the Loddon is managed for consumptive use?

- One of the key issues in Environmental Flow provision in northern Victoria is the difficulty associated with attempting to mitigate the seasonal inversion of the natural flow regime. Options to address this were investigated on the Goulburn – but found to be very untenable due to cost. On the Loddon where there are lower volumes involved, are there options to address this issue? Or are there higher environmental priorities?

- Scientific Panel conducted a review of environmental implications of draft Bulk Entitlement. Generally they found that although not all scientific recommendations for Environmental Flows were implemented in Bulk Entitlement (especially not high flows / overbank events in winter), b/c current operating strategy provided some of these events anyway, the risk of not achieving environmental objectives not too high (providing operating strategy remained the same and complimentary management actions were implemented). Were similar reviews carried out for other Bulk Entitlements across the state? Do you understand that operating strategies have picked up these concerns? Do they need to be revisited in light of Climate Change scenarios – work on sustainable diversion limits suggests significant reductions in environmentally important flow events such as small winter floods? Why was it considered inappropriate to put these operational details
into the Bulk Entitlement? Should this be revisited / how can such flows best be provided?

- Given Climate Change scenarios, can we still rely on the Environmental Flow determination as a basis for future planning, or do these recommendations need to be revised comprehensively?
- The Sustainable Water Strategy discussion paper provides a volumetric estimation of shortfalls in meeting Environmental Flows recommendations in various Climate Change scenarios. How effective is this volumetric assessment in addressing how Environmental Flows regime will be impacted upon by Climate Change? Is there a disproportionate effect on various flow components under Climate Change (eg may be able to maintain low flows, but what about flood frequency)?

2 Qualification of rights

The Water Act provides a very broad power to temporarily qualify all rights to water in times of water shortage. In the last years this has been exercised to the detriment of Environmental Water Reserve.

- Is it appropriate to try and build ecological safeguards into the exercise of this power – for example, place basic ecological health at similar priority to basic human and stock needs?
- If so, how would you arrive at an appropriate level of environmental protection to safeguard a basic level of ecological health / protect against irreversible impacts?

3 Environmental Outcomes from water planning processes – Bulk Entitlement and Sustainable Water Strategy

Bulk Entitlement

The Water Act does not provide a specific planning process for the conversion to Bulk Entitlements, other than a range of considerations and content requirements.
• Are you able to describe the planning process employed for the Loddon Bulk Entitlement?

The Loddon Bulk Entitlement did not significantly re-allocate the resource and only implemented selected elements of the Environmental Flow recommendations developed by the expert scientific panel, which were generally the least disruptive to existing management (did not implement winter freshes and high flow events, or winter min flows to the extent recommended).

• Can you identify reasons for such minimal implementation?
• Were features of the planning process influential in this outcome? (eg, stakeholder representation; availability of resources and time; provision of clear policy direction on expected substantive outcomes; processes to manage trade-offs)
• In your opinion, was this an appropriate planning process to formalise and substantially guarantee water allocation in the Loddon? How best could the process have been improved?

**Sustainable Water Strategy**

The Water Act provides that a Sustainable Water Strategy must, among other things:

• identify threats to the reliability of supply and quality of water for both environmental and consumptive uses in the region, and identify ways to improve this reliability; and
• identify ways to improve the maintenance of the Environmental Water Reserve in accordance with the Environmental Water Reserve objective, and ways to increase the volume of water in the Environmental Water Reserve to improve the environmental values and health of water ecosystems.

• Do you believe that the Northern Sustainable Water Strategy process to date addresses both these requirements?
• Has there been an attempt to use the Sustainable Water Strategy process to find ways to meet shortfalls in Environmental Flow recommendations? Why or why not?

• Have features of the planning process been influential in this outcome?

• In your opinion, was this an appropriate planning process to guarantee long term water security for the environment, and to achieve an ecologically sustainable Environmental Water Reserve? How best could the process have been improved?

4 Efficacy of Environmental Water Rules

The Environmental Water Reserve for the Loddon is comprised of:

Wetland entitlement

(2000ML per annum minus delivery losses, aim to maximise flora and fauna values within Boort district wetlands)

• What is the origin of this provision given the Environmental Flow determination expressly refrained from making recommendations for wetlands – why Boort selected and not other wetlands?

• What was the source of this water?

• How was volume agreed upon?

• What is the impact of the provision that this can only be supplied if there is spare channel capacity available?

• What is the impact of level of security?

• Some limited carry over provisions are provided – are these effective? Will they undermine opportunistic use?

• How has the entitlement been used to date?

Passing Flow requirements for various reaches

(including provisions for summer and winter minimum flows, freshes and some highflow events)

• Winter low flows are dependent on storage height – does this have any reference to natural flows, or is it purely to guarantee adequate supplies for
consumptive use? – how often has this been achieved to date? How likely is it under climate scenarios?

- What is the intent behind reimbursement provisions (cl. 5)? – How can this water be used? Will these rules allow the environment to accrue volumes with significant environmental potential? Has this water been accruing over recent qualification period – how will it be used?

- Summer low flows are defined as volume per day, or a min volume – eg, reach one – 20ML/day or natural. Is the intent to provide max. flows? Does this in any way address the likelihood that flows will be higher during summer irrigation season?

- “Or natural flow” - All passing flows and river freshening flows subject to cl 6.1/6.2 with specific method for calculation – natural flow provisions - if natural flow lower than specified flow then this appears to override the need for higher min flows and freshes. What is the impact of this provision, particularly under climate scenarios when low ‘natural’ flows more likely?

- Freshes: only minimal provision in terms of volume, usually corresponding to recommendations for summer freshes. Is there no provision for winter freshes? Or are these able to be met via strategic use of wetland entitlement and/or spills of unregulated water?

- Adequacy of environmental flow regime under Bulk Entitlement depends on maintaining spill regime, which provides some of the recommendations for high flow events, particularly in winter. Under climate scenarios, are these flow components still likely to be met under the spill regime? What has been the experience to date of implementing this provision? Why was it considered inappropriate to include this detail in Bulk Entitlement?

- Reach 4 – Environmental Flow recommendations were for significant variability in min flows, however these recommendations not implemented in Bulk Entitlement, but apparently operational strategy will implement. Do you understand that these recommendations are actually being implemented, (given current situation under qualification)? Why was it considered inappropriate to include this detail in Bulk Entitlement?

- Bulk Entitlement does not contain provisions for reach Kerang Weir to Murray confluence – what are the reasons for this?
Above Cap Water
Given last ten years of record low inflows, and predictions under climate change scenarios, what is the likelihood of above cap water?

- Is there a need to formalise / specify above cap water as environmental water?

Efficacy under Climate Change

- Given Climate Change scenarios, can we still rely on the environmental flow determination as a basis for future planning, or do these recommendations need to be revised comprehensively? (especially review of Bulk Entitlement suggesting most environmental objectives would be met even with partial implementation of Environmental Flow recommendations)

- Sustainable Water Strategy discussion paper provides a volumetric estimation of shortfalls in meeting Environmental Flow recommendations in various climate scenarios. How effective is this volumetric assessment at addressing how environmental water regime will be impacts upon by Climate Change? Is there a disproportionate effect on various flow components under Climate Change?

- Modelling in Sustainable Water Strategy discussion paper shows that under Climate Change scenarios, a continuation of last 10 years of low inflows will have a disproportionately severe impact on environmental water in the Loddon - (By 2055 if conditions of last ten years continued 70% reduction in inflows compared to long term average > 67% reduction in water for consumptive use, and 73% for environmental flows). What is the reason for this disproportionate impact on Environmental; Water Reserve in Loddon?

Constraints

- Can you describe any constraints to Environmental Flow delivery and effectiveness? (eg, water quality re. salinity inputs from tributaries for eg, - Are problems sufficient to undo any benefits made by Environmental Flows? Is an Environmental Entitlement for water quality desirable?) (eg, operational constraints / infrastructure)
Water Trade

- Is water trading in the Loddon having, or likely to have an impact on environmental values and objectives identified in the Environmental Flow determination? Are there restrictions in place to address these impacts?

5 Priorities for Improving Environmental Water Reserve

- Sustainable Water Strategy process identifies shortfalls in meeting Environmental Flow determinations, and outlines potential effects of climate change on environmental water provision. Given climate impacts in Loddon – what types of Environmental Water Reserve are needed and in what magnitude to maintain a basic level of ecological health?
- There is much reference to the management benefits and flexibility that can be achieved for Environmental Water Reserve through expansion of the water grid in northern Victoria. Given that the Waranga Channel enters the Loddon so low in the system, are there any potential benefits to be gained for the Loddon from such integrated management? (cf. eg. Campaspe)

Environmental Water Recovery

- How is the Loddon expected to benefit from/ and or contribute to environmental water recovery under the Living Murray Initiative?
- Will the Loddon benefit from current projects to recover water for the environment?
- Water Act provides an opportunity to reassess the balance between consumptive and environmental water, and if necessary reallocate the resource without the requirement to pay compensation every 15 years? Do you consider these time frames appropriate (given there are already perceptible disproportionate impacts on Environmental Water Reserve)? Are there priorities which should be addressed sooner?
- The new Commonwealth Water Act will deliver new sustainable diversion limits for the MDB – a new Cap. Has work begun on this process in the Loddon? Do you anticipate that this process will recommend / require substantial re-allocation of the resource?
6 Management of Environmental Water

Institutional Arrangements

- How effective are the management arrangements for the Loddon Environmental Water Reserve? Are these institutional arrangements appropriate to achieving the environmental outcomes identified in environmental flow determination? For how long have Catchment Management Authorities taken the lead role in Environmental Flow delivery (only a result of 2005 amendments?)

- In what ways could this framework be improved to enhance accountability, transparency, effective implementation? Eg, enhance independence of Environmental Water manager, increase scrutiny of Bulk Entitlement delivery.

- Are Catchment Management Authorities the most appropriate body to be responsible for the active management of Environmental Water Reserve?– how much of this has changed?

- Scientific Panel notes importance of complementary catchment management actions to Environmental Flow delivery if environmental objectives are to be achieved (particularly as there was only partial implementation of Environmental Flow recommendations). For eg, riparian management; water quality, water temperature, sediment control in reach 4.

- How effectively are Catchment Management Authority programs addressing these issues?

Status of EW

- How do you understand the legal status of environmental water rules compared with consumptive water rules? Are there situations where the delivery of consumptive water requirements and environmental requirements conflict? (eg, delivery of a fresh?? If so, how are these resolved?)
Qualification of Rights

- Water Act provides a very broad power to qualify all rights to water in times of water shortage. In the last few years this has been exercised to the detriment of Environmental Water Reserve.
- How was the Loddon Environmental Water Reserve qualified? (Environmental Entitlement and passing flows?)
- What was the trigger point for such qualification?
- What is the potential ecological impact of such qualification?
- Is it appropriate to try and build ecological safeguards into the exercise of this power – for example, place basic ecological health at similar priority to basic human and stock needs?
- If so, how would you arrive at an appropriate level of environmental protection to safeguard a basic level of ecological health / protect against irreversible impacts?

7 Identification of compliance and accountability issues

- Are there particular accounting / compliance difficulties which arise in respect of the environmental water rules?
- How could accountability and compliance be improved?
- Are significant improvements in monitoring infrastructure required? At the level of diversion metering, river gauging, Environmental Flow monitoring points specified in Bulk Entitlement?
- Environmental minimum flows are theoretically not intended for any consumption. How are stock and domestic supplies provided through the system – is additional water over and above min flows delivered? Is it possible to predict how much will be taken for Stock and Domestic at any one time? In practice are min flows also available for Stock and Domestic extractions? Does this greatly affect water available to the environment?

Independent Regulation of Water Authorities

The 2001 Parliamentary Inquiry into water allocation in northern Victoria – highlighted evidence of shortfalls in delivery of passing flows by Water Authorities,
but no prosecutions as at July 01. The identified issues with quality and conduct of monitoring and the fact that it was carried out by water authority itself

- Has this potential conflict of interest been addressed by enhancing the role of Catchment Management Authorities in Environmental Flow management? How could this be further improved?

Monitoring effectiveness of Environmental Flows – VEFMAP program

- What is the focus of this program in the Loddon? Do you believe there are sufficient processes in place for this information to be fed back into an adaptive management regime that also incorporates re-allocation of the resource where necessary?

B Interviews with stakeholder representatives involved in negotiation and/or implementation of environmental flows

1 Balancing competing demands on water

- Has there been significant resistance within the community to the negotiation and implementation of environmental water rules within the Bulk Entitlement such as the 2000ML wetland entitlement, and provisions for minimum passing flows and summer freshes? If so, what are the reasons for this resistance? What are the main points of conflict between Environmental Flow recommendations and the way the Loddon is managed for consumptive use?
- There is increasing understanding that achieving healthy river systems across northern Victoria will require further water recovery for the environment beyond the measures achieved to date through the Bulk Entitlement. The Sustainable Water Strategy process is intended to identify shortfalls in current provision for Environmental Water needs, and ways to meet these.
- What are community attitudes to further environmental water recovery? How should this best be approached?
2 Water planning processes – Bulk Entitlement and Sustainable Water Strategy

- Both planning processes included some measures to allow public participation and input. In your opinion was this adequate / appropriate?
- Do you think that all stakeholders were appropriately represented in these planning processes?
- Were there difficulties in ensuring each stakeholder group was able to participate effectively in the process?
- Were these issues which arose in the planning process that divided the consultative committee? How was conflict resolved on such issues? Could you please provide an example of such a situation?

Bulk Entitlement

The Water Act does not provide a specific planning process for the conversion to Bulk Entitlements, other than a range of considerations and content requirements.

- Are you able to describe the planning process employed for the Loddon Bulk Entitlement?
- The Loddon Bulk Entitlement did not significantly re-allocate the resource and only implemented selected elements of the Environmental Flow recommendations developed by the expert scientific panel, which were generally the least disruptive to existing management (did not implement winter freshes and high flow events, or winter min flows to the extent recommended).
- Can you identify reasons for such minimal implementation?
- Were features of the planning process influential in this outcome? (eg, stakeholder representation; availability of resources and time; provision of clear policy direction on expected substantive outcomes; processes to manage trade-offs)
- Would the outcome have differed considerably if the planning process was accompanied by a comprehensive adjustment package to compensate water users for any impact beyond reasonable levels?
In your opinion, was this an appropriate planning process to formalise and substantially guarantee water allocation in the Loddon? How best could the process have been improved?

**Sustainable Water Strategies**

The Water Act provides that a Sustainable Water Strategy must, among other things:

- identify threats to the reliability of supply and quality of water for both environmental and consumptive uses in the region, and identify ways to improve this reliability; and
- identify ways to improve the maintenance of the Environmental Water Reserve in accordance with the Environmental Water Reserve objective, and ways to increase the volume of water in the Environmental Water Reserve to improve the environmental values and health of water ecosystems.

Do you believe that the Northern Sustainable Water Strategy process to date addresses both these requirements adequately?

Has any one issue dominated the planning process?

Has there been an attempt to use the Sustainable Water Strategy process to find ways to meet shortfalls in Environmental Flow recommendations? Why or why not?

Have features of the planning process been influential in this outcome?

In your opinion, was this an appropriate planning process to guarantee long term water security for the environment? How best could the process have been improved?

**3 Management of Environmental Water**

- How effective are the current management arrangements for environmental water? Are these institutional arrangements appropriate to achieving the environmental outcomes identified in environmental flow determination?
- In what ways could this framework be improved to enhance accountability, transparency, effective implementation?
• Are Catchment Management Authorities the most appropriate body to be responsible for the active management of the Environmental Water Reserve? – how much of this has changed?

C Interviews with water managers involved in negotiation and/or implementation of environmental flows

1 Environmental Outcomes from water planning processes – Bulk Entitlement and Sustainable Water Strategy

Bulk Entitlement
The Water Act does not provide a specific planning process for the conversion to Bulk Entitlements, other than a range of considerations and content requirements.

• Are you able to describe the planning process employed for the Loddon Bulk Entitlement?

The Loddon Bulk Entitlement did not significantly re-allocate the resource and only implemented selected elements of the Environmental Flow recommendations developed by the expert scientific panel, which were generally the least disruptive to existing management (did not implement winter freshes and high flow events, or winter min flows to the extent recommended).

• Can you identify reasons for such minimal implementation?
• Were features of the planning process influential in this outcome? (eg, stakeholder representation; availability of resources and time; provision of clear policy direction on expected substantive outcomes; processes to manage trade-offs)
• In your opinion, was this an appropriate planning process to formalise and substantially guarantee water allocation in the Loddon? How best could the process have been improved?

Sustainable Water Strategy
The Water Act provides that a Sustainable Water Strategy must, among other things:
• identify threats to the reliability of supply and quality of water for both 
environmental and consumptive uses in the region, and identify ways to 
improve this reliability; and
• identify ways to improve the maintenance of the Environmental Water Reserve 
in accordance with the Environmental Water Reserve objective, and ways to 
increase the volume of water in the Environmental Water Reserve to improve 
the environmental values and health of water ecosystems.

• Do you believe that the Northern Sustainable Water Strategy process to date 
daddresses both these requirements?
• Has there been an attempt to use the Sustainable Water Strategy process to 
find ways to meet shortfalls in Environmental Flow recommendations? Why 
or why not?
• Have features of the planning process been influential in this outcome?
• In your opinion, was this an appropriate planning process to guarantee long 
term water security for the environment, and to achieve an ecologically 
sustainable Environmental Water Reserve? How best could the process have 
been improved?

2 Efficacy of Environmental Water Rules

The Environmental Water Reserve for the Loddon is comprised of:

Wetland entitlement
(2000ML per annum minus delivery losses, aim to maximise flora and fauna values 
within Boort district wetlands)

• What is the origin of this provision given Environmental Flow determination 
expressly refrained from making recommendations for wetlands – why Boort 
selected and not other wetlands?
• What was the source of this water?
• How was volume agreed upon?
• What is the impact of the provision that this can only be supplied if there is 
spare channel capacity available?
• What is the impact of level of security
• Some limited carry over provisions are provided – are these effective? Will they undermine opportunistic use?
• How has the entitlement been used to date?

Passing Flow requirements for various reaches
(including provisions for summer and winter minimum flows, freshes and some high flow events)

• Winter low flows are dependent on storage height – does this have any reference to natural flows, or is it purely to guarantee adequate supplies for consumptive use? – how often has this been achieved to date? How likely is it under climate change scenarios?
• What is the intent behind reimbursement provisions (cl. 5)? – How can this water be used?? Will these rules allow E to accrue volumes with significant environmental potential? Has this water been accruing over recent qualification period – how will it be used?
• Summer low flows are defined as volume per day, or a min volume – eg, reach one – 20ML/day or natural. Is the intent to provide max. flows? Does this in any way address the likelihood that flows will be higher during summer irrigation season?
• “Or natural flow” - All passing flows and river freshening flows subject to cl 6.1/6.2 with specific method for calculation – natural flow provisions - if natural flow lower than specified flow then this appears to override the need for higher min flows and freshes. What is the impact of this provision, particularly under climate change scenarios when low ‘natural’ flows more likely?
• Freshes: only minimal provision in terms of volume, usually corresponding to recommendations for summer freshes. Is there no provision for winter freshes? Or are these able to be met via strategic use of wetland entitlement and/or spills of unregulated water?
• Adequacy of Environmental Flow regime under Bulk Entitlement depends on maintaining spill regime, which provides some of the recommendations for high flow events, particularly in winter. Under climate scenarios, are these
flow components still likely to be met under the spill regime? What has been the experience to date of implementing this provision? Why was it considered inappropriate to include this detail in Bulk Entitlement?

- Reach 4 – Environmental Flow recommendations were for significant variability in min flows, however these recommendations were not implemented in BE, but apparently operational strategy will implement. Do you understand that these recommendations are actually being implemented, (given current situation under qualification)? Why was it considered inappropriate to include this detail in Bulk Entitlement?
- Bulk Entitlement does not contain provisions for reach Kerang Weir to Murray confluence – what are the reasons for this?

**Above Cap Water**

- Given last ten years of record low inflows, and predictions under climate scenarios, what is the likelihood of above cap water?
- Is there a need to formalise / specify above cap water as environmental water?

**Efficacy under Climate Change**

- Given Climate Change scenarios, can we still rely on the environmental flow determination as a basis for future planning, or do these recommendations need to be revised comprehensively?
- Sustainable Water Strategy discussion paper provides a volumetric estimation of shortfalls in meeting Environmental Flow recommendations in various climate scenarios. How effective is this volumetric assessment at addressing how Environmental Flow regime will be impacts upon by Climate Change? Is there a disproportionate effect on various flow components under Climate Change?
- Modelling in SWS discussion paper shows that under Climate Change scenarios, a continuation of last 10 years of low inflows will have a disproportionately severe impact on environmental water in the Loddon - (By 2055 if conditions of last ten years continued 70% reduction in inflows compared to long term average > 67% reduction in water for consumptive use, and 73% for environmental flows).
What is the reason for this disproportionate impact on Environmental Water Reserve in Loddon?

Constraints

- Can you describe any constraints to Environmental Flow delivery and effectiveness? (eg, water quality re. salinity inputs from tributaries for eg, - Are problems sufficient to undo any benefits made by Environmental Flows? Is an Environmental Entitlement for water quality desirable?) (eg, operational constraints / infrastructure)

Water Trade

- Is water trading in the Loddon having, or likely to have an impact on environmental values and objectives identified in the Environmental Flow determination? Are there restrictions in place to address these impacts?

3 Priorities for Improving Environmental Water Reserve

- Sustainable Water Strategy process identifies shortfalls in meeting Environmental Flow determinations, and outlines potential effects of Climate Change on environmental water provision. Given Climate Change impacts in Loddon – what types of Environmental Water Reserve are needed and in what magnitude to maintain a basic level of ecological health?
- There is much reference to the management benefits and flexibility that can be achieved for Environmental Water Reserve through expansion of the water grid in northern Victoria. Given that the Waranga Channel enters the Loddon so low in the system, are there any potential benefits to be gained for the Loddon from such integrated management? (cf. eg. Campaspe)

Environmental Water Recovery

- How is the Loddon expected to benefit from/ and or contribute to environmental water recovery under the Living Murray Initiative?
- Will the Loddon benefit from current projects to recover water for the environment?
• Water Act provides an opportunity to reassess the balance between consumptive and environmental water, and if necessary reallocate the resource without the requirement to pay compensation every 15 years? Is 15 year review too late for the Loddon? Are there priorities which should be addressed sooner?

• The new Commonwealth Water Act will deliver new sustainable diversion limits for the MDB – a new Cap. Has work begun on this process in the Loddon? Do you anticipate that this process will recommend / require substantial re-allocation of the resource?

4 Management of Environmental Water

Institutional Arrangements

• Can you please describe the institutional arrangements for the management of the Loddon Environmental Water Reserve. Clarify roles of Catchment Management Authority, Environmental Water Reserve officers, various Water authorities involved, DSE, Minister. Under Bulk Entitlement who has the role of Environmental Water Manager, Resource Manager, Storage Operator, and Authority? For how long have Catchment Management Authorities taken the lead role in Environmental Flow delivery (?only a result of 2005 amendments?)

• How effective are these management arrangements? Are these institutional arrangements appropriate to achieving the environmental outcomes identified in environmental flow determination?

• In what ways could this framework be improved to enhance accountability, transparency, effective implementation? Eg, enhance independence of Environmental Water manager, increase scrutiny of Bulk Entitlement delivery.

• Are Catchment Management Authorities the most appropriate body to be responsible for the active management of Environmental Water Reserve? – how much of this has changed?

• Scientific Panel notes importance of complementary catchment management actions to Environmental Flow delivery if environmental objectives are to be achieved (particularly as there was only partial implementation of
Environmental Flow recommendations). For eg, riparian management; water quality, water temperature, sediment control in reach 4.

- How effectively are Catchment Management Authority programs addressing these issues (through river health strategy)?

5 Status of Environmental Water

- How do you understand the legal status of environmental water rules compared with consumptive water rules? Are there situations where the delivery of consumptive water requirements and environmental requirements conflict? (eg, delivery of a fresh?? If so, how are these resolved?
- Can you identify other practical impediments to Environmental Flow delivery which may impact on effectiveness of Environmental Flow regime – eg delivery constraints for wetland entitlement?

Qualification of Rights

Water Act provides a very broad power to temporarily qualify all rights to water in times of water shortage. In the last few years this has been exercised to the detriment of Environmental Water Reserve.

- How was the Loddon Environmental Water Reserve qualified? (Environmental Entitlement and passing flows?)
- What was the trigger point for such qualification?
- What is the potential ecological impact of such qualification?
- Are there measures that could have been taken to avoid such extensive qualification of the Environmental Water Reserve?
- Does the requirement to mitigate the environmental impact of qualification (purchase of volumetric entitlements; monitoring and other mitigation measures for passing flows) operate as an incentive for water authorities to take measures to avoid the need for qualification?
- Is it appropriate to try and build ecological safeguards into the exercise of this power – for example, place basic ecological health at similar priority to basic human and stock needs?
• If so, how would you arrive at an appropriate level of environmental protection to safeguard a basic level of ecological health / protect against irreversible impacts?

6 Identification of compliance and accountability issues

• How, and by whom, is implementation of the various Environmental Flow rules monitored and reported? Clarify roles of Catchment Management Authority, various Water authorities involved, Dept. Sustainability and Environment, Minister. Under Bulk Entitlement who has the role of Environmental Water Manager, Resource Manager, Storage Operator, and Authority?

• Are there particular accounting / compliance difficulties which arise in respect of the environmental water rules?

• How could accountability and compliance be improved?

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