



Australian Government  
National Water Commission



# National Water Planning Report Card 2011





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**Australian Government**  
**National Water Commission**

**Chair**

Mr David Parker  
Chair  
Water Thematic Oversight Group  
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Dear Mr Parker

It is with pleasure that I deliver to you, and through you to the members of the Water Thematic Oversight Group, the first National Water Planning Report Card (Report Card). The Report Card provides a consolidated summary of the status of water plans across Australia and an analysis of jurisdictional progress in the development and implementation of water planning.

The Commission has undertaken the task of preparing the first Report Card at the request of the COAG Water Reform Committee (WRC). This report is one of a number of actions developed by the WRC in response to the National Water Commission's 2009 Biennial Assessment of progress in implementation of the National Water Initiative.

I would like to acknowledge the cooperation of all jurisdictions both in terms of the development of the Report Card assessment framework and the assessment process. The Commission recognises that jurisdiction input and comment has had a significant positive impact on this report.

By establishing a baseline for water planning across Australia, using criteria determined by the WRC, this report provides a benchmark for evaluating progress and will support a more objective discussion on future planning priorities.

The Commission considers that the second Report Card, due in 2013, should build on this baseline by placing more emphasis on the adequacy and effectiveness of implementation activities, noting that there will be a smaller number of new plans requiring a full assessment.

Although good planning provides the roadmap for improved water management, tangible benefits to communities, the economy and the environment are delivered through effective implementation of plan objectives and transparent reporting of outcomes.

The Commission welcomes the commitment by governments to assess the progress of water planning across all jurisdictions. Robust planning, alongside appropriate regulation and effective markets, is critical to achieving the efficient and sustainable water management system agreed under the National Water Initiative.

Yours sincerely

Chloe Munro  
14 December 2011





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# 1. Executive Summary





## EXECUTIVE SUMMARY

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This inaugural National Water Planning Report Card 2011 (Report Card) prepared by the Commission on behalf of the Council of Australian Governments (COAG) provides a consolidated summary of the status of water plans across Australia. It shows how all jurisdictions have made progress in the development and implementation of water planning.

This Report Card task examines the extent to which water planning frameworks and 157 individual water plans<sup>1</sup> include the critical elements of water planning contained in the National Water Initiative (NWI). This report also provides improved clarity around the complex and often poorly understood processes for water planning across different jurisdictions. It is intended that future Report Cards will be undertaken biennially and will describe how management arrangements and their implementation have changed since the previous Report Card.

Importantly, when considered together the individual Report Cards and jurisdictional summaries of water planning frameworks tell a story of how water planning arrangements have progressed over time. The report does not compare state and territory water planning frameworks or advocate a particular water planning model and it does not provide an in-depth evaluation of onground implementation of water plans.

Water planning is the central mechanism used by governments and communities in making water management and allocation decisions to meet specific productive, environmental and social objectives. It is critically important in managing stressed water systems and for managing resources under climatic extremes. There is no single best practice for water planning and jurisdictions use a range of governance structures to manage the diversity of water systems across Australia.

This report provides a clear, agreed baseline for future reference and will facilitate a national discussion on the quality of water plans and planning frameworks, areas of better practice and areas for improvement.

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<sup>1</sup> The water plans assessed for each jurisdiction included all water plans that had commenced as at 30 June 2011, as well as any relevant draft water plans that were available for assessment (e.g. on public exhibition). Any change in the status of these water plans up to 30 September 2011 was incorporated into the assessment.

## National Trends

The summary of findings below outlines trends in water planning across Australia identified during this Report Card assessment. The findings do not relate to all jurisdictions or all water plan areas but rather show the general direction that water planning is heading nationally. Notable exceptions to these trends are identified within jurisdictional summaries and individual Report Card assessments contained in the following chapters.

- Substantial progress has been made in the development of water planning arrangements consistent with the NWI to manage surface water and groundwater resources across Australia. There are however still significant delays in the development and implementation of water plans and water plan reviews that jurisdictions have made commitments to do. This is of particular concern where failure to act has irreversible consequences for the water resource.
- Jurisdictions that have a large number of water systems without water plans tend not to undertake comprehensive assessments of when, or whether, they will prepare a water plan for each water system. They make decisions to do a water plan where one is most needed, rather than explicitly making decisions not to plan for particular systems.
- The coverage of key hydrological, environmental, social and economic assessments and their use in informing water planning decisions has improved. This is particularly evident in the transparency of trade-off decisions for water plans or the associated documentation of water planning decisions.
- Although progress has been made in all jurisdictions, interception activities are not yet consistently managed in accordance with the NWI. Water planning instruments do not often contain a transparent assessment of the significance of interception activities on catchments and aquifers and appropriate measures such as the setting of thresholds above which activities must be licensed. Where such arrangements are in place, monitoring of interception activities is not comprehensive, even for systems that are identified as fully allocated, over allocated or approaching full allocation.
- Considerable effort is currently being directed at the development of monitoring and evaluation frameworks. However, older water plans in particular do not always articulate outcomes that are easily measured and the coordination of monitoring effort is often limited. Reporting on implementation and ultimately progress towards achieving stated water planning outcomes is not done well and has limited capacity to influence the adaptive management and review of water plans.
- Jurisdictions have made provisions for compliance and enforcement measures in their water planning frameworks to combat unlawful water use, however there is limited reporting and information available to determine how well it is undertaken. In recognition that compliance and enforcement arrangements across jurisdictions have significant gaps, the National Framework for Compliance and Enforcement Systems for Water Resource Management was recently developed. The Commission expects to see further development in jurisdictions' management of compliance and enforcement activities in the future, in line with the national approach articulated in that framework.
- Provision for environmental water remains substantially rules based within water plans, rather than entitlement based. Transparency of the coordination and accountability for planned environmental water activities is limited in most jurisdictions. It is often difficult to determine the extent to which rules-based commitments in water plans result in environmental water being made available. Monitoring and reporting of water plan provisions are not done systematically or comprehensively and it is difficult to tell from existing reports whether water plan implementation is achieving environmental objectives.



## 2. Introduction





# Introduction



This report is the inaugural National Water Planning Report Card (Report Card) undertaken by the National Water Commission (the Commission). The report provides a transparent summary of the status of 157 water plans<sup>2</sup> across Australia to show how all jurisdictions have progressed with the development and implementation of water planning across all water resource systems<sup>3</sup>.

It is timely to undertake an assessment of water planning across Australia given that all jurisdictions have accelerated work on water planning in line with commitments under the 2004 National Water Initiative (NWI). This report provides clarity around water planning frameworks across jurisdictions and forms a solid foundation for all future assessments.

The Commission has undertaken the task of the first Report Card as a key action towards progressing NWI water reform priorities in Australia. The objectives of the task were developed through the Water Reform Committee<sup>4</sup> in 2010 in response to the National Water Commission's 2009 Biennial Assessment of Progress in Implementation of the NWI. The committee proposed that the Report Card will be a stand-alone, enduring report published biennially by or on behalf of the Council of Australian Governments (COAG)<sup>5</sup>.

The Report Card is a desktop assessment. It assesses whether key elements of water planning, consistent with the NWI and the Draft NWI Policy Guidelines for Water Planning and Management (draft guidelines), are addressed by each jurisdiction. It does not compare state and territory water planning frameworks or advocate a particular water planning model.

The Report Card assessment criteria (see Appendix 1) examine the inclusion of key water planning elements within different state and territory water planning frameworks. It is important to note that detailed examination of the effectiveness of implementation of these elements by jurisdictions is not within the scope of this task.

The findings of the Report Card are based on evidence that was in the public domain at the time of assessment, or that was provided to the Commission by the lead water planning agency in each jurisdiction for the purpose of this and other assessment tasks.

## The importance of water planning

Water planning is a process for transparently determining the distribution of water resources over time. It is the central mechanism used by governments and communities in making water management and allocation decisions to meet specific productive, environmental and social objectives. Water plans sit within a broader management system including regulatory and market structures that also guide water use.

In Australia, water is vested in the state and territory governments. State and territory governments are responsible for managing water resources to facilitate the achievement of public and private benefits of water. The Australian Government's involvement in water reform has increased since 1994 with the COAG Water Reform Framework with national goals and actions further outlined in the NWI.

2 The number of plans assessed for each jurisdiction included all plans that had commenced as at 30 June 2011, as well as any relevant draft plans that were available for assessment. Information on the status of these plans was considered up until 30 September 2011. For example, between July and September, a number of suspended plans in New South Wales recommenced and some draft plans became operational, and these are included in this Report Card assessment.

3 This includes unregulated, regulated, surface water and groundwater systems.

4 The Water Reform Committee comprised all jurisdictions and was chaired by the Department of Sustainability, Environment, Water, Populations and Communities (DSEWPoC). It was reconstituted in 2011 as the Water Thematic Oversight Group.

5 Subsequent Report Cards will describe how management arrangements and their implementation have changed since the previous Report Card, including actions in response to changes in system condition or resource availability.

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Statutory water plans provide security to all water users through clearly defined entitlements to a share of water. Further, water planning is a participatory process that allows for community input to government decision making in relation to the management of water resources in their local area.

Water planning is particularly important for managing Australia's water resources effectively throughout the extremes in wet and dry climatic conditions and is critical where resources are contested.

The importance of water planning is highlighted by the large number of water reform actions agreed to in the NWI that are delivered through implementation of sound water planning arrangements. There is no one best practice for water planning and jurisdictions use a range of governance structures to manage the diversity of water systems across Australia. However, the NWI does specify the objectives for water access entitlements and planning and provided guidelines for planning processes which have been further articulated in the more recent draft guidelines. Both the NWI and draft guidelines for water planning and management have informed the Report Card assessment framework.

## The National Water Initiative

The NWI addresses water management issues at a national level, reflecting the imperative for national compatibility and a strategic, coordinated approach to managing connected water systems. The NWI is a commitment by all state and territory governments and the Australian Government through COAG. It maps out Australia's water use and management objectives and actions and, importantly, sets out the basis on which freshwater resources are to be shared to support resilient and viable communities, healthy freshwater ecosystems and economic development.

Through the NWI, all jurisdictions have agreed to a set of key elements to include within their water planning frameworks and the closely linked water access entitlement frameworks (see NWI Clause 25). It was agreed that these frameworks will:

- i. enhance the security and commercial certainty of water access entitlements by clearly specifying the statutory nature of those entitlements
- ii. provide a statutory basis for environmental and other public benefit outcomes in surface water and groundwater systems to protect water sources and their dependent ecosystems
- iii. be characterised by planning processes in which there is adequate opportunity for productive, environmental and other public benefit considerations to be identified and considered in an open and transparent way
- iv. provide for adaptive management of surface water and groundwater systems in order to meet productive, environmental and other public benefit outcomes
- v. implement firm pathways and open processes for returning previously overallocated and/or overdrawn surface water and groundwater systems to environmentally-sustainable levels of extraction
- vi. clearly assign the risks arising from future changes to the consumptive pool
- vii. in the case of water access entitlements, be compatible across jurisdictions to improve investment certainty, be competitively neutral and to minimise transaction costs on water trades (where relevant)
- viii. reflect regional differences in the variability of water supply and the state of knowledge underpinning regional allocation decisions
- ix. recognise Indigenous needs in relation to water access and management
- x. identify and acknowledge surface water and groundwater systems of high conservation value, and manage these systems to protect and enhance those values
- xi. protect the integrity of water access entitlements from unregulated growth in interception through land-use change.

## Draft Policy Guidelines for Water Planning and Management

All jurisdictions, through COAG, have expanded on the commitments contained in the NWI and identified better practice across the range of key water planning elements in the Draft NWI Policy Guidelines for Water Planning and Management (draft guidelines). The need for this guidance was identified in the Commission's 2009 Biennial Assessment of Progress in Implementation of the NWI.

Consistent with the NWI, the draft guidelines are intended to be relevant nationally for all water systems. They recognise that legislative and administrative arrangements for water resource management differ among jurisdictions, and do not mandate a specific approach across all elements of water planning.

The objective of these guidelines is to assist all jurisdictions' water planners, policymakers and interested stakeholders in developing and implementing NWI-consistent water planning and management arrangements. Their value is in encouraging a degree of commonality at a national level in water planning approaches, which is important for achieving progress towards national water reform outcomes.

## The changing nature of water planning

There has been a significant shift in the focus of water policy and management from resource development (i.e. building dams and allocating available water for productive purposes) during much of the twentieth century to a multi-outcome focus that seeks to optimise social, economic and environmental objectives now articulated in the NWI.

All jurisdictions have developed their own frameworks for water planning that reflect the different priorities and issues faced in different parts of the country. This has led to often innovative approaches to water planning and management of water resources. All governments have demonstrated a long-term commitment to water planning over many years, gaining momentum for a nationally consistent approach through the 1994 COAG Water Reform Framework and then a renewed focus with the 2004 NWI.

Water planning in all jurisdictions is now based on an assessment of water resources and competing demands within a system to inform management arrangements over long periods. All jurisdictions have become more aware of the information and approaches required to inform water planning decisions and are working through the difficulties of developing individual water plans to operationalise them. The challenges of implementation now dominate water planning across the country.

In addition to onground implementation of plans, there are increasingly important issues in water planning that pose ongoing challenges for jurisdictions. These include significant uncertainty surrounding climate change and extremes in inflows and recharge and the pressures of urban, mining and agricultural development, addressing interception and changing expectations surrounding the health of ecosystems. These pressures drive a continued push for efficient, effective and equitable water management. The principles outlined in the NWI and draft guidelines to encourage continuous improvement through the application of new knowledge and regular monitoring and review provide an essential framework for governments to deal with these challenges responsively and fairly.

# Development of the National Water Planning Report Card

## The task

The Report Card is one of a number of actions contained within Water Reform Committee advice to COAG in response to the Commission's Biennial Assessment of Progress in Implementation of the NWI 2009. As part of this advice, the Water Reform Committee recommended that the Commission complete the first National Water Planning Report Card in 2011.

The intent of this National Water Planning Report Card is threefold:

1. Document a baseline of the status of water planning across Australia
2. Report on progress with the development and implementation of water plans in all water resource systems with reference to the draft guidelines
3. Provide a succinct evaluation of the status of each water plan against specific components of water planning (see below) to facilitate continual improvement of water planning in Australia by providing transparency of water planning processes across jurisdictions and highlighting better practice approaches.

The Water Reform Committee agreed on a list of key water planning components to be used as indicators of progress of development and implementation of water plans.

### KEY WATER PLANNING COMPONENTS TO BE EVALUATED:

- a. *overuse status and whether there is a pathway to return to a sustainable water extraction regime*
- b. *inclusion of clearly identified and measurable outcomes*
- c. *facilitation of water trade (absence of trade barriers, meeting service standards for trade, etc.)*
- d. *integration of mining, forestry and other water intercepting activities within the water planning and entitlements system where appropriate*
- e. *surface water/groundwater connectivity*
- f. *accountable environmental water management arrangements, together with a comprehensive environmental watering plan (or other appropriate environmental water management arrangement)*
- g. *the adequacy of monitoring, compliance and enforcement provisions, and*
- h. *planning for climate change and extremes in inflows or recharge that may occur during the planning cycle.*

*In addition, the National Water Planning Report Card will assess the adequacy of stakeholder engagement in planning processes and the extent to which identified outcomes have been achieved during the reporting period.*

As well as the ten areas identified above, this National Water Planning Report Card also outlines where water plans have not been developed for water systems and jurisdictions' reasons for those decisions.



## Our approach

The Commission's approach to the Report Card task was designed to accommodate the complexity and diversity of water planning across Australia.

The Commission developed an assessment framework for the evaluation of water plans. Building on the 10 indicators provided by the Water Reform Committee, the Commission identified 12 criteria against which all water plans were assessed (see Appendix 1).

As outlined in the NWI and the draft guidelines, a water plan may be a single legal document or a number of legal and policy instruments working together. The water planning arrangements for one water plan area can thus be distributed across several documents. The evaluation of each individual water plan area recognised the contribution of overarching legislation, regulation and policy frameworks where they are a component of a water planning framework.

Similarly, the scale at which a water plan is developed varies, and each jurisdiction has taken a different approach. A water plan may apply to a number of water systems or a discrete part of a water system. All jurisdictions have prioritised plans where systems are under stress.

It was important for the Commission to utilise a consistent approach in assessing water plan areas against each criterion and that the objectivity of the evaluation was maintained. More detailed sub-criteria were developed to clarify and standardise the detail of the assessment. These sub-criteria were based heavily on the various elements of good water planning as presented in the NWI and the draft guidelines. They then were further refined on the basis of feedback received from jurisdictional water planning agencies and early assessments undertaken for the task. These sub-criteria are shown at Appendix 1.

All plans underwent a 'baseline' assessment against all criteria and a limited set of sub-criteria. A more detailed assessment focussing further on the implementation of certain water planning elements was undertaken for a sample of 25 water plans. The additional 18 sub-criteria addressed plan implementation in areas such as environmental water, stakeholder engagement, interception and the reporting of outcomes.

Extensive internal and external consultation, peer review and quality assurance measures employed by the Commission ensured informed analysis and consistency in assessment of the criteria across all water plans. The Commission notes, however, that a degree of judgement was still required to ensure contextual matters were adequately taken into account.

The Report Card made use of all publicly available information through desktop analysis. This allowed examination of a large volume of information within a relatively short timeframe. Guidance was sought from jurisdictions to source documentation that is difficult to access and some additional information that is not publicly available was provided upon request. This was particularly the case for the older water plans.

This report provides a baseline for understanding the status of water plans and the maturation of water planning arrangements across Australia. However, the limitations of the scope of this first Report Card are recognised. Future biennial Report Card assessments, the next due in 2013, will describe how management arrangements and their implementation have changed since the previous Report Card, including actions by jurisdictions in response to changes in system condition or resource availability. The Commission considers that further examination of the onground implementation of key elements of water plans would be valuable, particularly in areas of monitoring and reporting, compliance, stakeholder engagement and the achievement of water plan outcomes.

## Structure of this report

Sections 3-10 are organised by jurisdiction. Each section contains jurisdictional summary and individual Report Cards for each water plan area.

### INDIVIDUAL REPORT CARDS

Individual Report Cards apply the National Water Planning Report Card assessment framework to each water plan in Australia.

Each Report Card provides both direct answers to all criteria questions, as per the standard answers noted in Appendix 1, as well as comments providing further details of the reasoning behind each answer given.

The standard answers provide a snapshot of which components of water planning have been addressed well, and which components are lacking, for that particular water plan.

The comments associated with each answer provide insight into what factors contributed to the answer given. This comment is particularly important for highlighting the distinct factors affecting specific water plans and explaining any differences in answers across the same assessment criteria for water plans within the same jurisdiction.

### JURISDICTIONAL SUMMARIES

The findings from the individual Report Cards are consolidated to develop an overview of how water planning operates in each jurisdiction.

It is important to address water planning at the state and territory level, as well as the individual water plan level, as many of the associated functions are governed by jurisdiction-scale instruments, such as for trade, compliance and enforcement and state-wide policies that guide consultation and monitoring and reporting activities. The state and territory summaries provide important context for understanding how individual water plans are built in each jurisdiction.

A succinct summary of the key aspects of each jurisdiction's water planning framework has been compiled. Further, the key instruments that govern different aspects of water planning are linked to each of the Report Card assessment criteria. The descriptions help to bring greater transparency to what is often a very complex process.

The summary is then linked to a synthesis of the findings from individual water plan Report Cards to provide a general description of how water planning activities relate to the Report Card assessment criteria. This allows the opportunity to highlight areas of good practice and achievement as well as areas for further attention.

The multiple layers of information for each jurisdiction are consolidated into an assessment overview as a concise record of the key take home messages for each jurisdiction.





## 3. New South Wales





# STATE SUMMARY

# NEW SOUTH WALES



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## The context of water planning in New South Wales

New South Wales has a diverse range of regulated and unregulated surface water and groundwater resources, and covers 56 per cent of the area of the Murray–Darling Basin. High rainfall variability and the geographic separation of water resources in New South Wales provide challenges for water planning. Extreme droughts and floods occur regularly across the State and rivers have historically had highly variable flow. The impacts of climate change are expected to increase evaporation and alter rainfall patterns and the levels of runoff, leading to further changes in the flow regimes of rivers and potentially affecting aquatic ecosystem health. Within this context, there are strongly competing demands for water between high-value conservation areas, productive industries, cultural and societal amenity, as well as high demand from urban areas.



# Planning arrangements



## Key legislation and policies

The key water planning instruments are the *Water Management Act 2000*, and the associated water sharing plans (WSPs). The Water Management Act established a new statutory framework for managing water in New South Wales, although the original *Water Act 1912* continues to apply in areas that are not yet covered by water sharing plans.

Under the Water Management Act, water rights can now only be acquired through an access licence, with the exception of some stock and domestic rights, harvestable rights, native title rights and other activities which are exempt from requiring a water licence (e.g. bushfire fighting). The objects and principles of the Water Management Act recognise the need to allocate water for the environmental health of surface water and groundwater systems, while also providing licence holders with more secure access to water and greater opportunities to trade water.

The Water Management Act provided for the establishment of an overarching policy for the development, conservation, management and control of the State's water resources called the State Water Management Outcomes Plan (SWMOP). The State Water Management Outcomes Plan guided the first round of water sharing plans that commenced in 2004, but has not been renewed because the long-term outcomes and management targets for water use are now guided by other instruments, such as the NWI, the State Plan, the macro planning process and the subsequent objectives set in the water sharing plans themselves.

## Process for developing water sharing plans

Water sharing plans are statutory instruments that establish environmental water rules and make provisions for Basic Landholder Rights (BLR), water for extraction under access licences, water trading rules and the establishment of bulk access regimes for extractions. A water sharing plan may cover all, part of or multiple water management areas, and may apply to regulated rivers, non-regulated rivers and/or groundwater.

The Water Management Act provides for management committees to be established to prepare draft water sharing plans for public exhibition and eventual approval by the state Minister. These management committees are required to include environmental protection, water user, local council, Catchment Management Authority, Indigenous, and government department representatives.

The first round of water sharing plans that commenced in 2004 often focused on a single water resource and was prepared using the local committee approach with extensive stakeholder consultation during draft plan development. However, in recent years, the process of developing water sharing plans for single sub-catchments using localised committees has been replaced by a macro approach that aggregates water sources into broader management units and is driven by an Interagency Panel. The panel consists of government agency staff that have local expertise on water related issues, with the relevant Catchment Management Authority as an observer. This shift in approach aims to fast track the preparation and commencement of water sharing plans to cover the remaining unregulated and groundwater sources that generally have lower intensity water use compared with earlier planning areas.






























## Tenure and review of water sharing plans

Water sharing plans generally have a lifespan of 10 years and can be extended for a further 10 years. All water sharing plans are to be audited at five-yearly intervals by a panel appointed by the Minister. An implementation program may be established that sets out the means by which the objectives of the plan will be achieved. This implementation program is to be reviewed by New South Wales Office of Water (NOW) each year and the results published in its annual report. The Natural Resources Commission is also tasked with reviewing water sharing plans between years five and ten of the plan.

The following table indicates the planning level and instruments that address each Report Card criterion.



Table 1: Planning instruments

Assessment criteria	State		Regional/ catchment	Comment
	WMA 2000	State policy	WSP	
1. Status of plan				WSPs establish water sharing arrangements for each water resource, including extraction limits, trading rules and environmental water provisions. There are also a number of state and regional plans and policies, as well as various pieces of state and Commonwealth legislation that relate to water planning in NSW (e.g. Murray–Darling Basin cap). WSPs generally apply for a period of 10 years.
2. Key assessments				Assessments (e.g. hydrological, socioeconomic, environmental) are generally undertaken at the proposed plan area level, with further details on individual water sources provided in supporting documentation (e.g. Report Cards, background, guide).
3. Overuse status & pathways to sustainable water extraction				WSPs contain rules to manage environmental and consumptive water entitlements. A number of state policies have been developed to guide the development of extraction regimes (e.g. Groundwater Quantity and Quality Protection Policy, SWMOP).
4. Clearly identified & measurable outcomes				The <i>Water Management Act 2000</i> applies the principles of ecologically sustainable development guided by the objectives of the SWMOP. WSPs include overarching objectives, often detailing strategies and performance indicators for their achievement.
5. Facilitation of trade				WSPs developed under the <i>Water Management Act 2000</i> create tradeable water access entitlements and detail the specific trading rules associated with each water source. For areas still under the <i>Water Act 1912</i> (i.e. without a WSP) trade is possible under certain circumstances.
6. Integration of water intercepting activities				Interception activities are largely controlled by state-wide legislation and policies (e.g. Harvestable Rights, aquifer interference/mining) and WSPs may include estimates of some interception activities (e.g. BLR, floodplain harvesting).
7. Surface water/ groundwater connectivity				SWMOP targets include connectivity mapping but the provisions for the integrated management of surface water and groundwater vary between WSPs. Some WSPs focus only on single water resources, but may have connectivity estimates incorporated into their underlying hydrological models.
8. Environmental water management arrangements				The <i>Water Management Act 2000</i> outlines an overarching commitment to providing environmental water (planned and adaptive), but it is individual WSPs that detail the specific rules or entitlements of the provision in each water source.
9. Monitoring, compliance & enforcement provisions				NOW maintains a compliance and enforcement policy for monitoring extractions. The <i>Water Management Act 2000</i> requires WSPs to be audited every five years. Other monitoring initiatives occur (e.g. Integrated Monitoring of Environmental Flows), but no specific provisions are detailed for each WSP.
10. Planning for climate change & extremes in inflows or recharge				Most WSPs consider climate variability through the use of long-term climate data for their development. The <i>Water Management Act 2000</i> provides for WSP suspension if a severe water shortage is declared, and this provision has been enacted for a number of WSPs.
11. Stakeholder engagement				The <i>Water Management Act 2000</i> requires exhibition of draft WSPs for the purpose of receiving public submissions. There is also provision for public submissions to be received at the time of WSP review by the Natural Resources Commission.
12. Extent to which outcomes have been achieved				The <i>Water Management Act 2000</i> requires audits of WSPs to assess the effectiveness of implementation and regular reviews of achievements.



## Key findings



### Coverage of planning accelerated through the NWI-consistent macro approach

In recent years, New South Wales has implemented a generic, largely NWI-consistent macro planning framework to accelerate delivery of most of the remaining unregulated surface water and groundwater water sharing plans that generally have lower intensity water use compared with earlier planning areas. The approach has shifted responsibility for developing the draft water sharing plan away from the local community committees to Interagency Regional Panels. While the macro planning approach has proved quick and more cost effective, there are limitations to its applicability across the diverse range of water resources in the state.

### Shifting from single to multiple resource plans facilitates more integrated management

The first round of water sharing plans frequently had a single resource focus resulting in a set of discrete plans that lacked a catchment or valley-scale context for planning provisions. Greater emphasis on integrated planning arrangements (e.g. Bega Brogo Water Sharing Plan) has been demonstrated to provide opportunities for more flexible trade-off outcomes across all users and the environment, and for more effective management of broader landscape scale issues.

### Better coordination of monitoring and more consistent reporting needed to improve the assessment of water sharing plan outcomes

In general, the ecological and cultural outcomes of water sharing plans are under-monitored and under-reported making it difficult to assess whether they are being achieved. Better progress has been made in the achievement of objectives that relate to security of water rights and trade. To date none of the completed audits of water sharing plans have been released by the Minister and so are currently unavailable to the public. Greater transparency is necessary in assessment of plan implementation and reporting on achievement of plan outcomes.

## Findings against criteria

1. Status of water planning	New South Wales has made significant progress in developing water sharing plans for the entire state since 2004. More than 95 per cent of the water extracted is covered by 53 operational water sharing plans. At the time of assessment, nine draft plans were being finalised for commencement and a further 21 plans were in various stages of development. More transparency around the triggers for water sharing plan suspension would improve community confidence in water planning.
2. Do plans include key assessments?	A lack of comprehensive knowledge of surface water and groundwater systems in some areas has meant that extraction regimes established in some water sharing plans trade-off consumptive and environmental water use, but are not necessarily based on quantification of the water requirements of environmental assets or an adequate understanding of cultural values. In general, hydrological, socioeconomic, and environmental assessments were undertaken as part of the development of draft water sharing plans by local committees in 2004. However, there is limited documentation available for this process. In contrast, the macro approach to planning aims to provide online accessibility to water resource assessments, including the risk assessments that support decision making. New South Wales Office of Water is currently rolling out an initiative to engage Indigenous communities in water sharing and improve understanding of cultural values associated with water resources.
3. Do plans address overuse and is there a pathway to sustainable extraction?	In the small number of plans where overuse has been identified extraction limits have been established and clear pathways have been set to reduce entitlements within the life of the plan. Where plans have not identified overuse extraction limits have also been set and rules for responding to noncompliance have been included. For some plans it is not clear that extraction regimes were developed through a trade-off process informed by appropriate social, environmental and economic assessments.



4. Do plans include clearly identified and measurable outcomes?	The Water Management Act aims to apply the principles of ecologically sustainable development guided by the objectives of the State Water Management Outcomes Plan and other state policies. Each water sharing plan includes overarching objectives with many also detailing strategies and performance indicators. The objectives set in water sharing plans are often broad and their measurement would require considerable effort. A lack of coordination across monitoring programs also makes it difficult to assess the effectiveness of plan implementation or achievement of outcomes. New South Wales Office of Water is currently developing a framework to improve the setting of ecological objectives for new and reviewed water sharing plans.
5. Do plans facilitate trade?	Water sharing plans developed under the Water Management Act create NWI-consistent, tradeable water access entitlements and detail the specific trading rules associated with each water source. Access to the full range of trade options for all entitlement holders will be achieved with conversion of the remainder of <i>Water Act 1912</i> licences and implementation of metering in unregulated systems to allow temporary trades.
6. Is interception appropriately considered and integrated into plans?	Interception activities are largely controlled by state-wide legislation and policies (e.g. farm dams, plantation forestry), and individual water sharing plan extraction limits often include estimates of volumes for interception activities (e.g. Basic Landholder Rights, floodplain harvesting). Floodplain harvesting has been identified as an interception issue in water sharing plans since 2004, however the policy to control this type of water use remains in draft. Similarly, the Reasonable Use Guidelines for Basic Landholder Rights also have not been finalised. Water extraction by mining, either to support production or for the purpose of dewatering, must be licensed in New South Wales. A moratorium on the use of hydraulic fracturing during coal seam gas drilling is in place until 31 December 2011.
7. Do the plans address surface water and groundwater connectivity as appropriate?	Provisions for the integrated management of surface water and groundwater resources vary between water sharing plans. In general, early single resource water sharing plans lacked provisions for integrated management of connectivity, even though it may have been addressed in their underpinning hydrological models. Recent policy changes have resulted in greater emphasis being placed on integrating surface water and groundwater management in later macro plans.
8. Do plans contain accountable environmental water management arrangements?	More recent water sharing plans are increasingly including integrated management and attention to water regime requirements to maximise environmental benefits. Measurement of the achievement of environmental outcomes is impaired by the lack of data available in some plan areas to quantify water requirements and/or assess the condition of environmental assets.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	The Water Management Act requires water sharing plans to be audited and reviewed, but monitoring has generally been poorly coordinated. Reporting has also been highly variable. An Environmental Flow Response Monitoring and Modelling Program is currently under development to improve linkages amongst data collection initiatives. Better coordination of monitoring data and more effective synthesis in reporting will be useful to inform decision making into the future. The New South Wales Office of Water has established compliance and enforcement arrangements for monitoring extractions, however metering of licensed water use has not commenced in all water sources.
10. Do the plans deal appropriately with climate change and extremes in inflows or recharge?	Historical climate variability data is considered in the development of all water sharing plans. Long term climate change scenarios have informed the development of some recent macro plans. Not all plans have the capacity to manage extremes in inflows as evidenced by the temporary suspension of five regulated river water sharing plans. Suspension of water sharing plans is permitted in the event of a severe water shortage under the Water Management Act.
11. Is stakeholder engagement in the planning process adequate?	Early water sharing plans used local water management committees to develop draft plans and this process generally resulted in extensive community consultation. However, for many of these water sharing plans information explaining the final decision-making process was not made available to the public. More recent macro water sharing plans are developed by an Interagency Regional Panel. The transparency of trade-offs is supported by online documentation, targeted consultation, community meetings to disseminate information, and public exhibition of draft water sharing rules.
12. Have identified outcomes been achieved during the reporting period?	To date, none of the completed audits of water sharing plans have been released by the Minister and so are currently unavailable to the public. Some published results of monitoring demonstrate that a subset of water sharing plan strategies is being implemented, with progress evident in the achievement of objectives that relate to security of rights and trade. By contrast, the achievement of cultural and environmental objectives is difficult to assess due to a lack of coordinated monitoring and reporting.



## Glossary and abbreviations

Term	Acronym	Definition
Annual watering plan	AWP	Descriptive non-statutory plan that summarises environmental watering arrangements.
Available water determinations	AWD	Determines how much water a licence holder can extract in a year.
Basic Landholder Rights	BLR	Rights for water use that do not require a licence, e.g. landholders can extract water for stock and domestic use.
Environmental Contingency Allowance	ECA	Volume of water provided in some water sharing plans for environmental purposes.
Floodplain harvesting	FPH	Collection, extraction or impoundment of water flowing across floodplains.
Great Artesian Basin	GAB	A multilayered system of pressurised aquifers underlying significant parts of New South Wales, Queensland, South Australia and the Northern Territory.
Groundwater-dependent ecosystem	GDE	Ecosystems that are dependent on groundwater for their existence and health.
Long-term extraction limit	LTEL	Volume of water available to be extracted from a water source on average per year, also referred to as LTAAEL (long-term average annual extraction limit).
New South Wales Office of Water	NOW	Part of the Department of Primary Industries, responsible for the management of the State's surface water and groundwater resources.
Office of Environment & Heritage	OEH	Responsible for managing environmental water in New South Wales.
Reasonable Use Guidelines	RUG	Draft policy being developed to guide the exercising of basic landholder rights.
State Water Management Outcomes Plan	SWMOP	Sets overarching policy, targets and strategic outcomes for water management under the <i>Water Management Act 2000</i> .
Water access licence	WAL	Entitles the holder to a share of the available water source and to take water from a specified location.
Water sharing plan	WSP	Statutory instrument which establishes environmental water rules and makes provisions for basic landholder rights, water extraction under access licences, water trading rules and establishment of bulk access regimes.





## Planning areas

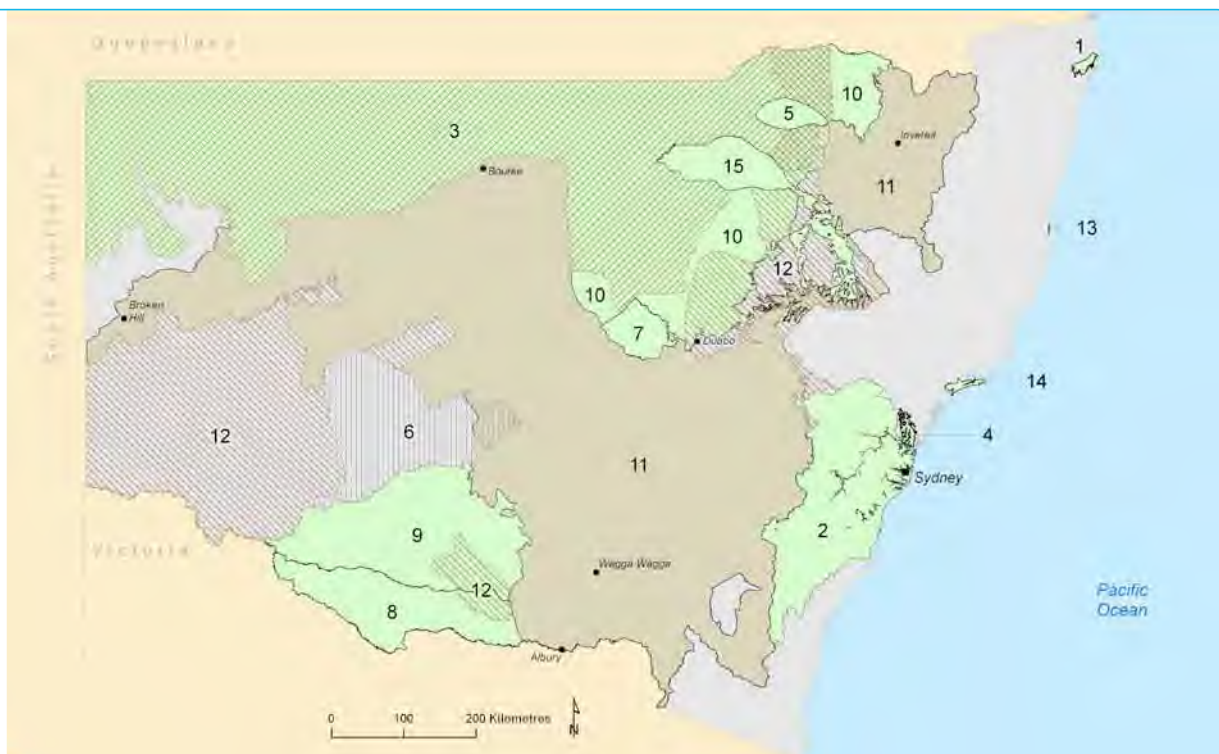
### New South Wales: surface water sharing plan areas

Map 1



### New South Wales: groundwater sharing plan areas

Map 2



## Location



## MAP 1

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## New South Wales: groundwater sharing plan areas

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# ADELONG CREEK WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Adelong Creek Water Source is located in southern New South Wales. It flows for approximately 70 km past the townships of Adelong and Tumblong, joining the Murrumbidgee River downstream of Gundagai. While there are many unregulated waterways in the upper Murrumbidgee catchment, some of the greatest volumes of water for irrigation are extracted from Adelong and Tarcutta creeks. In the 1998 Stressed Rivers Assessment Report Adelong Creek was classified as being under high hydrological stress and prioritised for river management plan development. Despite being one of many unregulated rivers in the Murrumbidgee catchment, Adelong Creek is managed under a discrete water sharing plan which commenced in 2004.

## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the unregulated surface waters of the Adelong Creek Water Source commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	To some extent	Some key assessments were undertaken as part of the development and drafting of the plan by a localised water management committee. Public documentation of this process has been limited (e.g. environmental asset condition, cultural values, connectivity). The 1998 Stressed Rivers Assessment Report also categorised the environmental and hydrological stress of this water source.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. However, the environmental and consumptive use trade-offs that underpin the extraction limit are no longer publicly available.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements for the measurement of the effectiveness of this particular plan in achieving all outcomes have not been clearly articulated. While ecological and cultural objectives are broad and will require considerable monitoring investment to measure their achievement, some trade and entitlement objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of forestry and mining interception.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	No	The plan does not quantify the connectivity between surface water and groundwater. There is acknowledgment of the potential impacts on connected systems via reference to maintenance of groundwater to sustain critical surface flows and ecosystems in the plan's objectives.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. Environmental assets and their water requirements are not clearly detailed and monitoring is not a clearly embedded component of the plan or supporting documents.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some socioeconomic, water extraction and flow monitoring has been undertaken, however this has not been clearly linked to plan outcomes and reporting is limited. A progress report on all water sharing plans in the Murrumbidgee Valley is pending. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements informed by historical climate data. The cease-to-pump rule will assign any potential reductions in supply to water users. There is no quantification of the potential risks to system health or entitlement securities due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The draft plan was developed by the Murrumbidgee Unregulated Streams Management Committee and the final plan was based on these recommendations. Public submissions were accepted on the draft but information explaining the final decision-making process was not made available to the public.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of plan actions, such as the provision of tradeable water entitlements, however none of the evidence examined demonstrated that outcomes have been achieved to date. In particular, data on assessment of ecological objectives were not provided and no information was available on cultural values.



# ALSTONVILLE PLATEAU GROUNDWATER SOURCES



## WATER SHARING PLAN 2003



### Context

The Alstonville Plateau Groundwater Sources are located on the north coast of New South Wales and the towns of Bangalow, Alstonville and Lismore are located within the plan area. The Alstonville Plateau Groundwater Sources are highly connected to the surface water, and the basalt aquifer was classified as being at high risk of over extraction and contamination in some parts during the 1998 Aquifer Risk Assessment reporting. A broad range of crops are grown on the plateau including stone fruit, nuts, potatoes and flowers and the area has been extensively cleared. High urban development was occurring on the plateau during plan drafting.

## Findings

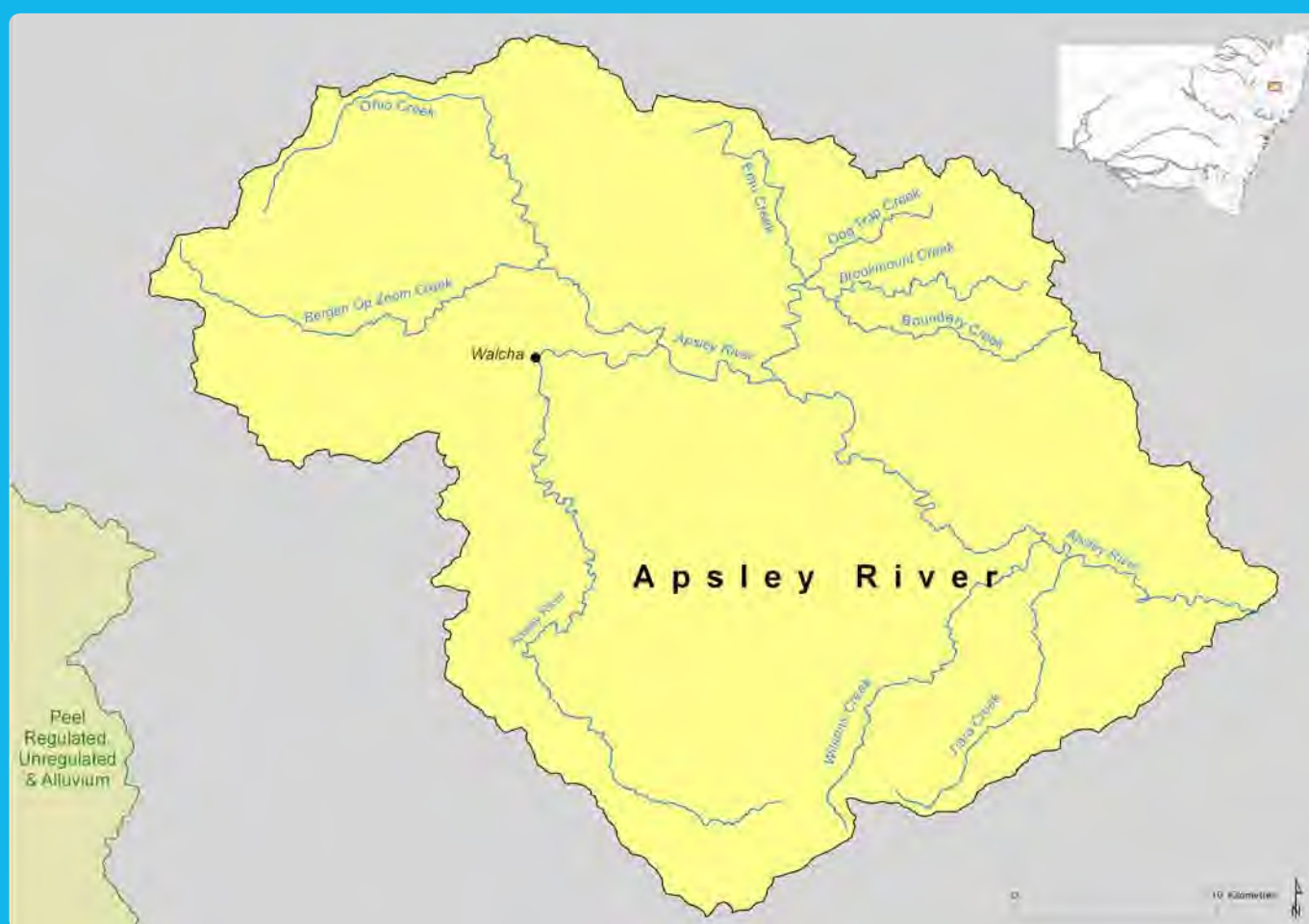
Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the Alstonville Plateau Groundwater Sources commenced in 2004 and applies for 10 years. The plan was reviewed in 2009.
2. Does the plan include key assessments?	To some extent	Key assessments were completed during 1999–2002, however they were not clearly linked to the plan. No process has been identified for documenting or managing key risks to the water source, though over extraction is an inferred risk.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, but does recognise the system is at risk of over extraction. An extraction limit has been established and the plan allows for reductions to allocations if it is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad outcomes, the achievement of which may be difficult to measure. The plan does link objectives to plan provisions but monitoring arrangements are not detailed, including the monitoring of risks.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan addresses interception by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of other potential intercepting activities (e.g. forestry, mining).
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The plan is a single resource plan and addresses groundwater only, with no reference to integrated management arrangements and no links to other plans. Hydrogeological research is ongoing to improve groundwater modelling and knowledge of groundwater-dependent ecosystems (GDEs).
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements but the water required to sustain GDEs is not quantified. There are provisions in the plan for adaptive environmental water, however monitoring is not a clearly embedded component of the plan or supporting documents.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some monitoring of groundwater levels and socioeconomic objectives is being undertaken, however the specific arrangements for monitoring have not been clearly described and reporting on the effectiveness of this plan is yet to occur. Metering of licensed water use has not commenced. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	While the plan acknowledges climate variability, it assumes that the in-built review cycle will provide sufficient adaptive capacity. The plan does not quantify the potential risks to system health or entitlement security as a result of climate change or variability.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Considerable information was made available to and received from the public during the stakeholder engagement process (e.g. targeted consultation in plan development, public exhibition of draft plan). However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress towards some outcomes has been made (e.g. maintenance of groundwater quality). A groundwater model has been developed to inform the establishment of extraction limits and installation of monitoring bores has occurred. However, metering of licensed water use has not commenced. Required reporting against the implementation program and the five-year review are not publicly available.



# APSLEY RIVER WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Apsley River is a tributary of the Macleay River in the northern tablelands of New South Wales. The catchment includes the town of Walcha and is an area of cultural importance for Aboriginal people. The plan area has been largely cleared for agriculture and is upstream of the Oxley Wild Rivers National Park. The Apsley River was rated as being under high hydrological and high environmental stress in the 1998 Stressed Rivers Assessment Report. At the time of plan drafting there were 10 water access licences in the water source.

## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the unregulated surface waters of the Apsley River Water Source commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments were undertaken to inform the plan's development. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, but does recognise the system as hydrologically-stressed. The plan establishes the basis for a long-term extraction limit and allows for reductions to allocations if the extraction limit is exceeded. Information explaining the trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad outcomes, which are linked to the plan's provisions. Monitoring arrangements for measuring plan outcomes are not clearly specified within the plan or its supporting documents.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of other potential intercepting activities (e.g. forestry), and the plan may be amended for licensing floodplain harvesting.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The water sharing plan is a single resource plan and addresses surface water only, with no reference to integrated management arrangements and no links to other plans.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements based on the long-term average extraction limit and maintaining flow classes which dictate volumes to be taken on a daily basis and cease-to-pump conditions on licences. However, the water requirements of environmental assets have not been quantified.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving its objectives. However, there is no monitoring schedule in the plan or supporting documents and to date there appears to have been minimal monitoring to support the 2014 assessment. Some socioeconomic monitoring is undertaken as part of a state-wide program. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. The cease-to-pump rule will assign any potential reductions in supply to water users. There is no quantification of the potential risk to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The draft plan was developed by a localised committee that included stakeholder representatives and government agencies. Plan development involved extensive community engagement, which included public meetings, public exhibition of the draft plan and a public submissions process. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Some progress has been made towards the implementation of some plan strategies (e.g. provision of tradeable water entitlements). However, monitoring of plan effectiveness is not consistently reported in publicly available documents. Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. temporary water trading). None of the evidence examined demonstrated that outcomes have been achieved to date.

# BEGA AND BROGO RIVERS AREA, REGULATED, UNREGULATED AND ALLUVIAL WATER SOURCES



## WATER SHARING PLAN 2011



### Context

The Bega River catchment is situated on the far south coast of New South Wales. Dairy and beef farming have largely supported the growth of the regional economy since the 1850s, and the catchment contains high conservation value environmental assets, such as the Bega River Estuary. There is a high level of development in some water sources of the Bega catchment and the Brogo and Bemboka rivers have been categorised as being under high environmental stress. The 1998 Stressed Rivers Assessment Report prioritised these areas for development of river management plans. Water sharing rules have been developed from water management committee recommendations, Healthy River Commission assessments and community consultation.

## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers the unregulated and regulated surface waters, as well as the alluvial groundwater sources, in the Bega and Brogo Rivers Area. It commenced in 2011 and applies for 10 years.
2. Does the plan include key assessments?	Yes	The plan and supporting documentation provide information on the key assessments undertaken (e.g. hydrological modelling, ecological assets, risk assessments) and include links to the studies that underpin the relevant data.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements are not specific. Ecological and cultural objectives are broad and their measurement will require considerable effort. Flow and entitlement related objectives are likely to be measurable using routinely collected hydrologic and trade parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan addresses interception for BLR, including consideration of impacts from farm dams. Forestry was assessed during plan development as an insignificant interception risk. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan does recognise the connectivity of groundwater and surface water resources and facilitates their integrated management. For example, where surface water and groundwater sources are highly connected they are managed as one resource.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Environmental objectives are specified in the plan and supporting documents provide detail on the water requirements of environmental assets. The environmental water provisions of the plan will be given effect to in Water Supply Work Approvals and State Water Corporation is required to provide an annual compliance report. However, the specific arrangements for monitoring the effectiveness of this plan in achieving environmental outcomes have not been clearly articulated.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan commenced in 2011, therefore it is too early to assess this criterion. A project has commenced to install water metering equipment in the catchment and socioeconomic parameters are collected using state-wide surveys. Some monitoring requirements will be outlined in the Water Supply Work Approvals and State Water Corporation is required to provide an annual compliance report. However, no specific arrangements are detailed for this particular plan. There is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan has been developed with consideration of the impacts to the environment and other users from variability in rainfall, inflow and recharge. An overall assessment of likely risks posed by long-term climate change was undertaken during plan development.
11. Is stakeholder engagement in the planning process adequate?	Yes	Development of the plan involved extensive stakeholder engagement through a number of consultation phases. This included establishment of the South Coast Water Management Committee to ensure community input during plan preparation and feedback on draft water sharing arrangements.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	This plan commenced on 1 April 2011, so an assessment of this criterion cannot be made at this time.



# BELLINGER RIVER AREA UNREGULATED AND ALLUVIAL WATER SOURCES



## WATER SHARING PLAN 2008



### Context

The Bellinger River Area Unregulated and Alluvial Water Sources are located within the upper north coast catchment. The two main rivers in the catchment are the Kalang and the Bellinger. Rainfall is high in the Bellinger valley and coastal areas. The Bellinger catchment has high ecological values and contains regionally significant rainforest. Topography has been a dominant factor in development, with steep areas remaining forested and the narrow floodplain and associated foothills cleared for grazing, cropping and other uses. Forestry operations and agriculture are important contributors to the local economy but tourism is progressively increasing.



## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	There is a finalised and operational statutory plan that covers unregulated rivers, alluvial groundwater and the tidal pool areas within the planning area. The plan commenced in 2008 and applies for 10 years.
2. Does the plan include key assessments?	To some extent	Development of the plan was based on key assessments informed by available studies, expert panel knowledge and community consultation. However, for some water sources there was a lack of information on in-stream values and community dependencies.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify any areas of overuse. An extraction limit has been established based on existing entitlements and the plan allows for reductions to allocations if the extraction limit is exceeded. The plan also established cease-to-pump rules based on daily flows and schemes to move extraction from low flows to higher flows.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad objectives, strategies and related performance indicators, but monitoring and reporting arrangements are not specific. Measurement of the plan's ecological objectives will require considerable monitoring effort. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	Yes	The Bellinger catchment is considered an area in which no significant water interception activities are anticipated within the life of the plan, however 80% of the catchment remains forested. The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan identifies groundwater/surface water connectivity and includes water access rules that address impacts in connected aquifers and rivers within the plan area.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental water provisions. Preservation of low flows for environmental purposes is based on general ecological information but no area-specific environmental requirements have been identified. The objectives are broad making the links between provisions and outcomes unclear.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some socioeconomic monitoring is occurring as part of a state-wide program. However, metering of use is not widespread. The specific arrangements for monitoring of the effectiveness of this plan in achieving all outcomes have not been clearly articulated. No implementation program has been made public. Live daily flow volumes are online for existing gauges but the ecological monitoring program has not been established. The plan and its supporting framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements informed by historical climate data. There is no quantification of the potential risks to system health or entitlement securities due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement included targeted consultation pre-draft and public submissions accepted on the draft plan. An Interagency Regional Panel drafted the plan and all submissions were responded to in the updated Report Cards re-issued with the finalised plan.
12. Have identified outcomes been achieved during the reporting period?	No	No information on the achievement of outcomes, implementation of plan strategies, or assessment against performance indicators has been made publicly available.

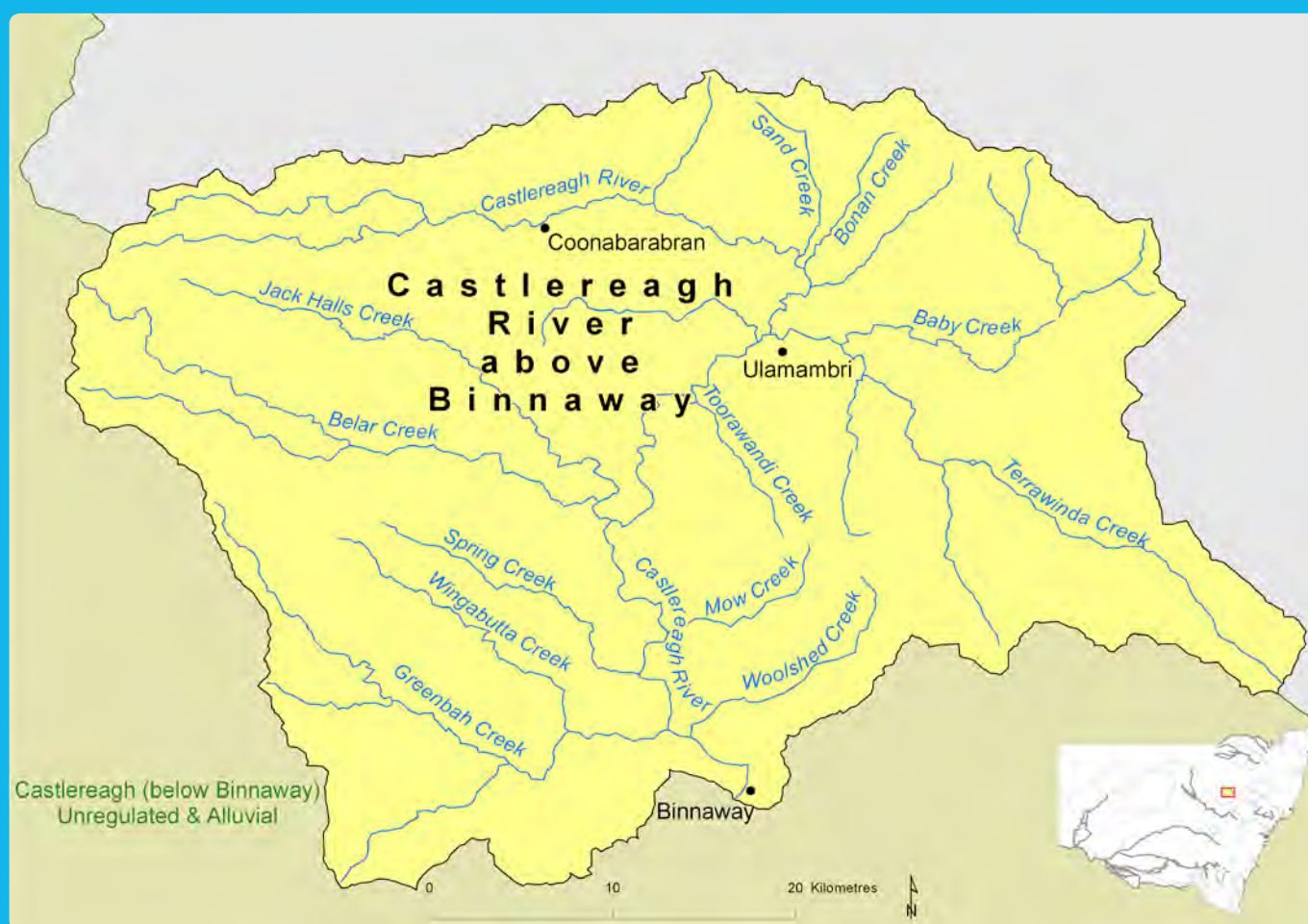




# CASTLEREAGH RIVER ABOVE BINNAWAY WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Castlereagh above Binnaway Water Source is located in the upper reaches of the Castlereagh Valley in central-west New South Wales. Water sharing for the remainder of the system will be managed under the Water Sharing Plan for the Castlereagh River Unregulated and Alluvial Water Sources (in draft as at 30 September 2011). The Castlereagh above Binnaway is characterised by highly variable flow patterns. Low flow conditions predominate, with December tending to be the month of the lowest flows but also the time of highest consumptive demand for irrigation, industry, town water supply and domestic and stock uses. The main uses of irrigation water are for cropping, pasture, viticulture and horticulture. The planning area is considered hydrologically-stressed because of the high reliance on the system's low flows. Previous water access tensions within the system have demonstrated that without equitable water sharing arrangements upstream users have the ability to reduce flows to the extent that downstream licence holders or Basic Landholder Rights users are unable to obtain water.



## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments were undertaken to inform the plan's development. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, but does recognise the system is hydrologically-stressed. It establishes an extraction limit and allows for reductions in allocations if the level of extraction from all unregulated water take exceeds the limit set by the unregulated rivers component of the Macquarie-Castlereagh Valley Murray-Darling Basin cap. Information on the trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad objectives, strategies and related performance indicators, but monitoring and reporting arrangements are not specific in the plan or its supporting documentation. Measurement of a number of the plan's ecological objectives will require considerable monitoring effort. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. A number of state-wide policies guide the management of other potential intercepting activities, such as mining.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan that addresses surface water only, with no reference to integrated management arrangements.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes cease-to-pump levels to protect pool connectivity during low flow periods, and daily flow sharing volumes to protect natural flow variability. The environmental water provisions are based on the hydro-ecological assumption that mimicking natural flow variability will protect aquatic ecosystems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving its objectives using monitoring and modelling of ecological, economic and cultural indicators. Environmental flow response and socioeconomic monitoring commenced in 2008, with the first results publicly reported in 2010. The frequency of future public reporting is unclear. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not explicitly deal with climate change; rather, it assumes that the in-built review cycle will provide sufficient adaptive capacity. There are some self-adjustment mechanisms for climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. provision of tradeable water entitlements, provision of BLR, maintenance of extraction limit). Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. daily flow sharing, temporary water trading). Monitoring of the ecological and socioeconomic outcomes of the plan has commenced but it is difficult to assess achievements as there has been little public reporting of results to date. The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions have not been made publicly available.

# CASTLEREAGH RIVER (BELOW BINNAWAY) UNREGULATED AND ALLUVIAL WATER SOURCES



## DRAFT WATER SHARING PLAN



### Context

The Castlereagh Unregulated and Alluvial Water Sources are located in central to north-western New South Wales. The Castlereagh River is within the Murray–Darling Basin and joins the Macquarie system close to its confluences with the Barwon River near Brewarrina. The area's rainfall varies considerably from year to year, with around half of the annual rainfall typically recorded from November to March. The streams that drain the Warrumbungle Range provide most of the area's runoff and between Mendooran and downstream to Coonamble the river quite often flows below the surface through extensive sand beds. Consumptive water use includes irrigation, town water supply and domestic and stock uses. Limited flow and water usage data exists for the Castlereagh system, however planning has recognised that the system is hydrologically-stressed. The draft plan was placed on public exhibition from 6 December 2010 to 31 January 2011.

## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	To some extent	A draft plan has been developed and exhibited for public comment. As at 30 September 2011, the plan was awaiting ministerial approval.
2. Does the plan include key assessments?	To some extent	Some key assessments were undertaken to inform the development of the plan, including estimates of consumptive use. The standard macro planning assessments (e.g. risk assessments for water sources, condition of environmental assets) were not made publicly available during the exhibition period.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The draft plan does not identify any areas of overuse, but it does recognise that the system is hydrologically-stressed. The plan establishes a long-term extraction limit and allows for reductions to allocations if the extraction limit is exceeded. Information explaining the environmental and consumptive use trade-offs that underpin the extraction limit were not made publicly available during the exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The draft plan includes clearly documented but broad outcomes that are supported by management strategies. Monitoring and reporting arrangements are not specified in the plan or its supporting documentation.
5. Does the plan facilitate trade?	Yes	Once operational, the plan will facilitate water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	Interception activities have been identified within the draft plan, including potential increases in water demand related to BLR. However, much of this potential demand is unquantified. A number of state-wide policies guide the management of intercepting activities such as mining.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The draft plan recognises surface water and groundwater connectivity and addresses it appropriately. The Castlereagh Alluvial Groundwater Source has been classified as not being highly connected with the Castlereagh River (less than 70% of groundwater pumped within an irrigation season is derived from streamflow) and will therefore be managed under the plan using groundwater rules only.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The environmental watering arrangements required to meet the plan's environmental objectives are not specified but are somewhat implicit in the water management rules (i.e. cease-to-pump levels).
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan is still in draft, so an assessment of this criterion is not possible at this time. No specific monitoring arrangements are detailed for this particular plan. Once operational, the plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	While the plan acknowledges climate variability, it assumes that the in-built review cycle will provide sufficient adaptive capacity. The plan does not quantify the potential risks to system health or entitlement security as a result of climate change. It also does not specify entitlement securities under the current climatic regime.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The stakeholder engagement process provided opportunities for input and advice from interested parties during the plan's development. The information used to determine the water source classifications and indicative water access and trading rules was not publicly available during the exhibition period (e.g. risk assessments).
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is still in draft, so an assessment of this criterion is not possible at this time.



# CENTRAL COAST UNREGULATED WATER SOURCES

## WATER SHARING PLAN 2009



### Context

The Central Coast Unregulated Water Sources cover more than 156 000 hectares immediately north of Sydney. The plan includes the rivers and creeks flowing into Tuggerah Lakes, a large coastal saltwater lake, as well as those flowing into the Hawkesbury River, a coastal river popular for recreation and recognised as supporting New South Wales' second largest commercial fishery. The main consumptive water uses within the planning area are irrigation, town water supply and Basic Landholder Rights. The area contains significant primary industries such as turf growing and fruit and vegetable production but is also highly urbanised, particularly around Tuggerah Lakes and Brisbane Water. Gosford Wyong Council Water Authority is the largest water user in the area, supplying urban water services to 285 000 people; this number is projected to grow to 350 000 by 2020. Managing competing urban water, agricultural and environmental water demands is the primary planning driver.



## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2009 and applies for 10 years.
2. Does the plan include key assessments?	To some extent	Some key assessments were undertaken to inform the plan's development and were based on existing studies, regional expert knowledge and community consultation. However, data used to inform the assessment of current water use and users was compiled in 2000 and environmental water requirements of identified in-stream values were not assessed.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify overuse, however it recognises that some areas are under high hydrological stress. It establishes an extraction limit set at full development of pre-existing entitlements. Daily management arrangements (i.e. cease-to-pump levels) are based on existing licence conditions or visible flow conditions, rather than access rules identified by the macro classification process.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented outcomes and related performance indicators. The plan's socioeconomic and ecological objectives are broad and their measurement will require considerable effort.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan notes that new plantation developments will be monitored and assessed to determine if a water access licence is required. It addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	Surface water and groundwater were assessed as not being highly connected (less than 70% of groundwater pumped within an irrigation season is derived from streamflow). Integrated management was therefore not considered appropriate; a groundwater plan will instead be developed for the area.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Environmental water provisions are based on existing licence conditions or visible flow conditions, rather than the access rules identified by the macro classification process or environmental water requirements. The plan allows for delayed introduction of access rules based on investigations of appropriate cease-to-pump arrangements, however there is no evidence to demonstrate that these investigations have commenced.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Specific monitoring arrangements are not publicly available for this plan. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. The plan was developed using the macro approach, which uses indices for hydrological stress (risk to entitlement security from limits to supply) and risk to in-stream value to determine water sharing rules. As each of the plan's water sources has a cease-to-pump rule, any potential supply reductions are borne by the water user. Construction of urban water supply infrastructure for the central coast under the Gosford/Wyong Council Water Authority's 40-year demand planning strategy (WaterPlan 2050) will improve the security of supply for entitlement holders.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The stakeholder engagement process sought to engage all relevant stakeholders and provide a number of opportunities for their input and advice throughout the plan's development. While stakeholder input is transparently reported in the final plan's supporting documentation, the data used by the Regional Expert Panel to determine the initial water source classifications and indicative water access rules and trading rules was not publicly available.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There has been no reporting of plan implementation progress or the effectiveness of the plan's provisions in delivering its intended outcomes to date. However, a progress report on the monitoring and evaluation activities underway on the central coast is pending.





# COFFS HARBOUR AREA UNREGULATED AND ALLUVIAL WATER SOURCES



## WATER SHARING PLAN 2009



### Context

The Coffs Harbour Unregulated and Alluvial Water Sources Water Sharing Plan covers surface water and groundwater in the region generally upstream of the tidal limit. The area covered by the Coffs Harbour Area macro water sharing plan is located on the mid north coast of New South Wales and covers 13 small coastal catchments from Pine-Bungaree Creek in the south to Station Creek in the north. Coffs Harbour is generally warm and subtropical with average rainfall high and variable. The area is recognised as having high biological diversity with significant coastal, rainforest, estuarine wetlands and headland rock platforms supporting a variety of threatened species. Systems in the plan area were identified as under high hydrological and environmental stress in the 1998 Stressed Rivers Assessment Report. The area supports the production of beef cattle, intensive agricultural and horticultural activities and a large proportion of the catchment is covered by New South Wales state forests (35 per cent).

## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	A finalised and operational statutory plan commenced for the area in 2009 and applies for 10 years.
2. Does the plan include key assessments?	To some extent	Key assessments were informed by available studies, expert panel knowledge and community consultation. Existing available information used to inform the plan was over five years old by the time the plan was drafted.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify any areas of overuse. It establishes a long-term extraction limit and allows for reductions to allocations if the limit is exceeded. Provisions were also made in the plan for daily extraction limits, however no systems were identified for limit implementation at commencement of the plan.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad outcomes, the achievement of which will be difficult to measure. NOW acknowledges that it will not be practicable to monitor all issues in all water sources and will focus in high-risk water sources.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The Coffs Harbour area is considered an area in which there are no significant water interception activities anticipated within the life of the plan, however 35% of the land is owned by NSW State Forests. The plan accounts for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan addresses the integrated management of surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Environmental water is provided through the establishment of extraction limits and cease-to-pump rules. Preservation of low flows for environmental purposes is based on general ecological information but no area-specific environmental requirements have been identified. The objectives are broad making the links between the provisions and the outcomes unclear.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some socioeconomic monitoring is occurring as part of a broad state-wide program. However, the specific arrangements for monitoring of the effectiveness of this plan in achieving all outcomes have not been clearly articulated. No implementation program has been made public and there is no monitoring schedule identified for the plan. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan considers climatic variability but does not deal with long term climate change; rather, it assumes that the in-built review cycle will provide sufficient adaptive capacity.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement was undertaken during River Flow Objectives consultation in 1997. Stakeholders were invited to make submissions on the draft plan which was developed by an Interagency Panel. Stakeholders' feedback will also be sought at the five-year audit of the plan performed by the Natural Resources Commission.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There has been no reporting of plan implementation progress or the effectiveness of the plan's provisions in delivering its intended outcomes to date.

# COMMISSIONERS WATERS WATER SOURCE



## WATER SHARING PLAN 2003



### Context

Commissioners Waters is a tributary of the Macleay River on the northern tablelands of New South Wales. The plan area contains undulating, cleared agricultural land and Oxley Wild River National Park is immediately downstream. Commissioners Waters is a relatively low flowing river compared to other eastern flowing water sources in northern New South Wales. Commissioners Creek was assessed as being under high hydrological and high environmental stress by the 1998 Stressed Rivers Assessment Report. December tends to be the month of the lowest flows, and is also the time when water demands for irrigation are high (e.g. irrigated pasture, turf). Equitable sharing of water for consumptive and non-consumptive purposes during periods of low water availability is the primary planning driver. Although a tributary of the Macleay River, Commissioners Waters is managed under a separate water sharing plan, which commenced in 2004.

## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2004 and will apply for a period of 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments were undertaken to inform the plan's development. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The planning area is considered overused and hydrologically-stressed. The plan establishes a long-term extraction limit based on existing licensed use and environmental water provisions to manage critical periods of resource stress. The plan allows for reductions to allocations if the extraction limit is exceeded. Information on the trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented outcomes, strategies and related performance indicators, but monitoring and reporting arrangements are not specific. A number of the plan's ecological objectives are broad and their measurement will require considerable effort. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters. Socioeconomic objectives are measured as part of broad state-wide socioeconomic monitoring program.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. A number of state-wide policies guide the management of other potential intercepting activities, such as mining.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	No	This plan is a single resource plan that does not include information on the potential connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes cease-to-pump rules to protect pool connectivity during low flow periods, and daily flow sharing volumes to protect natural flow variability. The environmental provisions are based on the hydro-ecological assumption that mimicking natural flow variability will protect aquatic ecosystems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. Environmental flow response monitoring commenced in 2009 and socioeconomic monitoring commenced in 2006. Water trade and flow is also monitored for the plan area. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not deal with climate change; rather, it assumes that the in-built review cycle will provide sufficient adaptive capacity.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. provision of tradeable water entitlements, provision of BLR, maintenance of extraction limit). Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. daily flow sharing, temporary water trading). A report published in March 2011 on the monitoring and evaluation activities being undertaken to assess the ecological and socioeconomic performance of each WSP in the north coast concluded that there was not yet enough information to assess this plan's effectiveness. The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.



# COOPERS CREEK WATER SOURCE



## WATER SHARING PLAN 2003



### Context

Coopers Creek is a coastal upland system in north-eastern New South Wales. Water sharing in Coopers Creek is managed under an individual plan despite it being a tributary of the Richmond River. The Coopers Creek sub-catchment receives significant annual rainfall in the summer and autumn months, however consumptive water demand peaks during the typically dry spring period. An important consideration for the plan was to provide water for the endangered Eastern Freshwater Cod. The plan was challenged in the Land and Environment Court by the Coopers Creek Water Users' Group who were concerned that the cease-to-pump conditions in the plan were overly stringent and had the potential to seriously impact the viability of their businesses. Implementation of the out-of-court settlement required a number of amendments be made to the plan, which were finalised in February 2011.

## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments informed the water management provisions within the plan, as well as its 2011 amendments. Apart from the socioeconomic assessment that informed the 2011 amendments, these assessments are no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, however the system is considered hydrologically-stressed during low flow periods. The plan establishes a long-term extraction limit and allows for reductions to allocations if the extraction limit is exceeded. Information on trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented objectives, strategies and related performance indicators, but monitoring and reporting arrangements for measuring achievement against these is not specific. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters, but some ecological objectives will require considerable monitoring investment to assess their achievement.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. Possible interception impacts of plantation forestry have not been considered despite the existence of state forests and other agro-forestry operations in the plan area.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	This plan is a single resource plan that does not include information on the potential connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains environmental watering arrangements, including cease-to-pump rules to protect pool connectivity during low flow periods, and responsibility for their delivery has been assigned.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. Environmental flow response and socioeconomic monitoring commenced in 2008, with the first results publicly reported in 2011. The frequency of future public reporting of monitoring results is unclear. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. The cease-to-pump rule will assign any reductions in supply to water users. There is no quantification of the potential risk to entitlement securities due to long-term climate change, however background material did consider the risks to system health during plan development.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. provision of tradeable water entitlements, provision of BLR, maintenance of extraction limit); however, metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. daily flow sharing, temporary water trading). Ecological monitoring has demonstrated that the plan's low flow access (cease-to-pump) rules are delivering the intended environmental outcomes. The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.



# DORRIGO PLATEAU SURFACE WATER SOURCE AND THE DORRIGO BASALT GROUNDWATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Dorrigo Plateau is located in the south-western corner of the Clarence catchment and forms the headwaters of the Nymboida River, a major tributary of the Clarence River. A number of national parks and the town water supply extraction points for the Clarence Valley and Coffs Harbour water supply systems are located downstream of the plan area. The plan area includes one surface water source (rivers and creeks of the Dorrigo Plateau) and one groundwater source (Dorrigo Basalt Aquifer). Rivers on the Dorrigo Plateau flow most of the year due to contributions from groundwater, however surface water demands for irrigation are high during the low flow months of September to December. Groundwater is extracted mainly for domestic and stock purposes, however the largest extraction is for commercial bottled water. Equitable sharing of water for consumptive and non-consumptive purposes during periods of low water availability is the primary planning driver.

## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface water and groundwater within the planning area. The plan commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments informed the water management provisions within the plan. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify overuse, but the area is considered hydrologically-stressed. The plan establishes an extraction limit that permits increased daily access to some medium and high flows that it acknowledges may cause a future decline in aquatic ecosystem health. Information on trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad outcomes that have supporting strategies and performance indicators. Monitoring and reporting arrangements are not specified. The measurement of a number of the plan's ecological objectives will require considerable monitoring investment, however the majority of the plan's objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. Possible interception impacts of plantation forestry have not been considered despite the existence of state forests and other agro-forestry operations in the planning area.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan addresses surface water and groundwater connectivity in the Dorrego Plateau. The plan recognises the groundwater contribution to surface water baseflow and a number of high priority GDEs. A conservative groundwater extraction limit and groundwater extraction exclusion zones have been established to protect these assets.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. The plan's environmental provisions limit annual and daily extraction and regulate the development of water affecting activities (e.g. buffer zones for high priority GDEs). The environmental provisions are based on the hydro-ecological assumption that mimicking natural flow variability or protecting a percentage of groundwater recharge will protect environmental assets.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. Environmental flow response monitoring commenced in 2009, however monitoring of groundwater levels has not been implemented because of the low density of existing bores relative to allocations. Socioeconomic monitoring commenced in 2006. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not deal with climate change; rather, it assumes that the in-built review cycle will provide sufficient adaptive capacity.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. provision of tradeable water entitlements). Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. daily flow sharing, temporary water trading). A report published in March 2011 on the monitoring and evaluation activities being undertaken to assess the ecological and socioeconomic performance of each WSP in the north coast concluded that there was not enough information to assess plan effectiveness at that time. The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.

# GREATER METROPOLITAN REGION GROUNDWATER SOURCES



## WATER SHARING PLAN 2011



### Context

The Greater Metropolitan Region Groundwater Sources Water Sharing Plan covers 13 groundwater sources located on the east coast of New South Wales. The region is bounded by the Hawkesbury River catchment to the north and west and the Shoalhaven River catchment to the south and south-west. The region also includes the groundwater of the Illawarra and metropolitan Sydney. The majority of water licences in the plan area are for irrigation, with a significant proportion also used for industrial purposes. The Greater Metropolitan Region contains a significant number of groundwater-dependent ecosystems, such as karsts, springs and wetlands, some of which are sensitive to water extraction. The development of a water sharing plan for the groundwater sources of the Greater Metropolitan Region was undertaken in conjunction with the unregulated water sharing plan, with both plans commencing on 1 July 2011.

## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the Greater Metropolitan Groundwater Sources commenced in 2011 and applies for 10 years.
2. Does the plan include key assessments?	Yes	The plan includes hydrological, socioeconomic and environmental assessments of all water sources in the area, along with a risk categorisation linked to the development of water sharing arrangements.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements for the measurement of these are not specific. While ecological and cultural objectives are broad and will require considerable monitoring investment to assess their achievement, some trade and entitlement related objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. Mining is identified as an activity which may potentially interfere with aquifers and the requirement for licensing is noted. However, there is no additional information provided to quantify potential impacts of mining or future demand in the plan area.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan recognises the connectivity between surface water and groundwater, and there is acknowledgment of the potential impacts on connected systems. This plan is closely linked to the WSP for the Greater Metropolitan Region Unregulated River Water Sources.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains accountable environmental watering arrangements but water requirements for all environmental assets are not clearly detailed and monitoring of the effectiveness of this plan in achieving environmental outcomes has not been clearly articulated. Some monitoring of the plan's effectiveness in delivering its water security objectives will be recorded in various registers that document available water determinations and trade activity.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan commenced in 2011, therefore an assessment of this criterion cannot be made at this time. No specific monitoring arrangements are detailed for this particular plan. There is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements informed by historical climate data. However, there is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved targeted stakeholder consultation on proposed water sharing arrangements. Community feedback on the draft plan was sought through public meetings and calls for public submissions. The background document provides information on the submissions received and the responses made to address concerns raised by stakeholders.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	This plan commenced on 1 July 2011, so an assessment of this criterion cannot be made at this time.



# GREATER METROPOLITAN REGION UNREGULATED RIVER WATER SOURCES



## WATER SHARING PLAN 2011



### Context

The Greater Metropolitan Region Water Sources are located on the south-eastern coast of New South Wales and include the rivers of the Illawarra and metropolitan Sydney. The area contains important wetland ecosystems that support a significant number of threatened species. Rivers in the region have extremely variable flows but water storage capacity is one of the largest in the world per head of population. These highly developed water sources provide for a wide range of uses including town water supply, irrigation of fodder, vegetables, fruit and flowers, mining, recreational and commercial fishing, particularly in the estuaries. Balancing the supply of water for consumptive uses with environmental requirements in the Greater Metropolitan Region is complex due to a growing population, highly variable rainfall and the potential impacts of climate change. The development of a water sharing plan for the unregulated water sources of the Greater Metropolitan Region was undertaken in conjunction with the groundwater water sharing plan, with both plans commencing on 1 July 2011.



## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the Greater Metropolitan Unregulated River Water Sources commenced in 2011 and applies for 10 years.
2. Does the plan include key assessments?	Yes	The plan includes hydrological, socioeconomic and environmental assessments of all water sources in the area, along with a risk categorisation linked to the development of water sharing arrangements.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements for the measurement of these are not specific. While ecological and cultural objectives are broad and will require considerable monitoring investment to measure their achievement, some flow, trade and entitlement related objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. Amendments can be made to manage floodplain and stormwater harvesting, plantation forestry and aquifer interference (e.g. mining), but information on these potential interception activities is not provided.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan recognises the connectivity between surface water and groundwater, and there is acknowledgment of the potential impacts on connected systems. This plan is closely linked to the WSP for the Greater Metropolitan Region Groundwater Sources.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains environmental watering arrangements including a range of strategies which aim to deliver environmental objectives (e.g. protection of low flows, first flush rules). However, monitoring to assess their achievement is not clearly detailed in the plan or supporting documents. Environmental water provisions are given effect to in Water Supply Work Approvals and corporate licence holders are required to provide annual compliance reports.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan commenced in 2011, therefore it is too early to assess this criterion. However, a water balance accounting project, supported by water meter installation, has commenced in the catchment. There is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan recognises the potential for climate change and variability, including identification of the climate change scenarios considered in the development of the plan. However, no long-term strategies are explicitly outlined.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved targeted stakeholder consultation on proposed water sharing arrangements. Community feedback on the draft plan was sought through public meetings and calls for public submissions. In addition, a Ministerial Advisory Group was established to help identify ways to address community concerns.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	This plan commenced on 1 July 2011, so an assessment of this criterion cannot be made at this time.

# GROUNDWATER SOURCES OVERLAYING THE NSW GREAT ARTESIAN BASIN



## DRAFT WATER SHARING PLAN



### Context

The draft plan comprises eight groundwater sources which overlie the Great Artesian Basin (GAB) in the north-west of New South Wales. These stacked groundwater sources have been assessed as having minimal hydraulic connectivity with the Great Artesian Basin. The rules in the draft plan do not rely on and do not alter the existing rules in the commenced Great Artesian Basin plan (e.g. Water Sharing Plan for the New South Wales Great Artesian Basin Groundwater Sources 2008). The water quality and yields from groundwater sources in the plan area are generally low and so the reliance on these water resources for domestic and stock, town water supply, irrigation or commercial purposes is limited. However, the draft plan provides for additional entitlement to be issued to allow for the expansion of irrigation, mining and industrial water use. The draft plan was placed on public exhibition from 6 December 2010 to 29 April 2011.

## Findings

Report Card Criteria	Assessment	Commentary
1. Is there a plan in place?	To some extent	A draft plan has been developed and exhibited for public comment. As at 30 September 2011, the draft plan was awaiting ministerial approval.
2. Does the plan include key assessments?	To some extent	Some key assessments were undertaken to inform the development of the draft plan, including estimates of consumptive use. However, some of the detail underpinning water sharing arrangements (e.g. information on environmental assets) was not publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The draft plan does not identify any areas of overuse. It does establish a long-term extraction limit, including limits to extraction of recharge generated over high environmental/conservation value areas. The extraction limit reflects environmental and consumptive use trade-offs and the plan allows for adjustments to available water determinations if the extraction limit is exceeded.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The draft plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements are not specific. Ecological and cultural objectives are broad and their measurement will require considerable monitoring investment.
5. Does the plan facilitate trade?	Yes	Once operational, the plan will facilitate water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	Interception activities have been identified within the draft plan, including potential increases in water demand related to BLR and provision of unassigned water to meet future water needs. However, there are no volumetric estimates for the predicted increase in BLR and no threshold set above which licensing would be required.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The draft plan recognises the potential for connectivity between surface water and groundwater. Assessments of connectivity categorise these water sources as 'less highly connected' and therefore manage them using groundwater rules only.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The draft plan identifies environmental watering arrangements for each water source. However, there is little detailed information provided to underpin these arrangements (e.g. current environmental asset condition or water requirements).
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan is still in draft, so an assessment of this criterion cannot be made at this time. No specific monitoring arrangements are detailed for this particular plan. There is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The draft plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	Targeted consultation was undertaken with stakeholder groups to develop water sharing rules in the draft plan. Report Cards on each water source were also made available to the public on the NOW website during the public exhibition period and provided information on water resources, recharge estimates, risk assessments and Interagency Panel decisions.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is still in draft, so an assessment of this criterion cannot be made at this time.



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## Findings

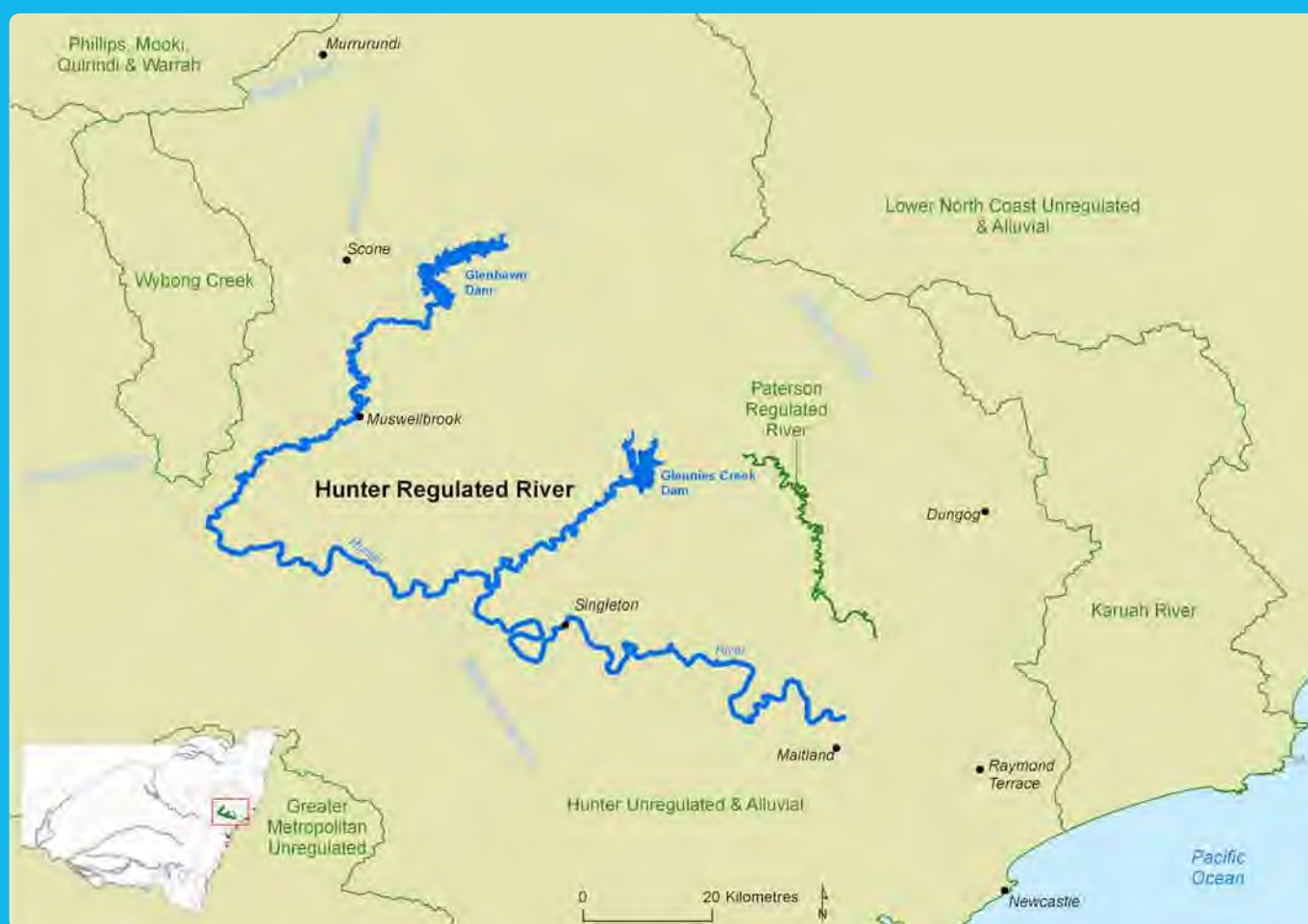
1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the regulated surface waters of the Gwydir Regulated River commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Key assessments (e.g. environmental assets and condition, economic values) were undertaken as part of the development and drafting of the plan by a localised water management committee. However, this information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. Information explaining the trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented outcomes and related performance indicators but monitoring arrangements are not detailed. The plan's ecological and cultural objectives are broad and will require considerable monitoring investment to measure their achievement. Extraction and trade related objectives are measurable using routinely collected parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. The plan identifies the need for regulation of floodplain harvesting and estimated volumes are integrated into the plan's extraction limit, however the state policy remains in draft. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not include information on the potential connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements (e.g. flows to the Gingham and Lower Gwydir wetlands), but the water requirements of environmental assets have not been quantified by empirical studies and monitoring is not a clearly embedded component of the plan or supporting documents. Environmental water provisions are given effect to in Water Supply Work Approvals and State Water Corporation is required to provide an annual compliance report.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Collection of some environmental, water accounting and socioeconomic information is being undertaken, however monitoring has not been clearly linked to plan outcomes and reporting has been inconsistent. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Stakeholder engagement occurred during the development and drafting of the plan through the local Gwydir Regulated River Management Committee (e.g. establishment of environmental flow rules, recommendations for water sharing arrangements) and through public exhibition of the draft plan. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. tradeable water entitlements, delivery of BLR, some environmental watering). However, monitoring of plan effectiveness is not consistently reported in publicly available documents. None of the evidence examined demonstrated that outcomes have been achieved to date.



# HUNTER REGULATED RIVER WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Hunter Regulated River Water Sharing Plan covers the rivers regulated by Glenbawn Dam and Glennies Creek Dam within the Hunter River catchment. The plan is one of five plans that control the overall extraction of water in the Hunter Valley, which has a wide variety of water uses from agriculture, heavy industrial and major urban developments. It has one of the highest storage to allocation ratios of any river system in the world, with much of the water reserved for thermal power stations, mining and viticulture that require high levels of reliability. Current water entitlements within the regulated river and extraction by upstream interception, unregulated and groundwater users represent 47 per cent of the mean annual flow at the downstream limit of the plan. During droughts general security users have periods of little or no allocation. The water sharing plan was suspended from December 2006 to February 2009 due to the risk to power generation from droughts in south-eastern Australia.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers regulated surface waters within the planning area. The plan commenced in 2004, was suspended in late 2006 and subsequently reinstated on 20 February 2009. The plan applies for 10 years.
2. Does the plan include key assessments?	Yes	Key hydrologic, socioeconomic and environmental assessments were undertaken as part of the development and drafting of the plan.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It establishes a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. Information explaining the trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented outcomes and related performance indicators. A number of the plan's ecological objectives are broad and their measurement will require considerable effort. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. Interception by mining and plantation development were not included in the planning assessment, however a number of state-wide policies guide the management of these intercepting activities.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan that addresses surface water only, with no reference to integrated management arrangements. The more recent WSP for the Hunter Unregulated and Alluvial Water Sources 2009 contains management arrangements to integrate areas of highly connected Hunter River alluvial water source with the regulated river system.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. The Annual Watering Report for the plan's Environmental Contingency Allowance, due since July 2010, is still to be publicly released. The environmental water provisions of the plan are given effect through the conditions on State Water Corporation's Water Supply Work Approvals. State Water Corporation must report annually on its compliance with these conditions.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. Monitoring of the plan's effectiveness in delivering its water security objectives is evident from various registers that document available water determinations and trade activity, as well as corporate licence holders' annual reporting requirements. Various ecological studies have assessed, or continue to assess, the effectiveness of the plan's environmental water provisions and socioeconomic monitoring commenced in 2006 as part of a broader state-wide program. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. Modelling of the potential risk of climate variability to entitlement holders during plan development led to the removal of shelf water and the establishment of an environmental contingency allowance to cover potential environmental risks. The plan did not consider climate change, although it does contain some self-adjustment mechanisms.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	The plan's rules of distribution were suspended for over two years, however progress has been made towards the implementation of water sharing plan actions, such as provision of tradeable water entitlements, provision of BLR and maintenance of water use within the extraction limit. A progress report on the monitoring and evaluation activities underway to assess the ecological and socioeconomic performance of each WSP in the Hunter Valley is pending. The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.

# HUNTER UNREGULATED AND ALLUVIAL WATER SOURCES



## WATER SHARING PLAN 2009



### Context

The Hunter Unregulated and Alluvial Water Sources Water Sharing Plan covers the unregulated rivers and creeks, and highly connected alluvial groundwater within the Hunter River catchment (excluding Wybong Creek, which is covered by a separate water sharing plan). The plan is one of five plans that control the overall extraction of water in the Hunter Valley. The valley's climate is highly variable, with the area experiencing severe droughts and extensive floods. The Hunter Valley has a wide variety of water uses from agriculture, heavy industrial and major urban developments. Across the plan area, the largest single user from the unregulated rivers is Hunter Water Corporation. Hunter Water provides water and wastewater services to over half a million people in the Lower Hunter. Other uses include irrigation and mining.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface water and alluvial groundwater within the planning area. The plan commenced in 2009 and applies for 10 years.
2. Does the plan include key assessments?	Yes	The key assessments undertaken to inform the plan's development are summarised in the plan's supporting documentation. The assessments were informed by existing studies, regional expert knowledge and community consultation.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, but acknowledges that some management zones are hydrologically-stressed during low flow, peak water demand months. The plan establishes a long-term annual extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit is set at full development of pre-existing entitlements plus amendments for the construction and operation of Tillegra Dam, however the plan's daily management arrangements reflect environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad outcomes and related performance indicators. Monitoring of plan outcomes will be focused in high-risk water sources.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan addresses interception for BLR, including consideration of impacts from farm dams. The plan's supporting documentation notes that new plantation developments will be monitored and assessed to determine if a water access licence is required. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan recognises alluvial groundwater and surface water connectivity within the planning area and includes appropriate integrated management arrangements, such as in-stream cease-to-pump levels that apply to both surface water and groundwater users, and conditions for new alluvial groundwater bores.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan includes rules-based environmental water provisions expressed as cease-to-pump levels for each water source. The plan allows for amendment to these levels in some water sources where there was a lack of adequate information to establish water sharing rules that would fully meet plan objectives. The plan's monitoring arrangements are not clear.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	With the exception of a list of performance indicators in the plan, there is minimal information on how the achievement of plan outcomes, and progress towards them, will be monitored. Supporting documentation suggests that a specific monitoring program will be developed for the plan. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. The plan was developed using the macro approach, which uses indices for hydrological stress (risk to entitlement security from limits to supply) and risk to in-stream value to determine water sharing rules. As most of the plan's sub-catchments have cease-to-pump rules, any potential supply reductions are borne by the water user.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement provided opportunities for all interested parties to contribute to the plan's development and refinement. Stakeholder input is transparently recorded in the plan's supporting documentation.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There has been no reporting of plan implementation progress or the effectiveness of the plan's provisions in delivering its intended outcomes to date. However, a progress report on the monitoring and evaluation activities underway to assess the ecological and socioeconomic performance of each WSP in the Hunter Valley and central and lower north coast is pending.



# INTERSECTING STREAMS UNREGULATED AND ALLUVIAL WATER SOURCES



## DRAFT WATER SHARING PLAN



### Context

The Intersecting Streams Water Sharing Plan includes the unregulated Culgoa, Moonie, Narran, Paroo and Warrego rivers and the Paroo and Warrego Alluvial groundwater sources, located in the north of New South Wales. The Paroo River originates in Queensland and is the last free-flowing river in the northern Murray–Darling Basin. The Paroo River water source supports a significant wetland system and has the largest active complex of artesian mound springs in the state. Townships in the plan area include Lightning Ridge, Enngonia, Hungerford, Wanaaring, White Cliffs and Cobar. Key water management issues centre on the sharing of resources between New South Wales and Queensland, including the capture and storage of floodwaters by Queensland, and compliance with the Murray–Darling Basin cap. A draft plan was placed on public exhibition between 6 December 2010 and 29 April 2011.



## Findings

1. Is there a plan in place?	To some extent	A draft plan has been developed and exhibited for public comment. As at 30 September 2011, the plan was awaiting ministerial approval.
2. Does the plan include key assessments?	To some extent	Some information has been provided to support the draft plan, including estimates of recharge and consumptive water use. However, much of the detail underpinning these estimates and the risk assessment process were not included in the draft plan or supporting documents (e.g. condition or water requirements of environmental assets).
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The draft plan does not identify any areas of overuse. It does provide the basis for establishing a long-term extraction limit and allows for adjustments to available water determinations if the limit is exceeded. However, measurement of water usage for the area is generally lacking.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The draft plan does include clearly identified outcomes linked to strategies and performance indicators. However, risk assessment and monitoring arrangements are not clearly linked to plan objectives.
5. Does the plan facilitate trade?	Yes	Once operational, the plan will facilitate water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements. An intergovernmental agreement is required to permit cross-border trade.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. Amendments can be made to manage plantation forestry and aquifer interference (e.g. mining). Information on these potential interception activities is not provided, despite forecast increases in the region.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The draft plan recognises the potential connectivity between surface water and groundwater, however areas of connectivity are not identified and the level of connection is not quantified.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The draft plan contains environmental watering arrangements, but there is little detailed information presented to underpin them (e.g. studies of current environmental asset condition).
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan is still in draft, so an assessment of this criterion cannot be made at this time. No specific monitoring arrangements are detailed for this particular plan. There is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The draft plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Targeted consultation was undertaken with stakeholder groups to develop water sharing rules in the draft plan but, in some cases, further details are required to provide greater transparency around panel decisions (e.g. condition of environmental assets). The draft plan has been released for public comment but is yet to be finalised.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is still in draft, so an assessment of this criterion cannot be made at this time.

# JILLIBY JILLIBY CREEK WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The plan covers surface waters in the Jilliby Jilliby Creek catchment on the central coast of New South Wales. It is a major tributary of the Wyong River, which flows into Tuggerah Lakes, a large coastal saltwater lake with ecologically important wetlands. Jilliby Jilliby Creek was assessed as being under high hydrological and high environmental stress in the 1998 Stressed Rivers Assessment Report. Consumptive water demand during the system's summer low flows is at full allocation. Irrigation uses include vegetables, perennial pasture, annual pasture and citrus, while orchards and dairies are being increasingly used for rural residential purposes. Equitable sharing of water for consumptive and non-consumptive purposes during periods of low water availability is the primary planning driver. Although part of the Tuggerah Lakes catchment, water sharing in Jilliby Jilliby Creek is managed under a discrete plan, which commenced in 2004.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments were undertaken to inform the plan's development. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, but does recognise the system as hydrologically-stressed. The plan establishes the basis for a long-term extraction limit and allows for reductions to allocations if the extraction limit is exceeded. Information on trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad objectives, strategies and related performance indicators. Monitoring arrangements for measuring plan outcomes are not clearly specified within the plan or its supporting documents. A number of the plan's ecological objectives will require considerable monitoring investment to assess their achievement.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of other interception activities, such as mining.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	No	This plan is a single resource plan that does not include information on the potential connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes a cease-to-pump level to protect a portion of low flows, and daily flow sharing volumes to protect natural medium to high flow variability. The environmental water provisions are based on the hydro-ecological assumption that mimicking natural flow variability will protect aquatic ecosystems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. Some environmental, socioeconomic and flow monitoring has commenced and a report on progress is pending. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. The cease-to-pump rule will assign any reductions in supply to water users. There is no quantification of the potential risk to entitlement securities due to long-term climate change, however background material did consider the risks to system health during plan development.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards implementation of some plan actions (e.g. provision of tradeable water entitlements, provision of BLR). Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. daily flow sharing, temporary water trading). There has been minimal reporting of the plan's outcomes and results of the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available. A progress report on the monitoring and evaluation activities underway to assess the ecological and socioeconomic performance of each WSP in the Hunter Valley and central and lower north coast is pending.

# KANGAROO RIVER WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Water Sharing Plan for the Kangaroo River Water Source covers surface waters in the Kangaroo River catchment on the south coast of New South Wales. Water sharing in the Kangaroo River catchment is managed under an individual plan despite it being a tributary of the Shoalhaven River. The plan area is drained by three main tributaries: Kangaroo River, Brogers Creek and Barrengarry Creek. The upstream reaches of the water source include parts of Morton and Budderoo national parks. Surface water use is primarily for irrigation, town water supply and domestic and stock purposes. The area is considered hydrologically-stressed because of the high consumptive water demand during the system's summer low flows. Equitable sharing of water for consumptive and non-consumptive purposes during periods of low water availability is the primary planning driver.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments informed the water management provisions within the plan. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, however the system is considered hydrologically-stressed during low flow periods. The plan establishes a long-term extraction limit and allows for reductions to annual allocations if the extraction limit is exceeded. Information explaining the trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented objectives, strategies and related performance indicators, but monitoring and reporting arrangements for measuring achievement against these is not specific. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters, but some ecological objectives will require considerable monitoring investment to assess their achievement.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of other potential interception activities, such as mining.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not address groundwater and surface water connectivity, despite evidence that suggests groundwater extraction in the Upper Kangaroo River affects river baseflows.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. The plan establishes a cease-to-pump level to protect a portion of low flows, and daily flow sharing volumes to protect natural medium to high flow variability.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. Socioeconomic, environmental and flow monitoring is being undertaken. A progress report on environmental and socioeconomic monitoring for all WSPs on the south coast is pending. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not explicitly deal with climate change; rather, it assumes that the in-built review will provide sufficient adaptive capacity. There are some self-adjustment mechanisms for climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards implementation of some plan actions (e.g. provision of tradeable water entitlements, provision of BLR, maintenance of extraction limit). Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. daily flow sharing, temporary water trading). A progress report on the monitoring and evaluation activities underway to assess the ecological and socioeconomic performance of the WSP (and others on the south coast) is being prepared. The findings of the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.



# KARUAH RIVER WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Karuah River is located on the lower north coast of New South Wales. The Karuah catchment has high conservation values and contains large areas of state forest, national park, coastal wetland and minimally disturbed waterways. Surface water use is primarily for irrigation, town water supply and domestic and stock purposes. The area is considered hydrologically-stressed because of the high consumptive water demand during the system's summer low flows. Equitable sharing of water for consumptive and non-consumptive purposes during periods of low water availability and protecting conservation values are the primary planning drivers.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments were undertaken to inform the plan's development. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, however the system is considered hydrologically-stressed during low flow periods. The plan establishes a long-term extraction limit and allows for reductions to allocations if the extraction limit is exceeded. Information on trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented objectives, strategies and related performance indicators, but monitoring and reporting arrangements for measuring achievement against these is not specific. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters, but some ecological objectives will require considerable monitoring investment to assess their achievement.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of mining interception. Possible interception impacts of plantation forestry have not been considered despite the existence of large areas of state forest and other agro-forestry operations in the planning area.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not address groundwater and surface water connectivity.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes a cease-to-pump level to protect a portion of low flows, and daily flow sharing volumes to protect natural medium to high flow variability. The environmental water provisions are based on the hydro-ecological assumption that mimicking natural flow variability will protect aquatic ecosystems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. Monitoring programs to assess socioeconomic and environmental objectives have commenced, and river flow and trade activity are routinely measured. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not explicitly deal with climate change; rather, it assumes that the in-built review cycle will provide sufficient adaptive capacity. There are some self-adjustment mechanisms for climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards implementation of some plan actions (e.g. provision of tradeable water entitlements, provision of BLR, maintenance of extraction limit). Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. daily flow sharing, temporary water trading). A progress report on the monitoring and evaluation activities underway to assess the ecological and socioeconomic performance of each WSP in the Hunter Valley and central and lower north coast is pending. The findings of the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.

# KULNURA MANGROVE MOUNTAIN GROUNDWATER SOURCES



## WATER SHARING PLAN 2003



### Context

The Kulnura Mangrove Mountain Groundwater Sources are located north of Sydney and inland from Gosford. The plan separates the groundwater resources into eight management zones, which occur in both porous layers and fractured zones. The groundwater resources provide important baseflows to rivers and support a number of groundwater-dependent ecosystems (wetlands, heath scrub and woodland areas, aquifer and cave ecosystems). About 40 per cent of the planning area consists of national park and state forests, while about 10 per cent is a drinking water reserve. The Kulnura Mangrove Mountain Groundwater Sources were assessed by the 1998 Aquifer Risk Assessment Report to be one of 17 New South Wales coastal aquifers at highest risk of over extraction and contamination. Groundwater is primarily used for domestic and stock, and irrigation purposes.

## Findings

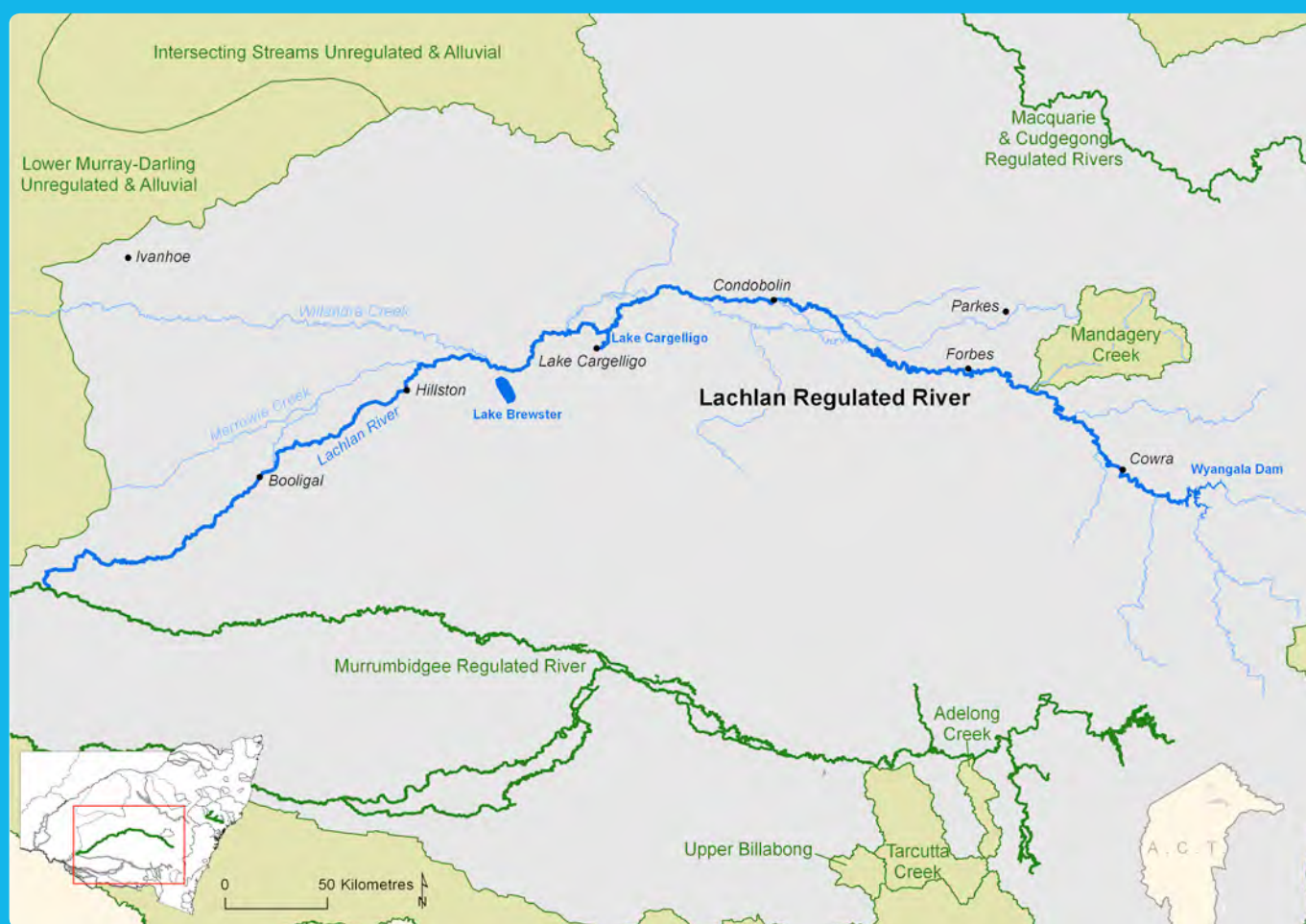
1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers groundwater within the planning area. The plan commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments were undertaken to inform the plan's development. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The Kulnura Mangrove Mountain Groundwater Sources are considered at risk of over extraction. The plan includes a number of management arrangements that aim to prevent further hydrological stress, including the establishment of a long-term extraction limit for each of its eight groundwater management zones. The plan's environmental water provisions can be amended based on further scientific studies of GDE and baseflow dependence of groundwater inflows.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented outcomes and strategies that are intended to protect aquifer water quality and nearby GDEs, and maintain the aquifer as a safe urban water supply. Monitoring and reporting arrangements are not specific.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of forestry and mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan manages the sharing of groundwater resources within the planning area. It recognises groundwater/surface water connectivity between the Ourimbah groundwater source and Ourimbah Creek and management arrangements have been established to protect groundwater baseflow contributions to Ourimbah Creek.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains environmental watering arrangements that aim to deliver the plan's environmental objectives. The plan acknowledges that the arrangements are based on limited understanding of environmental water requirements and allows for amendments to its provisions based on further scientific studies.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Aquifer water quality and water level monitoring has commenced and studies to assess the socioeconomic impact of the plan were completed in 2006 and 2010. Monitoring of consumptive water use to assess entitlement holder compliance has not commenced despite the plan being operational for seven years. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not explicitly address climate change; rather, it assumes that the in-built review will provide sufficient adaptive capacity. There are some self-adjustment mechanisms for climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. provision of tradeable water entitlements, provision of planned environmental water). Metering of licensed water use has not commenced and therefore compliance with the plan's extraction limits is not monitored and enforced. Environmental water requirements for each groundwater management zone have been reassessed based on new groundwater ecosystem dependency research and hydrological modelling. The environmental water provision may be increased for six of the eight management zones in light of this new research. A progress report on the monitoring and evaluation activities underway to assess the ecological and socioeconomic performance of each WSP in the Hunter Valley and central and lower north coast is pending.



# LACHLAN REGULATED RIVER WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Lachlan River begins in the Great Dividing Range and flows to its junction with the Murrumbidgee River only during large flood events, generally terminating at the Great Cumbung Swamp. The Lachlan River is fed from the tributaries of Belubula, Abercrombie, Crookwell, Boorowa and Mandagery (although a separate water sharing plan covers Mandagery Creek). Wyangala Dam regulates the river and Lake Cargelligo and Lake Brewster have been modified for use as storages. Land use is dominated by livestock grazing but irrigated agriculture occurs along the length of the Lachlan River. The main irrigated crops include cereals, lucerne and cotton. Irrigation for oilseeds, vegetables, wine grapes and stone fruits also occurs. Wetlands are a common feature of the catchment downstream of Forbes. Due to severe water shortages the Water Sharing Plan for the Lachlan Regulated River was suspended from 1 July 2004 until 16 August 2011.





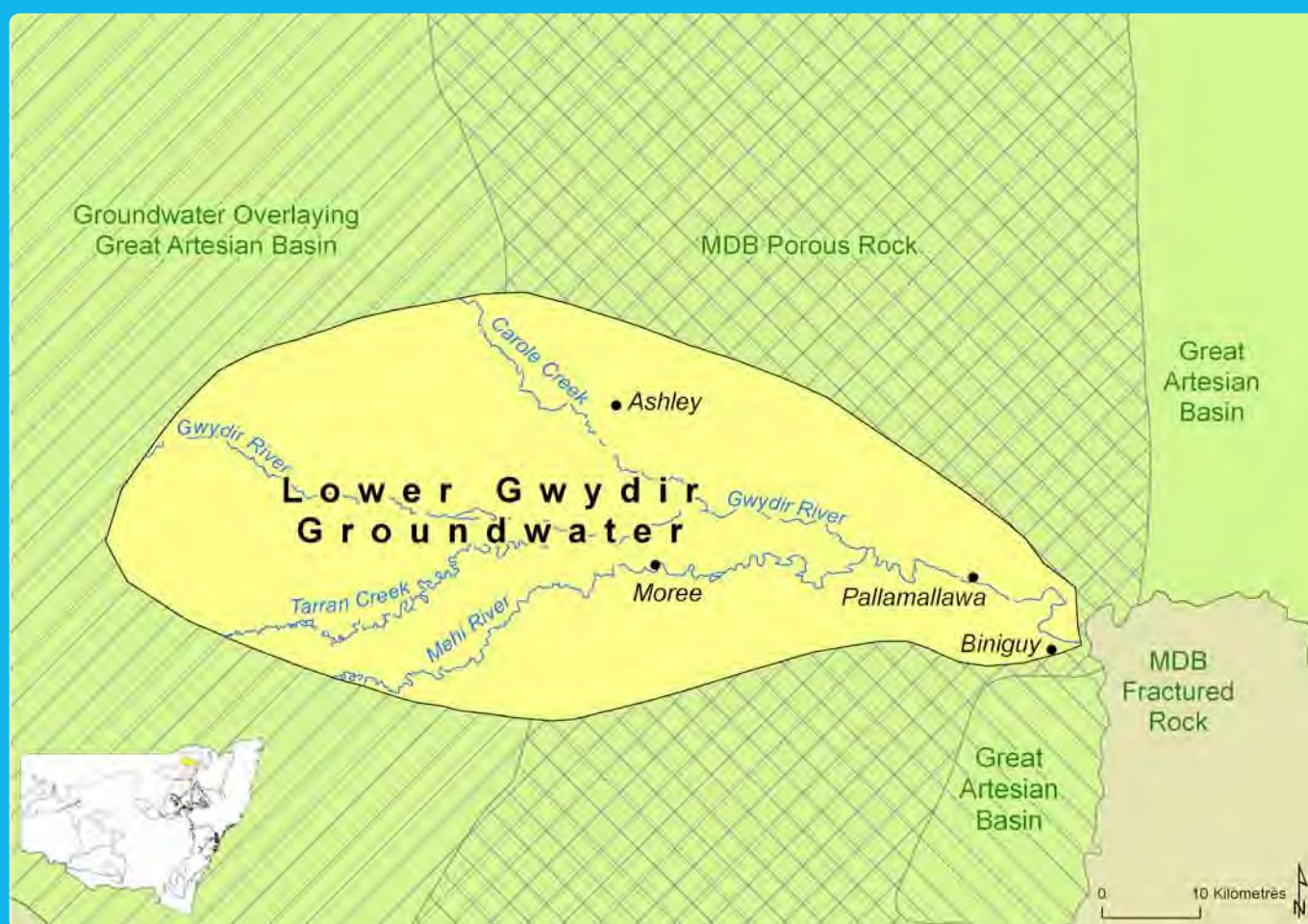
## Findings

1. Is there a plan in place?	Yes	A statutory plan commenced and was suspended on the same day in July 2004. The plan recommenced on 16 August 2011.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments informed the water management provisions of the plan. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. Information on the environmental and consumptive use trade-offs that underpin the extraction limit is no longer publicly available.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies outcomes which are linked to plan provisions but monitoring and reporting arrangements are not clearly detailed. Some objectives do not have clear strategies (e.g. protection of cultural and spiritual values).
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. There is identification of the need for regulation of floodplain harvesting, however the state policy remains in draft. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The plan is a single resource plan and provides little information on the potential connectivity between surface water and groundwater. Areas of connectivity are not identified or quantified in the plan, but links to the Mandagery Creek surface water tributary WSP are made.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan links environmental water provisions to objectives, and responsibility for their delivery has been assigned. Environmental water in the plan takes the form of translucency releases, water above the extraction limit, environmental contingency allowances, a water quality allowance and replenishment flows. Environmental water provisions are given effect to in Water Supply Work Approvals and State Water Corporation is required to provide an annual compliance report.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Despite suspension of the plan, there is evidence that some monitoring is occurring, such as trades, water quality, entitlement provisions and some environmental watering. Socioeconomic monitoring commenced in 2006. A progress report on all WSPs in the Lachlan Valley is pending. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risk to system health or entitlement security due to long-term climate change. There is some self-adjustment for climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	A River Management Committee, including stakeholder representatives, was established in 1997 to provide advice on environmental flow rules and went on to draft the WSP in 2001. However, the plan was eventually gazetted in 2003 and information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan strategies, such as the provision of tradeable water entitlements, however none of the evidence examined demonstrated that outcomes have been achieved to date. In particular, it should be noted that the plan was suspended on the day it commenced due to severe water shortages.



# LOWER GWYDIR GROUNDWATER SOURCES

## WATER SHARING PLAN 2003



### Context

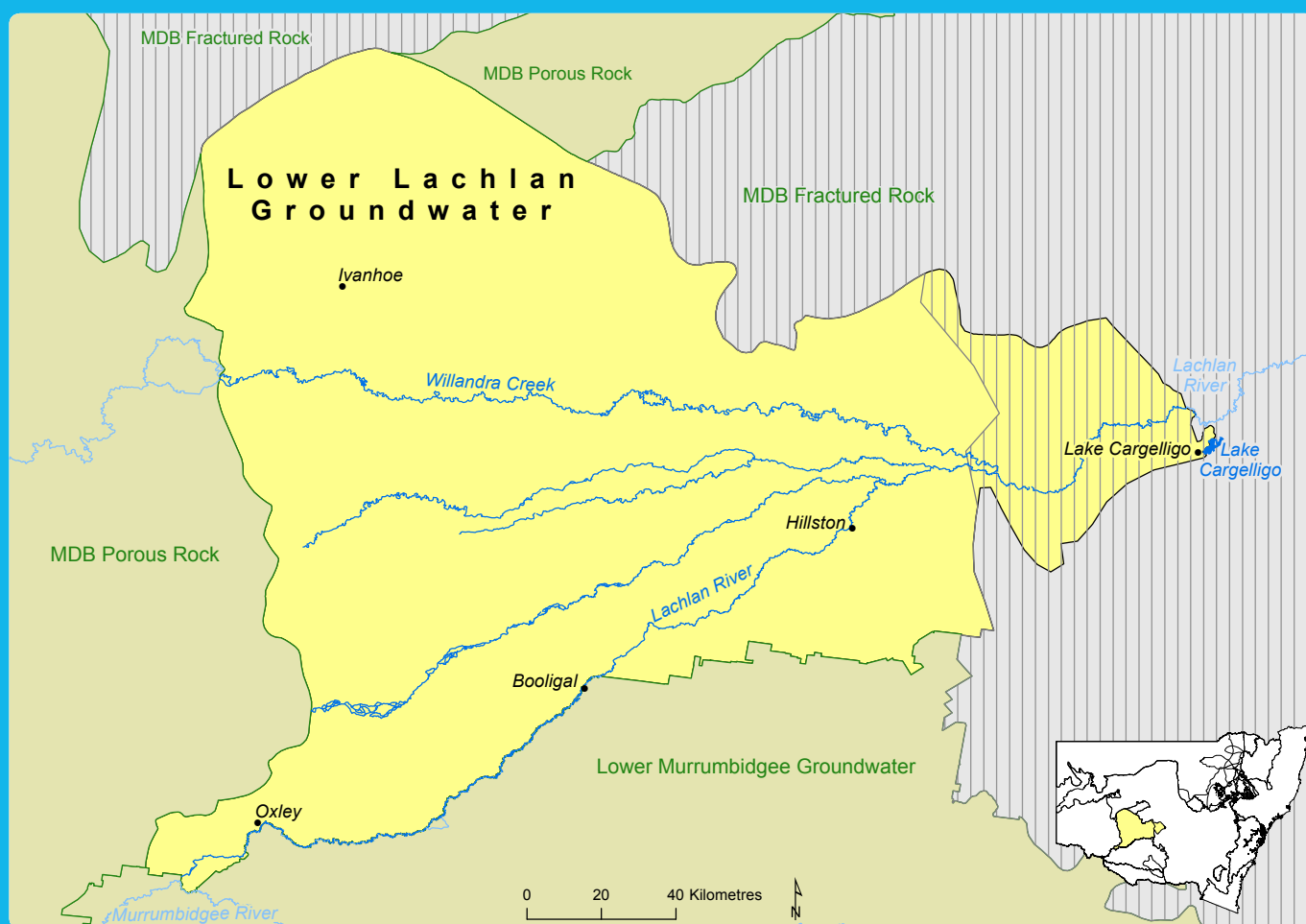
The Lower Gwydir Groundwater Sources lie within the Murray–Darling Basin in north-western New South Wales. Groundwater quality is generally high with water uses in the plan area including irrigation, industrial, domestic and stock, and town water supplies. Ongoing high demand for water has resulted in the area being identified as one of the most at-risk groundwater resources in the state. The Lower Gwydir Groundwater Sources were included in the Achieving Sustainable Groundwater Entitlements program funded by the New South Wales and Australian governments. Although these alluvial sediments are associated with the Gwydir and Mehi rivers, the surface water and groundwater are managed under separate water sharing plans.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers the Lower Gwydir Groundwater Sources. It commenced in 2006 and applies for 10 years.
2. Does the plan include key assessments?	To some extent	The Aquifer Risk Assessment Report (1998) classified these groundwater sources as highest risk. Assessments of extraction volumes and the socioeconomic importance of this water source were undertaken as part of plan development but no information on GDEs was provided. Knowledge of GDEs remains limited within the Gwydir region, but work has commenced to address information gaps.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan acknowledges that this groundwater source is overallocated. It establishes a long-term extraction limit and reduces entitlements over the life of the plan. The plan also allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes broad outcomes which are generally linked to plan provisions. Specific arrangements for monitoring of the effectiveness of this plan in achieving all outcomes have not been clearly articulated. Ecological and cultural objectives are general and will require considerable monitoring investment to measure their achievement, but trade and entitlement objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of mining interception.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	Although connectivity is recognised in the underpinning hydrological model, the plan is a single resource plan and the extent to which provisions address potential connectivity between surface water and groundwater is unclear.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. Environmental assets and their water requirements are not clearly detailed and monitoring is not a clearly embedded component of the plan or supporting documents. Knowledge of GDEs remains limited within the Gwydir region, but work has commenced to address information gaps.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Groundwater usage, levels and quality are being monitored and some socioeconomic data have been collected. Reporting from several sources across varying temporal and spatial scales lacks coordination (e.g. State of Catchment, Murray–Darling Basin Authority). Minimal information is available on the achievement of ecological or cultural outcomes, or progress towards these.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability, and historical climate data informed the establishment of extraction limits. The plan does not explicitly deal with climate change; rather, it assumes that the in-built review will provide sufficient adaptive capacity.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Stakeholder engagement occurred during the development and drafting of the plan through the local Gwydir Groundwater Management Committee (e.g. targeted consultation in plan development, public exhibition of draft plan). However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of plan strategies, such as tradeable water entitlements and provision of BLR. However, the status report identifies drawdowns of up to 40% of saturated thickness of the alluvium have occurred in some areas that are also showing recovery decline. Trade restrictions were proposed as a result of the levels of impact occurring.

# LOWER LACHLAN GROUNDWATER SOURCE

## WATER SHARING PLAN 2003



### Context

The plan area is located within the Lachlan catchment in central New South Wales. This groundwater source includes an upper unconfined aquifer and two lower confined aquifers. Recharge comes from rainfall, leakage from river and creeks, inundation from flooding and deep drainage from irrigation. Discharge occurs naturally and through groundwater pumping from all three layers. A large irrigation area near Hillston is reliant on groundwater for the production of citrus and vegetable crops. Ongoing high demand for water has resulted in the area being identified as at-risk and it was included in the Achieving Sustainable Groundwater Entitlements program funded by the New South Wales and Australian governments. Although this groundwater source receives recharge directly from the Lachlan River, the surface waters are managed under a separate water sharing plan (e.g. Water Sharing Plan for the Lachlan Regulated River Water Source).



## Findings

1. Is there a plan in place?	Yes	A statutory plan was developed and gazetted in 2003 but commenced in 2008 with an amended recharge estimate following a scientific review. The plan applies until 2018.
2. Does the plan include key assessments?	To some extent	Key assessments of extraction volumes and the socioeconomic importance of this water source were undertaken at the time of plan development but no information on environmental water requirements of GDEs was provided. The hydrological assessment was reviewed by the Natural Resources Commission in 2006 and the extraction limit was amended prior to plan commencement.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan acknowledges that this groundwater source is overallocated. It establishes a long-term extraction limit and reduces entitlements over the life of the plan. The plan also allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad outcomes, the achievement of which may be difficult to measure. The plan does link objectives to provisions but monitoring arrangements are not detailed. Risk monitoring of salinity is to be implemented in the sixth year of the plan.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of other interception activities, such as mining and forestry.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	Although connectivity is recognised in the underpinning hydrological model, the plan is a single resource plan and the extent to which provisions address potential connectivity between surface water and groundwater is unclear. GDEs are still to be identified.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	There is a lack of information on environmental assets and their water requirements. No GDEs have been identified. Monitoring to assess environmental outcomes is not a clearly embedded component of the plan or supporting documents.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some monitoring of groundwater levels is being undertaken, however the specific arrangements for monitoring have not been clearly described and reporting on the effectiveness of this plan in achieving all outcomes has been limited. A progress report on all WSPs in the Lachlan Valley is pending. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Stakeholder engagement occurred during the development and drafting of the plan (e.g. targeted consultation in plan development, public exhibition of draft plan). However, information explaining the final decision-making process is not publicly available. Consultative groups are required to be established to amend the recharge estimate or include provisions for GDE environmental water.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions, such as the provision of tradeable water entitlements and establishment of monitoring bores. However, the salinity risk monitoring strategy is yet to be developed and significant information gaps still exist (e.g. identification of GDEs).



# LOWER MACQUARIE GROUNDWATER SOURCES



## WATER SHARING PLAN 2003



### Context

The water sharing plan covers six groundwater sources or zones in the Lower Macquarie which lie within the Murray–Darling Basin and include the main high yielding aquifers north-west of Narromine. This groundwater is an important resource for domestic, stock, irrigation and town water supplies in the Macquarie Valley. Ongoing high demand for water has resulted in the area being identified as one of the most at-risk groundwater resources in the state. The Lower Macquarie Groundwater Sources were included in the Achieving Sustainable Groundwater Entitlements program funded by the New South Wales and Australian governments. The Lower Macquarie Groundwater Sharing Plan commenced in 2006.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers the Lower Macquarie Groundwater Sources. It commenced in 2006 and applies for 10 years.
2. Does the plan include key assessments?	To some extent	Some key assessments were undertaken as part of the development and drafting of the plan by a localised water management committee. Public documentation of this process has been limited (e.g. environmental asset condition, cultural values, connectivity). Assessment of the existing entitlement levels for the Lower Macquarie identified it as one of the most at-risk groundwater sources in the state.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan acknowledges that this groundwater source is overallocated. It establishes a long-term extraction limit and reduces entitlements over the life of the plan. The plan also allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes broad outcomes which are generally linked to plan provisions. Specific arrangements for monitoring of the effectiveness of this plan in achieving all outcomes have not been clearly articulated. Ecological and cultural objectives are general and will require considerable monitoring investment to measure. Trade and entitlement objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of other potential interception activities, such as mining and forestry.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	The plan is a single resource plan and provides little information on the potential connectivity between surface water and groundwater. Modelling work is underway to assess the current recharge estimates and to identify GDEs.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and responsibility for their provision has been assigned. Environmental assets and their water requirements are not clearly detailed and monitoring is not a clearly embedded component of the plan or supporting documents.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	While groundwater levels and quality are being monitored and some socioeconomic data collected, reporting is limited. Minimal information is available on the achievement of ecological or cultural outcomes, or progress towards these. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability, and historical climate data informed the establishment of extraction limits. There is no quantification of the potential risk to system health or entitlement security due to long-term climate change. There is some self-adjustment for climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Stakeholder engagement occurred during the development and drafting of the plan through the local Macquarie Groundwater Management Committee (e.g. targeted consultation in plan development, public exhibition of draft plan). However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. tradeable water entitlements, provision of BLR). Groundwater quality continues to be at-risk and knowledge of GDEs remains poor.

# LOWER MURRAY–DARLING UNREGULATED AND ALLUVIAL WATER SOURCES



## DRAFT WATER SHARING PLAN



### Context

The Draft Lower Murray–Darling Unregulated and Alluvial Water Sources Water Sharing Plan covers one unregulated surface water source and one alluvial groundwater source in the south-west of New South Wales. The plan area includes unregulated surface waters in the Lower Darling catchment, including the Great Darling Anabranch, and in the Murray River from its confluence with the Murrumbidgee River to the South Australian border. The Lower Darling Alluvial Groundwater Source associated with the Darling River has been categorised as 'less highly connected' but excessive extraction from the freshwater lenses of the alluvium has been identified as a risk to water quality in the river. Consumptive water use in the plan area includes irrigation, industrial purposes, and domestic and stock water use. Little information is available on the environmental assets in the region, such as Thegoa Lagoon. A draft plan was developed and placed on public exhibition from 6 December 2010 to 31 January 2011.

## Findings

1. Is there a plan in place?	To some extent	A draft plan has been developed and exhibited for public comment. As at 30 September 2011, the draft plan was awaiting ministerial approval.
2. Does the plan include key assessments?	To some extent	A number of key assessments have been undertaken to inform the development of the draft plan including estimates of consumptive use and the establishment of a long-term extraction limit. However, some of the detail underpinning these estimates and the risk assessment process were not provided in the plan or supporting documents (e.g. condition of environmental assets, empirical evidence of environmental water requirements, social or cultural values of water resources).
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The draft plan does not identify any areas of overuse. It does establish a long-term extraction limit and provision for reductions to allocations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The draft plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements are not specific. Ecological and cultural objectives are broad and their measurement will require considerable monitoring effort. Flow and entitlement related objectives are likely to be measurable using routinely collected hydrologic and trade parameters.
5. Does the plan facilitate trade?	Yes	Once operational, the plan will facilitate trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The draft plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. The plan may be amended to manage interception impacts from plantations and aquifer interference (mining), but this potential demand is unquantified. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The draft plan does recognise the connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The draft plan contains environmental watering arrangements but there is little detailed information presented to underpin them (e.g. current environmental asset condition or water requirements). The specific arrangements for monitoring the effectiveness of this plan in achieving environmental outcomes have not been clearly articulated.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan is still in draft, therefore it is difficult to assess this criterion at this time. No specific monitoring arrangements are detailed for this particular plan. There is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The draft plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	The stakeholder engagement process provided opportunities for input and advice from interested parties during the plan's development. The information used to determine some of the initial water source classifications and indicative water access and trading rules is not publicly available (e.g. condition and water requirements of environmental assets such as Thegoa Lagoon).
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is still in draft, therefore it is difficult to assess this criterion at this time.



# LOWER MURRAY GROUNDWATER SOURCES



## WATER SHARING PLAN 2006



### Context

The Lower Murray Groundwater Sources Water Sharing Plan applies to water contained in the unconsolidated alluvial aquifers of the Calivil and Renmark Formations, and the deeper Shepparton Formation. The plan area extends downstream from Corowa in the east to the confluence of the Wakool and Murray River in the west. This groundwater has been intensively pumped for irrigation, industrial, recreation and town water supplies in the past resulting in it being identified as one of the most at-risk groundwater resources in New South Wales. The Lower Murray Groundwater Sources were included in the Achieving Sustainable Groundwater Entitlements program funded by the New South Wales and Australian governments.

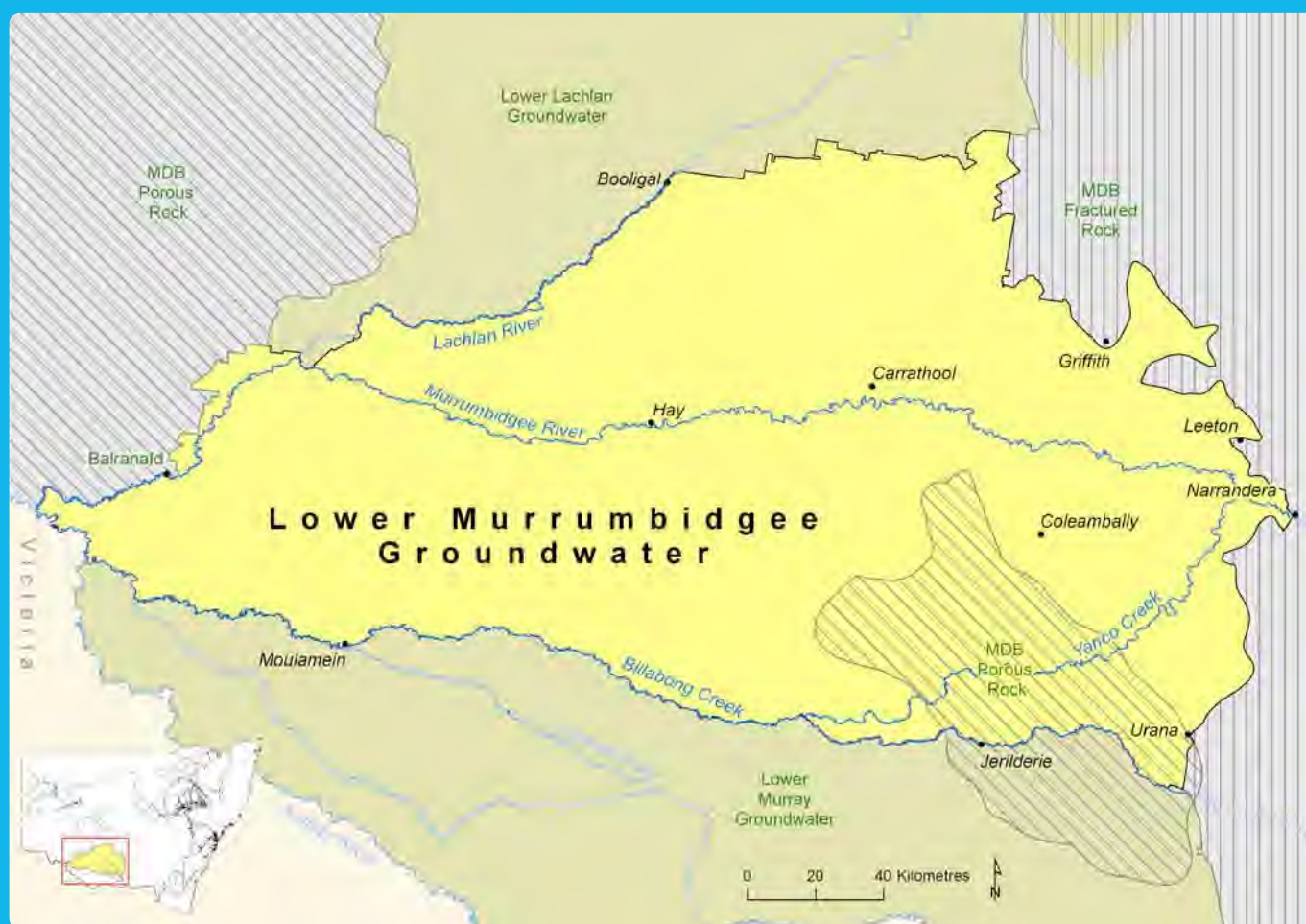
## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers the Lower Murray Groundwater Sources. It commenced in 2006 and applies for 10 years.
2. Does the plan include key assessments?	To some extent	Some assessment of extraction volumes and the socioeconomic importance of this water source have been undertaken but no information on environmental water requirements or GDEs was provided. The Aquifer Risk Assessment Report (1998) assessed these groundwater sources as highest risk.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan acknowledges that this groundwater source is overallocated. It establishes a long-term extraction limit and reduces entitlements over the life of the plan. The plan also allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes broad outcomes which are generally linked to plan provisions. Specific arrangements for monitoring of the effectiveness of this plan in achieving all outcomes have not been clearly articulated. Ecological and cultural objectives are general and will require considerable monitoring investment to measure their achievement, but trade and entitlement objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of potential interception activities, such as mining and forestry.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The plan is a single resource plan and provides little information on the potential connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	There is a lack of information on environmental assets and their water requirements, but the plan contains environmental watering arrangements and responsibility for their delivery has been assigned. Monitoring to assess environmental outcomes is not a clearly embedded component of the plan or supporting documents.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	While groundwater levels and water quality are being monitored and some socioeconomic data collected, reporting is limited. Minimal information is available on the achievement of ecological or cultural outcomes, or progress towards these. A progress report on all WSPs in the Murray Valley is pending. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Stakeholder engagement occurred during the development and drafting of the plan through the local Murray Groundwater Management Committee (e.g. targeted consultation in plan development, public exhibition of draft plan). However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of plan strategies, such as tradeable water entitlements and provision of BLR. However, none of the evidence examined demonstrated that outcomes have been achieved to date.

# LOWER MURRUMBIDGEE GROUNDWATER SOURCES



## WATER SHARING PLAN 2003



### Context

The Lower Murrumbidgee Groundwater Sources are located in southern New South Wales, extending in the south to Jerilderie and in the north to Griffith, and following the Lachlan River downstream to its confluence with the Murrumbidgee River, then to its junction with the Murray River. Groundwater extraction for stock supplies dates back to the early 1900s, while deeper bores were sunk for irrigation in the late 1960s. Ongoing high demand for water has resulted in the area being identified as one of the most at-risk groundwater resources in New South Wales. The Lower Murrumbidgee Groundwater Sources were included in the Achieving Sustainable Groundwater Entitlements program funded by the New South Wales and Australian governments.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers the Lower Murrumbidgee Groundwater Sources. It commenced in 2006 and applies for 10 years.
2. Does the plan include key assessments?	To some extent	Some assessment of extraction volumes and the socioeconomic importance of this water source have been undertaken but no information on environmental water requirements and GDEs was provided. The Aquifer Risk Assessment Report (1998) assessed these groundwater sources as highest risk.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan acknowledges that this groundwater source is overallocated. It establishes a long-term extraction limit and reduces entitlements over the life of the plan. The plan also allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes broad outcomes which are generally linked to plan provisions. Specific arrangements for monitoring of the effectiveness of this plan in achieving all outcomes have not been clearly articulated. Environmental objectives are general and will require considerable monitoring investment to measure their achievement, but trade and entitlement objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of other potential interception activities, such as mining and forestry.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and provides little information on the potential connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. Environmental assets and their water requirements are not clearly detailed and monitoring is not a clearly embedded component of the plan or supporting documents.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	While groundwater levels and water quality are being monitored and some socioeconomic data collected, reporting is limited. Minimal information is available on the achievement of environmental outcomes, or progress towards these. A progress report on all WSPs in the Murrumbidgee Valley is pending. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Stakeholder engagement occurred during the development and drafting of the plan through the local Murrumbidgee Groundwater Management Committee (e.g. targeted consultation in plan development) and through public exhibition of the draft plan. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of plan strategies, such as the provision of tradeable water entitlements and setting extraction limits. However, preliminary monitoring data show that groundwater levels continue to decline and usage has exceeded extraction limits in the deep aquifer.



# LOWER NORTH COAST UNREGULATED AND ALLUVIAL WATER SOURCES



## WATER SHARING PLAN 2009



### Context

The plan area is located at the southern end of the mid north coast of New South Wales bounded by the Hastings River Basin to the north, and the Hunter Valley to the south and west. Seventeen water sources were identified as having high in-stream values; many of these are sensitive to either high or low inflows and are valued as water sources for extraction. Significant industries in the area include oyster farming, forestry, fisheries, beef and dairy production, manufacturing, tourism, and gravel quarries. The plan includes the lower north coast unregulated rivers, the highly connected alluvial groundwater, and the tidal pool areas not previously covered by the *Water Act 1912*. This plan excludes the Karuah River because a separate water sharing plan had already commenced in 2004. The two plans will operate in parallel until the Karuah Water Sharing Plan ceases in 2014. At this time, there may be a case to merge the plans.

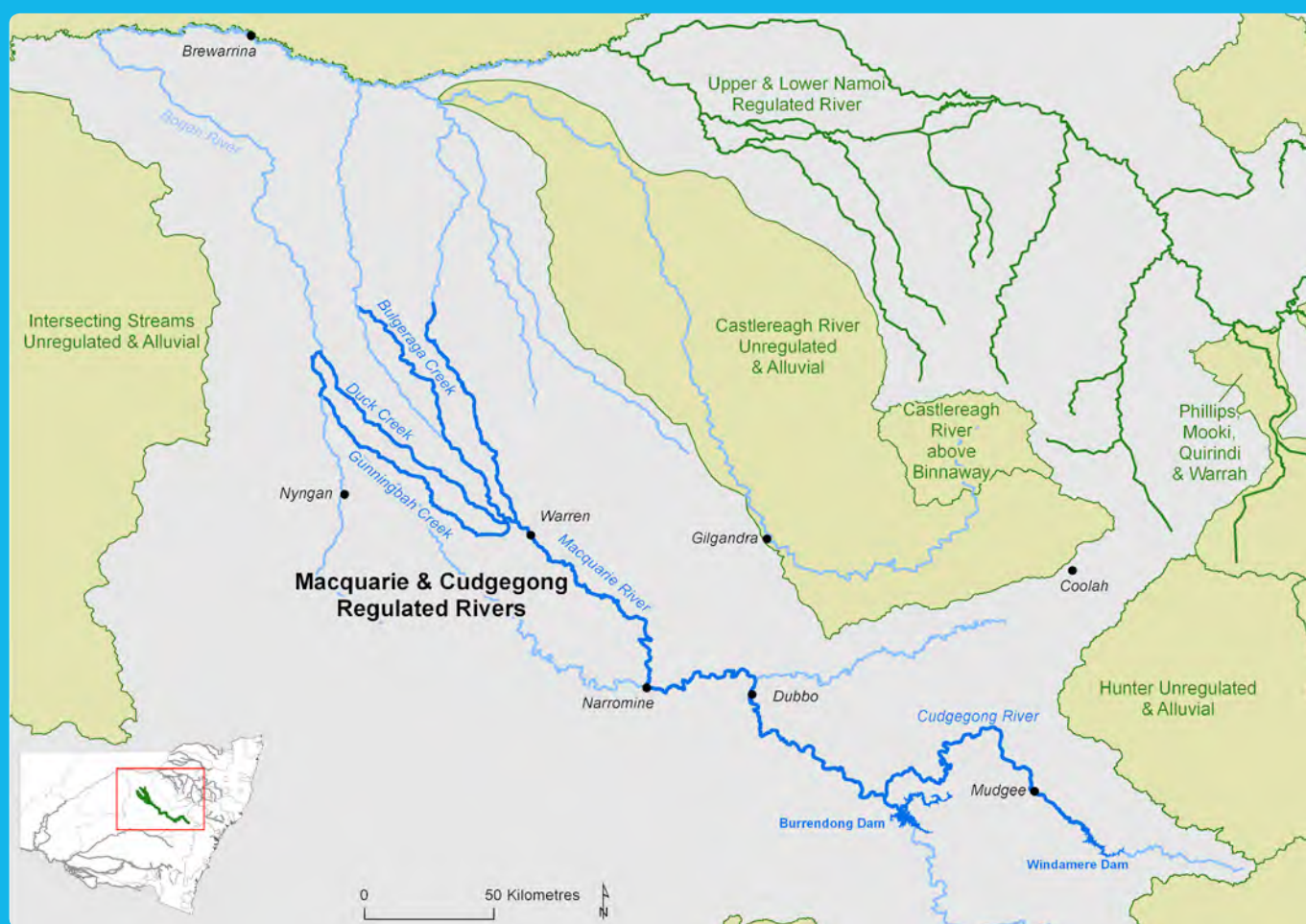
## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers the surface waters and alluvial water sources within the planning area. The plan commenced in 2009 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments informed the water management provisions within the plan. An assessment of the risk to in-stream values posed by the existing or increased extraction was undertaken based on existing information.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, but does recognise some of the system is hydrologically-stressed. The plan establishes a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad outcomes, the achievement of which will be difficult to measure. While the plan includes strategies for achieving its objectives, monitoring and reporting arrangements to assess their effectiveness are not specified.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. Interception activities such as forestry have been considered within the plan. A number of state-wide policies guide the management of other potential intercepting activities including farm dams and mining.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan recognises surface water and groundwater connectivity in the planning area and establishes appropriate integrated management arrangements.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	While environmental objectives are specified in the plan, the water requirements to achieve those objectives are not stated. They are, however, implicit to an extent in the water management rules set out in the plan. Environmental water provisions are given effect to in Water Supply Work Approvals, and Macquarie Generation is required to provide an annual compliance report.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	There is minimal information on how the achievement of plan outcomes, and progress towards them, will be monitored. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There was no quantification of the potential risk to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement provided opportunities for all interested parties to contribute to the plan's development and refinement. Stakeholder input is transparently recorded in the plan's supporting documentation.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan commenced in 2009. There has been no reporting of plan implementation progress or the effectiveness of the plan's provisions in delivering its intended outcomes. However, a progress report for all WSPs in the Hunter Valley and central and lower north coast is pending.

# MACQUARIE AND CUDGEGONG REGULATED RIVERS WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Macquarie catchment lies within the Murray–Darling Basin, and includes the internationally important Macquarie Marshes. Water in the Macquarie River is regulated by two major storages in the upper catchment (Burrendong and Windamere) and supports a range of industries including agriculture, tourism, mining and viticulture. The largest agricultural use of water in the valley is for cotton production and most of the major towns rely on the rivers in the catchment for their water supply. The Water Sharing Plan for the Macquarie and Cudgong Regulated Rivers commenced in 2004 but was suspended three years later due to severe water shortages. It recommenced on 16 August 2011.

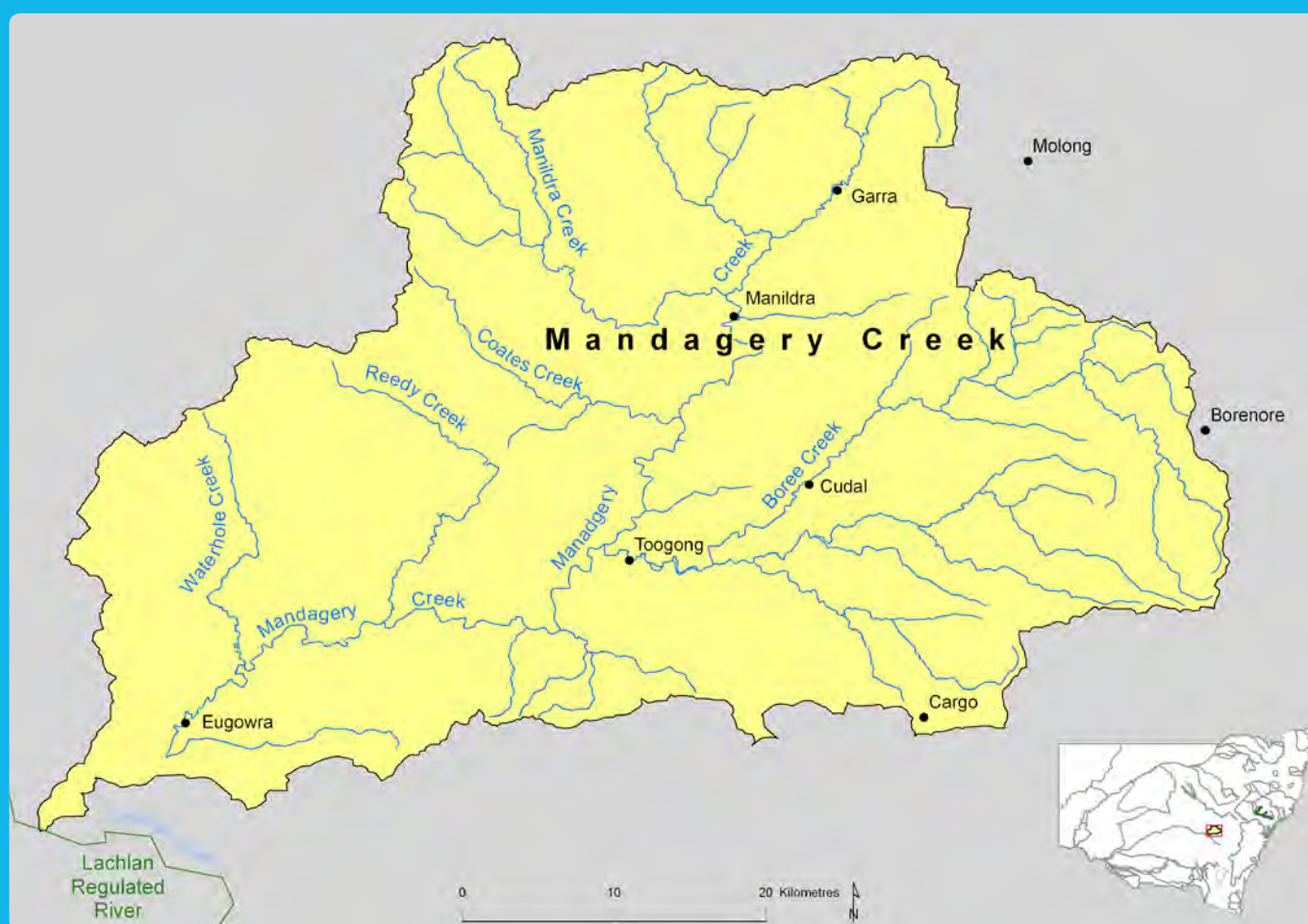
## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers the regulated surface waters of the Macquarie and Cudgegong regulated rivers. It commenced in 2004, was suspended in 2007, and recommenced on 16 August 2011. It applies for 10 years.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken as part of the development and drafting of the plan by the local Macquarie Cudgegong River Management Committee (e.g. hydrological and economic modelling). However, this information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. Information on the environmental and consumptive use trade-offs that underpin the extraction limit is no longer publicly available.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements are not specific. Ecological, socioeconomic and cultural objectives are broad and their measurement will require considerable effort. Entitlement related objectives are likely to be measurable using routinely collected hydrologic and trade parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. While there is identification of the need for regulation of floodplain harvesting and estimated volumes are integrated into the plan's extraction limit, a state policy has not been finalised. State-wide policies guide the management of other potential interception activities, such as mining and forestry.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not include information on the potential connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. Environmental assets and their water requirements are not clearly detailed and monitoring is not a clearly embedded component of the plan or supporting documents. Environmental water provisions are given effect to in Water Supply Work Approvals and State Water Corporation is required to provide an annual compliance report.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some environmental, hydrological and socioeconomic monitoring is being undertaken despite the suspension of the plan in 2007. Monitoring has not been clearly linked to plan outcomes and reporting is limited. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There are some self-adjustment mechanisms but no quantification of the potential risk to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The draft plan was developed by a localised committee that included stakeholder representatives and government agencies. Plan development involved extensive community engagement, which included public meetings, exhibition of the draft plan and a public submissions process. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Despite suspension of the plan in 2007, progress has been made towards the implementation of water sharing plan actions, such as provision of tradeable water entitlements and delivery of BLR. A general lack of reporting on the effectiveness of the plan's provisions in delivering its ecological and cultural outcomes makes assessment difficult.



# MANDAGERY CREEK WATER SOURCE

## WATER SHARING PLAN 2003



### Context

The Mandagery Creek Water Source is a major unregulated tributary of the Lachlan River in the central-west of New South Wales. Mandagery Creek and its tributaries have highly variable flow patterns, however on average flows are low for most of the time, with occasional large events in response to heavy rainfall. Irrigation and domestic and/or stock needs are the main consumptive water uses within the planning area. The area is considered hydrologically-stressed because of the high consumptive water demand during the system's summer low flows. Equitable sharing of water for consumptive and non-consumptive purposes during periods of low water availability is the primary planning driver. Despite being one of many unregulated rivers in the Lachlan catchment, Mandagery Creek is managed under a discrete water sharing plan, which commenced in 2004.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments were undertaken to inform the plan's development. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, however the system is considered hydrologically-stressed during low flow periods. The plan establishes a long-term extraction limit and allows for reductions to allocations if the extraction limit is exceeded. Information on trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented objectives, strategies and related performance indicators, but monitoring and reporting arrangements for measuring achievement against these is not specific. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters, but some ecological objectives will require considerable monitoring investment to assess their achievement.
5. Does the plan facilitate trade?	To some extent	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not address groundwater and surface water connectivity.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes a cease-to-pump level to protect a portion of low flows, and daily flow sharing volumes to protect natural medium to high flow variability. The environmental water provisions are based on the hydro-ecological assumption that mimicking natural flow variability will protect aquatic ecosystems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. Measurement of socioeconomic objectives commenced in 2006 as part of a broad state-wide program and water trade activity and streamflow are routinely monitored. A progress report on environmental and socioeconomic monitoring for all WSPs in the Lachlan Valley is pending. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not explicitly deal with climate change; rather, it assumes that the in-built review will provide sufficient adaptive capacity. There are some self-adjustment mechanisms for climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards implementation of some plan actions (e.g. provision of tradeable water entitlements, provision of BLR, maintenance of extraction limit), however there has been minimal reporting on the plan's outcomes. Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. daily flow sharing, temporary water trading). Results of the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.

# MURRAH-WALLAGA AREA UNREGULATED AND ALLUVIAL WATER SOURCE



## WATER SHARING PLAN 2010



### Context

The Murrah-Wallaga area is located on the south-east coast of New South Wales and includes the towns of Cobargo and Bermagui. The catchment has a relatively high density of sensitive estuaries and coastal lakes. Beef grazing and dairy farming are the main agricultural activities, comprising 30 per cent of land use with the other 70 per cent primarily state forest and national park. A significant area of land is harvested for timber and paper products. The catchment has very low flows due to the small catchment size and moderate rainfall. Although the total volume of water extracted is relatively low compared to average annual flow, most of the demand for water occurs when streamflow is low. Four water sources were rated as having high in-stream values but are also highly hydrologically-stressed.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers the surface waters and alluvial water sources within the planning area. The plan commenced in 2010 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments informed the water management provisions within the plan. An assessment of the risk to in-stream values posed by the existing or increased extraction was undertaken and a summary was publicly available in the supporting documentation.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, but does recognise some of the system is hydrologically-stressed. The plan establishes a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad objectives, strategies and related performance indicators that are linked to the plan's provisions. Monitoring arrangements for measuring plan outcomes are not clearly specified. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters, but some ecological objectives will require considerable monitoring investment to assess their achievement.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan addresses interception for BLR, including consideration of impacts from farm dams. A number of state-wide policies guide the management of other potential intercepting activities, such as forestry and mining.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan recognises surface water and groundwater connectivity in the planning area and establishes appropriate integrated management arrangements.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes cease-to-pump rules to protect pool connectivity during low flow periods, and daily flow sharing volumes to protect natural flow variability. The environmental water provisions have not been established based on the watering requirements of in-stream assets, but on the hydro-ecological assumption that mimicking natural flow variability will protect aquatic ecosystems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan commenced in 2010, therefore it is too early to assess this criterion. There is minimal information on how the achievement of plan outcomes, and progress towards them, will be monitored. However, there is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan considered potential climate change in framing access conditions and determining the long-term extraction limit. The plan has strategies in place to deal with the risks posed by long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement provided opportunities for all interested parties to contribute to the plan's development and refinement. Stakeholder input is transparently recorded in the plan's supporting documentation.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan commenced in 2010. There has been no reporting of plan implementation progress or the effectiveness of the plan's provisions in delivering its intended outcomes.



# MURRAY AND LOWER DARLING REGULATED RIVERS WATER SOURCES

## WATER SHARING PLAN 2003



### Context

The Murray and Lower Darling Regulated Rivers Water Sharing Plan covers the regulated surface waters of the Murray River from the Hume Dam storage downstream to the South Australian border and the regulated portion of the Lower Darling from Menindee Lakes. The volume and pattern of flows in the Murray–Darling have been altered by the construction of Hume Dam on the Murray, Dartmouth Dam on the Mitta-Mitta River and by the operation of Menindee Lakes in the Lower Darling River. The Murray and Lower Darling valleys support some of the most highly productive agricultural areas in the country, as well as significant environmental assets. The process of river regulation has had a wide range of effects on river and wetland health, as well as water quality. A Water Sharing Plan for the Murray and Lower Darling Regulated Rivers commenced in 2004, but was suspended in 2006. The water sharing plan recommenced on 16 August 2011.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the regulated surface waters of the Murray and Lower Darling rivers commenced in 2004 and applies for 10 years. However, it was suspended in 2006 and recommenced on 16 August 2011.
2. Does the plan include key assessments?	To some extent	Some key assessments were undertaken as part of the development and drafting of the plan by a localised water management committee but public documentation of this process has been limited. The extent to which these key assessments have been integrated into water sharing provisions is unclear.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. However, information on the environmental and consumptive use trade-offs that underpin the extraction limit is not publicly available.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements for the measurement of these are not specific. While ecological and cultural objectives are broad and will require considerable monitoring investment to measure their achievement, some entitlement and extraction related objectives are measurable using routinely collected trade and hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. Consideration of potential impacts from forestry was not evident but subsequent risk assessments by NSW have concluded they are likely to be negligible. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not include information on the potential connectivity between surface water and groundwater. The extent to which connectivity was considered in hydrological modelling is unclear.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements but was suspended from 2006 to 2011. The extent to which information on environmental water needs was integrated into plan provisions is unclear. Environmental water provisions will be given effect to in Water Supply Work Approvals and State Water Corporation is required to provide an annual compliance report.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some environmental, water accounting and socioeconomic monitoring has occurred under a range of programs (e.g. Integrated Monitoring of Environmental Flows, Murray–Darling Basin cap audit). However, monitoring in some cases has not been clearly linked to plan outcomes. The timing of reporting and the spatial scale at which results are reported have been variable. A progress report on all WSPs in the Murray Valley is pending. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Stakeholder engagement occurred during the development and drafting of the plan through the local Murray Lower Darling Community Reference Committee. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. tradeable water entitlements, delivery of BLR, some environmental watering). However, the plan was suspended for several years and monitoring of plan effectiveness has not been consistently reported in publicly available documents. None of the evidence examined demonstrated that outcomes have been achieved to date.

# MURRAY UNREGULATED AND ALLUVIAL WATER SOURCES



## DRAFT WATER SHARING PLAN



### Context

The Draft Murray Unregulated and Alluvial Water Sources Water Sharing Plan covers 15 unregulated water sources and one alluvial groundwater source within the Murray River catchment in the south of the State. Water sources in the planning area have high in-stream ecological values and significant economic importance. Consumptive water use includes irrigation, town water supply, domestic and stock uses, industrial purposes, and recreation. In some areas peak daily demand can exceed supply during the summer months which can result in high hydrological stress. A draft plan was developed and placed on public exhibition from 6 December 2010 to 31 January 2011.

## Findings

1. Is there a plan in place?	To some extent	A draft plan has been developed and exhibited for public comment. As at 30 September 2011 the draft plan was awaiting ministerial approval.
2. Does the plan include key assessments?	To some extent	A number of key assessments have been undertaken to inform the development of the draft plan including estimates of consumptive use and the establishment of a long-term extraction limit. However, some of the detail underpinning these estimates and the risk assessment process were not provided in the plan or supporting documents (e.g. condition of environmental assets, empirical evidence of environmental water requirements, social or cultural values of water resources).
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The draft plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The draft plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements are not specific. Ecological and cultural objectives are broad and their measurement will require considerable monitoring effort. Flow and entitlement related objectives are likely to be measurable using routinely collected hydrologic and trade parameters.
5. Does the plan facilitate trade?	Yes	Once operational, the plan will facilitate trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. The plan may be amended to manage interception impacts from floodplain harvesting, plantations, and aquifer interference (mining), but this potential interception is unquantified. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The draft plan does recognise the connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements but there is little detailed information presented to underpin them (e.g. current environmental asset condition or water requirements). The specific arrangements for monitoring the effectiveness of this plan in achieving environmental outcomes have not been clearly articulated.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan is still in draft, therefore it is difficult to assess this criterion at this time. No specific monitoring arrangements are detailed for this particular plan. There is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	The stakeholder engagement process provided opportunities for input and advice from interested parties during the plan's development. The information used to determine some of the initial water source classifications and indicative water access and trading rules was not publicly available.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is still in draft, therefore it is difficult to assess this criterion at this time.



# MURRUMBIDGEE REGULATED RIVER WATER SOURCE

## WATER SHARING PLAN 2003



### Context

The Murrumbidgee River is a highly developed water source in southern New South Wales which forms a major tributary of the Murray–Darling River system. The two largest water storages are Blowering and Burrinjuck dams and major water users in the catchment include local councils and water utilities, agriculture (e.g. rice, grapes), forestry and tourism. The Murrumbidgee catchment area contains ecologically significant wetlands, such as the Lowbidgee Floodplain and Fivebough Swamp. The alteration of river flows through regulation and extraction has affected the environmental health of the river and its wetlands and contributed to water quality problems, such as salinity. A water sharing plan commenced for the Murrumbidgee Regulated River in 2004, but was suspended in 2006 due to severe water shortages. The plan recommenced on 16 August 2011.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the regulated surface waters of the Murrumbidgee Regulated River commenced in 2004 and applies until 2013. The WSP was suspended on 10 November 2006 and recommenced on 16 August 2011.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken as part of the development and drafting of the plan by a localised water management committee. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify any areas of overuse. It does establish the basis for a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. Some of the environmental and consumptive use trade-offs made in setting extraction limits are unclear (e.g. increase in environmental water after fifth year).
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements for the measurement of these are not specific. While ecological and cultural objectives are broad and will require considerable monitoring investment to measure their achievement, some trade and extraction related objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. Consideration of potential impacts from forestry was not evident but subsequent risk assessments conducted by NSW have concluded that they are likely to be negligible. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not include information on the potential connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned but monitoring is not a clearly embedded component of the plan or supporting documents. Environmental water provisions are given effect to in Water Supply Work Approvals and State Water Corporation is required to provide an annual compliance report. It should be noted that due to severe water shortages in NSW the plan was suspended for five years.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Collection of some environmental, water accounting and socioeconomic information is being undertaken despite the suspension of the plan in 2006. However, monitoring has not been clearly linked to plan outcomes and reporting has been limited. A progress report on all WSPs in the Murrumbidgee Valley is pending. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There are some self-adjustment mechanisms but no quantification of the potential risk to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Stakeholder engagement occurred during the development of the plan through the local Murrumbidgee River Management Committee (e.g. establishment of environmental flow rules, recommendations for water sharing arrangements) and through public exhibition of the draft plan. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. tradeable water entitlements, delivery of BLR, some environmental watering). There has been no coordinated reporting of the plan's effectiveness in delivering its outcomes, however a progress report on the monitoring and evaluation activities underway to assess the ecological and socioeconomic performance of each WSP in the Murrumbidgee Valley is pending. The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available. It should be noted that due to severe water shortages in NSW the plan was suspended for five years.

# NORTH WESTERN UNREGULATED AND FRACTURED ROCK WATER SOURCES



## DRAFT WATER SHARING PLAN



### Context

The draft plan covers two groundwater sources and one unregulated surface water source in the north-west of New South Wales. The plan area sits outside the Murray–Darling Basin and includes the towns of Tibooburra and Milparinka. At present the low volume of water entitlement provides for industrial purposes, mining, or for domestic and stock water use. These water sources are relatively undeveloped and the draft plan provides for volumes of unassigned water which could potentially allow new small business ventures to expand into the region. The draft plan was placed on public exhibition from 6 December 2010 to 31 January 2011.

## Findings

1. Is there a plan in place?	To some extent	A draft plan has been developed and exhibited for public comment. As at 30 September 2011 the draft plan was awaiting ministerial approval.
2. Does the plan include key assessments?	To some extent	Some key assessments were undertaken to inform the development of the draft plan, including estimates of consumptive use. The standard macro planning assessments (e.g. risk assessments for water sources) were not made publicly available during the exhibition period.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The draft plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. In addition, limits to extraction of recharge generated over high environmental/conservation value areas have been established. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The draft plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements are not specific. Ecological and cultural objectives are broad and their measurement will require considerable monitoring investment.
5. Does the plan facilitate trade?	Yes	Once operational, the plan will facilitate water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	Interception activities have been identified within the draft plan, including potential increases in water demand related to BLR and provision of unassigned water to meet future water needs. However, there are no volumetric estimates for the predicted increase in BLR and no threshold set above which licensing would be required.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The draft plan recognises the connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Although this is a relatively undeveloped water resource, the draft plan identifies environmental watering arrangements for each water source. However, there is little detailed information provided to underpin these arrangements (e.g. current environmental asset condition or water requirements).
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan is still in draft, so an assessment of this criterion is not possible at this time. No specific monitoring arrangements are detailed for this particular plan. There is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The draft plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The stakeholder engagement process provided opportunities for input and advice from interested parties during the plan's development. The information used to determine the water source classifications and indicative water access and trading rules is not publicly available (e.g. risk assessments).
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is still in draft, so an assessment of this criterion is not possible at this time.



# NSW BORDER RIVERS REGULATED RIVER WATER SOURCE



## WATER SHARING PLAN 2009



### Context

The Border Rivers catchment lies within the Murray–Darling Basin. It contains the Dumaresq and Macintyre rivers which form part of the state border between Queensland and New South Wales. Management of the system is covered by an intergovernmental agreement between the New South Wales and Queensland governments ratified in 1946 and amended in 2008, which stipulates an end-of-system flow requirement. The area supports a variety of irrigated and dryland agricultural industries, such as intensive fruit and vegetable production, grazing, broadacre cropping and cotton. The development of the water sharing plan was prioritised due to the growth in extractions in the 1980s–90s and the introduction of the Murray–Darling Basin cap.

## Findings

1. Is there a plan in place?	Yes	A statutory plan commenced in 2009 for the regulated surface water of the New South Wales Border Rivers. It applies for 10 years.
2. Does the plan include key assessments?	To some extent	The plan and supporting documentation provide information on the key assessments undertaken and include links to the studies that underpin the relevant data. The assessments were completed eight years before the plan was finalised in 2009 but were reviewed during plan finalisation.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify any areas of overuse. It does establish an extraction limit and allows for adjustments to allocations if the extraction limit is exceeded. However, information on trade-offs that underpin the extraction limits set under the intergovernmental agreement and the WSP are no longer publicly available.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan identifies objectives, strategies and performance indicators. Ecological objectives are broad and their measurement will require considerable effort. The majority of objectives are measurable using routinely collected hydrologic parameters. A specific monitoring schedule, which is required under the intergovernmental agreement, is yet to be developed.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements. Cross-border trade is managed under the intergovernmental agreement.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. While estimated volumes for floodplain harvesting are integrated into the plan's extraction limit, a state policy has not been finalised. Other intercepting activities, such as forestry, were identified as low risk. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not include information on the potential connectivity between surface water and groundwater. The extent to which connectivity and potential impact on GDEs is considered in the hydrological modelling is unclear.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and assigns responsibility for its delivery. However, monitoring arrangements to assess the achievement of environmental objectives are not detailed. Environmental water provisions are given effect to in Water Supply Work Approvals and State Water Corporation is required to provide an annual compliance report.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some monitoring of the plan's effectiveness in delivering its water security objectives is evident from various registers that document available water determinations and trade activity, as well as State Water Corporation's annual reporting requirements. Socioeconomic objectives are to be reported using data from state-wide surveys. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The long-term extraction limit is based on historical use with variation between years based on climatic conditions. Long-term historical climatic data was used to inform the development of water sharing rules but there are no long-term climate change strategies in place to respond to associated risks to system health or entitlement securities.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The draft plan was developed by the Border Rivers Regulated River Management Committee and was based, to some extent, on agreements reached under the intergovernmental agreement. Public submissions were accepted on the draft plan but information explaining the final decision-making process was not made available to the public.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards some plan objectives (e.g. provision of tradeable water entitlements). However, the 2009 Valley Progress Report indicates that the monitoring program required under the intergovernmental agreement is yet to be completed. Therefore, it is difficult to assess the achievement of plan objectives.

# NSW BORDER RIVERS UNREGULATED AND ALLUVIAL WATER SOURCES



## DRAFT WATER SHARING PLAN



### Context

The Border Rivers catchment lies within the Murray–Darling Basin and the Dumaresq and Macintyre rivers form part of the state border between Queensland and New South Wales. The draft plan area comprises 12 surface water and four groundwater sources and covers the townships of Inverell, Ashford and Glen Innes. The catchment has summer-dominant rainfall with high variability and the area supports a variety of irrigated and dryland agricultural industries, such as fruit and vegetable production, grazing, broadacre cropping and cotton. A separate water sharing plan applies to the regulated Border Rivers and this macro plan was developed for the remaining water sources not previously covered by a water sharing plan.

## Findings

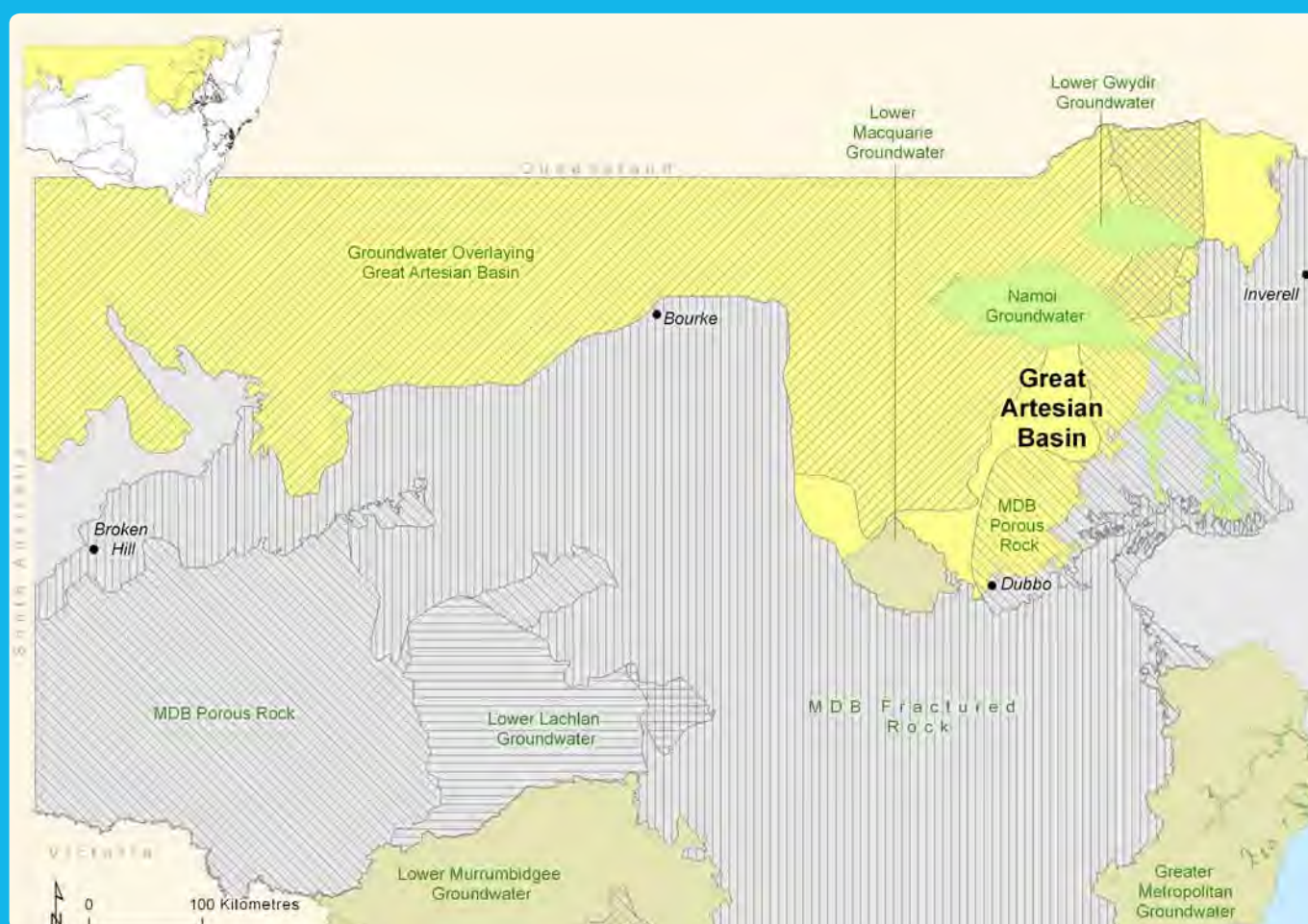
1. Is there a plan in place?	To some extent	A draft plan has been developed and comment has been sought during a formal public exhibition period. As at 30 September 2011 the draft plan was awaiting ministerial approval.
2. Does the plan include key assessments?	To some extent	Some key assessments have been undertaken to inform the development of the draft plan (e.g. estimates of consumptive use). However, much of the detail underpinning these estimates and the risk assessments were not provided in the draft plan or supporting documents (e.g. condition of environmental assets).
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The draft plan does not identify any areas of overuse. The final extraction limit will be based on a survey of current extractions from the water sources plus an estimate of BLR. There are provisions for reductions to allocations if the extraction limit is exceeded but these cannot be implemented until the sixth year of the plan.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The draft plan does include clearly identified outcomes linked to strategies and performance indicators. However, risk assessment and monitoring arrangements are not clearly articulated for all plan objectives.
5. Does the plan facilitate trade?	To some extent	Once operational, the plan may facilitate water trade under the <i>Water Management Act 2000</i> . However, trading arrangements are not clear because extraction limits have not been quantified for all water sources.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. The plan can be amended to manage floodplain and stormwater harvesting, plantation forestry and aquifer interference (e.g. mining). Quantitative information on potential interception activities is not provided despite projected increases (e.g. forestry).
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The draft plan recognises the connectivity between surface water and groundwater, but connectivity is only actively managed for highly connected groundwater sources.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The draft plan identifies environmental watering arrangements, however there is little detailed information provided to underpin them (e.g. studies of current environmental asset condition, verification of modelled recharge or groundwater storage capacity). Environmental water is tied to extraction limits, and in some systems limits are yet to be determined.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan is still in draft, so an assessment of this criterion is not possible at this time. No specific monitoring arrangements are detailed for this particular plan. There is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The draft plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Some components of the stakeholder consultation process, such as the identification of stakeholder groups and the approach for targeted consultation, are unclear. There is also uncertainty about the level of detail provided during public exhibition of the draft plan (e.g. information pending on extraction limits).
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is still in draft, so an assessment of this criterion is not possible at this time.



# NSW GREAT ARTESIAN BASIN GROUNDWATER SOURCES



## WATER SHARING PLAN 2008



### Context

The plan applies to the New South Wales component of the Great Artesian Basin (GAB) in the north of the state. Natural discharge from the Great Artesian Basin occurs via mound springs, which often have high conservation, cultural and heritage values. Groundwater development in the Great Artesian Basin has supported the pastoral industry for over 120 years but has caused substantial groundwater pressure losses resulting in half of the Great Artesian Basin bores in New South Wales ceasing to flow. The Great Artesian Basin Sustainability Initiative (GABSI) is a coordinated program endorsed by all Great Artesian Basin jurisdictions that began in 1999 to improve artesian pressure by capping and replacing bores across the Basin. The NSW Great Artesian Basin Water Sharing Plan commenced in 2008.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers the NSW GAB Groundwater Sources. It commenced in 2008 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Key assessments of the current uses and entitlements, socioeconomic and cultural importance of this water source have been undertaken and a risk identification process was evident at the time of plan development. There is recognition that the resource supports important environmental assets and acknowledgment that more research is required on GDEs in the plan area.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan acknowledges that extractions from this water source have led to declines in artesian pressure and stress to GDEs. The plan establishes a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes broad outcomes which are generally linked to plan provisions. Specific arrangements for monitoring of the effectiveness of this plan in achieving all outcomes have not been clearly articulated. Ecological and cultural objectives are general and will require considerable monitoring investment to measure their achievement, but trade and entitlement objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. The loss of artesian water from uncontrolled bores is also recognised and implementation of the Cap and Pipe program to address this is acknowledged. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The plan describes the connectivity between this groundwater source and surface waters, however the degree to which these relationships have informed integrated management is unclear.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. Environmental assets and their water requirements are not clearly detailed and monitoring is not a clearly embedded component of the plan or its supporting documents.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	While groundwater levels and water quality are being monitored, minimal information is available on the achievement of environmental or cultural outcomes, or progress towards these. Some information on the achievements of the GABSI is available but this is not specifically linked to plan outcomes. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement provided opportunities for all interested parties to contribute to the plan's development and refinement including targeted consultation in plan development, public exhibition of the draft plan, and feedback responding to public submissions.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan strategies, such as the provision of tradeable water entitlements and implementation of the Cap and Pipe program. However, objectives related to ecological and cultural values are difficult to assess due to a lack of monitoring and reporting.

# NSW MURRAY–DARLING BASIN FRACTURED ROCK GROUNDWATER SOURCES



## DRAFT WATER SHARING PLAN



### Context

The draft plan covers 10 fractured rock groundwater sources, all within the Murray–Darling Basin. These groundwater sources do not contain any porous rock or alluvial sediments. While the draft plan generally limits the granting of new access licences, it does not prevent landholders accessing Basic Landholders Rights (i.e. allowable water use by landholders which is unlicensed) and there is a high demand on some water sources from rural residential landholders accessing this type of water entitlement (e.g. Yass catchment groundwater). The draft plan was placed on public exhibition from 6 December 2010 to 31 January 2011.

## Findings

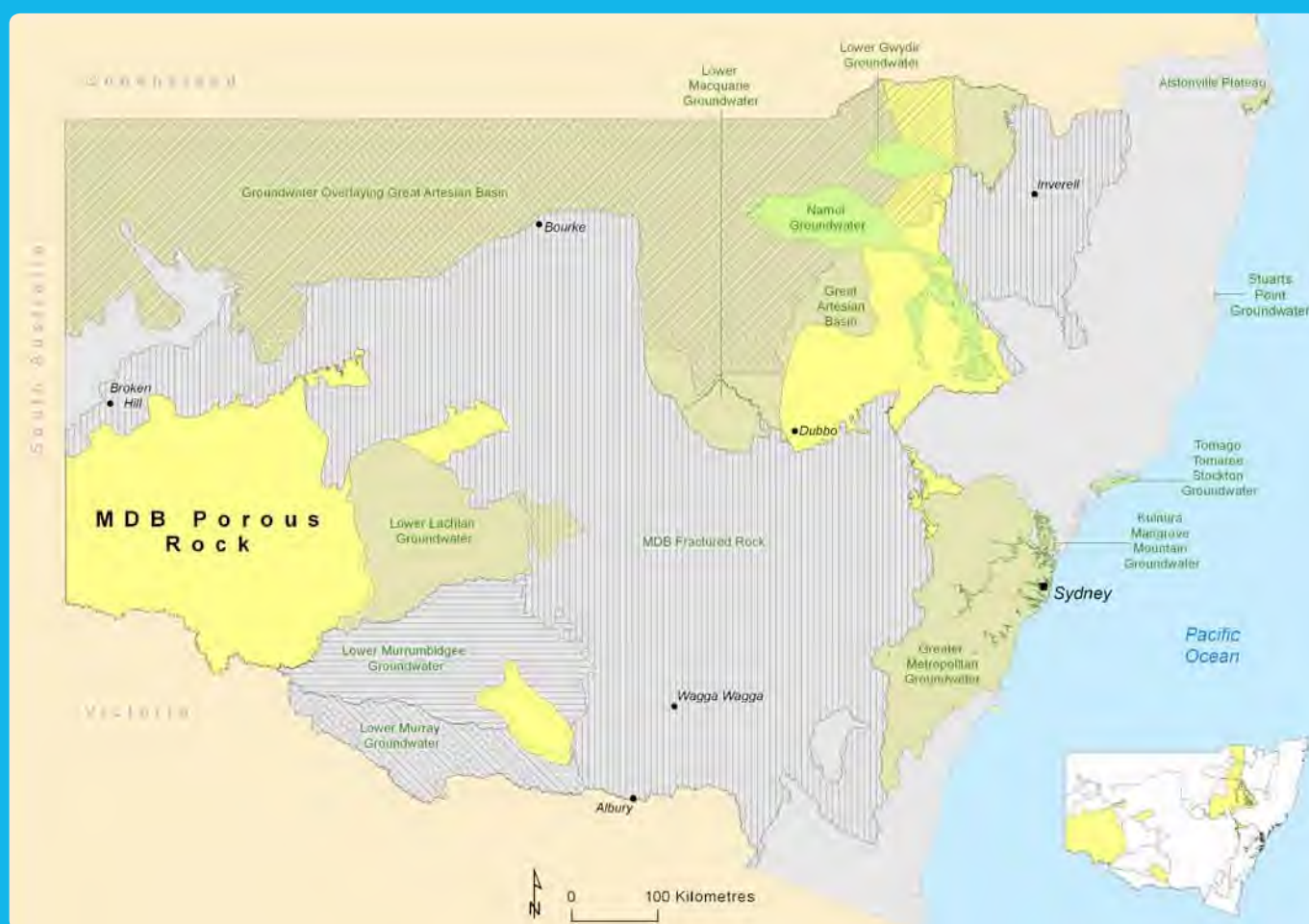
1. Is there a plan in place?	To some extent	A draft plan has been developed and exhibited for public comment. As at 30 September 2011 the draft plan was awaiting ministerial approval.
2. Does the plan include key assessments?	To some extent	Some key assessments were undertaken to inform the development of the draft plan, including estimates of consumptive use. However, some of the detail underpinning the risk assessment process was not provided in the draft plan or supporting documents (e.g. details of environmental assets).
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The draft plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. In addition, limits to extraction of recharge generated over high environmental/conservation value areas have been established. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The draft plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements are not specific. Ecological and cultural objectives are broad and their measurement will require considerable monitoring investment.
5. Does the plan facilitate trade?	Yes	Once operational, the plan will facilitate water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	Interception activities have been identified within the draft plan, including potential increases in water demand related to BLR and provision of unassigned water to meet future water needs. However, there are no volumetric estimates for the predicted increase in BLR and no threshold set above which licensing would be required.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The draft plan is a single resource plan but recognises that there is potential for connectivity between surface water and groundwater resources.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The draft plan identifies environmental watering arrangements for each water source. However, there is little detailed information provided to underpin these arrangements (e.g. current environmental asset condition or water requirements).
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan is still in draft, so an assessment of this criterion is not possible at this time. No specific monitoring arrangements are detailed for this particular plan. There is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The draft plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The stakeholder engagement process provided opportunities for input and advice from interested parties during the plan's development. The availability of information used to determine the water source classifications and indicative water access and trading rules was inconsistent (e.g. risk assessments).
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is still in draft, so an assessment of this criterion is not possible at this time.



# NSW MURRAY–DARLING BASIN POROUS ROCK GROUNDWATER SOURCES



## DRAFT WATER SHARING PLAN



### Context

The draft water sharing plan covers four groundwater sources, all within the Murray–Darling Basin (Gunnedah–Oxley Basin, Oaklands Basin, Western Murray and Sydney Basin). At present the low volume of groundwater entitlement is used for irrigation or for domestic and stock purposes. Many of the porous rock water sources in the plan area contain mineral, coal and gas resources and the draft plan provides for additional entitlement to be issued which may allow coalmining and gas extraction to proceed. The draft plan was developed and placed on public exhibition from 6 December 2010 to 31 January 2011.

## Findings

1. Is there a plan in place?	To some extent	A draft plan has been developed and exhibited for public comment. As at 30 September 2011 the draft plan was awaiting ministerial approval.
2. Does the plan include key assessments?	To some extent	A number of key assessments have been undertaken to inform the development of the draft plan including estimates of consumptive use and the establishment of a long-term extraction limit. However, some of the detail underpinning these estimates and the risk assessments were not provided in the plan or supporting documents (e.g. condition of environmental assets, empirical evidence of environmental water requirements, cultural values of water resources).
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The draft plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The draft plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements are not specific. Ecological and cultural objectives are broad and their measurement will require considerable monitoring effort. Extraction and entitlement related objectives are likely to be measurable using routinely collected parameters.
5. Does the plan facilitate trade?	Yes	Once operational, the plan will facilitate trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The draft plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. There is recognition of potential increases in water demand related to mining activities. State-wide policies guide the management of mining interception and the plan may be amended to manage interception impacts from aquifer interference (e.g. mining).
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The draft plan is a single resource plan but does recognise that there is potential for connectivity between surface water and groundwater resources.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Water sharing rules outlined in the draft plan clearly identify environmental watering arrangements, however there is little detailed information presented to underpin them (e.g. water requirements or condition of environmental assets).
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan is still in draft, therefore it is difficult to assess this criterion at this time. No specific monitoring arrangements are detailed for this particular plan. There is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The draft plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The stakeholder engagement process provided opportunities for input and advice from interested parties during the plan's development. The information used to determine some of the initial water source classifications and indicative water access and trading rules is not publicly available (e.g. cultural values, environmental assets).
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is still in draft, therefore it is difficult to assess this criterion at this time.

# OURIMBAH CREEK WATER SOURCE



## WATER SHARING PLAN 2003



### Context

Ourimbah Creek is a major tributary of Tuggerah Lakes, a large coastal saltwater lake with significant wetlands on the central coast of New South Wales. The water source is largely perennial, however there is considerable variation in its annual and daily flows. Irrigation, farming, town water supply and domestic and/or stock needs are the main consumptive water uses. Irrigation supports significant primary industries such as turf growing and fruit and vegetable production. The plan commenced in 2004 to direct equitable sharing of water for consumptive and non-consumptive purposes during periods of low water availability. The plan was suspended from December 2006 to April 2010 when drought caused a critical shortage of water for the Gosford/Wyong Councils' Water Authority. The plan is unlikely to be suspended again as the Authority is implementing a 40-year demand planning strategy (WaterPlan 2050) to enhance the area's urban water supplies.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2004 and applies for 10 years. The plan was suspended from December 2006 to April 2010.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments were undertaken to inform the plan's development. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, however the system is considered hydrologically-stressed during low flow periods. The plan establishes a long-term extraction limit and allows for reductions to allocations if the extraction limit is exceeded. Information on trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented objectives, strategies and related performance indicators, but monitoring and reporting arrangements for measuring achievement against these is not specific. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters, but some ecological objectives will require considerable monitoring investment to assess their achievement.
5. Does the plan facilitate trade?	To some extent	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements. Water trading remained possible while the plan was suspended.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not address groundwater and surface water connectivity.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes cease-to-pump rules to protect some low flows, and daily flow sharing arrangements to protect natural flow variability. Extraction was permitted below the cease-to-pump level while the plan was suspended, compromising the security of the plan's environmental water.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving its objectives using monitoring and modelling of ecological, economic and cultural indicators. Some environmental, socioeconomic and flow monitoring has commenced and a report on progress is pending. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not deal with climate change; rather, it assumes that the in-built review will provide sufficient adaptive capacity. The Minister suspended the plan's operation in 2006 as drought conditions threatened available town water supply. Construction of urban water supply infrastructure for the central coast will improve the security of supply for entitlement holders.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards implementation of some plan actions (e.g. provision of tradeable water entitlements), however others have been slow to establish (ecological monitoring) or have not commenced (water use monitoring, and hence daily flow sharing and temporary water trading). There has been minimal reporting of plan outcomes and results of the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available. A progress report on the monitoring and evaluation activities underway to assess the ecological and socioeconomic performance of each WSP in the Hunter Valley and central and lower north coast is pending.



# PATERSON REGULATED RIVER WATER SOURCE



## WATER SHARING PLAN 2007



### Context

The Paterson River is a major tributary of the highly developed Hunter River. This water sharing plan applies to the regulated section of the Paterson River from Lostock Dam downstream to the tidal limit; it is one of five plans that control the overall extraction of water in the Hunter Valley. Major water uses along the regulated Paterson River are town water supply, irrigation and domestic and stock watering. Only five per cent of the Paterson River's average annual flow is available for consumptive use, however high extractive demands place pressure on the resource between December and March when flows are typically low. Equitable sharing of water for consumptive and non-consumptive purposes during periods of low water availability is the primary planning driver.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers regulated surface waters (including some unconsolidated alluvial sediments) within the planning area. The plan commenced in 2007 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Key hydrologic, socioeconomic and environmental assessments were undertaken as part of the development and drafting of the plan.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It establishes a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. Information on trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented objectives, strategies and related performance indicators, but monitoring and reporting arrangements for measuring achievement against these is not specific. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters, but some ecological objectives will require considerable monitoring investment to assess their achievement.
5. Does the plan facilitate trade?	To some extent	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements. Permanent and temporary trade is prohibited into and out of the water source to manage third-party impacts. Detailed justification of this barrier to trade is not available.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of other potential intercepting activities, such as forestry and mining/exploration.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan that addresses surface water only, with no reference to integrated management arrangements. The more recent Hunter Unregulated and Alluvial Water Sharing Plan 2009 contains management arrangements to integrate the highly connected Paterson River alluvial groundwater source with the regulated river system.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements that require end-of-system flows, protection of a percentage of high flows and an environmental contingency allowance for critical events (e.g. algal blooms). Environmental water provisions are given effect to in Water Supply Work Approvals and State Water Corporation is required to provide an annual compliance report.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some monitoring of the plan's effectiveness in delivering its water security objectives is evident from various registers that document available water determinations and trade activity, as well as the State Water Corporation's Annual Water Balance. Various ecological studies have assessed, or continue to assess, the effectiveness of the plan's environmental water provisions and socioeconomic monitoring commenced in 2009 as part of a broader state-wide program. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not address climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. provision of tradeable water entitlements). There has been no coordinated reporting of the plan's effectiveness in delivering its outcomes, however a progress report on the monitoring and evaluation activities underway to assess the ecological and socioeconomic performance of each WSP in the Hunter Valley and central and lower north coast is pending. The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.

# PEEL VALLEY REGULATED, UNREGULATED, ALLUVIUM AND FRACTURED ROCK WATER SOURCES



## WATER SHARING PLAN 2010



### Context

The Water Sharing Plan for the Peel Valley covers the regulated Peel River, its associated unregulated creeks, fractured rock and the highly connected alluvial groundwater sources within the plan area. The Peel River is regulated by Chaffey Dam which provides water for Tamworth's town water supply and agriculture in the region. Consumptive water use is heavily dominated by irrigation, primarily pasture and fodder crops. A number of water sources in the Peel Valley are highly developed and have been classified as being at-risk. The Peel Valley is managed under a discrete water sharing plan, although the Peel River is a tributary of the regulated Namoi River.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the Peel Valley regulated, unregulated, alluvium and fractured rock water sources commenced in 2010 and applies for 10 years.
2. Does the plan include key assessments?	Yes	The plan and supporting documentation provide information on the key assessments undertaken (e.g. hydrological modelling, identification of ecological assets, risk assessments) and include links to the studies that underpin the relevant data. Few details are provided on the current condition and water requirements of environmental assets.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	There are no areas of overuse identified by the plan. It establishes a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. Information on trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements for the measurement of these are not specific. While ecological and cultural objectives are broad and will require considerable monitoring investment to measure their achievement, some trade and extraction related objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. The plan identifies floodplain harvesting and estimated volumes are integrated into the plan's extraction limit, however the state policy remains in draft. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan does recognise the connectivity of groundwater and surface water resources and facilitates their integrated management. For example, where surface water and groundwater sources are highly connected groundwater extraction is linked to surface water rules.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Environmental objectives are specified in the plan, but the water requirements of environmental assets have not been clearly quantified by empirical studies and monitoring is not a clearly embedded component of the plan or supporting documents. Environmental water provisions are given effect to in Water Supply Work Approvals and State Water Corporation is required to provide an annual compliance report.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	This plan commenced on 1 July 2010, therefore it is difficult to assess this criterion at this time. Some monitoring of the plan's effectiveness in delivering its water security objectives is available from various registers that document available water determinations and trade activity, as well as State Water Corporation's annual compliance reports. There is a legislative framework to provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan recognises the potential for climate change and variability to impact water availability, including a discussion of predicted climate change scenarios in supporting documents. However, no long-term strategies are explicitly outlined.
11. Is stakeholder engagement in the planning process adequate?	Yes	Development of the plan involved considerable stakeholder consultation and engagement, including establishment of the Peel Advisory Group to address issues raised by stakeholders. Public submissions on the draft plan and Interagency Regional Panel responses to these have been recorded in the plan's supporting documentation.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	This plan commenced on 1 July 2010, so an assessment of this criterion cannot be made at this time.



# PHILLIPS CREEK, MOOKI RIVER, QUIRINDI CREEK AND WARRAH CREEK WATER SOURCES



## WATER SHARING PLAN 2003



### Context

The Phillips Creek, Mooki River, Quirindi Creek and Warrah Creek Water Sources are located on the northern slopes of New South Wales within the Namoi Water Management Area. These water sources are tributaries of the regulated Namoi River, entering through the Mooki River upstream of Gunnedah. All four water sources are ephemeral and have variable river flows throughout the year, yet they support high levels of licensed water use, the majority of which is for irrigation and domestic and stock purposes. Town water supply is also a significant use in the Quirindi Water Source. The planning area is considered hydrologically-stressed because of the high reliance on the system's low summer flows. The plan aims to protect a proportion of these low flows from extraction for the benefit of the environment and ensure equitable sharing among consumptive users.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments were undertaken to inform the plan's development. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify overuse, but does recognise the system is hydrologically-stressed. The plan establishes a long-term extraction limit and allows for reductions to allocations if the extraction limit is exceeded. Information on trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad outcomes that are linked to the plan's provisions. Monitoring arrangements for measuring plan outcomes are not clearly specified within the plan or its supporting documents.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. A number of state-wide policies guide the management of other potential intercepting activities, such as mining.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan that addresses surface water only, with no reference to integrated management arrangements.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes cease-to-pump and commence-to-pump levels to protect pool connectivity during low flow periods, and daily flow sharing volumes to protect natural medium to high flow variability. The environmental water provisions have not been established based on the watering requirements of in-stream assets, rather on hydro-ecological assumptions that mimicking natural flow variability will protect aquatic ecosystems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. Environmental flow response monitoring commenced in 2011 and socioeconomic monitoring commenced in 2008. The frequency of future public reporting is unclear. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	While the plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements, it does not quantify the potential risks to system health or entitlement securities under the current climatic regime. The plan does not deal with climate change; rather, it assumes that the in-built review cycle will provide sufficient adaptive capacity.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. provision of tradeable water entitlements, maintenance of extraction limits). Implementation of monitoring to assess the ecological and socioeconomic outcomes of the plan has been slow to establish and there has been minimal public reporting of results to date. Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. daily flow sharing, temporary water trading). The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions have not been made publicly available.

# RICHMOND RIVER AREA UNREGULATED, REGULATED, AND ALLUVIAL WATER SOURCES



## WATER SHARING PLAN 2010



### Context

The Richmond River catchment is located on the north coast of New South Wales and major population centres include Lismore, Kyogle and Casino. The Richmond River drains from the heavily forested upland sections of the catchment into the ocean at Ballina. The north coast of New South Wales and its water resources are currently under pressure from a rapidly increasing population and a burgeoning tourism industry. Separate water sharing plans were already in place for Coopers Creek and for the Alstonville plateau groundwater sources. This macro plan was developed for the remaining water sources and comprises the regulated Richmond River, 21 unregulated rivers and all alluvial aquifers contained within the Richmond River and Evans Creek catchments.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface water and groundwater within the planning area. The plan commenced in 2010 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Development of the plan was based on key assessments of hydrology, socioeconomic value and environmental condition, informed by available studies, expert panel knowledge and community consultation.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. However, detailed information on water use in unregulated rivers is unavailable due to a lack of broad scale metering in these water sources.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad outcomes, the achievement of which will be difficult to measure. Monitoring and reporting arrangements are not specific and an implementation program has not been produced.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan addresses interception for BLR, including consideration of impacts from farm dams. Plantation development is noted but no significant growth in water interception activities is anticipated within the life of the plan. Sugar cane drains are required to be licensed under the plan.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan recognises the connectivity between surface water and groundwater, but does not describe integrated management with other WSPs in the area (e.g. Alstonville, Coopers Creek).
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Water requirements of individual assets are not quantified and environmental objectives are broad making measurement of their achievement difficult. The regulated Richmond River has a set of environmental release rules based on Environmental Contingency Allowance Operations Advisory Committee recommendations. Daily cease-to-pump rules apply to groundwater sources. Environmental water provisions are given effect to in Water Supply Work Approvals and State Water Corporation is required to provide an annual compliance report.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	No specific monitoring arrangements are detailed for this particular plan and no implementation program has been made public. Some information on the plan's effectiveness in delivering its water security objectives may be available from various registers that document available water determinations and trade activity, and from State Water Corporation's annual compliance reports. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements informed by historical climate data. There is no quantification of the potential risks to system health or entitlement securities due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	The plan was drafted by an Interagency Panel and public submissions on the draft plan were accepted and responded to transparently. Ongoing stakeholder engagement may occur via the Environmental Contingency Allowance Operations Advisory Committee and is required at the time of the five-year audit of the plan.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan commenced in 2010. There has been no reporting of plan implementation progress or the effectiveness of the plan's provisions in delivering its intended outcomes.



# ROCKY CREEK, COBBADAH, UPPER HORTON AND LOWER HORTON WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source covers the unregulated catchment of the Horton River and its tributaries. The plan area is located on the northern slopes of New South Wales within the Murray–Darling Basin. It is the only major tributary of the regulated Gwydir River. The plan area is generally undulating grazing and dryland cropping land and surface water use is primarily for irrigation and domestic and stock purposes. The area is considered hydrologically-stressed because of high consumptive water demand during the system’s summer low flows. Equitable sharing of water for consumptive and non-consumptive purposes during periods of low water availability is the primary planning driver.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2004 and will apply for a period of 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments informed the water management provisions within the plan. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, however the system is considered hydrologically-stressed. The plan establishes a long-term extraction limit and allows for reductions to allocations if the extraction limit is exceeded. Information on trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented objectives, strategies and related performance indicators, but monitoring and reporting arrangements for measuring achievement against these are not specific. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters, but some ecological objectives will require considerable monitoring investment to assess their achievement.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. A number of state-wide policies guide the management of other potential intercepting activities such as mining and plantations.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not address groundwater and surface water connectivity.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes cease-to-pump levels to protect pool connectivity during low flow periods, and daily flow sharing volumes to protect natural flow variability. The environmental water provisions have not been established based on the watering requirements of in-stream assets, rather on hydro-ecological assumptions that mimicking natural flow variability will protect aquatic ecosystems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. Socioeconomic monitoring commenced in 2006, while environmental flow response monitoring is yet to commence and the frequency of future public reporting is unclear. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not explicitly deal with climate change; rather, it assumes that the in-built review will provide sufficient adaptive capacity. There are some self-adjustment mechanisms for climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. provision of tradeable water entitlements, provision of BLR, maintenance of extraction limit). Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. daily flow sharing, temporary water trading). Monitoring of ecological objectives in the plan area has not commenced, therefore progress towards their achievement cannot be assessed. The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.

# STUARTS POINT GROUNDWATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Stuarts Point Groundwater Source is located on the New South Wales mid north coast. It covers an area of unconsolidated sand sediments west of the Macleay Arm, between Grassy Head and the Macleay River estuary. The area is characterised by heaths, woodlands, forests and wetlands that are dependent on groundwater and includes the town of Stuarts Point and the villages of Fishermans Reach and Grassy Head. Groundwater is extracted for domestic water, town water and horticultural purposes. The Stuarts Point Groundwater Source was assessed by the 1998 Aquifer Risk Assessment Report to be at-risk from over extraction and contamination. Protection of groundwater-dependent ecosystems and prevention of saltwater intrusion into the aquifer are the primary planning drivers.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers groundwater within the planning area. The plan commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments were undertaken to inform the plan's development. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The planning area is considered to be at risk of over extraction. The plan includes a number of management arrangements that aim to prevent further hydrological stress, including the establishment of a long-term annual extraction limit. Information explaining the trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented outcomes and strategies for protecting the aquifer's water quality and GDEs. The links between plan strategies and outcomes are not clear, and monitoring arrangements are not provided.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan addresses interception via the quantification of expected volumes for domestic and stock water use. A number of state-wide policies guide the management of other potential intercepting activities.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan is a single resource plan, however its management provisions recognise the importance of groundwater to a number of GDEs and estuarine ecosystems.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements that are designed to deliver the plan's environmental objectives. Monitoring arrangements to assess the effectiveness of the environmental watering provisions are unclear.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Aquifer water quality and water level monitoring has commenced and studies to assess the socioeconomic impact of the plan were completed in 2006 and 2010. Monitoring of consumptive water use to assess entitlement holder compliance has not commenced despite the plan being operational for seven years. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not address climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. provision of tradeable water entitlements, provision of BLR) and water level monitoring indicates that the plan's provisions are adequately protecting the aquifer's water level and water quality. Monitoring of water use is yet to commence in the planning area and therefore extraction limit compliance cannot be assessed. The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.



# TARCUTTA CREEK WATER SOURCE



## WATER SHARING PLAN 2003



### Context

Tarcutta Creek is a highly developed tributary of the Murrumbidgee River located in the south-west of New South Wales. While there are many unregulated waterways in the upper Murrumbidgee catchment, some of the greatest volumes of water for irrigation are extracted from Tarcutta and Adelong creeks. In the 1998 Stressed Rivers Assessment Report Tarcutta Creek was classified as being under high environmental stress and prioritised for river management plan development. Despite being one of many unregulated rivers in the Murrumbidgee catchment, Tarcutta Creek is managed under a discrete water sharing plan which commenced in 2004.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the unregulated surface waters of the Tarcutta Creek Water Source commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments informed the water management provisions within the plan. They are no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. Information on the trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period, however this information is no longer publicly available.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements for the measurement of the effectiveness of this particular plan in achieving all outcomes have not been clearly articulated. While ecological and cultural objectives are broad and will require considerable monitoring investment to measure their achievement, some trade and entitlement objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of forestry and mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan does not quantify the connectivity between surface water and groundwater. There is acknowledgment of the potential impacts on connected systems via reference to maintenance of groundwater to sustain critical surface flows and ecosystems in the plan's objectives.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. Environmental assets and their water requirements are not clearly detailed and monitoring is not a clearly embedded component of the plan or supporting documents.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some water accounting and flow monitoring has been undertaken, however this has not been clearly linked to plan outcomes and reporting is limited. Some socioeconomic monitoring commenced in 2006 as part of state-wide program. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements informed by historical climate data. There is no quantification of the potential risks to system health or entitlement securities due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The draft plan was developed by the Murrumbidgee Unregulated Water Management Committee which included stakeholder representatives. Provisions were made during plan development to disseminate information to and receive input from the public (e.g. public submissions on draft plan, public meetings). However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of plan strategies such as the provision of tradeable water entitlements, however none of the evidence examined demonstrated that outcomes have been achieved to date. In particular, data on assessment of ecological objectives were not provided and no information was available on cultural values. Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. temporary water trading).

# TENTERFIELD CREEK WATER SOURCE



## WATER SHARING PLAN 2003



### Context

Tenterfield Creek is located in the east of the Border Rivers catchment and is a tributary of the Dumaresq River, which forms part of the state border between Queensland and New South Wales. In the 1998 Stressed Rivers Assessment Report Tenterfield Creek was classified as being under high environmental and high hydrological stress. Parts of the plan area have high environmental values and a high community dependence on water extraction. Water uses include irrigation, industrial purposes, local water utilities, and domestic and stock. Tenterfield Creek experiences extended periods of low flow and the greatest competition for water occurs over the spring and summer months. Although part of the larger Border Rivers Extraction Management Unit, Tenterfield Creek is covered by a separate water sharing plan which commenced in 2004.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the unregulated surface waters of the Tenterfield Creek Water Source commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	To some extent	Water sharing arrangements detailed in the plan have been based on key environmental and socioeconomic assessments provided to, and considered by, the water management committee, however these assessments are no longer publicly accessible.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify any areas of overuse, however Tenterfield Creek was assessed as a stressed river. The plan establishes an extraction limit at the sum of current entitlement. Provisions for daily flow classes and daily extraction limits are dependent on the establishment of additional gauging stations and the metering of extractions. Very low flow access is to be revoked in the eighth year of the plan.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad outcomes, which are linked to the plan's provisions. Monitoring arrangements for measuring plan outcomes are not clearly specified within the plan or its supporting documents.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. A number of state-wide policies guide the management of other potential intercepting activities, such as mining, and the plan can be amended to allow for licensing of floodplain harvesting.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and addresses surface water only. Connectivity and links to surrounding WSPs are not referenced although the extraction limit is managed under the larger Border Rivers Extraction Management Unit.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements based on the extraction limit, management of flow classes and cease-to-pump conditions on licences. The water required to meet environmental objectives is not quantified and monitoring is not a clearly embedded component of the plan or supporting documents.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. One report has demonstrated implementation of water trade and streamflow monitoring, but the frequency of future public reporting is unclear. Some socioeconomic monitoring commenced in 2006 as part of a state-wide program. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements informed by historical climate data. There is no quantification of the potential risks to system health or entitlement securities due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The draft plan was developed by a localised committee that included stakeholder representatives and government agencies. Plan development involved extensive community engagement, which included public meetings, public exhibition of the draft plan and a public submissions process. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of plan actions, such as provision of tradeable water entitlements, however none of the evidence examined demonstrated that outcomes have been achieved to date. Reporting against plan objectives has been limited despite Tenterfield Creek being assessed as a high priority for management through the 1998 risk assessment.



# TOMAGO TOMAREE STOCKTON GROUNDWATER SOURCES



## WATER SHARING PLAN 2003



### Context

The Tomago Tomaree Stockton Groundwater Sources are located north of Newcastle, extending from the Hunter River estuary in the south, to Port Stephens in the north and Raymond Terrace in the west. The three sand groundwater sources occur along a 10 to 15 km wide coastal strip. The groundwater sources contain good quality water that provides important baseflows to surface rivers and tidal creeks and supports a number of groundwater-dependent ecosystems (terrestrial vegetation, wetlands, coastal sand dune systems). There are numerous consumptive uses, including supplementing town water supplies for Newcastle and the Tomaree Peninsula, mining, industrial, recreation, irrigation and domestic and stock supply. Rapid residential and tourism development is also occurring in the area. The Tomago Tomaree Stockton groundwater sources are considered at high risk from over extraction and contamination, which the plan aims to equitably and sustainably manage.

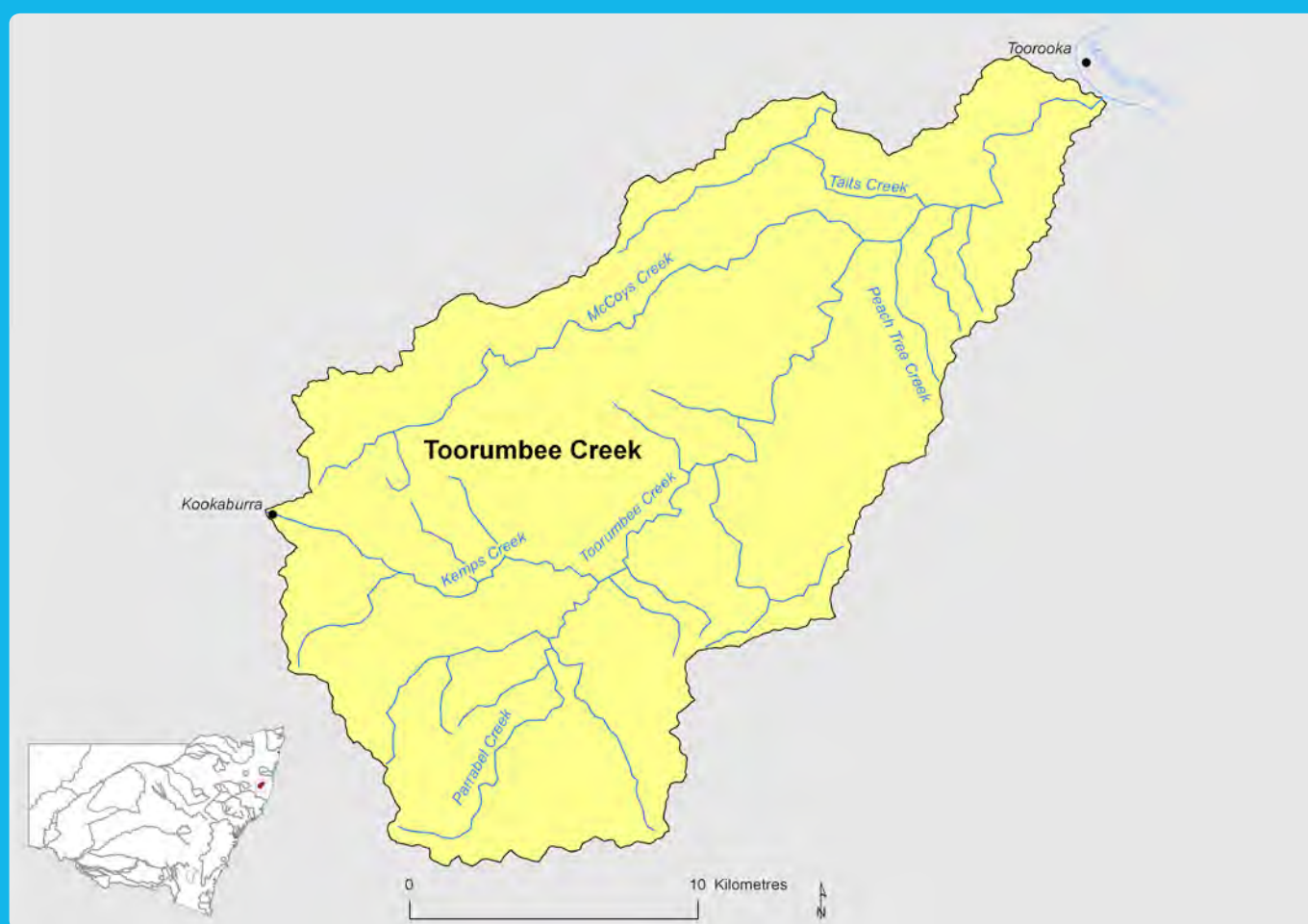
## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers groundwater within the planning area. The plan commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments were undertaken to inform the plan's development. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, however the groundwater source has been assessed as being at-risk from over extraction. The plan includes a number of management arrangements that aim to prevent further hydrological stress, including the establishment of a long-term extraction limit. Information explaining the trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented outcomes and strategies that are intended to protect aquifer water quality and nearby GDEs, and maintain the aquifer as a safe urban water supply. Monitoring and reporting arrangements are not specific in the plan or its supporting documentation.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. A number of state-wide policies guide the management of other potential intercepting activities, such as mining.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan is a single resource plan, however its management provisions recognise the importance of groundwater to a number of GDEs and coastal ecosystems.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains environmental watering arrangements that are based on limited understanding of the environmental water requirements of the systems but does allow for amendments to its provisions based on further scientific studies. Environmental water provisions are given effect to by access licence conditions and Hunter Water Corporation's Water Supply Work Approvals, which will be publicly available from 2011. Hunter Water Corporation must report annually on its compliance with these conditions.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	Aquifer water quality and water level monitoring has commenced and studies to assess the socioeconomic impact of the plan were completed in 2006 and 2010. Ecological parameters are also monitored on the Tomago and Tomaree Sandbeds to assess the plan's impact on GDEs. Hunter Water Corporation, the major user in the system, regularly provides water usage data to NOW and publishes annual usage figures on its website. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not address climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. provision of tradeable water entitlements, provision of BLR). A progress report on the monitoring and evaluation activities underway to assess the ecological and socioeconomic performance of each WSP in the Hunter Valley and central and lower north coast is pending. The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.

# TOORUMBEE CREEK WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The plan covers surface water resources in the Toorumbée Creek catchment on the mid north coast of New South Wales. Toorumbée Creek is a tributary of the Macleay River, which enters the Pacific Ocean at South West Rocks. The plan area is generally steep to undulating forested lands, and the Creek's headwaters are in Willi Willi National Park. Water use in the catchment is low and at the time of plan development there were no water licences issued. The plan area has high conservation values with some near-pristine aquatic ecosystems. The plan has a conservation focus and limits new water access entitlements to domestic and stock or Aboriginal cultural purposes only.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Key assessments informed the plan's primary objective of maintaining the area's high conservation values. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan area is not overused. There are no water access entitlements within the planning area and there is only limited scope to issue new licences (domestic and stock access licences, Aboriginal cultural access licences). The plan prevents the possibility of future overuse by maintaining extraction within the long-term extraction limit for the whole of the Macleay River catchment.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented objectives, strategies and related performance indicators, but monitoring and reporting arrangements are not specified in the plan and supporting documentation. A number of the plan's ecological objectives are broad and their measurement will require considerable effort to assess whether the system's high conservation values are being maintained by the plan's management provisions.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by enabling the introduction of NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements. Little trade activity is likely in the system as there is currently no licensed extraction and the plan prohibits trade into the system in order to maintain its high conservation value.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by prohibiting new runoff harvesting dams and accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. A number of state-wide policies guide the management of other potential intercepting activities, such as plantation forestry.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan that addresses surface water only, with no reference to integrated management arrangements.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. The majority of the system flows are set aside to protect the high conservation values of the water source and any future licensed extraction (domestic and stock or Aboriginal cultural purposes only) will be subject to a cease-to-pump condition and defined extraction limits.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. Socioeconomic monitoring commenced in 2006 as part of a broader state-wide program. Monitoring to assess the effectiveness of the plan's environmental objectives has not commenced as the risk to in-stream values is considered low due to the absence of licensed extraction. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements, however it does not quantify the potential risks to system health or entitlement securities under the current climatic regime. The plan does not deal with climate change; rather, it assumes that the in-built review cycle will provide sufficient adaptive capacity.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. A description of the committee's decision-making process was available during the plan's public exhibition period, however this information is no longer publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. provision of BLR, no approvals for new runoff harvesting dams, prohibiting trade into the water source). There continues to be no licensed water extraction in the plan area and therefore several support systems have not been implemented (flow monitoring, establishment of flow classes). The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.



# TOWAMBA RIVER UNREGULATED AND ALLUVIAL WATER SOURCES



## WATER SHARING PLAN 2010



### Context

The Towamba Basin plan covers the Towamba River catchment and several coastal catchments to the north and south. The plan area is situated on the south coast of New South Wales, and includes 22 water sources from Wallagoot Lake to the Victorian border. The towns of Tathra, Merimbula, Pambula, Edena, Towamba and Wyndham are located in the plan area. The Towamba catchment has a relatively high density of estuaries and coastal lakes, some of which are sensitive to water extraction, and 40 per cent of the plan area is national park or nature reserve. Beef grazing is the main agricultural activity, and there is significant harvesting for timber and paper products. Several commercial oyster leases also exist in the plan area. Equitable sharing of water for consumptive and non-consumptive purposes and protecting conservation values are the primary planning drivers.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers the surface waters and alluvial water sources within the planning area. The plan commenced in 2010 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Key hydrologic, socioeconomic and environmental assessments informed the water management provisions within the plan, including an assessment of the risk to in-stream values posed by the existing or increased extraction.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, but does recognise some of the system is hydrologically-stressed. The plan establishes a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad objectives, strategies and related performance indicators that are linked to the plan's provisions. Monitoring arrangements for measuring plan outcomes are not clearly specified within the plan or its supporting documents. The majority of the plan's outcomes are measurable using routinely collected hydrologic parameters, but some ecological outcomes will require considerable monitoring investment to assess their achievement.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan addresses interception for BLR, including consideration of impacts from farm dams. While intercepting activities are not assessed as a significant water resource risk, the plan notes that new plantation developments will be monitored to determine if access licences are required. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan recognises surface water and groundwater connectivity in the planning area and establishes appropriate integrated management arrangements.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes cease-to-pump levels to protect pool connectivity during low flow periods, and daily flow sharing volumes to protect natural flow variability. The environmental water provisions have not been established based on the watering requirements of in-stream assets, rather on hydro-ecological assumptions that mimicking natural flow variability will protect aquatic ecosystems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	There is minimal information on how the achievement of plan outcomes, and progress towards them, will be monitored. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan considered climate change in framing access conditions and determining the long-term extraction limit. The plan has strategies in place to deal with the risks posed by long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement provided opportunities for all interested parties to contribute to the plan's development and refinement. Stakeholder input is transparently recorded in the plan's supporting documentation.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan commenced in 2010. There has been no reporting of plan implementation progress or the effectiveness of the plan's provisions in delivering its intended outcomes.

# TWEED RIVER UNREGULATED AND ALLUVIAL WATER SOURCES



## WATER SHARING PLAN 2010



### Context

The Tweed River catchment is located in north-east New South Wales. The catchment includes the major towns of Tweed Heads and Murwillumbah. Town water supply is the largest use of water from the Tweed River followed by water for irrigation, domestic and stock use. The rivers of the Tweed catchment have been affected by land clearing, agricultural use, human settlement and recreation. The water sharing plan covers the unregulated rivers, creeks and tidal pools, estuaries and alluvial groundwater. Thirteen water sources in the catchment are (or are at risk of being) hydrologically-stressed during low flow periods. During plan development the mid-Tweed water sources were deemed to have high in-stream values which are at risk of hydrological stress. A process of community consultation and development of water sharing rules was initiated which led to the commencement of a Water Sharing Plan for the Tweed Unregulated and Alluvial Water Sources in 2010.

## Findings

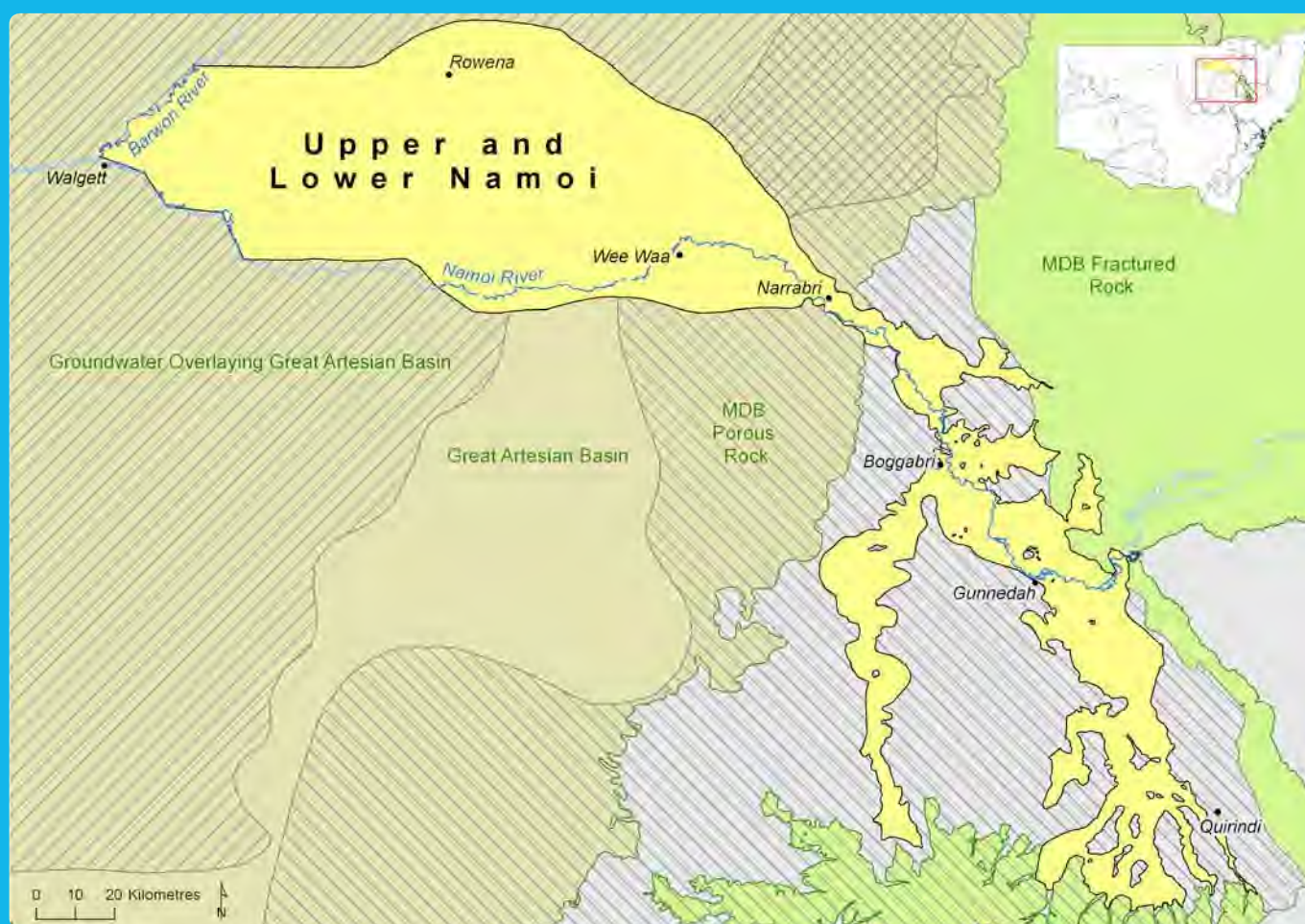
1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers the surface waters and alluvial water sources within the planning area. The plan commenced in 2010 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Key hydrologic, socioeconomic and environmental assessments informed the water management provisions within the plan, including an assessment of the risk to in-stream values.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, but does recognise the system is hydrologically-stressed. The plan establishes a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad objectives, strategies and performance indicators that are linked to the plan's provisions. Monitoring arrangements for measuring plan outcomes are not clearly specified within the plan or its supporting documents. A number of the plan's ecological objectives will require considerable monitoring investment to measure their achievement. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan addresses interception for BLR, including consideration of impacts from farm dams. The plan can be amended to allow future licensing of forestry interception activities. A number of state-wide policies guide the management of other potential intercepting activities, such as mining.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan recognises surface water and groundwater connectivity in the planning area and establishes appropriate integrated management arrangements.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes cease-to-pump and commence-to-pump levels to protect pool connectivity during low flow periods, and daily flow sharing volumes to protect natural medium to high flow variability. The environmental water provisions have not been established based on the watering requirements of in-stream assets, however the provisions have been in place for a period of time (prior to plan commencement) and have adequately protected in-stream values while providing certainty for users.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	With the exception of a list of performance indicators in the plan, there is minimal information on how the achievement of plan outcomes, and progress towards them, will be monitored. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	While the plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements, it does not quantify the potential risks to system health or entitlement securities under the current climatic regime.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement provided opportunities for all interested parties to contribute to the plan's development and refinement. Stakeholder input is transparently recorded in the plan's supporting documentation.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan commenced in 2010. There has been no reporting of plan implementation progress or the effectiveness of the plan's provisions in delivering its intended outcomes.



# UPPER AND LOWER NAMOI GROUNDWATER SOURCES



## WATER SHARING PLAN 2003



### Context

The Namoi Valley lies in northern New South Wales between the Gwydir Valley to the north and the Macquarie Valley to the south. The Upper and Lower Namoi Groundwater Sources are important for the provision of domestic and stock water supplies, irrigation, industry and town water supplies. Ongoing high demand for water has resulted in the area being identified as one of the most at-risk groundwater resources in New South Wales. These groundwater sources were included in the Achieving Sustainable Groundwater Entitlements program funded by the New South Wales and Australian governments. Although much of this groundwater resource is highly connected to the Namoi River, the surface water and groundwater are managed under separate water sharing plans.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers the Upper and Lower Namoi Groundwater Sources. It commenced in 2006 and applies for 10 years.
2. Does the plan include key assessments?	To some extent	Some assessment of extraction volumes and the socioeconomic importance of this water source have been undertaken but no information on environmental water requirements and GDEs was provided. The Aquifer Risk Assessment Report (1998) assessed these groundwater sources as highest risk.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan acknowledges that this groundwater source is overallocated. It establishes a long-term extraction limit and reduces entitlements over the life of the plan. The plan also allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes broad outcomes which are generally linked to plan provisions. Specific arrangements for monitoring of the effectiveness of this plan in achieving all outcomes have not been clearly articulated. Ecological and cultural objectives are general and will require considerable monitoring investment to assess their achievement, but trade and entitlement objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and provides little information on the potential connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. Environmental assets and their water requirements are not clearly detailed and monitoring arrangements are not described in the plan or supporting documents.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	While groundwater levels and water quality are being monitored and some socioeconomic data collected, reporting is limited. Minimal information is available on the achievement of environmental or cultural outcomes, or progress towards these. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Stakeholder engagement occurred during the development and drafting of the plan through the local Namoi Groundwater Management Committee (e.g. targeted consultation in plan development) and through public exhibition of the draft plan. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of plan strategies, such as the provision of tradeable water entitlements. However, recent monitoring indicates that groundwater quality may be declining in some extraction zones.

# UPPER BILLABONG WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Upper Billabong Water Source is situated in the South West Slopes region of New South Wales, to the east of the township of Holbrook. Water uses in the plan area include irrigation, stock watering and domestic water supply. Billabong Creek has considerable variation in its annual and daily flows, and peak demand can exceed supply during the summer months resulting in high hydrological stress. In the 1998 Stressed Rivers Assessment Report Billabong Creek was classified as being under high environmental stress and prioritised for river management plan development. A water sharing plan commenced for the Upper Billabong Water Source on 1 July 2004.



## Findings

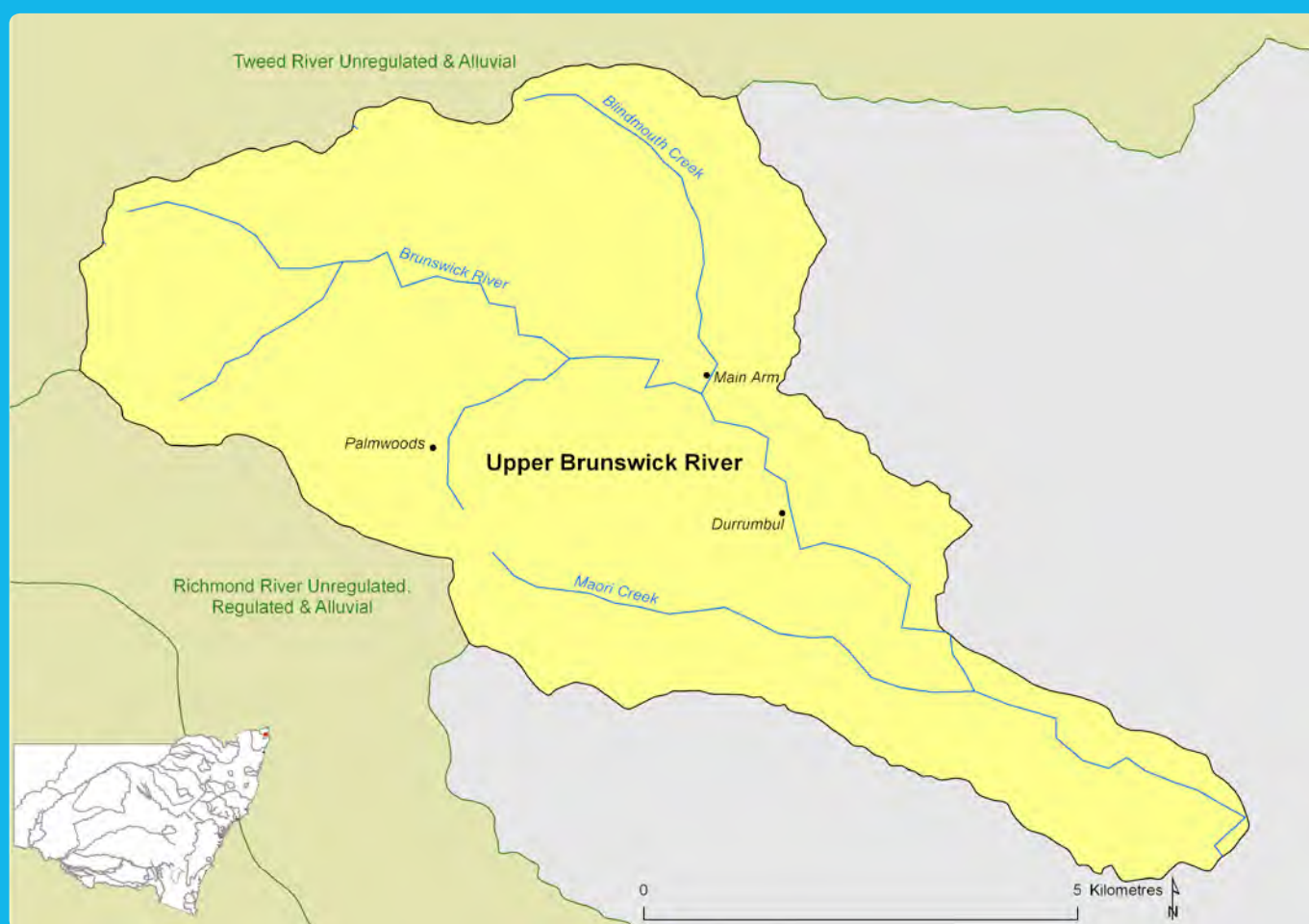
1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the unregulated surface waters of the Upper Billabong Water Source commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments informed the water management provisions within the plan. The 1998 Stressed Rivers Assessment Report categorised the environmental and hydrological stress of this water source.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements for the measurement of the effectiveness of this particular plan in achieving all outcomes have not been clearly articulated. While ecological and cultural objectives are broad and will require considerable monitoring investment to assess their achievement, some trade and entitlement objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of forestry and mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not include information on the potential connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. Environmental assets and their water requirements are not clearly detailed and monitoring is not a clearly embedded component of the plan.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some socioeconomic monitoring, water accounting and flow monitoring has been undertaken, however this has not been clearly linked to plan outcomes and reporting is limited. A progress report on all WSPs in the Murray Valley is pending. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements informed by historical climate data. There is no quantification of the potential risks to system health or entitlement securities due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	The draft plan was developed by the Murray Unregulated Water Management Committee which included stakeholder representatives. Provisions were made during plan development to disseminate information to and receive input from the public (e.g. public submissions on draft plan, public meetings). However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Some progress has been made towards the implementation of plan strategies, such as the provision of tradeable water entitlements. However, temporary trades are limited due to a lack of monitoring of water use and water quality monitoring shows increases in electrical conductivity and turbidity. Therefore, none of the evidence examined demonstrated that outcomes have been achieved to date. The outcomes from the five-year audit of the effectiveness of implementation of plan provisions are not publicly available.



# UPPER BRUNSWICK RIVER WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Upper Brunswick River is located on the far north coast of New South Wales. Water sharing in Upper Brunswick River is managed under an individual plan that commenced in 2004. The area's major irrigation activity is irrigated pasture for dairying purposes, a nursery and some limited horticultural production. The system also contributes important estuarine flows despite being relatively low flowing. The Upper Brunswick reduces to a string of natural pools in dry periods, typically between September and January, when sections of the river frequently flow below the riverbed. The area is considered hydrologically-stressed because of the high consumptive water demand during the system's summer low flows. Equitable sharing of water for consumptive and non-consumptive purposes during periods of low water availability is the primary planning driver.

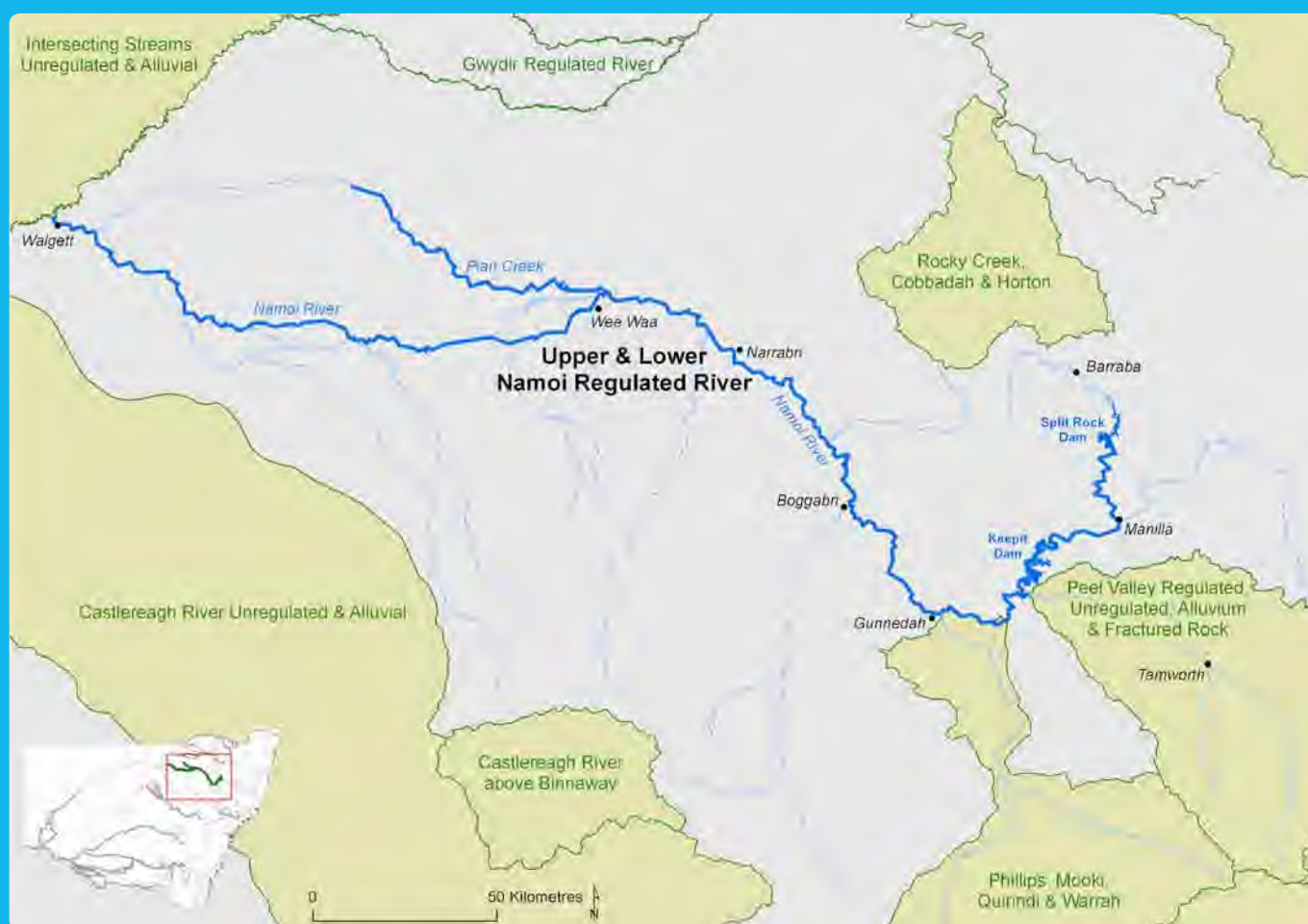
## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan covers surface waters within the planning area. The plan commenced in 2004 and will apply for a period of 10 years.
2. Does the plan include key assessments?	Yes	Hydrologic, socioeconomic and environmental assessments informed the water management provisions within the plan. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse, however the system is considered hydrologically-stressed. The plan establishes a long-term extraction limit and allows for reductions to allocations if the extraction limit is exceeded. Information explaining trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements are not specified.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. A number of state-wide policies guide the management of other potential intercepting activities, such as mining and plantations.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan that addresses surface water only.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes cease-to-pump levels to protect pool connectivity during low flow periods, and daily flow sharing volumes to protect natural flow variability. The environmental water provisions have been established based on hydro-ecological assumptions that mimicking natural flow variability will protect aquatic ecosystems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving the stated objectives using monitoring and modelling of ecological, economic and cultural indicators. Socioeconomic monitoring commenced in 2006 as part of a state-wide program, while environmental flow response monitoring is yet to commence in the planning area. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not explicitly deal with climate change; rather, it assumes that the in-built review will provide sufficient adaptive capacity. There are some self-adjustment mechanisms for climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. provision of tradeable water entitlements, provision of BLR, maintenance of extraction limit). Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. daily flow sharing, temporary water trading). The outcomes from the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.

# UPPER NAMOI AND LOWER NAMOI REGULATED RIVER WATER SOURCES



## WATER SHARING PLAN 2003



### Context

The Namoi Valley lies in northern New South Wales between the Gwydir Valley to the north and the Macquarie Valley to the south. The major public storages that regulate surface waters in the plan area are Split Rock and Keepit Dams. The chief water users in this highly developed river system are general security irrigators, with cotton, livestock production, grain and hay, poultry and horticulture the key industries in the region. The volume and pattern of flows in the Namoi River have been significantly altered by the extraction of water and dam operation, with the frequency of most flood events and end-of-system flows reduced. These changes have impacted on the environmental health of the river and its wetlands and contributed to water quality problems in the catchment. A key management issue is the equitable sharing of water between competing water users and the environment.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan commenced for the Upper and Lower Namoi regulated rivers in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken as part of the development and drafting of the plan by the local Namoi Regulated River Management Committee (e.g. hydrological and economic modelling, environmental assets). However, this information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. Information on the environmental and consumptive use trade-offs that underpin the extraction limit are no longer publicly available.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements for the measurement of these are not specific. While ecological and cultural objectives are broad and will require considerable monitoring investment to measure their achievement, some trade and extraction related objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. Consideration of potential impacts from forestry was not evident but subsequent risk assessments conducted by NSW have concluded that they are likely to be negligible. The plan identifies the need for regulation of floodplain harvesting and estimated volumes are integrated into the plan's extraction limit, however the state policy remains in draft. State-wide policies guide the management of mining interception.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not include information on the potential connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental watering arrangements and responsibility for their delivery has been assigned. However, the links between environmental flow provisions and empirical evidence of environmental water requirements are not clear. Environmental water provisions are given effect to in Water Supply Work Approvals and State Water Corporation is required to provide an annual compliance report.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some water quality, water accounting, environmental, and socioeconomic monitoring is being undertaken. In general, monitoring has not been clearly linked to plan outcomes and reporting has been limited. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability. Water allocation decisions and critical water supply arrangements are informed by historical climate data. There is no quantification of the potential risks to system health or entitlement security due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Stakeholder engagement occurred during the development of the plan through the local Namoi River Management Committee (e.g. establishment of environmental flow rules, recommendations for water sharing arrangements) and through public exhibition of draft plan. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress has been made towards the implementation of some plan actions (e.g. tradeable water entitlements, delivery of BLR). However, monitoring of plan effectiveness is not consistently reported in publicly available documents. None of the evidence examined demonstrated that outcomes have been achieved to date.



# WANDELLA CREEK WATER SOURCE



## WATER SHARING PLAN 2003



### Context

Wandella Creek is located on the far south coast of New South Wales. The plan area includes a significant proportion of forested public land (around 60 per cent) with much of the remainder cleared for farming. The plan area is considered hydrologically-stressed because of the high water demands for irrigation during low summer flows. A draft plan was prepared by the South Coast Water Management Committee in 2002. Although a tributary of the Tuross River, Wandella Creek is managed under a discrete water sharing plan which commenced in 2004.

## Findings

1. Is there a plan in place?	Yes	A finalised and operational statutory plan for the unregulated surface waters of the Wandella Creek Water Source commenced in 2004 and applies for 10 years.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken as part of the development and drafting of the plan by a localised water management committee. Public documentation of this process has been limited (e.g. environmental asset condition, cultural values, connectivity). The 1998 Stressed Rivers Assessment Report categorised the environmental and hydrological stress of this water source.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It does establish a long-term extraction limit and allows for adjustments to available water determinations if the extraction limit is exceeded. The extraction limit reflects environmental and consumptive use trade-offs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan clearly identifies objectives, strategies and performance indicators, but monitoring and reporting arrangements for the measurement of the effectiveness of this particular plan in achieving all outcomes have not been clearly articulated. While ecological and cultural objectives are broad and will require considerable monitoring investment to assess their achievement, some trade and entitlement objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates water trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. State-wide policies guide the management of forestry and mining.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	The plan is a single resource plan and does not include information on the potential connectivity between surface water and groundwater.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains accountable environmental watering arrangements and responsibility for their delivery has been assigned. However, monitoring arrangements to enable the assessment of achievement of environmental outcomes are not detailed in the plan or supporting documents.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Some water accounting and flow monitoring has been undertaken, however this has not been clearly linked to plan outcomes and reporting is limited. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements informed by historical climate data. There is no quantification of the potential risks to system health or entitlement securities due to long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Stakeholder engagement occurred during development of the plan through the local South Coast Water Management Committee. Public submissions on the draft plan were considered during plan finalisation. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Some progress has been made towards the implementation of plan strategies, such as the provision of tradeable water entitlements. Metering of volumes extracted by water users has not commenced and therefore the implementation of some plan provisions has not been possible (e.g. temporary water trading). The outcomes from the five-year audit of the effectiveness of implementation of plan provisions are not publicly available. None of the evidence examined demonstrated that outcomes have been achieved to date.

# WYBONG CREEK WATER SOURCE



## WATER SHARING PLAN 2003



### Context

The Wybong Creek Water Source is located in the Hunter Valley. Wybong Creek is a tributary of the Goulburn River, which is a tributary of the highly developed Hunter River. Wybong Creek is an ephemeral stream with considerable variation in its annual and daily flows. Surface water and groundwater are highly connected, with low flows characterised by groundwater inflows to the river. Wybong Creek supports a high level of consumptive water use for irrigation and domestic, stock and farming purposes and is considered hydrologically-stressed because much of this is extracted during the system's low summer flows. A water sharing plan, which is one of five that control the overall extraction of water in the Hunter Valley, commenced in 2004 to protect a proportion of low flows for the benefit of the environment and to ensure equitable sharing among consumptive users. However, the plan was suspended in 2006 due to severe water shortages. Prior to the plan's suspension, irrigators had been unable to extract surface water or groundwater in excess of 200 consecutive days. The plan's low flow access arrangements are currently under review and the plan has not recommenced.

## Findings

1. Is there a plan in place?	To some extent	A finalised statutory plan covers the surface waters and alluvial sediments within the planning area. The plan commenced in 2004 and applies for 10 years. The plan's rules of distribution were suspended on 18 August 2006 and have not been reinstated. The triggers for suspending and reinstating plans during severe water shortages are subject to the Minister's discretion.
2. Does the plan include key assessments?	To some extent	Hydrologic, socioeconomic and environmental assessments were undertaken to inform the plan's development. This information is no longer publicly available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	There were no areas of overuse identified in the plan, but it does recognise the system is hydrologically-stressed. The plan establishes an extraction limit and allows for reductions to allocations if the limit is exceeded. Information on trade-off decisions that underpin the extraction limit and access rules was available during the plan's public exhibition period.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly documented but broad objectives, strategies and related performance indicators that are linked to the plan's provisions. Monitoring arrangements for measuring socioeconomic and ecological outcomes are not clearly specified within the plan or its supporting documents. A number of the plan's ecological objectives will require considerable monitoring effort. The majority of the plan's objectives are measurable using routinely collected hydrologic parameters.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade by creating NWI-consistent water access entitlements under the <i>Water Management Act 2000</i> and defining clear trading arrangements.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan addresses interception to some extent by accounting for BLR but Reasonable Use Guidelines to regulate this type of water use have not been finalised. A number of state-wide policies guide the management of other potential intercepting activities, such as mining.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan recognises surface water and groundwater connectivity in the planning area and establishes appropriate integrated management arrangements.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan contains environmental water provisions and responsibility for their delivery has been assigned. The plan establishes cease-to-pump levels to protect pool connectivity during low flow periods, and daily flow sharing volumes to protect natural flow variability. Environmental water provisions have been established based on hydro-ecological assumptions that mimicking natural flow variability will protect aquatic ecosystems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan will be assessed by 2014 to determine its effectiveness in achieving its objectives using monitoring and modelling of ecological, economic and cultural indicators. Some environmental flow response and socioeconomic monitoring has commenced and a report on progress is pending. River flow and trade activity are routinely measured. The plan and its supporting legislative framework provide compliance and enforcement mechanisms.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges climate variability and deals with this through water allocation decisions and critical water supply arrangements. The plan does not explicitly deal with climate change; rather, it assumes that the in-built review will provide sufficient adaptive capacity. There are some self-adjustment mechanisms for climate change. The plan's rules for distribution have been suspended since 2006 due to dry conditions and the adverse impact of cease-to-pump provisions on licensed extractors.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Plan development involved extensive stakeholder engagement. The draft plan was prepared by a stakeholder committee and public meetings and a public exhibition period allowed for broader public input. However, information explaining the final decision-making process is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	To some extent	The plan's rules of distribution have been suspended since 2006. Progress has been made towards the implementation of some plan actions (e.g. provision of tradeable water entitlements). There has been minimal reporting of the plan's outcomes, however a progress report on the monitoring and evaluation activities underway to assess the ecological and socioeconomic performance of each WSP in the Hunter Valley and central and lower north coast is pending. The results from the five-year audit of the effectiveness of the implementation of plan provisions are not publicly available.





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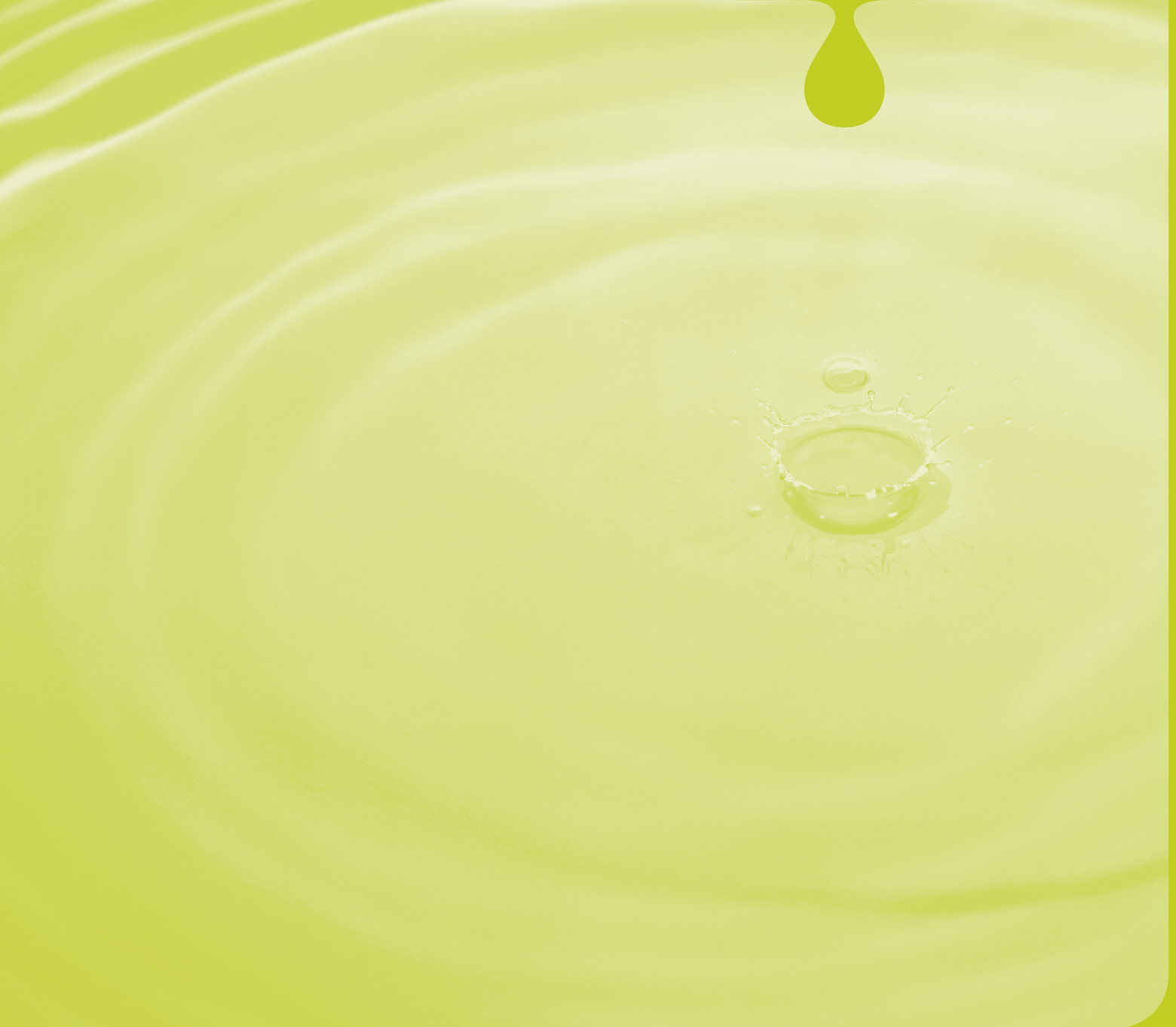
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The context of water planning in Victoria

The water planning and allocation framework in Victoria aims to balance the needs of the environment and water users, restore and protect river health, and facilitate future economic growth. Although Victoria covers only three per cent of total surface area, it accounts for approximately 21 per cent of Australia’s water use. Approximately 80 per cent of use is from surface water systems.

Water systems and uses are diverse and include heavily regulated and developed rivers used for irrigated agriculture in the north that flow into the River Murray; unregulated rivers and large storages that supply Melbourne; internally draining systems in the groundwater dominant western region; and heritage-listed unregulated rivers with high conservation value in the Gippsland region. Victoria’s many water systems are connected through a network of rivers, channels, pipes and storages, and investment has been made in water savings and efficiency projects in irrigation districts. Groundwater aquifers vary in size and volume throughout Victoria, accounting for 37 per cent of water use in the drier Western Region. Groundwater resources are used for agricultural, domestic and stock, industrial purposes and augmenting town supply and there are indications of declining levels in different parts of the state.

Unprecedented dry conditions between 1997 and 2010 and the recognition of the potential future impacts of climate change are major drivers to the way water is planned for in Victoria. In addition, the need to balance environmental and consumptive water use has arisen due to the impacts of water extraction and regulation on the environmental condition of rivers and aquifers. Population growth across the State and in particular the major urban centres and the increasing dependency on water sources such as groundwater and farm dams have also shaped the priorities for water allocation and planning.



# Planning arrangements



## Water planning legislation and framework

The *Water Act 1989* (the Act) provides the framework for the planning of, allocation for and entitlements to the State's water resources. The Minister for Water is responsible for implementation and enforcement of the Act and the Department of Sustainability and Environment (DSE) is the main agency delegated responsibility for implementation. Responsibilities under the Act are also delegated to the 19 water corporations for water planning and allocation decisions.

The planning and allocation framework under the Act comprises a number of planning instruments that vary according to their purpose, legislative status, geographic scale and the type of water system. The Act specifies the creation of sustainable water strategies (SWSs), bulk entitlements (BEs), and groundwater and streamflow management plans (GMPs and SFMPs). The framework gives priority to resource security and is built on the principle of recognising existing rights and entitlements.

## Water planning instruments

Sustainable water strategies aim to guide the development, integration and implementation of other planning instruments and infrastructure. Sustainable water strategies apply to four regions covering all of Victoria and are 50-year strategies which identify key risks to water resources and set out actions to address the risks. Sustainable water strategies aim to provide users with information to manage their own resources and associated risks. As of September 2011, there were two adopted sustainable water strategies and two in draft form.

The entitlement system provides the basis for how water is accessed and shared in Victoria. A process has been underway since the mid-1990s to convert existing ill-defined water rights into bulk entitlements and is nearing completion. The bulk entitlement provides the statutory right to use and supply water and specifies water sharing arrangements and operating rules. There are over 200 bulk entitlements in place across the state, of which this assessment sampled a small number. Bulk entitlements are held by water corporations and other entities and range from large shares of reservoirs for supply to primary entitlement holders to small-scale quantities of water for town supply.

Environmental entitlements (EEs) are also issued on regulated systems and hold similar statutory characteristics as consumptive bulk entitlements. Environmental entitlements are held by the recently established Victorian Environmental Water Holder (VEWH) for the purposes of improving the environmental values and health of water ecosystems. Environmental entitlements are one component of the Environmental Water Reserve (EWR) together with obligations under bulk entitlements and management plans and water left over after limits on diversions have been reached.

Streamflow management plans and groundwater management plans are statutory water plans developed for declared water supply protection areas (WSPAs). Management plans are local in scale and are in place for a small number of unregulated systems and aquifers. Water supply protection areas are declared where there is a risk to the resource and stricter management of use is required. There are 14 implemented plans for the 33 declared water supply protection areas. In addition to the 14 implemented plans there are eight in draft form.

Regional river health strategies (RRHSs), developed under the *Catchment and Land Protection Act 1994*, apply to the catchment scale and establish priorities for the protection and restoration of river systems and identified priority reaches. They are developed by Catchment Management Authorities (CMAs) and are guided by the Victorian River Health Strategy (VRHS). Regional river health strategies set management objectives for rivers and identify options for improving environmental flows, elements of which are reflected in sustainable water strategies. The Victorian Strategy for Healthy Rivers, Estuaries and Wetlands (VSHREW) is proposed to replace the Victorian River Health Strategy to improve and integrate the management framework for protecting aquatic ecosystems.

A long-term resource review required under the Act will take place in 2019 to identify whether there has been any decline in the long-term availability of water and whether changes to entitlements are required. The Act also specifies powers for the Minister for Water to declare a water shortage and temporarily override existing water entitlements under a process of qualification of rights.

The Commission has undertaken assessment of water planning at the catchment scale to allow consideration of the range of instruments that address Report Card criteria. All existing statutory-based planning instruments were assessed against criteria and consolidated to form a view on water planning at this scale. A sample of bulk entitlements from each catchment was included in the assessment.



Table 2: Planning instruments

Assessment criteria	State	Regional	Catchment	Comment
	Water Act VEWH	SWS	RRHS SFMP GMP BE	
1. Status of plan				The <i>Water Act 1989</i> requires the development of SWSs and states that management plans must be developed for WSPAs. Victoria has four SWSs (two draft), ten RRHSs, six SFMPs, seven GMPs, 203 BEs and 15 EEs.
2. Key assessments				The Act requires SWSs to include key assessments and specifies 15-year water resource assessments. RRHSs identify river-related assets and BEs and SFMPs/GMPs are underpinned by assessments.
3. Overuse status & pathways to sustainable water extraction				SWSs identify actions to recover water for the environment and in some cases identify overuse in WSPAs. MDB catchments are managed under the MDB cap. SFMPs and GMPs set SDLs and PCVs to limit use. BEs may include passing flow obligations.
4. Clearly identified & measurable outcomes				The Act contains overarching objectives and SWSs outline guiding principles for the management and sharing of regional water resources. RRHSs set objectives at a catchment scale for the protection of environmental assets. GMP, SFMP and BE objectives are tailored to their specific purpose.
5. Facilitation of trade				The Act specifies rules for the trading of water shares and BEs. SWSs provide an overview of the water trading framework and rules. Localised restrictions and rules to trading are stipulated in SFMPs, GMPs and BEs.
6. Integration of water intercepting activities				The Act includes regulations for some interception activities. SWSs broadly identify risks related to interception activities. SFMPs focus on quantifying extraction relating to farm dams.
7. Surface water/ groundwater connectivity				Connectivity is identified in SWSs and some GMPs quantify connectivity. The Draft Upper Ovens WMP includes provisions to conjunctively manage connected resources.
8. Environmental water management arrangements				The Act defines the EWR, which is managed by the VEWH. The EWR is comprised of EEs, obligations for BEs and 'above cap' water. SWSs identify water recovery targets and identify actions to increase the volume of the reserve. SFMPs and GMPs stipulate rules such as cease-to-pump, SDLs and PCVs. RRHSs set out strategies for protecting the environmental health of waterways.
9. Monitoring, compliance & enforcement provisions				The Act requires monitoring and review of progress of SWSs. SFMPs require annual implementation reports and regular reviews. DSE maintains monitoring data systems for surface water and groundwater. Ecosystem health monitoring occurs under the RRHS. Monitoring reports are issued by DSE, water corporations and CMAs. Statements of Obligations to water corporations and CMAs relate to performance of their functions and exercise of their powers.
10. Planning for climate change & extremes in inflows or recharge				The Act gives the Minister power to qualify rights in severe water shortages. SWSs quantify the impacts of climate change on water availability in the region and provide climate projections. SFMPs/GMPs stipulate rules to protect minimum flows in dry conditions.
11. Stakeholder engagement				The Act stipulates the process of stakeholder engagement when developing the SWSs, SFMPs, GMPs and BEs. Engagement is also required for the RRHS.
12. Extent to which outcomes have been achieved				The Act specifies long-term water resource assessments to be undertaken every 15 years. SWSs, RRHSs, SFMPs and GMPs are reported on annually and generally reviewed within 7–10 years of implementation.



## Key findings



### The Victorian planning framework is complex and progress in some areas of planning is very slow

The existence of a number of instruments operating at a range of scales with differing objectives and accountability requirements means that it can be difficult for stakeholders to understand and gain confidence in the planning framework. Progress has been slow in the development of the overarching sustainable water strategies and planning in declared water supply protection areas. As of September 2011, two of four sustainable water strategies were in draft and the ongoing status of planning in water supply protection areas is unclear.

### The role of planning instruments in addressing sustainable water strategy priorities is unclear

The Act protects entitlement holders' share of the available water resource. Sustainable water strategies do not have the statutory capacity to effect changes to bulk entitlements and management plans. The degree to which sustainable water strategy actions to address water management priorities will be addressed through planning instruments is unclear as Victoria expects that the majority of adjustment required will be delivered through the water market and investments in water savings.

### Long-term vision for responding to threats to water resources

Victoria's sustainable water strategies articulate long-term priorities and the key risks to the water resource and dependent ecosystems over the period to 2055, particularly with respect to climate change and variability. This allows water corporations, Catchment Management Authorities, users and the broader community to anticipate changes to water availability and to better manage their own risks.

### Strategic focus supported by robust assessments and inclusive community engagement

The sustainable water strategies and regional river health strategies are underpinned by extensive community and stakeholder engagement and key assessments of hydrological, environmental, social and economic factors. Bulk entitlements were established through an engagement process and included hydrological and environmental assessments, however the degree to which decisions made in the bulk entitlement conversion process were communicated to the community is not always clear.

### Progress towards more accountable environmental watering arrangements

The recent establishment of the Victorian Environmental Water Holder has the potential to improve the transparency around the management of entitlement-based environmental water and coordination in the application of rules-based environmental water.





## Findings against criteria

1. Status of water planning	Victoria does not have a single statutory water planning instrument that addresses all Report Card criteria. When examined at the catchment scale, the planning framework comprises a number of instruments that together aim to achieve water allocation outcomes. As of September 2011, there were two finalised and two draft sustainable water strategies which identify key actions and aim to guide the integration and implementation of other instruments. The process to develop water management plans for declared water supply protection areas is not clear and 19 declared areas across the State do not yet have plans in place. The continued transitional nature of the water planning framework does not yet provide certainty around how the instruments will be aligned and interact through the sustainable water strategies.
2. Do plans include key assessments?	Sustainable water strategies and regional river health strategies are underpinned by key assessments that cover resource, social, economic and environmental aspects. Hydrological, environmental and socioeconomic assessments informed the development of the bulk entitlements but this information is not publicly available. Management plans utilised hydrology models and environmental flow studies which is consistent with their objectives.
3. Do plans address overuse and is there a pathway to sustainable extraction?	Overuse and sustainable levels of extraction are not identified in Victoria's planning instruments, other than in the Central Region Sustainable Water Strategy in relation to management plans for water supply protection areas. Streamflow management plans and groundwater management plans identify sustainable diversion limits (SDLs) and permissible consumptive volumes (PCVs) respectively. Sustainable water strategies identify environmental water requirements and recovery options based on detailed environmental flow studies. It is largely left to mechanisms outside of but linked to the planning framework, such as water savings projects and entitlement purchases, to obtain reductions in consumptive use.
4. Do plans include clearly identified and measurable outcomes?	Objectives of each of the planning instruments reflect their specific purpose. Sustainable water strategies identify guiding principles and set priority actions for securing water rights, providing certainty to entitlement holders and delivering environmental outcomes. The degree to which planning provisions are linked to objectives varies across the different instruments.
5. Do plans facilitate trade?	Planning instruments define water trading zones and facilitate water trade. A number of established limits and rules as well as recent suspensions exist in Victoria and are typically defined and explained in bulk entitlements, management plans and supporting rules and policies. Trading rules are in place largely to prevent adverse impacts on other water users. Groundwater entitlements remain bundled to property rights in Victoria. It is not clear how trade will be facilitated in declared water supply protection areas without plans in place.
6. Is interception appropriately considered and integrated into the plans?	Interception is identified as a risk to water availability in sustainable water strategies and addressed to some extent in streamflow management plans and groundwater management plans. It is not clear if or how the broad recognition in sustainable water strategies has driven action on interception in other planning instruments. Recent actions to address interception include the requirement to register household and farm dams and domestic and stock dams in rural residential areas. The management of interception from forestry activities is not evident in water planning.
7. Do the plans address surface water and groundwater connectivity as appropriate?	Connectivity is recognised at a broad level in sustainable water strategies and there is a single example of the Upper Ovens system where a draft integrated management plan for highly connected systems has been prepared. Many catchments show little evidence of connected systems being conjunctively managed.

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| 8. Do plans contain accountable environmental water management arrangements?                             | Sustainable water strategies identify environmental water requirements and set water recovery targets based on environmental flow assessments (EFAs). Regional river health strategies identify priority reaches and specify actions to protect and maintain environmental assets. Many bulk entitlements contain environmental water provisions, such as passing flow obligations, although the volume of passing flows set aside for the environment is not clear. Environmental entitlements, obligations under statutory instruments and above cap water are components of the Environmental Water Reserve. From July 2011, the Victorian Environmental Water Holder took over responsibility for managing the delivery of environmental entitlements and has added clarity to the management of environmental outcomes. A seasonal watering plan was released in August 2011 that lists all environmental entitlements held by the Victorian Environmental Water Holder. |
| 9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place? | Monitoring is occurring throughout the State against obligations under management plans and bulk entitlements, as well as to gauge stream condition, water use, trade activities, cap compliance, river health and groundwater levels. Reporting occurs through various formats by the Department of Sustainability and Environment, Catchment Management Authorities and water corporations. However, monitoring is not always evaluated or reported in line with the objectives of the water planning instruments. Despite no statutory requirement to implement sustainable water strategy actions, there is a statutory requirement to report against implementation. Department of Sustainability and Environment reports annually where progress has been made.   |
| 10. Do the plans deal appropriately with climate change and extremes in inflows or recharge?             | Sustainable water strategies outline climate change scenarios and threats to water availability to 2055, as part of their long-term approach. Other planning instruments such as bulk entitlements and streamflow management plans include mechanisms to decrease use when water availability decreases.  |
| 11. Is stakeholder engagement in the planning process adequate?  | There has been considerable stakeholder engagement in the development and implementation of sustainable water strategies, regional river health strategies and management plans. Stakeholders are provided with opportunities to engage, either through representative committees or public forums, and information is readily provided. Bulk entitlements were developed using local community and interagency engagement, however documentation of decisions has not been made available to the community.  |
| 12. Have identified outcomes been achieved during the reporting period?                                  | The complex and changing nature of the water planning framework in Victoria makes it difficult to assess progress against outcomes. The draft status of two of four sustainable water strategies, the ongoing reassessment of priorities for water supply protection areas, and the lack of reviews of many regional river health strategies further restricts the ability to gauge achievement. Many outcomes of the planning instruments will not be fully understood until the 2019 long-term review of resources.   |



## Glossary and abbreviations

Term	Acronym	Definition
Annual watering plan	AWP	The AWP (or seasonal watering plan) describes the proposed use of the Environmental Water Reserve for the coming water year to maximise environmental outcomes with the available volume of water.
Bulk entitlement	BE	A statutory right to water held by water authorities. 'Source' bulk entitlements are entitlements to harvest water directly from water sources and describe the different sharing arrangements at that source. 'Delivery' bulk entitlements are entitlements to be supplied from another water corporation's dam.
Catchment Management Authority	CMA	Statutory bodies established under the <i>Catchment and Land Protection Act 1994</i> and responsible for river health, catchment planning, and waterway, salinity and water quality management.
Department of Sustainability and Environment	DSE	
Environmental entitlement	EE	A water entitlement held by the Victorian Environmental Water Holder that permits the use of water in a river or storage for a purpose that benefits the environment.
Environmental operating strategy	EOS	Environmental operating strategies outline the principles behind the environmental water releases provided by the environmental entitlement and the procedure for deciding on the annual watering plan.
Environmental Water Reserve	EWB	The share of water resources set aside to maintain the environmental values of a water system that are dependent on the environmental condition of the system.
Groundwater management plan	GMP	A statutory management plan prepared for a water supply protection area to manage the groundwater resources.
Index of Stream Condition	ISC	State-wide study of the environmental condition of rivers that integrates the condition of river hydrology, water quality, streamside zone, physical form and aquatic life. Two assessments have been undertaken in 1999 and 2004 and a third is due to be reported in early 2012.
Interim management rules	IMRs	Interim rules applied on a temporary basis after the water supply protection area is declared and before the management plan is approved.
Management plan	MP	A legal document prepared under the Act that defines the total amount of water in a water supply protection area and prescribes how it will be shared between water users and environment (e.g. Upper Ovens).
Murray–Darling Basin	MDB	
Permissible consumptive volume	PCV	The total amount of water that can be taken in a groundwater management area.
Qualification of rights		The Minister of Water declares a water shortage and qualifies existing water entitlements to reallocate water to priority uses.

Term	Acronym	Definition
Regional river health strategy	RRHS	A regional strategy developed by Catchment Management Authorities to provide a framework that will protect or improve the health of priority rivers.
Streamflow management plan	SFMP	A statutory management plan prepared for a water supply protection area to manage unregulated surface water resources.
Sustainable diversion limit	SDL	The upper limit on winter-fill diversions within an unregulated river sub-catchment, beyond which there is an unacceptable risk to the environment.
Sustainable water strategy	SWS	A statutory-based regional strategy for the strategic planning of water resources across four regions.
Victorian Environmental Water Holder	VEWH	Independent statutory body responsible for holding and managing the Environmental Water Reserve from July 2011.
Victorian River Health Strategy	VRHS	State-wide strategy outlining the requirements for regional river health strategies.
Victorian Strategy for Healthy Rivers, Estuaries and Wetlands	VSHREW	Currently under development and will replace the Victorian River Health Strategy to provide a more integrated approach to rivers, estuaries and wetlands.
Water corporations		Water corporations are established under the Act and are responsible for supplying water for urban, irrigation, domestic, stock and commercial use in irrigation and water districts.
Water management plan	WMP	A statutory management plan prepared for a water supply protection area to manage surface water and groundwater resources.
Water supply protection area	WSPA	An area declared under Section 27 of the Act to protect the area's groundwater or surface water resources through the development of a management plan.





# Planning areas

## Victoria



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### Location

VIC



1	Corangamite Catchment	184	6	North Central Catchment	194
2	East Gippsland Catchment	186	7	North East Catchment	196
3	Glenelg Hopkins Catchment	188	8	Port Phillip and Westernport Catchment	198
4	Goulburn Broken Catchment	190	9	West Gippsland Catchment	200
5	Mallee Catchment	192	10	Wimmera Catchment	202





# CORANGAMITE CATCHMENT



## Context

The Corangamite catchment is located on the south-western coast of Victoria and includes most of Ballarat and Geelong. The four major river basins in the catchment are the Moorabool, Barwon, Lake Corangamite and Otway Coast. The Moorabool River is considered one of the most heavily committed and flow-stressed rivers in Victoria. The catchment includes an extensive system of lakes and wetlands including a number of Ramsar-listed sites. Groundwater is used to augment urban water supplies and demand for surface water irrigation is low in the east of the catchment due to relatively high rainfall. Land use varies by sub-catchment with forested areas in the east, where systems are more ecologically healthy than in the cleared agricultural land in the west. Threats to water resources include highly altered flows in regulated systems, climate change, water quality, high urban demand and development and loss of in-stream habitat. Responsibilities for water planning and implementation are split between the Department for Sustainability and Environment, Barwon Water, Central Highlands Water, South West Region Water Authority, Southern Rural Water Corporation and Corangamite Catchment Management Authority.



## Findings

1. Is there a plan in place?	To some extent	The catchment is in the Central Region SWS and Draft Western Region SWS areas. Other relevant planning instruments include the Corangamite RRHS, 15 consumptive BEs and two EEs for the Barwon and Moorabool rivers. The Warrion GMP is the only commenced plan out of three declared WSPAs.
2. Does the plan include key assessments?	Yes	The SWSs contain key assessments, including connectivity, climate projections, economic, environmental assets and risks. The RRHS identified environmental assets and their economic and social values. Key assessments informing the Warrion GMP were almost 10 years old.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The Central Region SWS proposed to increase the EWR but there is no timeframe identified to provide the full required environmental flows. The Central Region SWS states that WSPAs are declared and management plans developed to reduce overuse. Warrion WSPA is the only area with a plan in place, but long-term groundwater levels are noted as declining. There are limited arrangements in place for the flow-stressed Moorabool River. There is no clear trade-off process evident to set levels of extraction in planning instruments.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Principles of the Central Region SWS are not clearly linked to or measurable against actions. Actions linked to the Western Region SWS principles are not finalised. The RRHS identifies river health objectives, risk-based management actions and resource condition targets. The Warrion GMP objectives rely on water level and quality observation bores.
5. Does the plan facilitate trade?	To some extent	The SWSs outline and propose actions to facilitate trade and describe the trading framework. BEs are able to be traded. The Act prohibits permanent trade in the WSPAs without an approved plan. The Warrion GMP did not restrict any trades.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The SWSs and Warrion GMP identify and quantify farm dam impacts and land-use change but there is limited discussion and identification of other potential intercepting activities such as the open-cut coalmine in Anglesea.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	Areas of connectivity are identified in the SWSs but the systems are not conjunctively managed or the level of connection quantified. The Warrion GMP does not provide connectivity estimates.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Environmental water is provided to the Moorabool and Barwon rivers through an EE and the SWSs identify potential savings and infrastructure to increase the EWR. Passing flow provisions are provided in many of the regulated BEs. There are no identified environmental provisions in the GMP as methods for setting the PCVs are unknown.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Progress against Central Region SWS actions is reported in DSE's annual report, although reporting is limited to a small number of actions each year. The RRHS sets condition targets and monitoring will inform the five-year review and the 2019 long-term resource assessment. Compliance monitoring for GMP and BEs is reported annually. Alignment of monitoring results, compliance provisions and objectives of the different planning instruments is not clear.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The SWSs quantify the impacts of long-term climate change to the resource reliability. Climate variability consideration was identified in the Moorabool EE. Variability was not considered in the Warrion GMP although risks due to climate change are mentioned.
11. Is stakeholder engagement in the planning process adequate?	Yes	Formal stakeholder engagement occurred during development of the Central Region SWS, RRHS and Warrion GMP. Stakeholder engagement is ongoing for the Western Region SWS to set the directions and actions of the final SWS. Legislation outlines requirements for stakeholder engagement in BEs, although evidence is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The draft status of the Western Region SWS does not allow for measurement of progress. Progress is evident against a limited set of actions for the Central Region SWS in DSE's annual report. Reporting against the Warrion GMP was due in September 2011. Reporting against the EEs is not yet due.





# EAST GIPPSLAND CATCHMENT



## Context

East Gippsland is located in the far east of the State and is characterised by near-pristine and highly variable river systems, which are amongst Victoria's most valuable environmental and heritage assets. Major systems within the catchment include the Mitchell, Nicholson, Tambo, Snowy and Far East Gippsland river basins. The Mitchell River is the largest remaining system in Victoria without a large on-stream dam and most of the rivers in the catchment have close to natural flow regimes. Regulated rivers include the Nicholson River below Nicholson Dam and the Snowy River. Major water uses in the catchment include dairy, horticulture and town supply, although the region also depends on the natural condition of its rivers for an increasing tourism industry. Water is available in the Mitchell and Tambo rivers for consumptive use, but only in wetter months. The opportunity to share available water between consumptive users and the environment is a key driver for water planning in the catchment. Responsibilities for water planning and implementation are split between the Department for Sustainability and Environment, East Gippsland Water Corporation and the East Gippsland Catchment Management Authority.

## Findings

1. Is there a plan in place?	To some extent	The catchment is located within the Draft Gippsland Region SWS (the SWS) area. Other relevant planning instruments include the East Gippsland RRHS and nine BEs, including the Snowy River EE. The Wy Yung GMP was drafted in 2004 but not finalised. The Sale WSPA GMP was prepared in 2003 but was refused on the grounds that it failed to deal with overallocation. The current status of both WSPAs is not known.
2. Does the plan include key assessments?	Yes	The SWS and RRHS contain key hydrological, environmental, and socioeconomic assessments. Limited information is available on assessments undertaken for the declared WSPAs.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	There are no areas of overuse identified in the planning instruments. The Snowy River is fully allocated and a cap on diversions is in place. Water for consumptive use is still available in the wetter months in the Mitchell, Nicholson and Tambo rivers. A number of measures are in place across the catchment to cap diversions and limit extraction. The final SWS is expected to show evidence of trade-offs between consumptive users and the environment.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The SWS links proposed actions to principles, although they are yet to be finalised. The RRHS identifies river health objectives, risk-based management actions and resource condition targets. Objectives and actions of the GMPs and BEs reflect their specific purpose.
5. Does the plan facilitate trade?	To some extent	The SWS describes the trading framework and BEs are able to be traded. Groundwater entitlements remain bundled to property rights. The Act prohibits permanent trade in the WSPAs without an approved plan.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The SWS identifies domestic and stock use and land-use change as significant intercepting activities in the region but does not identify thresholds for their management and there is no evidence of risk assessments. Plantation forestry is mentioned in the RRHS but no arrangements are specified or impacts quantified.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	The SWS considers connectivity of surface water and groundwater systems and identifies highly connected areas. It also proposes where integrated management plans may need to be developed. Other planning instruments do not address connectivity.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The SWS outlines proposals and options for environmental watering arrangements. One EE exists for the Snowy River. Rivers are in better condition in this region than other regions in Victoria and emphasis is put on protecting existing environmental values of heritage pristine river systems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Reporting on progress in development of the SWS occurs in DSE annual reports. Monitoring and reporting for the RRHS is occurring and will inform a long-term resource assessment in 2019. Monitoring of water use and compliance with passing flow obligations are being reported in various formats for BEs, such as monthly monitoring reports and water corporation annual reports. Alignment of monitoring reports and objectives of the different planning instruments is not clear.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	Climate change scenarios are explored in the SWS. The SWS sets out scenarios, options and proposals to deal with climate change through the water management framework in the Gippsland region. Climate change and variability are not considered in detail in the other planning instruments.
11. Is stakeholder engagement in the planning process adequate?	Yes	Formal stakeholder engagement is ongoing for the SWS and was undertaken in development of the RRHS. The engagement process for GMPs is not clear. Legislation outlines requirements for stakeholder engagement in BEs, although evidence is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The draft status of the SWS does not allow for measurement of progress. Annual reports by the CMA and water corporations and the Victorian Water Accounts provide information on allocations and water use, which relate to the objectives of the RRHS and BEs.

# GLENELG HOPKINS CATCHMENT



## Context

The Glenelg Hopkins catchment is located in the south-west of Victoria and includes the sub-catchments of Glenelg, Hopkins, Portland Coast and a small part of the Millicent Coastal Basin. Along the coastal fringe the main agricultural activities are dairy and plantations. Rocklands Reservoir is on the Upper Glenelg, which diverts flow to the Wimmera-Mallee water supply system, and there are few other major surface water storages. The Glenelg, Hopkins and Portland Coast sub-catchments were rated as very poor in the last Index of Stream Condition assessment. Threats to water resources in the catchment include modified flow regimes, land-use change, farm dam interception, climate change, continuation of drought and water quality. Groundwater is an important source of domestic and stock water and is used to augment urban areas. Responsibilities for water planning and implementation are split between the Department for Sustainability and Environment, Glenelg Hopkins Catchment Management Authority, Southern Rural Water Corporation, Grampians Wimmera Mallee Water and Wannon Water. Agreements exist between the Victorian and South Australian governments for the management of the groundwater resource.



## Findings

1. Is there a plan in place?	To some extent	The catchment is in the Draft Western Region SWS (the SWS) area. Other relevant planning instruments include Glenelg-Hopkins RRHS, Yangery and Nullaware GMPs, Merri River SFMP which was drafted in 1998 but never finalised, and nine BEs, including an EE for the Glenelg River shared with the Wimmera River. The Condah and Glenelg WSPAs do not have plans in place despite being declared prior to 2004.
2. Does the plan include key assessments?	Yes	The SWS and RRHS contain key hydrological, socioeconomic and environmental assessments. Key assessments were not evident for GMPs. The EE annual watering plans (AWP) reference environmental water requirement studies.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	There are no areas of overuse identified in the planning instruments. Methods for setting extraction limits in the WSPAs are not clear. The declared Condah and Yangery WSPAs and Portland Groundwater Management Area have no local management rules or approved plan despite being identified as fully allocated. Groundwater levels were reported by DSE as declining for all WSPAs without plans in place. There is no clear trade-off process evident to set levels of extraction in planning instruments.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Proposed actions in the SWS are linked to principles, although actions are yet to be finalised. GMPs do not clearly link outcomes to management provisions. Environmental outcomes for the EE are included in the environmental operating strategy (EOS) and reviewed annually in the AWP.
5. Does the plan facilitate trade?	To some extent	The SWS proposes actions to facilitate trade and describes the trading framework. Trade is restricted in the implemented GMPs to maintain extraction under the PCV and interstate trade of groundwater is covered by the SA-Vic border agreement. The Act prohibits permanent trade in the WSPAs without an approved plan.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The SWS identifies stock and domestic and land-use change through forestry as significant intercepting activities but does not identify thresholds for management. The influence of plantation forestry on the water balance has been investigated by the CMA. GMPs quantified stock and domestic and dairy wash estimates, but did not explain risk of these intercepting activities.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	No	No conjunctive management arrangements for surface water and groundwater have been identified for the catchment. The GMPs do not quantify the level of connectivity and connected areas are only generally identified.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The SWS identifies potential savings and infrastructure to increase the EE for the Glenelg River. The RRHS identifies the environmental assets to inform the priority sub-catchment selection and environmental water requirements. Provision of environmental water to groundwater systems through the GMP is unclear.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The SWS does not indicate how the outcomes will be monitored. EE monitoring arrangements are aligned through the EOS and AWP. The RRHS sets condition targets and monitoring occurs through other catchment programs. Annual GMP reporting is occurring of compliance metering, water quality, rainfall and groundwater trends, but outcomes and performance indicators were not provided.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The SWS has quantified the impacts of climate change on the reliability of supply for the next 50 years. The annual adaptive management of the EE is expected to allow for climate variability and GMPs estimate recharge as a proportion of long-term rainfall, capturing some aspects of climate variability.
11. Is stakeholder engagement in the planning process adequate?	Yes	Formal stakeholder engagement is ongoing for the SWS and occurred during development of the RRHS. The GMPs were drafted by a consultative committee. Legislation outlines requirements for stakeholder engagement for BEs, although evidence is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	It is too soon to assess progress towards outcomes of the SWS. A mid-term Report Card was published under the RRHS in 2006, but there is no evidence of the RRHS review in 2009. Groundwater levels and salinity for GMPs have been reported as stabilising over the life of the plans. Licensed entitlements are within the PCVs, but use has been reported as exceeding entitlement volumes for some licences.



# GOULBURN BROKEN CATCHMENT



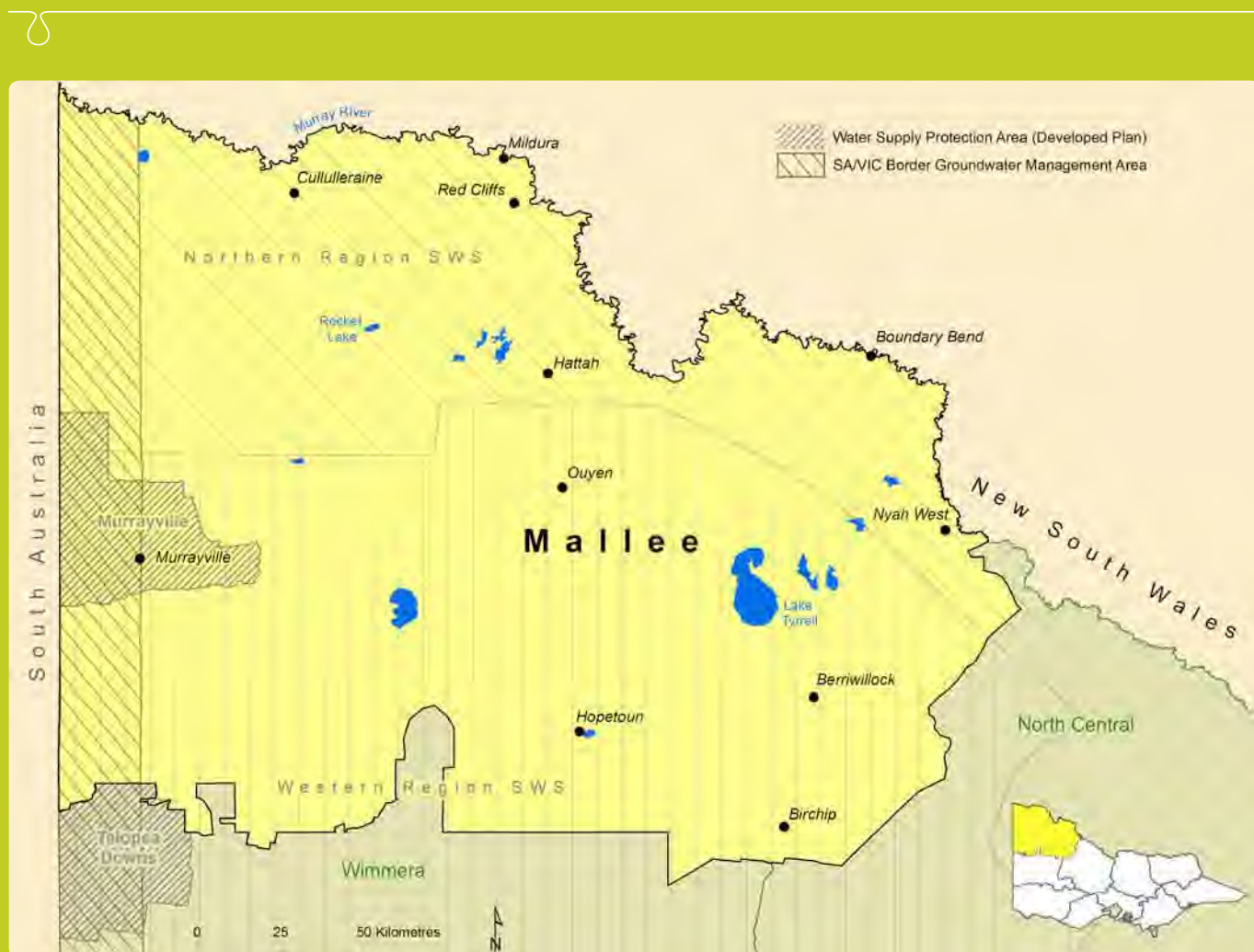
## Context

The Goulburn Broken catchment is located in northern Victoria and is the largest Victorian tributary to the Murray River, contributing 11 per cent of the inflows to the Murray–Darling Basin. The catchment is highly developed, regulated and fully allocated under the Murray–Darling Basin cap. Major water uses in the catchment include irrigated and dryland agriculture, domestic and stock use, and town supply. The level of surface water use is high at up to 50 per cent of natural flow. Key pressures on water resources include climate change and variability, water regulation and extraction, and interception activities. The catchment waterways are in poor ecological condition compared to other catchments in Victoria. Responsibilities for water planning and implementation are split between the Department for Sustainability and Environment, Goulburn–Murray Water Corporation and the Goulburn Broken Catchment Management Authority.

## Findings

1. Is there a plan in place?	To some extent	The catchment is in the Northern Region SWS (the SWS). Other relevant planning instruments include Goulburn Broken RRHS, Katunga and Shepparton Irrigation Region GMPs, and 53 BEs, including six EEs. The SWS states that King Parrot and Yea River WSPAs will be revoked and local management rules developed by 2011. No information is available on the current status.
2. Does the plan include key assessments?	Yes	The SWS, RRHS and management plans in the catchment contain hydrological, environmental and socioeconomic assessments. Other studies, such as Sustainable Yields and environmental flow assessments on the Goulburn and Broken systems, have contributed to the planning processes.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	Systems in the catchment are fully allocated under the MDB cap. The SWS sets water recovery targets for the Goulburn and Broken systems, as the EWR is insufficient to protect environmental assets. The Katunga GMP includes a PCV, although this is set at the volume of existing entitlements. There is no PCV in place for the Shepparton Irrigation Region GMP. There is no clear trade-off process evident to set levels of extraction in planning instruments.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The SWS principles are identified and linked to actions in background documents. The RRHS identifies measurable river health objectives, risk-based management actions and resource condition targets. Objectives for the Shepparton Irrigation Region and Katunga GMPs are linked to salinity control and user access and costs respectively.
5. Does the plan facilitate trade?	To some extent	Trade is well established and facilitated in the catchment through planning instruments. Barriers are largely defined and explained at the state level. For example, water trading through the Barmah Choke is limited for hydrological purposes. Water trading out of irrigation areas is limited by the 4% limit. Victoria has currently suspended allocation trade from NSW to Victorian trading zones. The Act prohibits permanent trade in the WSPAs without an approved plan.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The SWS identifies stock and domestic use as relevant intercepting activities but does not identify thresholds for management and there is no risk assessment evident. Forestry activities in the catchment are not quantified or addressed in the planning instruments.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	The SWS states that there are no strongly connected areas in the catchment. In the context of salinity control, connectivity is identified in the Shepparton Irrigation Region GMP between the shallow aquifer and surface water. Other planning instruments do not deal with connectivity.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The SWS contains objectives for environmental water and identifies a range of measures to ensure more efficient use of water. It outlines water recovery targets and specifies existing initiatives to recover water. Overall responsibility is assigned to DSE. Some BEs contain flow provisions and water savings and some licences have been converted to EEs. There is no link between actions to protect environmental assets identified in the RRHS and the SWS.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Progress against SWS actions is reported in DSE's annual report. Monitoring is reported throughout the catchment in line with compliance requirements. Alignment of monitoring results, compliance provisions and objectives of the different planning instruments is not clear.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The SWS provides long-term climate change scenarios and potential threats to water availability to 2055. Other planning mechanisms, such as seasonal allocations and qualification of rights, exist to deal with water shortages, but do not deal with long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	Formal stakeholder engagement occurred during development of the SWS and RRHS. The engagement process for GMPs and BEs is not well documented, however legislation outlines requirements for stakeholder engagement.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress is evident against actions in the SWS, although reporting is not comprehensive. Measurement of achievement of SWS actions will not be demonstrated until the 2019 long-term resource assessment. There is no evidence of the RRHS review due in 2010. Achievement of some outcomes related to GMPs and BEs has been reported in annual reports.

# MALLEE CATCHMENT



## Context

Located in north-west Victoria, the Mallee catchment is bounded by the South Australian border to the west and the Murray River to the north. Rivers and waterways include the Murray River, significant parts of its anabranches and floodplain, and sections of Yarriambiack, Outlet, Tyrrell and Lalbert creeks. There are more than 900 wetlands, several of which are recognised as internationally significant, and the region has two Living Murray icon sites. The catchment was rated as very poor in the last Index of Stream Condition assessment. The region is an important area for dryland agricultural production and irrigated horticulture along the Murray River. Threats to water resources include rising watertables causing salinity impacts, population growth and climate change. A significant proportion of the catchment is public land including the major reserves of Hattah-Kulkyne, Murray-Sunset and Wyperfeld national parks. Responsibilities for water planning and implementation are split between the Department for Sustainability and Environment, Grampians Wimmera Mallee Water, Lower Murray Water, and Mallee Catchment Management Authority. Agreements exist between the Victorian and South Australian governments for the groundwater resource and the Murray–Darling Basin Authority for the icon sites.



## Findings

1. Is there a plan in place?	To some extent	The catchment is in both the Draft Western Region SWS and Northern Region SWS areas. Other relevant planning instruments include the Mallee Regional RRHS and Murrayville GMP. The only BE within the catchment is the EE for the Murray River, which covers the length of the Murray.
2. Does the plan include key assessments?	To some extent	Assessments in the SWSs relating to the Mallee catchment are limited and contain only general information. The RRHS was informed by risk-assessed environmental, social and economic values. A hydrological model informed the Murrayville GMP with some evidence of consideration of socioeconomic values.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	There are no areas of overuse identified in the planning instruments. The SWSs contain limited Mallee specific actions. The Murrayville WSPA is noted to be a mined resource and the GMP established an extraction limit in line with the SA-Vic border agreement. There is no clear trade-off process evident to set levels of extraction in planning instruments.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The Northern Region SWS links principles to actions in background documents. Actions linked to the Western Region SWS principles are not finalised. The RRHS identifies river health objectives, risk-based management actions and resource condition targets. GMPs do not link outcomes to management provisions.
5. Does the plan facilitate trade?	To some extent	The SWSs propose actions to facilitate trade and describe the trading framework. Interstate trade of groundwater is covered by the SA-Vic border agreement. Trade is facilitated under the GMP with restrictions to minimise third-party impacts and maintain the extraction limit.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The SWSs provide limited information on the risks of intercepting activities in the Mallee region. There are no actions requiring the establishment of provisions or thresholds to manage interception. The GMP identifies domestic and stock take as an intercepting activity. Impacts of forestry are not quantified in planning instruments.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	The SWSs identify integrated management of connected systems as a priority, although no specific actions are identified for the Mallee catchment. Areas of connectivity are identified in the RRHS due to the salinity threat from rising watertables. The GMP manages groundwater resources as the aquifer is confined and recharge is negligible.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The principles for environmental water recovery are discussed in the SWSs, however there are no specific provisions for the Mallee catchment other than the River Murray EE. The GMP does not identify environmental water. Environmental objectives and The Living Murray wetland icon site are established by the Murray–Darling Basin Authority.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The SA-Vic border agreement stipulates the groundwater monitoring framework. Water levels, quality and usage are part of the risk monitoring activities in the GMP and are reported annually. Monitoring, particularly for ecosystem health, occurs through existing monitoring programs of the CMA and will be used to inform the five-year RRHS review and the 2019 long-term resource assessment. Compliance metering for the BE is reported annually.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The SWSs quantify the impacts of long-term climate change to the resource reliability. There is limited Mallee-specific information within the Western Region SWS. Climate change and variability were not considered applicable in development of the GMP. Climate variability is considered in the BE as the Valley cap is climatically adjusted.
11. Is stakeholder engagement in the planning process adequate?	Yes	Formal stakeholder engagement is ongoing for the Western Region SWS and was undertaken during development of the Northern Region SWS and RRHS. The GMP underwent stakeholder engagement during drafting and all public submissions were responded to.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	It is too soon to assess the progress towards outcomes of the Western Region SWS. DSE's annual report and project updates for the Northern Region SWS refer to the progress being made for some of the actions. The RRHS is expected to be reviewed in 2011. It is difficult to assess progress towards meeting the broad GMP objective. Efforts have been made to routinely collect information and meter users.



# NORTH CENTRAL CATCHMENT



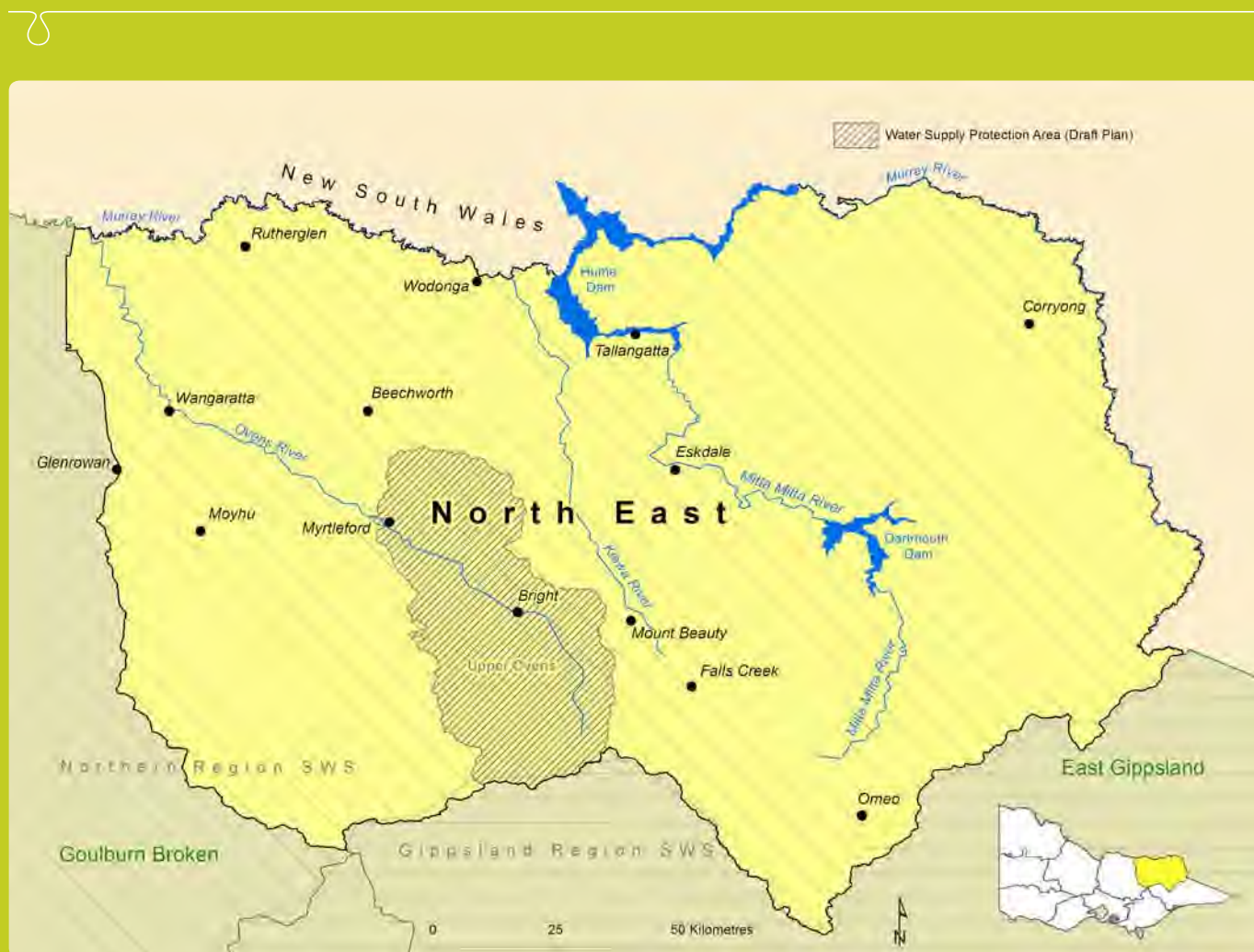
## Context

The North Central catchment is located in northern Victoria within the Murray–Darling Basin. The major systems in the catchment are the Loddon, Campaspe and Avoca rivers and agriculture is the dominant land use. Water is diverted through channels to the Loddon from other systems for irrigation purposes. There has been significant investment in water efficiency projects as part of the Northern Victoria Irrigation Renewal Project (NVRP). The Campaspe system is highly developed and regulated and supported by extensive irrigation infrastructure. Groundwater use is high in the Loddon Highlands and Lower Campaspe Valley with interim management rules (IMRs) in place to manage falling groundwater levels. Key drivers behind water planning in the catchment include the recent drought and potential impacts from climate change, changes in land use through subdivision of land and growth in urban centres such as Bendigo. According to the Index of Stream Condition report, the catchment's waterways are in relatively poor ecological condition compared to other catchments. Responsibilities for water planning and implementation are split between the Department for Sustainability and Environment, Goulburn–Murray Water Corporation, Coliban Water Corporation and the North Central Catchment Management Authority.

## Findings

1. Is there a plan in place?	To some extent	The catchment is in the Northern Region SWS and Draft Western Region SWS areas. Other relevant planning instruments include North Central RRHS, 24 BEs and four EEs. IMRs are in place for the reconfigured Loddon Highlands and Lower Campaspe Valley WSPAs, which will be in place until plans are approved. The Shepparton Irrigation Region GMP overlaps with the catchment.
2. Does the plan include key assessments?	Yes	The SWSs and RRHS contain hydrological, environmental and socioeconomic assessments. Limited information is available on the assessments that support GMPs and IMRs. Other studies, such as Sustainable Yields and environmental flow assessments on the Loddon-Avoca and Campaspe systems, have contributed to planning processes.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	Systems in the catchment are fully allocated under the MDB cap. The Northern Region SWS sets water recovery targets as the EWR is insufficient to protect environmental assets. BEs include passing flow obligations and IMRs include PCVs, although these are typically set at volumes of existing entitlements. Water recovery measures include efficiency projects in the NVIRP and The Living Murray Initiative. There is no clear trade-off process evident to set levels of extraction in planning instruments.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Principles of the SWSs are clearly linked to the actions in background documents. The RRHS identifies river health objectives, risk-based management actions and resource condition targets. Outcomes defined in IMRs for the two WSPAs are not measurable and linked to provisions. Objectives and actions of each of the planning instruments reflect their specific purpose.
5. Does the plan facilitate trade?	To some extent	Trade is well established and facilitated in the catchment through the SWSs and BEs. The Act prohibits permanent trade in the WSPAs operating under IMRs. Barriers are largely defined and explained in these instruments and state policies.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The Northern Region SWS identifies stock and domestic use as a significant intercepting activity but does not identify thresholds for management. Studies on farm dam impacts in the Campaspe informed the Northern Region SWS. No other potential intercepting activities have been identified in the area in planning documents, despite forestry and mining occurring in the catchment.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	The Northern Region SWS states that there are no strongly connected areas in the catchment. In the context of salinity control, connectivity is identified in the Shepparton Irrigation Region GMP between the shallow aquifer and surface water. Connectivity is not identified in the WSPAs or other planning instruments.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The SWSs contain objectives for environmental water and identify a range of measures to ensure more efficient use of water, including recovery targets for the Campaspe and Loddon. DSE has overall responsibility for delivering outcomes in SWSs. Some BEs contain flow management provisions and there are several EEs in place. There is no link between the RRHS actions and the arrangements in the SWSs.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Progress against Northern Region SWS actions is reported in DSE's annual report. Regular monitoring is reported throughout the catchment in a partnership between DSE, North Central CMA, Goulburn–Murray Water and Coliban Water. Alignment of monitoring results, compliance provisions and objectives of the different planning instruments is not clear.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The SWSs provides long-term climate change scenarios and potential threats to water availability to 2055. Other mechanisms in BEs and IMRs, such as seasonal allocations and qualification of rights, exist to deal with water shortages. It is not clear how the other planning instruments will incorporate the climate change actions in the SWSs.
11. Is stakeholder engagement in the planning process adequate?	Yes	Formal stakeholder engagement occurred during development of the SWSs and RRHS. The engagement process for GMPs is not well documented. Legislation outlines requirements for stakeholder engagement for BEs, although evidence is not publicly available.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	Some progress against actions in the Northern Region SWS has been reported through DSE's annual reports. There is no evidence of the RRHS review due in 2010. The status of IMRs makes it difficult to measure progress against outcomes.

# NORTH EAST CATCHMENT



## Context

The North East catchment is located in the Upper Murray region of northern Victoria. The catchment includes three major basins: Upper Murray, Kiewa and Ovens. The catchment contains two per cent of the Murray–Darling Basin surface area but contributes 38 per cent of its inflows. Two major storages, Lake Hume and Lake Dartmouth, are located in the catchment and supply bulk water for irrigation, domestic and stock and urban consumption in the surrounding region. The Ovens River is characterised by its high level of surface water and groundwater connectivity. Major water uses in the catchment include irrigated and dryland agriculture, plantation forestry, hydro-electricity and town supply. The primary drivers behind planning in the area are the effects of the recent drought on the surface water and groundwater resources and the potential impacts from future climate change. High degrees of connectivity are driving the planning of water resources in the Upper Ovens catchment, the first example of an integrated water management plan (WMP) in Victoria. The catchment's waterways are in better ecological condition than other Murray catchments in northern Victoria. Responsibilities for water planning and implementation are split between the Department for Sustainability and Environment, Goulburn–Murray Water Corporation, North East Water Corporation and the North East Catchment Management Authority.



## Findings

1. Is there a plan in place?	To some extent	The catchment is in the Northern Region SWS (the SWS). Other relevant planning instruments include the North East RRHS, Draft Upper Ovens WMP, and 20 BEs. The WMP is the first example in Victoria of an integrated surface water and groundwater management plan.
2. Does the plan include key assessments?	Yes	The SWS and RRHS contain hydrological, environmental, socioeconomic assessments. The SWS refers to environmental flow studies undertaken for the Ovens and Kiewa rivers. Detailed hydrological studies were undertaken on the connectivity of groundwater and surface water in the Upper Ovens system.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	Areas of overuse are not identified in the catchment, although systems are fully allocated under the MDB cap. No water recovery targets are set for the Ovens or Kiewa in the SWS. Mechanisms are in place to restrict use in dry periods, for example SDLs for the Upper Ovens and supply restrictions in the BEs. There is no clear trade-off process evident to set levels of extraction in planning instruments.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Principles of the SWS are clearly linked to the actions in background documents. The RRHS identifies measurable river health objectives, risk-based management actions and resource condition targets. The Draft Upper Ovens WMP identifies measurable outcomes and articulates strategies to achieve the outcomes.
5. Does the plan facilitate trade?	To some extent	Trade is established and facilitated in the catchment through the SWS and BEs. Trading zones exist for the Ovens and Murray and barriers are largely defined and explained. The Draft Upper Ovens WMP specified conjunctive trading arrangements for surface water and groundwater licences. The Act prohibits permanent trade in WSPAs without an approved plan.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The SWS identifies stock and domestic use as a significant intercepting activity but does not identify thresholds for management. Forestry plantations are identified as an activity in the Upper Ovens sub-catchment, but these are not managed through the WMP. Forestry is not identified in the Upper Murray or Kiewa systems.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The Upper Ovens system is the only system identified in the SWS as a highly connected system. The WMP is the first example in Victoria of a plan to conjunctively manage groundwater and surface water and will inform the management of other highly connected systems in the future. Areas of connectivity are identified and arrangements identified for a shared water regime between surface water and groundwater users.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The SWS contains objectives for environmental water. There are no EEs and no specific water recovery targets for the river systems in the catchment. BEs contain flow management provisions and require environmental minimum flows to be delivered. There is no clear link between the RRHS actions and arrangements in the SWS.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Despite the lack of detail on monitoring programs within the planning instruments, regular monitoring is undertaken and reported throughout the catchment in a partnership between DSE, North East CMA, Goulburn–Murray Water and North East Water. The links between the monitoring reports and objectives of the different planning instruments are not clearly integrated.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The SWS provides long-term climate change scenarios and potential threats to water availability to 2055. The Draft Upper Ovens WMP is the most recent plan to be developed in Victoria, but it is not clear how climate scenarios and information have been incorporated from the SWS.
11. Is stakeholder engagement in the planning process adequate?	Yes	Formal stakeholder engagement occurred during development of the SWS and RRHS and is ongoing for the Draft Upper Ovens WMP. The engagement process for BEs is not well documented, however the legislation outlines requirements for stakeholder engagement.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	Some progress against actions in the SWS has been reported through DSE's annual reports, although this is not comprehensive. There is no evidence of the mid-term review of the RRHS due in mid-2011. The draft status of the Upper Ovens WMP does not allow for measurement of progress.



# PORT PHILLIP AND WESTERNPORT CATCHMENT



## Context

The Port Phillip and Westernport catchment is located in south central Victoria and includes the urban centre of Melbourne. Major pressures on water resources include climate change and variability and urban expansion. A key focus of water planning in this catchment is securing Melbourne's urban water supply in the face of the recent drought and continuing peri-urban expansion. This catchment is the most complex in terms of active water planning in Victoria, with 12 declared water supply protection areas and 48 bulk entitlements held between various water corporations including Melbourne Water, which is also the Catchment Management Authority. Sub-catchments are the Werribee, Maribyrnong, Yarra, Dandenong and Westernport. The Yarra sub-catchment is the only area in Victoria with implemented streamflow management plans. Responsibilities for water planning and implementation are split between the Department for Sustainability and Environment, Melbourne Water, and to some extent Westernport Water, Western Water, Southern Rural Water Corporation and the Port Phillip and Westernport Catchment Management Authority.

## Findings

1. Is there a plan in place?	To some extent	The catchment is in the Central Region SWS (the SWS). Other relevant planning instruments include the Port Phillip and Westernport RRHS and Koo Wee Rup GMP. The six SFMPs in the Yarra sub-catchment are the only finalised SFMPs in the State. There are also two draft SFMPs. There are three WSPAs without plans in place. The 48 BEs include an EE for the Yarra River and one proposed on the Werribee River.
2. Does the plan include key assessments?	Yes	The SWS and RRHS contain key hydrological, environmental, and socioeconomic assessments. SFMPs contain hydrological models and assessments of land-use and environmental water requirements. The Yarra EE is supported by environmental flow studies.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The SWS identifies WSPA-declared systems in the catchment as overused. SFMPs in the Yarra sub-catchment attempt to address overuse through restriction management and market mechanisms. Deutgam WSPA was identified as potentially overused but no management plan is in place. There is no clear trade-off process evident to set levels of extraction in planning instruments.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Principles of the SWS are not clearly linked to actions or monitoring aspects. The RRHS identifies measurable river health objectives, risk-based management actions and resource condition targets. SFMPs contain reach-specific environmental objectives and environmental flow studies identify the water required to meet objectives.
5. Does the plan facilitate trade?	To some extent	Trade is established and facilitated in the catchment through the SWS and BEs. Localised trade restrictions are outlined in SFMPs to maintain the extraction limit. Under the Act, permanent trade is prohibited in the three WSPAs without an approved management plan.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The SWS identifies stock and domestic and land-use change through forestry and bushfires but does not identify thresholds for management. Farm dam impacts were considered in SFMPs, however other interception activities were not identified.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	The SWS identifies connected systems, such as the Yarra, but has only suggested the creation of additional plans in stressed systems and increased monitoring. Surface water and groundwater resources are not managed in an integrated way through plans. Connectivity is not accounted for in SFMPs, even though there are connected systems.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The SWS identifies environmental water required by the larger systems, however the full provision of this water has not yet occurred through the amendment of BEs. These flows will be provided through water savings and buybacks, as occurred through the Stream Flow Tender process in three Yarra SFMPs. Timeframes for returning water to the regulated systems are not clear. There is an EE for the Yarra River, and minimum passing flows are stipulated in the Maribyrnong and Werribee BEs. Rights of these systems were qualified from 2007–2010 in order to increase supplies for Melbourne.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Progress against SWS actions is reported in DSE's annual report. Monitoring of the RRHS occurs through existing monitoring programs of the CMA and will be used to inform the five-year review and the 2019 long-term resource assessment. Streamflow monitoring and compliance are the main focus of the annual reports for SFMPs. There are clearer links between monitoring programs for SFMPs and the RRHS than in other catchments.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The SWS provides long-term climate change scenarios and potential threats to water availability to 2055. Seasonal variability is considered in SFMPs.
11. Is stakeholder engagement in the planning process adequate?	Yes	Formal stakeholder engagement occurred during development of the SWS and RRHS. The SFMPs and GMPs were drafted by consultative committees and public submissions were responded to and made publicly available during plan development.
12. Have identified outcomes been achieved during the reporting period?	To some extent	SWS annual reviews are limited to water recovery volumes and any restrictions put in place in the previous year. Outcomes of the SFMPs are related to streamflow gauging and restrictions, which are reported against annually but do not state progress towards outcomes. Outcomes of the Yarra River EE have not been met due to the qualification of rights.

# WEST GIPPSLAND CATCHMENT



## Context

The West Gippsland catchment is located in south-eastern Victoria and includes the major rivers Thomson, Macalister, Latrobe and Avon, which drain to Gippsland Lakes, a Ramsar-listed site. The regulated Thomson, Macalister and Latrobe rivers are identified as stressed systems and considered to be fully allocated. Major pressures on water resources include climate change and variability, large industry and population growth. Industries in the region include brown coal in the Latrobe Valley, the Macalister Irrigation District and offshore oil and gas extraction. Rivers in the Gippsland region are generally in better condition than elsewhere in Victoria. Responsibilities for water planning and implementation are split between the Department for Sustainability and Environment, Southern Rural Water Corporation, Gippsland Water Corporation and the West Gippsland Catchment Management Authority.



## Findings

1. Is there a plan in place?	To some extent	The catchment is in the Draft Gippsland Region SWS (the SWS). Other relevant planning instruments include the West Gippsland RRHS, Yarram GMP and 34 BEs, including three EEs. The Sale WSPA had a GMP prepared in 2003 but was refused on the grounds that it failed to deal with overallocation. No information is available on the current status of the Sale or Denison WSPAs.
2. Does the plan include key assessments?	Yes	The SWS and RRHS contain hydrological, environmental, and socioeconomic assessments. Although noted as an issue, assessments of the extent of interaction and impacts from the offshore oil and gas extraction on the Yarram WSPA were not included in the GMP.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	There are no areas of overuse identified in surface water systems. The Thomson, Macalister and Latrobe rivers are considered fully or close to fully allocated. A number of measures are in place to cap diversions and limit extraction. Overuse attributed to offshore oil and gas extractions is leading to ongoing declines in groundwater levels in the Yarram WSPA. Oil and gas extractions are not managed under planning instruments. In the Thomson River, 10 GL of the recommended 47 GL to meet all environmental objectives has been committed to date and there are clear trade-offs with socioeconomic values.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The SWS links proposed actions to the principles, although actions are yet to be finalised. The RRHS identifies measurable river health objectives, risk-based management actions and resource condition targets. Objectives and actions of the GMPs and BEs reflect their specific purpose.
5. Does the plan facilitate trade?	To some extent	Trade is facilitated through the GMP and BEs, and the SWS refers to the trading framework. The Act prohibits permanent trade in the three WSPAs without an approved plan. Trade occurs in the more developed parts of the catchment, such as in the Macalister Irrigation District and Latrobe system.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The SWS identifies stock and domestic use, mining and land-use change as intercepting activities. Options are proposed to deal with these activities but management thresholds are not identified. The Yarram GMP acknowledges the impact from offshore oil and gas extractions but does not include measures to manage the activity.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	The SWS considers connectivity of surface water and groundwater systems and identifies highly connected areas. It also proposes where integrated management plans may need to be developed.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The SWS outlines proposals for environmental watering arrangements and identifies a mix of entitlement and rules-based measures. The EWR was established taking into account existing consumptive entitlements. Rights of the Thomson River EE were qualified from 2007–2009 to bolster urban water supplies for Melbourne.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Reporting on progress in development of the SWS occurs in DSE annual reports. Monitoring for the RRHS will inform a long-term resource assessment in 2019. Monitoring of water use and compliance with passing flow obligations and PCVs are being reported in various formats for BEs and GMPs. Alignment of monitoring results and objectives of the planning instruments is not clear.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	Climate change scenarios and implications for water users are explored in the SWS and are expected to form a significant part of the final strategy. Climate change and variability are not considered in detail in the other planning instruments.
11. Is stakeholder engagement in the planning process adequate?	Yes	Formal stakeholder engagement is ongoing for the SWS and was undertaken for the RRHS. The engagement process for GMPs is not well documented, however the legislation outlines requirements for stakeholder engagement.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The draft status of the SWS does not allow for measurement of progress. Annual reports by the CMA and water corporations and the Victorian Water Accounts provide information on allocations and water use, which show progress against the objectives of the GMP and BEs. The outcomes of the Thomson River EE have not been met due to the qualification of rights.



# WIMMERA CATCHMENT



## Context



## Findings

1. Is there a plan in place?	To some extent	The catchment is in the Draft Western Region SWS (the SWS). Other relevant planning instruments include the Wimmera Waterway Health Strategy which differs from other RRHSs, and five BEs, including an EE for the Wimmera River shared with the Glenelg. The Draft West Wimmera Groundwater Management Strategy (GMS) will cover the management of four WSPAs in the region, with only the Neuarpur WSPA having an implemented GMP.
2. Does the plan include key assessments?	To some extent	The SWS contains key assessments and future water availability projections. Environmental assessments in the RRHS lacked detail. The GMS contains key assessments but levels of connectivity are not well defined. The AWP for the EE reference environmental water requirement studies.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	There are no areas of overuse identified in planning instruments. Groundwater levels are declining in some areas, but there are limited measures in place to address the declines, with the exception of a 20-year timeline to stabilise water levels in the Neuarpur WSPA. The GMS has proposed the revoking of the WSPAs. There is no clear trade-off process evident to set levels of extraction in planning instruments.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Proposed actions in the SWS are linked to the principles, although actions are yet to be finalised. The RRHS does not identify site-specific outcomes, only broad visions. The GMS does not link the outcomes to management provisions. Outcomes for the EE are included in the EOS and reviewed in AWP.
5. Does the plan facilitate trade?	To some extent	Trade is facilitated through the GMP and BEs, and the SWS refers to the trading framework. Barriers to trade are implemented to maintain extraction under the SDL cap, which results in only localised trade opportunities. Within the GMS, trade is restricted to within the same aquifer and cannot occur between zones. The Act prohibits permanent trade in the WSPAs without an approved plan.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The SWS and GMS identify stock and domestic use and forestry as relevant intercepting activities but only quantify stock and domestic use and do not identify thresholds for management. No risk assessment of intercepting activities is evident.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	No	Areas of connectivity are identified in the SWS and GMS. There are no identified integrated surface water and groundwater management provisions in the catchment. The GMS acknowledges the impact of the connected WSPAs on each other and aims for integrated management of the groundwater systems.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The SWS identifies potential savings and infrastructure to increase the EWR. An EE is provided for the Wimmera River and shared with the Glenelg River. The consumptive BE includes provisions for wetland and recreational water. Provision of environmental water to groundwater systems through the GMS is not evident.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The SWS does not indicate how outcomes will be monitored for progress. Arrangements to measure progress towards outcomes are aligned for the EE through the EOS and AWP. Monitoring and compliance with the GMS are currently not included but are expected in the implementation plan. Compliance metering and reporting is undertaken for BEs.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The SWS has quantified the impacts of climate change on the reliability of supply for the next 50 years. Adaptive management of groundwater and the EE is required to allow for climate variability, particularly given the range of climate scenario models available for use.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Formal stakeholder engagement is ongoing for the SWS and GMS. The GMS was drafted by a consultative committee. The engagement process undertaken during development of the RRHS has not been documented.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	It is too soon to assess the progress towards outcomes of the SWS and GMS. The Neuarpur WSPA annual report demonstrates declining groundwater levels despite a reduction in the PCV over the life of the plan. The outcomes of the Wimmera River EE have not been met due to the qualification of rights.





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## 5. Queensland



# QUEENSLAND



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## The context of water planning in Queensland



Water planning in Queensland manages the allocation and use of water across the diversity of water systems in the State. It aims to provide efficient and transparent allocation of water to meet community needs and provide for the economic development of Queensland in a manner that protects natural ecosystems and other resources from degradation.

Queensland accounts for approximately 20 per cent of Australia’s water use. Almost two-thirds of water consumption in Queensland is sourced from surface water. Surface water resources in Queensland range from those contained in highly developed systems, such as those in the south-east of the State and the upper reaches of the Murray–Darling Basin, through systems with lower levels of development to river systems in a near-natural state such as those on Cape York. Groundwater resources range from localised aquifers to the Great Artesian Basin (GAB) which underlies approximately 70 per cent of Queensland.

Queensland faces a number of water planning challenges to ensure that water is used efficiently and that competing needs for water are balanced in an open and transparent way. Rapid population growth, particularly in the south-east, is creating increasing demand for urban water supplies. Highly variable rainfall across most of the State has an impact on water availability which will intensify according to current climate change projections. Providing water for Indigenous economic and social benefit as well as for cultural flows provides another driver for water planning. Recent levels of activity in coal seam gas exploration and extraction create additional challenges to the sustainability of significant groundwater resources.



# Planning arrangements



## Key legislation and policies

The Queensland *Water Act 2000* (the Act) provides the legislative and institutional framework for water planning and water entitlements for all naturally occurring freshwater resources in the State. Under the Water Act, all rights to use water are vested in the State. The Act specifies the conditions under which a water entitlement is required for the taking of water and provides for the creation of water resource plans (WRPs) and resource operations plans (ROPs) to allocate and manage water. A number of areas of the State where the river systems are in a near-natural state have been declared as 'wild river areas'. In these areas, the wild river declaration provides for the allocation and management of water.

Under the Act the take of surface water from a watercourse, lake or spring requires a water entitlement except for prescribed minor uses such as for stock and domestic purposes. The take of groundwater or overland flow water requires an entitlement only if specified by a water resource plan, a wild river declaration, a moratorium or (for groundwater only) an area declared under the Water Regulation 2002.

The Water Act also specifies the process for the development of the water resource plans and resource operations plans including the requirements for resource assessments, the need to consider future requirements and the need to undertake community consultation.

Proposed amendments to the Water Act are intended to streamline the process to develop and finalise water resource plans and resource operations plans. The changes will allow for the simultaneous development of water resource plans and resource operations plans, and so address the issue of resource operations plans often lagging water resource plans by several years. The amendments will also remove the requirement to undertake a new set of resource assessments to inform water resource plan development and allow greater ministerial discretion in the undertaking of community consultation in cases where the new plan is replacing an existing one without significant change.

The Queensland Water Plan seeks to facilitate sustainable growth at a regional level, and outlines Queensland's strategies to meet future water needs for consumption and the environment. The state-wide plan is complemented by regional development plans and regional water supply strategies (RWSSs). The state and regional plans are direction-setting statements that guide development over an extended period. The regional water supply strategies are intended to balance water demand and supply requirements over a timeframe of 50 years and include considerations of water infrastructure such as grids and storages. In this way they provide the context for the development of water resource plans.

## Water resource plans, resource operations plans and wild river declarations

Water resource plans are subordinate legislation under the Water Act. They are prepared for an area once the Minister has declared his or her intention to manage a water resource. They are usually prepared at a river catchment scale, although some plans include multiple catchments, and specify the outcomes and strategies that will be used for each plan area. Water resource plans can be amended or renewed at any time if the Minister believes the outcomes are at risk of not being met or if new uses emerge. As subordinate legislation they expire after 10 years unless they have been formally extended. Prior to expiry, water resource plans are reviewed and replaced with a new plan. In cases where particular sensitivities exist, or where for other reasons there is a need to review the plans earlier, plans may contain provisions for a review after a lesser period.

Resource operations plans implement water resource plans by setting the day-to-day arrangements for water management. Resource operations plans include operating rules for water releases from dams, water sharing, environmental flow arrangements and water trading.

Wild river declarations are natural resource management plans in areas of high conservation value that also specify the quantity of water available for consumptive use and may specify the means through which it will be allocated.





Table 3: Planning instruments

Assessment criteria	State	Regional	Catchment	Comment
	Water Act Wild Rivers Act	RWSS RDP	WRP ROP WRD EFAP	
1. Status of plan				WRPs are subordinate legislation under the Water Act. ROPs are statutory instruments under the Water Act. Wild river declarations are statutory instruments under the Wild Rivers Act.
2. Key assessments				The Water Act specifies the requirement for key assessments. The assessments are undertaken at the plan/declaration area level.
3. Overuse status & pathways to sustainable water extraction				Sustainable extraction limits and environmental flow objectives are specified in each WRP. The rules to achieve these objectives are contained in the ROP. Wild river declarations set extraction limits in wild river areas.
4. Clearly identified & measurable outcomes				The Water Act requires each WRP to include outcomes for the sustainable management of water in the plan area. The WRPs specify the outcomes for the plan area. The Wild Rivers Act requires each wild river declaration to specify the natural values it is intended to preserve. Wild river declarations specify the natural values to be preserved in a wild river area.
5. Facilitation of trade				The Water Act allows WRPs to convert identified water entitlements to tradeable water allocations. ROPs implement the conversion of specific entitlements into allocations and provide the trading rules.
6. Integration of water intercepting activities				WRPs specify which activities are to be regulated. ROPs define the operating rules. Wild river declarations do both in wild river areas.
7. Surface water/ groundwater connectivity				WRPs define the water resources to be managed by the plan. ROPs define the operating rules. Wild river declarations do both in wild river areas.
8. Environmental water management arrangements				Environmental water management requirements are included in the WRP in the form of environmental flow objectives and in some cases the assets to be protected. The rules for meeting these objectives are detailed in ROPs. Wild river declarations protect natural flows in wild river areas.
9. Monitoring, compliance & enforcement provisions				The Water Act requires public reporting of monitoring for WRPs. The Wild Rivers Act requires reporting of monitoring for wild river declarations. The Environmental Flows Assessment Program (EFAP) is a state-wide program which provides environmental assessments at a catchment and local level. The Water Act provides compliance provisions.
10. Planning for climate change & extremes in inflows or recharge				Regional strategies (where they exist) establish longer term planning arrangements and include a consideration of climate change. WRPs contain strategies and ROPs specify the rules to manage variability of rainfall and runoff patterns. They may also take account of climate change.
11. Stakeholder engagement				The Water Act specifies requirements for public consultation for WRPs and ROPs. The Wild Rivers Act specifies these requirements for wild river declarations. The consultations are undertaken at the proposed plan/declaration area level.
12. Extent to which outcomes have been achieved				The Water Act specifies the requirement to report against WRP outcomes. WRPs and ROPs include more detailed arrangements for reporting, including a timeframe. The Wild Rivers Act specifies the requirement to report on wild river declarations monitoring.



## Key findings



### Water planning is comprehensive, mature and transparent

Queensland has a comprehensive and mature legislative water planning framework with nearly all major water resources in the State covered by a water resource plan or a wild river declaration. Water planning is usually undertaken at a river catchment scale, with the progressive inclusion of groundwater management areas in water resource plans improving conjunctive management to deliver water resource outcomes. Water plan development is informed by hydrological, economic, social and environmental assessments. Transparency is provided through a thorough community consultation process that invites community input at key stages of the water planning process and provides public feedback on the issues raised and how they were dealt with in the final water resource plan or resource operations plan. Proposed changes to the process for review of plans will need to be used judiciously to ensure planning arrangements remain well informed and supported by community input.

### There are risks to groundwater resources from rights to water for coal seam gas extraction

Tenure holders under the *Petroleum and Gas (Production and Safety) Act 2004* are provided with 'underground water rights' outside of the Water Act and its water planning process. These rights are not volumetrically controlled and the provision of water rights outside of the Water Act has the potential to impede effective and sustainable management of the water resource as a whole and may impact on water security for other licensed users or the environment.

The Water Act has recently been amended to enable conditions to be placed on these water rights. These conditions include the requirement to minimise adverse impacts on the environment and other authorised users and the need to prepare an underground water impact report containing predictions of impacts over a threshold level for a three-year period. 'Make good' provisions also may apply where impacts occur.

### Limited ongoing reporting against plan outcomes impacts on adaptive management

Public reporting on progress towards the achievement of water resource plan outcomes is not extensive and has been included in only a few cases, usually without supporting evidence. In some water resource plan areas annual reports have stated that outcomes will not be assessed until their 10-year review. In other cases outcome reporting has been limited to stating what strategies have been implemented, with no assessment as to whether the strategies have been effective. Limited reporting to date from the Environmental Flows Assessment Program (EFAP) has also shed little light on progress towards the achievement of water resource plan ecological outcomes. While the first two draft second generation plans have benefited from comprehensive assessments, proposed changes to the Water Act may remove the requirement for new assessments to inform second generation plans, which would increase the need for progressive reporting against plan outcomes to support adaptive management and the revision of water resource plans.



## Findings against criteria

1. Status of water planning	At the time of assessment there were 22 water resource plans and 19 resource operations plans in place. Ten wild river declarations have also been proclaimed. Four water resource plans are in the process of being replaced with a new plan. In all four cases the original plan has been extended beyond the original 10 years. Queensland has declared an intention to develop one further water resource plan and has proposed two further wild river declarations. Areas without plans are limited in extent and consist mostly of small coastal catchments with little consumptive use.
2. Do plans include key assessments?	A comprehensive set of key assessments has been undertaken to inform water resource plan and wild river declaration development. These documents are available on the Department of Environment and Resource Management (DERM) website during the consultation phase but are usually removed from the website following the finalisation of each plan or declaration. After this point access is more difficult, although most are available on request from the department. As the final plans contain the water sharing rules but not an explanation of the basis of the rules or their development, the more limited access to these reports following plan finalisation is detrimental to the understanding of the basis for the planning rules and hence the transparency of the plans.
3. Do plans address overuse and is there a pathway to sustainable extraction?	Queensland has not identified overuse of any surface water resources, however it is intending to reduce allocations in a small number of plan areas, particularly in the Murray–Darling Basin. Sustainable extraction limits and environmental flow objectives have been set for each plan area. The basis for the setting of the environmental flows and the environmental assets they are designed to protect is not explained in the plan but is outlined to varying degrees of detail in supporting documents. Overuse of a limited number of groundwater systems has been identified and in these cases a pathway to return the resource to a sustainable extraction within a defined time period has been identified and is in the process of being implemented within a specified timeframe.
4. Do plans include clearly identified and measurable outcomes?	Water resource plans generally contain clearly specified outcomes, with newer plans including greater clarity around environmental outcomes. While performance indicators are included in many plans, they form part of the plan specification rather than a means of measuring progress towards achieving plan outcomes. As a result, there are no interim measures to enable assessment and reporting of progress towards outcome realisation. Outcomes are specified in a more general way in wild river declarations.
5. Do plans facilitate trade?	Trade has been facilitated in all major supplemented water supply schemes and for the majority of unsupplemented surface water entitlements by volume. The creation of fully tradeable groundwater allocations has lagged behind that for surface water and is being introduced on a priority basis. Trading has not been facilitated in areas where the level of demand is low, including wild river areas.
6. Is interception appropriately considered and integrated into plans?	<p>Interception has been integrated into water resource plans where it has been identified as a risk to the resource. In some cases the water resource plans commit to ongoing monitoring of interception risks with a commitment to report on these risks within a specified timeframe. However, in many water resource plan areas there was a lack of publicly available reporting to indicate that comprehensive risk assessments had been undertaken.</p> <p>Water resource plans regulate the interception of overland flows in areas where this has been identified as a risk to the water resource with storages generally greater than a threshold volume requiring a water licence and a development permit for the construction of the works. Estimates of water consumed for stock and domestic purposes are also allowed for in water allocation decisions. Water for mining operations generally requires a licence, however water to support coal seam gas operations is licensed under the Gas and Petroleum Act rather than the Water Act. Although these rights may contain restrictions intended to minimise adverse impacts, they are not volumetrically controlled and may impact on water security for other licensed users or the environment.</p>

- |  |   |
|--|---|
| 7. Do the plans address surface water and groundwater connectivity as appropriate?                       | A number of important groundwater resources remain managed through separate arrangements under the Water Regulation, meaning their management has not been integrated with connected surface water resources. However, Queensland is progressively incorporating consideration of surface water/groundwater connectivity and the development of conjunctive management arrangements into water plans. Wild river declarations provide for conjunctive management of declared rivers and underlying aquifers.  |
| 8. Do plans contain accountable environmental water management arrangements?                             | Water resource plans use a rules-based approach to providing water for the environment through the setting of sustainable extraction limits and environmental flow objectives specified as a proportion of pre-development flows rather than a volumetric specification of environmental water. Specification of the environmental assets or processes to be protected is increasing with newer plans, but is absent in a number of older plans. Wild river declarations specify the natural values to be preserved.  |
| 9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place? | Monitoring provisions are included in plans and links to outcomes are either specified or can be inferred. State-wide strategies for environmental monitoring and assessment are being implemented progressively but these have had limited impact on water planning or assessment of plan outcome realisation to date. Compliance provisions are included in the Water Act. Limited reporting of compliance activities is included in water resource plan annual reports.  |
| 10. Do the plans deal appropriately with climate change and extremes in inflows or recharge?             | Climate change is considered in regional strategies where they have been developed. Existing water resource plans are based on hydrological modelling using long-term hydrological data but generally not extremes beyond the historical record. Water plans include arrangements to manage variability of inflows through annual allocation decisions and contain critical water sharing arrangements where necessary. Modelled effects of climate change have informed the development of draft replacement water resource plans for Cooper Creek and Fitzroy Basin.  |
| 11. Is stakeholder engagement in the planning process adequate?  | Stakeholder engagement processes are outlined in the Water Act for water resource plans/resource operations plans and the Wild Rivers Act for wild river declarations. These processes include the identification of stakeholders and steps to involve stakeholders at key stages of the water planning process. A consultation report, prepared once a water resource plan, resource operations plan or wild river declaration has been finalised, provides public feedback on the issues raised and decisions taken. Consultation reports are retained on the Department of Environment and Resource Management website for a limited period and then removed. While they are available on request from the department, retention on the website for the life of the water resource plan would improve the transparency of the process. |
| 12. Have identified outcomes been achieved during the reporting period?                                  | Reporting against water resource plan outcomes occurs through annual reports. These reports provide a snapshot of the year passed including flow statistics, water use and trading activity but include only very limited information against plan outcomes. Where information has been provided it indicates that progress is being made towards the achievement of plan outcomes in most cases. For some plan areas, an assessment was not able to be made due to inadequate reporting. Most outcomes were reported as being achieved for the two water resource plans where assessments are available as part of the preparation of draft replacement plans. Reporting for wild river declarations is by way of five-yearly reports. No reporting is due to date for wild river declarations.  |



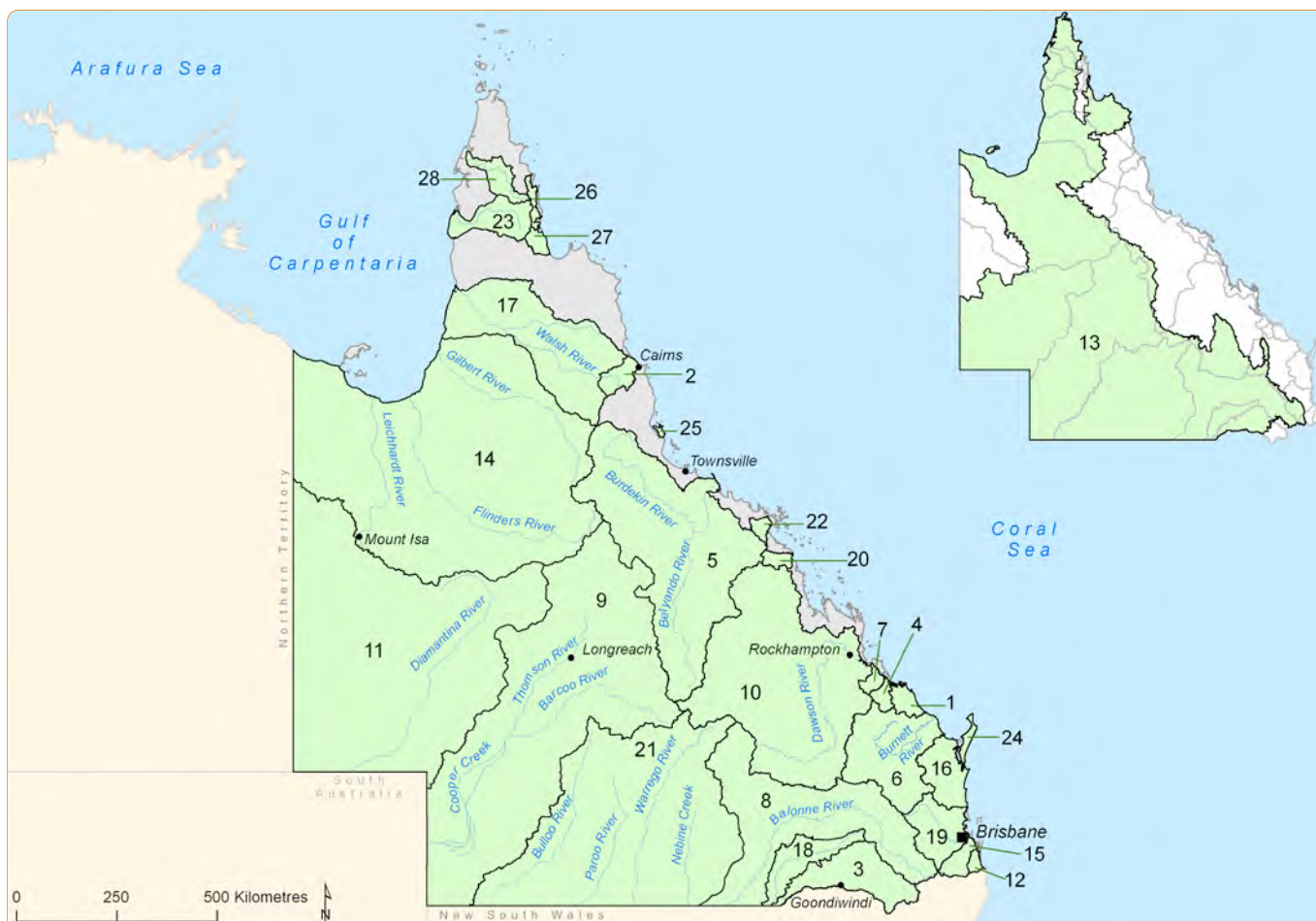


## Glossary and abbreviations

Term	Acronym	Definition
Department of Environment and Resource Management	DERM	Queensland government agency with lead role in water planning.
Environmental Flows Assessment Program	EFAP	State-wide program to identify flow-dependent ecological assets and assess the effectiveness of the water resource plans and resource operations plans in achieving ecological outcomes.
Great Artesian Basin	GAB	A multilayered system of pressurised aquifers underlying significant parts of Queensland, New South Wales, South Australia and the Northern Territory.
Groundwater-dependent ecosystem	GDE	Ecosystems that are dependent on groundwater for their existence and health.
Regional development plan	RDP	Regional strategy in place or under development to provide a development framework at the regional level, including a framework for natural resource management.
Regional water supply strategy	RWSS	Regional strategy in place or under development to balance water supply and demand pressures over a 50 year horizon.
Resource operations plan	ROP	Document enabled by the <i>Water Act 2000</i> to provide the operational rules to implement water resource plans.
Supplemented		Water supply from releases of water stored in infrastructure. Equivalent to a regulated water supply (NWI).
Unsupplemented		Water supply not involving releases of water stored in infrastructure. Equivalent to an unregulated water supply (NWI).
Water resource plan	WRP	Subordinate legislation under the Water Act which provides the water planning outcomes and strategies for the area covered by the plan including the quantity of water available for consumptive use.
Wild river area		An area covered by a wild river declaration.
Wild river declaration	WRD	Declaration under the Wild Rivers Act to preserve the natural values of the river system(s) included in the declaration in part through the specification of the quantity of water available for consumptive use.

# Planning areas

## Queensland



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### Location

QLD



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# BAFFLE CREEK BASIN



## WATER RESOURCE PLAN 2010



### Context

The Baffle Creek Basin is located on the central Queensland coast, with waters discharging into the Coral Sea north of Bundaberg. The plan area is one of the few remaining unregulated catchments in the region, and contains extensive protected areas and nationally important wetlands. Mean annual rainfall is approximately 1000 mm, with most falling between December and March.

The area has experienced significant population growth in recent years, particularly in the coastal resort towns of Agnes Water and Seventeen Seventy, and has a comparatively narrow economic base, with about two-thirds of registered businesses belonging to the agricultural and fisheries sector. The main commercial water resource consumption is for irrigated fodder production, horticultural enterprises and sugar cane.

There are relatively low levels of water use in the plan area, however demand for water resources may increase with potential expansion of horticulture. The plan was developed to support sustainable growth while protecting water-reliant ecosystems. The plan manages unsupplemented water extractions and take of overland flow water.

## Findings

1. Is there a plan in place?	To some extent	A WRP was finalised in 2010 and a consultation draft ROP was released in June 2011.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the plan. Risks to key environmental assets were clearly documented and assessed, but other risks were not explicitly identified or assessed. There was no modelling of groundwater and surface water interactions but the plan stated that groundwater availability and extraction in the area is minimal.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It establishes an extraction limit and includes pass flow conditions on water licences to protect low flows. The trade-off decisions are explicit.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly identified outcomes and strategies intended to achieve these outcomes. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	No	The plan does not enable trade. The current level of entitlement is low in most catchments and the WRP specifies unallocated water reserves to meet future demands. The plan also requires all licences to include volumetric limits. However, the reliance on unallocated water to meet future demand is not consistent with the NWI outcomes of promoting water use efficiency or facilitating water going to the highest value use.
6. Is interception appropriately considered and integrated into the plan?	To some extent	Interception of overland flow is integrated into the plan. It is unclear whether other forms of interception have been considered, especially stock and domestic use, despite the plan's identification of population growth in the area.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	The plan does not address groundwater and surface water connectivity, but the plan stated that groundwater availability and extraction in the area was not considered to be significant.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains specific environmental objectives and accountable environmental watering arrangements such as pass flow conditions on water licences.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan has appropriate monitoring arrangements in place but there is no reporting of monitoring required until the ROP is finalised. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions but does contain strategies such as flow conditions on licences to protect the low flow regime. The Central Queensland RWSS considers the impacts of longer term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	Engagement included the consideration of stakeholder and public input during development of both the WRP and ROP. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan has appropriate arrangements to report on achievement of outcomes, however the WRP is not in effect until the ROP is finalised.



# BARRON



## WATER RESOURCE PLAN 2002



### Context

The Barron Water Resource Plan is centred on the Atherton Tableland in Far North Queensland. It includes the catchment of the Barron River which flows into the Coral Sea near Cairns and the upper reaches of the Walsh River which flows west and joins the Mitchell River flowing into the Gulf of Carpentaria. The water resource plan also includes the groundwater resources of the Atherton Subartesian Area and the Cairns Northern Beaches Subartesian Area. Rainfall is predominantly seasonal with approximately 80 per cent of rainfall falling between December and March.

The Mareeba Dimbulah Water Supply Scheme supplied from Tinaroo Falls Dam is the major water resource development in the plan area and involves interbasin transfers between the Barron and Walsh rivers. Other important storages in the plan area are the Copperlode Dam and the Kuranda Weir.

Consumptive water use is dominated by irrigated agriculture, urban supply for Cairns and hydro-electricity generation. Water for a growing urban population in Cairns as well as recognition of the need to maintain river health are the major water planning challenges.

## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2002 and the ROP in 2005. The WRP was amended in 2009 to extend the conversion of area-based to volumetric licences and tradeable allocations. Amendments to the ROP to accommodate the amended WRP are currently at the consultation draft stage.
2. Does the plan include key assessments?	Yes	A comprehensive set of key assessments were undertaken to inform the plan development. The outcomes of the key assessments and consultations are explicitly linked to the plan objectives.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. The plan does establish an extraction limit. Rules to protect low flows, waterholes and lakes have also been included to prevent seasonal stress and areas of high cultural and ecological value. Clear trade-offs have been made in fully allocated areas to ensure the pre-plan resource and ecosystem condition is maintained. Closer monitoring is proposed for highly developed areas.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly identified outcomes and strategies intended to achieve these outcomes. Risk assessments have been undertaken to guide strategies. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	To some extent	The original Barron WRP established trading for supplemented resources and the amended plan extends trading to some but not all unsupplemented resources. The increased trading areas will take effect once the amended ROP is in place. Trading of groundwater licences in the Atherton Subartesian Area has also been proposed under the draft ROP amendment.
6. Is interception appropriately considered and integrated into the plan?	To some extent	Overland flow was considered to be a low risk and so not requiring management. No other interception activities were identified. No demand assessment was found for stock and domestic take of groundwater.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	The plan does not explicitly identify areas of connectivity, however the plan places restrictions on surface water and groundwater extractions in the Atherton Subartesian Area to manage possible impacts on groundwater and surface water flows respectively.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains environmental flow objectives and other strategies, including water release rules for Tinaroo Falls Dam, to protect minimum flows during the dry season.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Monitoring is reported each year in the water resource plan annual reports. Reporting for the 2009–10 year was quite extensive and demonstrated that monitoring of flows, compliance and water security objectives had been undertaken. It is not apparent that monitoring against ecological outcomes for particular parts of the plan area has been undertaken. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions. Short-term extremes and climate variability are dealt with through water allocation decisions and critical water supply arrangements. The Far North Queensland RWSS considers the impacts of longer term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP involved extensive engagement with a wide cross section of the community at key stages of plan development and amendment. This process included the formation and active involvement of an Indigenous working group. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	To some extent	The WRP 2009–10 annual report indicates progress is being made against most outcomes but provides no supporting evidence that rules included in the ROP have been effective. The report does not provide an indication of progress towards meeting ecological outcomes for particular sub-catchments such as Flagg Creek.

# BORDER RIVERS



## WATER RESOURCE PLAN 2003



### Context

The Border Rivers catchment is situated in southern Queensland and northern New South Wales and lies within the northern Murray–Darling Basin. Its main watercourses, the Dumaresq, Macintyre and Barwon rivers form part of the state border between Queensland and New South Wales. The area is covered by an intergovernmental agreement between the New South Wales and Queensland governments as well as the Murray–Darling Basin cap on extractions.

The plan manages the Queensland portion of the Border Rivers catchment. It includes management of supplemented supply, unsupplemented supply and overland flow harvesting. Water infrastructure in the plan area is dominated by private infrastructure to support opportunity-based water harvesting entitlements and also includes the Macintyre Brook and Border Rivers water supply schemes.

The region supports a wide variety of irrigated and dryland agricultural industries, such as intensive fruit and vegetable production, broadacre cropping and cotton. The lagoon wetland systems in the Boggabilla area are of special significance to local Indigenous communities.

## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2003 and the ROP was finalised in 2008. The WRP was amended in 2007 to support interstate trading with NSW. The Border Rivers intergovernmental agreement with NSW was most recently amended in 2008.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the plan development, however environmental assets were not explicitly identified, and there was no evidence of an assessment and mitigation of risks.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify any areas of overuse. The plan establishes an extraction limit, however there is no clear identification of environmental assets or trade-off decisions.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly identified outcomes and strategies intended to achieve these outcomes. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade and explains the reasons behind barriers to trade in the plan, such as the trading zones and volumetric limits, are to ensure that environmental and third-party impacts of trade are minimised and that the outcomes of the plan are met.
6. Is interception appropriately considered and integrated into the plan?	Yes	The take of overland flow is regulated and managed under an authorisation in accordance with the requirements of the plan. Other forms of interception were not identified to be significant in this catchment.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan does not manage groundwater. However, the plan recognises connectivity between groundwater and surface water and considers that groundwater extractions at the time of plan development were not a significant risk to achieving the outcomes of the plan.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains broad environmental objectives and accountable environmental watering arrangements, however specific environmental assets and their water needs have not been clearly identified. Water has been gifted to the Commonwealth Environmental Water Holder.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Monitoring is being undertaken and reported regularly in WRP annual reports, however reported assessments lack evidence of progress towards some plan outcomes. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions. Short-term extremes and climate variability are dealt with through water allocation decisions and critical water supply arrangements.
11. Is stakeholder engagement in the planning process adequate?	Yes	Engagement included the consideration of stakeholder and public input during development of the plan. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	To some extent	The WRP 2009–10 annual report indicates progress is being made against most outcomes but provides no supporting evidence for some of these. The report does not provide an indication of progress towards achieving many ecological outcomes.



# BOYNE RIVER BASIN



## WATER RESOURCE PLAN 2000



### Context

The Boyne River flows into Port Curtis south of Gladstone and is connected to the sea by an extensive estuary. Rainfall in the catchment is predominantly seasonal with approximately 60 per cent of rainfall falling between December and March.

Awoonga Dam is the major storage on the Boyne River and is used to supply water to Gladstone for urban and industrial uses. The Boyne Water Resource Plan manages both supplemented and unsupplemented supplies. The water resource plan aims to ensure a secure water supply for Gladstone and the Gladstone State Development Area, one of the most important industrial development areas in Australia.

Consumptive water use is dominated by urban and industrial water for Gladstone, supplied from the Awoonga Dam. Water is also used for small-scale irrigation both above and below Awoonga Dam.

## Findings

1. Is there a plan in place?	Yes	The Boyne WRP has been in place since 2000 with the ROP in effect since 2003. The Boyne WRP had an expiry date of September 2011 which has been extended to September 2012 to allow for the development of the replacement plan.
2. Does the plan include key assessments?	Yes	Key assessments with regards the costs and benefits of increasing the capacity of the Awoonga Dam were undertaken in preparation for the existing plan. DERM has advised that key assessments are being undertaken in preparation for the development of the replacement plan. These are not yet publically available.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It aims to prevent overuse by limiting future extractions based on water levels in the Awoonga Dam. Licences in the plan area have been converted to include volumetric limits and meters have been installed. The plan maintains environmental conditions downstream from the dam through environmental releases when the dam level exceeds 30 m Australian Height Datum.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The WRP contains clearly specified outcomes and strategies in relation to water security and environmental flows. The ROP contains a detailed specification of the monitoring required to be undertaken by the resource operations licence holders of Awoonga Dam. However, monitoring arrangements lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	No	There is limited demand for trading as most water in the catchment is used for urban and industrial use sourced from Awoonga Dam. The plan includes a small number of unsupplemented licences both upstream and downstream of Awoonga Dam. The WRP does not facilitate trade for these entitlements.
6. Is interception appropriately considered and integrated into the plan?	Unable to assess	Interception activities are not managed by the plan. It is unclear whether an assessment was undertaken as to the risk of interception to the water resource.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	No	The plan manages surface water only. Connectivity is not discussed, however given the lack of a declared groundwater resource in the area it is unlikely there is significant use of groundwater.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains accountable environmental watering arrangements which apply when the water level in the dam is above 30 m Australian Height Datum. Planning documents acknowledge that the arrangements to increase allocations from the Awoonga Dam incur a level of risk that the plan will result in a decline in environmental condition of the estuarine area.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Limited monitoring is occurring including on noncompliance issues with regards the operation of Awoonga Dam, however only very limited assessment of plan outcomes has occurred to date. A detailed assessment against plan outcomes is due to be undertaken as part of the preparation of the new plan. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions. The capacity of the Awoonga Dam was increased to provide greater security of water supplies for Gladstone, in part to deal with climate variability. The plan provides the water planning arrangements for the enlarged dam. The Central Queensland RWSS considers the impacts of longer term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	While the development of the WRP pre-dated the Water Act, it involved engagement with a wide range of stakeholders. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Additional allocations were facilitated for the first time in 2009–10 as a result of the near filling of Awoonga Dam. There has been limited reporting against other plan outcomes to date in spite of the plan being in place since 2000. A more thorough assessment is expected to occur to inform the development of the replacement plan.

# BURDEKIN BASIN

## WATER RESOURCE PLAN 2007



### Context

The Burdekin Basin is located on the northern Queensland coast, with waters discharging onto the Great Barrier Reef near Ayr. The Burdekin River catchment is the second largest river basin on the Queensland east coast and delivers a third of the total median annual discharge from all coastal catchments that flow into the Great Barrier Reef Lagoon. Mean annual rainfall varies from between 600 to 2500 mm per year, and mostly falls between December and April.

The plan area is highly regulated and includes the Burdekin Haughton and Bowen Broken water supply schemes. Queensland's largest dam, Burdekin Falls Dam, is the major storage in the plan area. The plan manages both supplemented and unsupplemented surface water, and overland flow.

Water use supports irrigated agriculture and mining. Town supply for the many centres within the catchment is also provided by the water supply schemes, as well as the major cities of Townsville and Thuringowa, which are located outside of the plan area. The expected urban and industrial growth in these cities will be underpinned by water from the Burdekin Basin.

## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2007 and the ROP was finalised in 2009.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the plan. Risks to key environmental assets were documented and assessed. Water for future mining activity has been allowed for. Comprehensive groundwater modelling is planned to be incorporated into a future plan amendment to enable the protection of the groundwater-dependent ecosystems (GDEs) identified as key environmental assets.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. The plan establishes an extraction limit and rules to ensure environmental flows are maintained. Trade-off decisions are explicit.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly identified outcomes and strategies intended to achieve these outcomes. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	Yes	The plan enables trade for all supplemented entitlements and unsupplemented entitlements in most of the high use areas. Some unsupplemented water licences and water harvesting licences cannot be traded. The plan clearly explains that water trading rules have been developed to protect security of supply as well as ecological outcomes.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan generally requires the take of overland flow over 250 ML to be licensed, and incorporates estimates of stock and domestic extractions and water harvesting into the hydrological model.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The pre-planning ecological assessment identifies GDEs and areas of high connectivity within the plan area. The plan manages one highly connected area as a single surface water resource. However, management of groundwater resources in the Lower Burdekin delta, which is artificially recharged, is not incorporated into the WRP due to the lack of detailed hydrological and water use information at the time of plan development.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains broad environmental objectives and accountable environmental watering arrangements. The water needs of the key environmental assets have not been clearly identified, but an environmental sensitivity analysis to regime changes has been undertaken.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Monitoring is being undertaken and reported regularly in WRP annual reports, however reported results lack evidence regarding progress towards plan outcomes. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions but does contain strategies to protect low flows. Short-term extremes and climate variability are dealt with through water allocation decisions and critical water supply arrangements.
11. Is stakeholder engagement in the planning process adequate?	Yes	Engagement included the consideration of stakeholder and public input during development of the plan. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress towards identified outcomes has been achieved through the implementation of the ROP rules, which commenced in December 2009. It is too early to assess whether the rules are effective in achieving many of the plan's outcomes.



# BURNETT BASIN



## WATER RESOURCE PLAN 2000



### Context

The rivers and streams in the Burnett Basin flow into the Coral Sea near Bundaberg. The water resource plan covers the Burnett and a number of smaller catchments as well as a number of groundwater aquifers. The area lies in between the tropical north and temperate south of the State which makes rainfall extremely variable.

The streamflows are highly modified by water resource development and the water resource plan includes five water supply schemes. The primary driver for water planning is to ensure a secure water supply to meet the growing demand for urban, industrial and agricultural uses in the area. Sugar cane is the most significant water user.

## Findings

1. Is there a plan in place?	Yes	A WRP has been in place since 2000 with the ROP in place since 2003. In 2007 the WRP was amended to include management of the Coastal Burnett Aquifer. A revision of the ROP to implement this addition is currently in draft form. The current WRP had an expiry date of September 2011 which has been extended to September 2012 to allow for the development of the replacement plan.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken in the preparation of the original WRP. Assessments of risks from the take of overland flow and groundwater have been undertaken during the life of the plan.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	Overuse of the Coastal Burnett Groundwater Management Area has been identified. A pathway has been identified to return the groundwater resource to a sustainable level of extraction through reduced annual announced entitlements. Returning this resource to a sustainable level of use will be facilitated through an amendment to the ROP, however, this has not yet been finalised. Overuse of surface water resources has not been identified. The plan has established surface water extraction limits.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly identified outcomes related to both environmental flows and water security along with strategies to achieve these outcomes. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	Yes	The existing WRP and ROP provide for trading for most surface water resources in the management area, including unsupplemented water. Once finalised the ROP amendment will establish the first tradeable groundwater allocations in Queensland.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The existing plan does not manage the take of overland flow water, however a moratorium on the construction of new overland flow works in the Coastal Burnett was announced in January 2011. Overland flow management is to be examined in the development of the replacement plan. Plantation forestry is not considered a risk to the water resource. Mine dewatering requires a water licence.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan manages both surface water and groundwater from the Coastal Burnett Groundwater Management Area. The plan establishes rules to ensure both resources are managed sustainably.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains an extensive set of environmental flow indicators. The ROP contains provisions for resource operation licence holders to release water from storages to provide for these flows as well as to monitor and report on release quantities and water quality.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	Monitoring is occurring and being reported in some detail in the WRP annual reports. A detailed assessment against plan outcomes is in preparation as part of the 10-year review process and provides important information for the replacement plan. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions, although these will be examined as part of assessments to inform the development of the replacement plan. Short-term extremes and climate variability are dealt with through water allocation decisions and critical water supply arrangements.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP and ROP followed extensive engagement with a wide cross section of the community. Community input has been invited in the development of the replacement plan through the release of an information report inviting public submissions to inform the draft replacement plan.
12. Have identified outcomes been achieved during the reporting period?	To some extent	While a full assessment has not yet been finalised as part of the plan replacement, the WRP annual report indicates that progress has been made against several plan outcomes. Challenges associated with achieving a number of ecological outcomes have also been noted.

# CALLIOPE RIVER BASIN



## WATER RESOURCE PLAN 2006



### Context

The Calliope River flows into the Coral Sea at Gladstone and is connected to the sea by an extensive estuary. The water resource plan covers the entire river catchment and manages surface water including overland flow water. The rainfall is predominantly seasonal with approximately 60 per cent of rainfall falling between December and March.

There are no in-stream storages on the Calliope River and the river is one of the few in the region which retains a near-natural flow regime. The water resource plan limits entitlements for consumptive use to less than seven per cent of the overall mean annual discharge. The primary driver for water planning is to sustainably manage water resources and protect areas of high conservation value.

Consumptive water use is dominated by small-scale irrigation. The basin includes industrial and urban users, however these are supplied from the Awoonga Dam, outside of the water resource plan area. Non-consumptive uses include tourism as well as commercial and recreational fishing.

## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2006. The ROP was finalised in 2008.
2. Does the plan include key assessments?	Yes	Key assessments regarding current and future demand have been undertaken to inform the plan. Key risks were examined in the environmental assessment.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. The ecological report prepared for the plan area indicates that there is a need to maintain existing flows to protect the environmental values. The plan seeks to protect these values while allowing for limited additional extractions by limiting allocations to around 6% of mean annual flows and protecting low flows. It does not manage groundwater extractions as these are not currently a threat to the resource.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes outcomes and strategies intended to achieve these outcomes. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	No	The plan does not enable trade. The current level of entitlement is low and the WRP specifies unallocated water reserves to meet future demands. The plan also requires all licences to include volumetric limits. However, the reliance on unallocated water to meet future demand is not consistent with the NWI outcomes of promoting water use efficiency or facilitating water going to the highest value use.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan manages the take of overland flow water. Rural stock and domestic use is expected to remain relatively stable and forestry was not considered a risk to the water resource.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan recognises connectivity but does not manage groundwater. Groundwater extraction is used primarily for stock and domestic purposes and significant additional extraction is considered unlikely. Groundwater bore drilling requires a licence and is being monitored.
8. Does the plan contain accountable environmental water management arrangements?	Yes	One of the outcomes of the plan is to support natural ecosystems by minimising changes to natural flow regimes. The plan includes strategies to achieve this outcome by way of extraction limits and rules to protect low flows.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The requirements for monitoring and reporting are specified in general terms in the WRP and in more detail in the ROP. Monitoring against outcomes is being reported through the WRP annual reports but without supporting evidence. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions but includes pass flow rules on licences. Critical human needs are met from water outside of the plan area. The Central Queensland RWSS considers the impacts of longer term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP and ROP followed the usual path for extensive engagement with stakeholders as specified in the Water Act.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The 2009–10 annual report noted that plan outcomes have been achieved during the latest reporting period. However, this could not be verified given the lack of supporting evidence in the report.



# CONDAMINE AND BALONNE



## WATER RESOURCE PLAN 2004



### Context

The Condamine–Balonne catchment is located in the south-west of Queensland and covers almost half of the Queensland section of the Murray–Darling Basin. The rivers in the plan area are ephemeral with waters flowing across the New South Wales and Queensland border into the Barwon River or the terminal Ramsar-listed Narran Lakes.

Rainfall across the catchment is highly variable, ranging from 1200 mm on the eastern ranges to 400 mm in the west. Most rainfall occurs during the summer months, but as the catchment lies within the semi-arid zone, droughts and floods are common.

The plan manages both supplemented and unsupplemented water, and harvesting of overland and floodplain flows. The major storages in the system are the Leslie Dam and EJ Beardmore Dam. There are also several smaller supplemented supply schemes such as the Chinchilla Weir and Maranoa River water supply schemes. Floodplain harvesting infrastructure is particularly common in the Lower Balonne area.

The Condamine–Balonne catchment supports irrigated and dryland agriculture, including cotton and grazing. Urban water is supplied from the major storages. Natural gas production, and especially coal seam gas, are also important industries in the region.



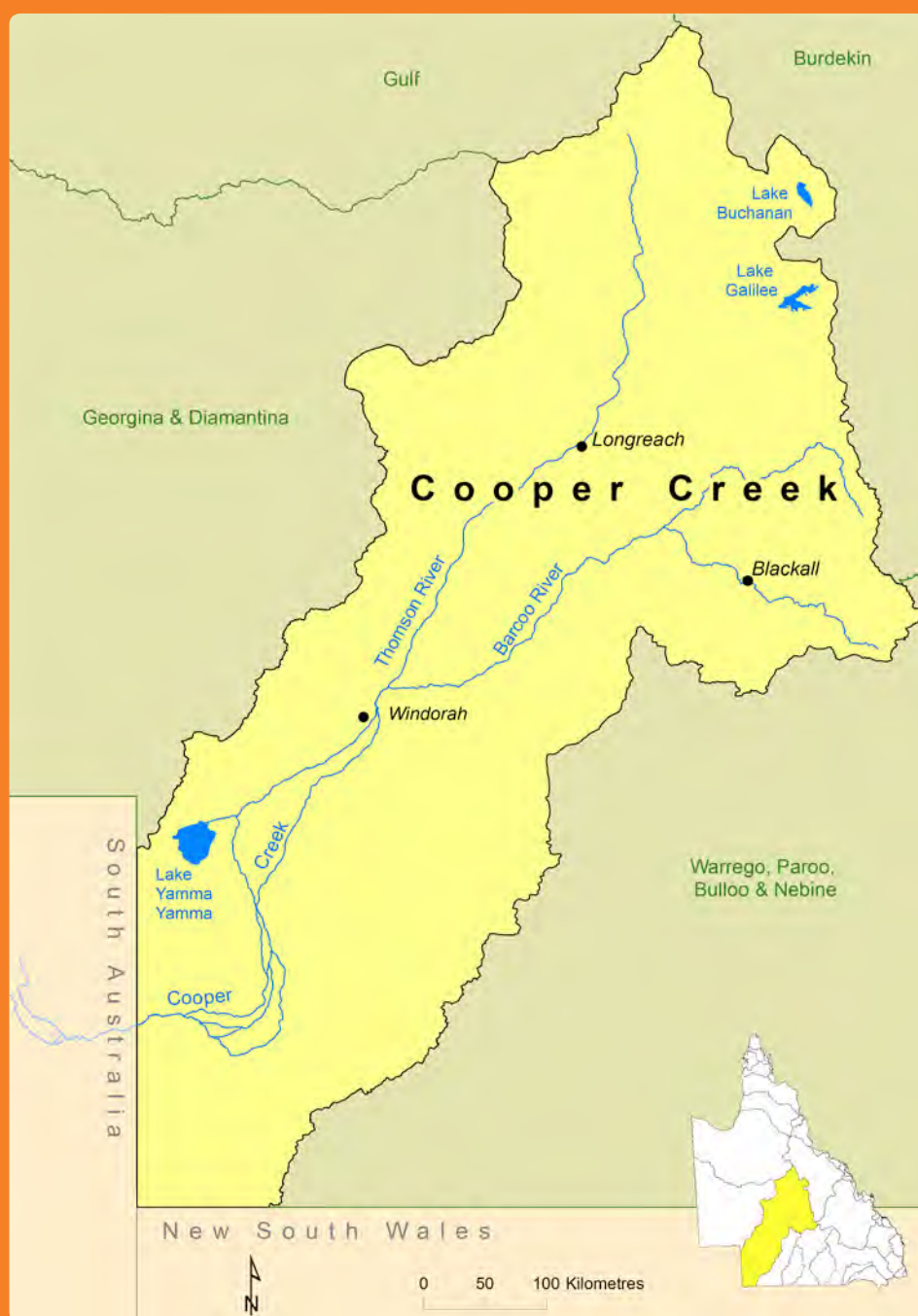
## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2004, and the ROP for the upper and middle Condamine was finalised in 2008. The ROP was amended in 2010 to include the Lower Balonne area.
2. Does the plan include key assessments?	To some extent	Most key assessments were undertaken to inform the plan. Risks to the broad riverine environment and the Narran Lakes were clearly documented and discussed. Future demands were not clearly documented or assessed.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	While the plan does not explicitly identify any areas of overuse, a key strategy is that any decision made in relation to the plan must not increase the average volume of water taken from the plan area. The plan identifies the Narran Lakes but no other specific environmental assets. Trade-off decisions between environmental and consumptive needs have not been made explicit.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly identified outcomes and strategies intended to achieve these outcomes. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade and explains that the reasons behind barriers to trade such as trading zones and volumetric limits are to ensure that environmental and third-party impacts of trade are minimised and that the outcomes of the plan are met.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The take of overland flow is regulated and managed under authorisations in accordance with the requirements of the plan but growth in stock and domestic extractions have not been considered. Impacts of coal seam gas activities on the water resources is not considered by the current plan, but a proposed amendment to the ROP is intended to address the discharge of treated production coal seam gas water into the Chinchilla Weir Water Supply Scheme.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The plan does not currently manage groundwater. However, streamflow losses to groundwater have been allowed for in surface flow modelling. An amendment to the plan is being drafted to incorporate the management of the Central Condamine alluvium, including surface water and groundwater interactions in this area.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains accountable environmental watering arrangements. While the watering needs of the Ramsar-listed Narran Lakes are identified, the watering needs of other environmental assets within the plan area are not.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Limited reporting of monitoring against outcomes is provided in the WRP annual reports. Further details were provided in the five-yearly Minister's report. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan is based on hydrological modelling using historical data. Modelling of future climatic conditions was undertaken as part of the five-year review. Short-term extremes and climate variability are dealt with through water allocation decisions and critical water supply arrangements.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP involved extensive engagement with a wide cross section of the community and included community meetings and submissions on the draft plan. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	To some extent	The WRP 2009–10 annual report noted progress towards achieving some plan outcomes such as the maintenance of water quality, security of supply and provision of tradeable allocations in the Lower Balonne. It also noted challenges in many areas such as improved understanding of social and cultural values, providing improved flows in the Lower Balonne and consistency with water sharing agreements and commitments with NSW.



# COOPER CREEK

## WATER RESOURCE PLAN 2000



### Context

One of Queensland's iconic Channel Country rivers, Cooper Creek, is part of the Lake Eyre Basin. The Cooper Creek system extends into New South Wales and South Australia, covering an area of 296 000 square kilometres. The plan area for the Cooper Creek Water Resource Plan comprises the Queensland section of the catchment, which comprises approximately 80 per cent of the total catchment. Rainfall is highly sporadic and prolonged dry periods are common.

There are no significant storages on the Cooper Creek and the river retains a near-natural flow regime. The draft water resource plan limits entitlements for consumptive use to less than two per cent of the overall mean annual discharge. The primary driver for water planning is to protect areas of high conservation value and waterholes which are important refuges during dry periods. The significance of the basin as a national asset is enshrined in the Lake Eyre Basin Intergovernmental Agreement, to which Queensland is a signatory.

The predominant use of water is for grazing as well as town water supply. Mining activities are likely to increase competition for water in the future.

The first water resource plan was implemented in this area in 2000. Queensland undertook a 10-year review of the plan and has prepared a draft replacement plan which has undergone public exhibition and is currently being finalised. This replacement plan will also manage overland flow water. This assessment is based on the replacement plan unless specific reference is made to the original water resource plan.

## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2000 and is due to expire in September 2012 after being extended for two years. A draft replacement WRP has been released for public consultation and is expected to be finalised in late 2011. A ROP was not considered necessary under the original plan, but an intention to prepare a ROP to accompany the replacement WRP has been announced.
2. Does the plan include key assessments?	Yes	Key assessments have been undertaken as part of the plan replacement process. These assessments include future water needs. Key risks to the resource were examined.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse and the river system is considered to be in a near-natural state. The area is subject to a wild river declaration proposal. The plan aims to prevent overuse of surface water through limiting extraction to less than 2% of mean annual flows.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes measurable outcomes and monitoring arrangements, however the links between monitoring and outcomes are not explicitly stated. The plan does not contain water security or environmental flow objectives given the unreliability of flows and the low level of extractions permitted under the plan.
5. Does the plan facilitate trade?	To some extent	The WRP intends to facilitate relocation of licences and purchases for environmental purposes rather than market trading. Given the low level of consumptive use and the extensive area, there is little demand for the creation of fully tradeable water rights separated from land.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The current plan does not manage the take of overland flow although there has been a moratorium in place since 2004 due to the potential risks to existing entitlements. The replacement plan proposes to regulate the taking of overland flow water.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan explicitly manages groundwater contributions to surface water. Given that only around 2% of surface water is available to be allocated there is little potential for surface water extractions to reduce groundwater recharge.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan provides for environmental water through minimising impacts on natural flows. This is done through limiting extractions to a small proportion of the annual flow volume. Cooper Creek has been proposed for wild river declaration in recognition of its natural values.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The requirements for monitoring and reporting are specified in the draft WRP. Monitoring is being undertaken and reported through the Lake Eyre State of the Basin Rivers Assessment. Monitoring progress in the achievement of plan outcomes is also reported through WRP annual reports although little detail has been provided in the 2009–10 annual report. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	Hydrological modelling for the plan included climate change scenarios and consideration of variable inflows. To minimise these impacts the plan has adopted a precautionary approach and only allows for the extraction of a small proportion of the average annual flows.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the draft replacement WRP has involved extensive stakeholder engagement in line with the requirements of the Water Act. The needs of local Indigenous groups have been recognised.
12. Have identified outcomes been achieved during the reporting period?	Yes	The 2009–10 annual report indicated there was insufficient evidence to assess whether the plan is achieving its outcomes but also notes that all ecological assets are at low or no risk from flow management. The assessment of Cooper Creek for a proposed wild river declaration indicated the river's environmental values have been maintained. The Lake Eyre State of the Basin 2008 Rivers Assessment concluded that Cooper Creek was generally in good hydrological condition.



# FITZROY BASIN



## WATER RESOURCE PLAN 1999



### Context

The Fitzroy Basin catchment is the largest coastal basin in Queensland, covering approximately 140 000 square kilometres, and incorporating major towns and regional centres such as Rockhampton, Biloela and Emerald. The Fitzroy Basin discharges into the southern end of the Great Barrier Reef. Rainfall and runoff are highly variable and evaporation rates are high.

Water in the plan area supports a number of industries including agriculture, power generation and mining as well as urban supply. The original Fitzroy Water Resource Plan includes management of supplemented water supply schemes, unsupplemented water and overland flow water.

Queensland is undertaking a 10-year review of the original Fitzroy Water Resource Plan with a draft replacement plan released in December 2010. The draft replacement plan has undergone public submissions and consultation and is currently being finalised. The replacement plan will continue to manage surface water including overland flow water but will also manage subartesian water. This assessment is based on the replacement plan unless specific reference is made to the original Fitzroy Water Resource Plan.



## Findings

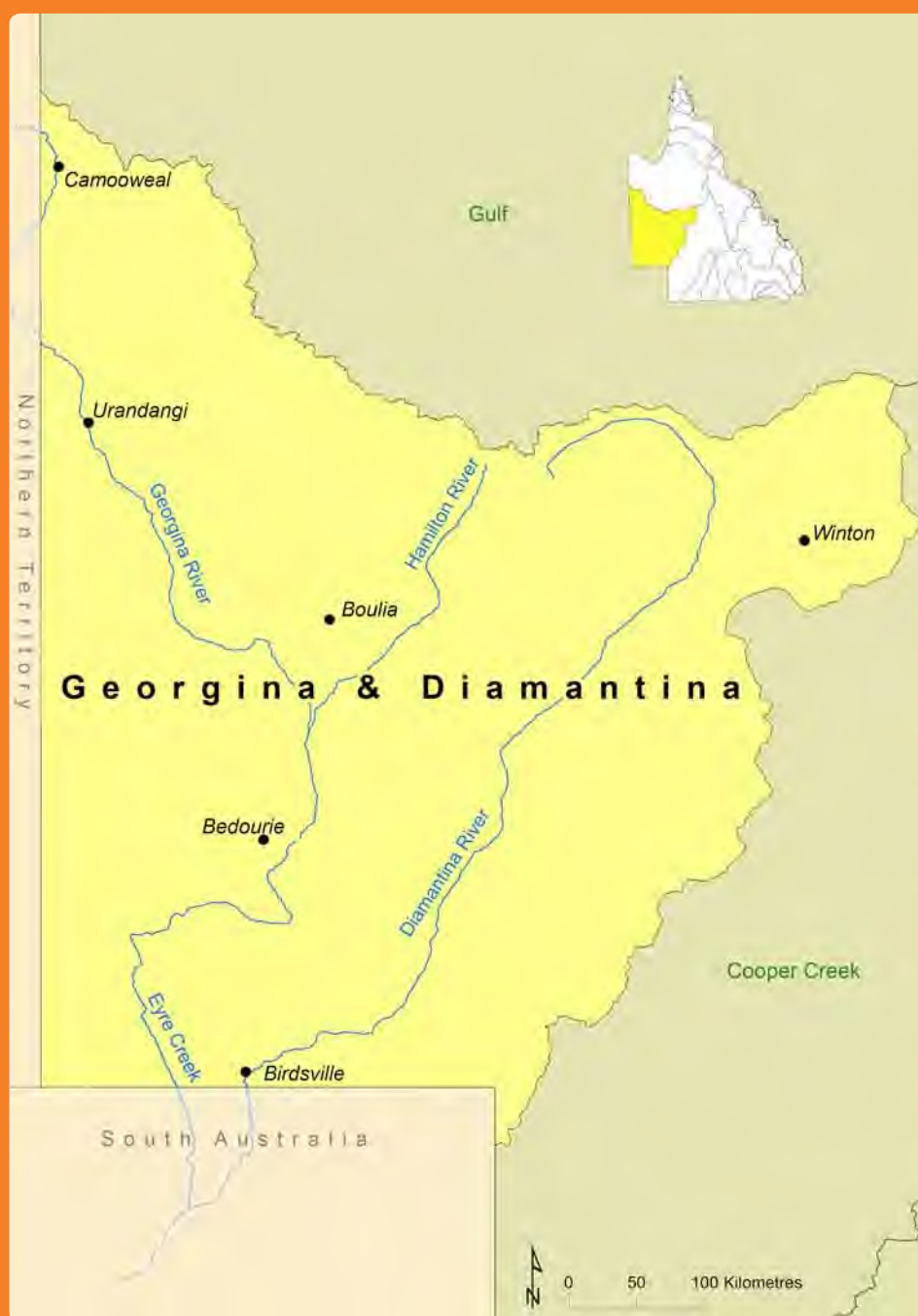
1. Is there a plan in place?	Yes	The WRP was finalised in 1999 and the ROP was finalised in 2004. The WRP and ROP were amended in 2005 and 2006 respectively to include overland flow water. The WRP has been extended beyond its nominal expiry date of September 2010 to September 2012 to enable a replacement plan to be developed. A consultation draft replacement plan was released in December 2010.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the plan. Risks to key environmental assets were clearly documented and assessed, but other risks were not explicitly identified or assessed.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan identifies overuse in the Callide Valley alluviums and the risk of over extraction in the Isaac Connors alluvium. The replacement plan proposes to manage overuse in the Callide Valley alluviums by reducing the total volume of allocations to more sustainable levels, and aims to prevent overuse in other areas by capping the amount of water that can be extracted, as well as providing environmental strategies.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly specified outcomes and strategies intended to achieve these outcomes. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	Yes	The plan enables trade for the majority of unsupplemented and supplemented surface water entitlements, although there are some unsupplemented water licences that cannot be traded. Trade is also enabled for groundwater entitlements in parts of the Callide Valley.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan includes management for stock and domestic extraction, overland flow harvesting and mining extractions and dewatering.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The plan requires consideration of connectivity for the development of the environmental management rules. However, it does not clearly recognise groundwater and surface water connectivity across the entire plan area and does not explicitly manage connected resources conjunctively.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains environmental objectives and accountable environmental watering arrangements, and environmental assets and their water needs have been clearly identified.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	Monitoring against outcomes is being undertaken and reported regularly in WRP annual reports. Although reported results lack evidence of progress towards the achievement of plan outcomes, a detailed assessment against plan outcomes has been undertaken as part of the preparation of the new plan. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan is based on hydrological modelling using historical data. Modelling of future climatic conditions was undertaken as part of the 10-year review. Short-term extremes and climate variability are dealt with through water allocation decisions and critical water supply arrangements.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP has involved extensive stakeholder engagement through a Community Reference Panel and other public consultations.
12. Have identified outcomes been achieved during the reporting period?	Yes	The broad outcomes contained in the original WRP have been achieved during the 10 year life of the plan. These include security for users, establishment of a water market, the provision of an unallocated reserve to allow for future development, and effective water management rules to provide for non-consumptive uses.



# GEORGINA AND DIAMANTINA



## WATER RESOURCE PLAN 2004



### Context

The Georgina and Diamantina catchments are located in the far west Channel Country of Queensland, and together with Cooper Creek form the Queensland portion of the Lake Eyre Basin. The plan area for the Georgina and Diamantina Water Resource Plan comprises the Queensland section of the catchments, which comprises approximately 266 000 square kilometres. Rainfall is highly sporadic and prolonged dry periods are common.

There are no significant storages on the Georgina or Diamantina rivers and they retain a near-natural flow regime. The plan manages unsupplemented extractions and overland flow harvesting in the plan area. There are only a very small number of licences currently in the plan area. The plan also sets aside unallocated water for future mining operations and growth in town water supply needs.

The primary driver for water planning is to protect areas of high conservation value and waterholes which are important refuges during dry periods. The catchments' waterholes and streams have important cultural values for Indigenous peoples of the region. A significant number of recorded Aboriginal occupation sites are located in the vicinity of these features. The significance of the basins as national assets is enshrined in the Lake Eyre Basin Intergovernmental Agreement, to which Queensland is a signatory.

The predominant use of water is for grazing as well as town water supply. Mining activities are likely to increase competition for water in the future.

## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2004 and the ROP was finalised in 2006.
2. Does the plan include key assessments?	Yes	Key assessments have been undertaken, including a clear identification of key environmental assets, although there is no transparent documentation of risks to the water resource.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse and the river systems currently have a low level of extraction. The plan has an extraction limit in place and trade-off decisions are explicit.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes outcomes and strategies intended to achieve these outcomes. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes. The plan does not contain water security or environmental flow performance indicators given the unreliability of flows and the low level of extractions permitted under the plan.
5. Does the plan facilitate trade?	No	Trading is not facilitated although there are only a small number of licences in the plan area and demand is low.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan regulates the take of overland flow. The hydrology models prepared also considered the current and future demands for stock and domestic and town water extractions. The plan also includes a strategic surface water reserve for future mining expansion, however mine dewatering impacts are not considered.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The plan manages extraction from the aquifers that are closely linked to the surface water, and artesian water including the mound springs are managed through the GAB WRP. The plan does not, however, manage the confined subartesian aquifers that may be an important water resource for future mining developments.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan provides for environmental water through minimising impacts on natural flows. This is done through limiting extractions to a small proportion of the annual flow volume. The Georgina and Diamantina have been proposed for a wild river declaration in recognition of their natural values.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Monitoring is being undertaken and reported through the Lake Eyre State of the Basin Rivers Assessment. The report lacks detailed information regarding progress towards plan outcomes and no further information was provided in the 2009–10 WRP annual report. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan is based on hydrological modelling using historical data. The plan does not consider any future climatic scenarios. Short-term extremes and climate variability are dealt with through flow conditions on licences.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement included the consideration of stakeholder and public input during development of both the WRP and ROP, and feedback on how submissions were addressed in finalising the plans was provided through the publication of a consultation report. A focus of the consultation was to obtain input from Indigenous and interstate stakeholders. Most amendments to the WRP and ROP also require stakeholder consultation.
12. Have identified outcomes been achieved during the reporting period?	To some extent	The 2009–10 annual report indicated there was insufficient evidence to assess whether the plan is achieving its outcomes. However, the assessment of the Georgina and Diamantina rivers for a proposed wild river declaration indicated the rivers' environmental values have been maintained. The Lake Eyre State of the Basin 2008 Rivers Assessment also concluded that the Georgina and Diamantina were generally in good hydrological condition.



# GOLD COAST

## WATER RESOURCE PLAN 2006



### Context

The Gold Coast Water Resource Plan includes the surface water catchments of the Nerang, Coomera and Pimpama rivers, and Talibudgera and Currumbin creeks in South East Queensland. The Nerang River catchment forms the largest component of the plan area. Rainfall varies across the area, with higher amounts falling along the McPherson Range. Falls are concentrated in the summer months.

The plan manages both supplemented and unsupplemented water. The plan area includes one supplemented water supply scheme, the Nerang Water Supply Scheme, which includes Hinze Dam on the Nerang River and Little Nerang Dam on Little Nerang Creek.

Urban water use accounts for approximately 70 per cent of consumption in the plan area, with industrial and agricultural uses also important in the plan area. Water resources in the plan area supply water to the SEQ Water Grid for urban water use both within the plan area and in other parts of the South East Queensland region.

The plan contains strategies to minimise impacts on the natural flow regime and maintain the natural values of the plan area, including the numerous national parks along the ranges and the Ramsar-listed Moreton Bay.

## Findings

1. Is there a plan in place?	Yes	The WRP has been in place since 2006 with the ROP in effect since 2009. The ROP was amended in 2010 to provide for the raising of the Hinze Dam wall and a significantly increased allocation to the SEQ Water Grid.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the development of the plan. Assessments were usually undertaken across the broader South East Queensland region.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It establishes an extraction limit and sets environmental flow and water allocation security objectives through a clear trade-off process. The plan provides for restrictions to be placed on the drawing of water from waterholes and lakes to preserve cultural and environmental values.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly specified outcomes, along with strategies related to both environmental flows and water allocation security. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	To some extent	Trade has been facilitated through the creation of tradeable supplemented water allocations and tradeable unsupplemented water allocations in the highest priority areas. The plan commits to the conversion of other unsupplemented water entitlements to tradeable water allocations within four years of the commencement of the plan.
6. Is interception appropriately considered and integrated into the plan?	Yes	The capture of overland flows was the only significant interception risk identified. Significant capture of overland flows occurs in the plan area, however urban development is expected to limit increased interception. The plan does not manage the capture of overland flows, however its impact has been factored into hydrological modelling and the setting of allocation limits. The plan also commits to ongoing monitoring of the interception of overland flows with reporting after three years.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan does not manage groundwater extractions. However, the potential impact on groundwater is one consideration in making decisions about the granting of new surface water entitlements in the plan area. The plan commits to ongoing monitoring of groundwater levels and the level of development of works to take subartesian water with reporting after three years.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains an extensive set of environmental flow objectives. The ROP contains provisions for the resource operations licence holder to release water from storages to provide for environmental flows as well as to monitor and report on release quantities and water quality. Environmental low flows are also protected through a requirement to include a flow condition on any new entitlements for taking water from unsupplemented watercourses.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	Monitoring has been reported for the first time in the 2010 annual report following completion of the ROP in December 2009. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions. Short-term extremes and climate variability are dealt with through water allocation decisions and critical water supply arrangements. The issues of climate change and variability have been major drivers of the SEQ Water Supply Strategy and the SEQ Water Grid. The Gold Coast plan contributes to this strategy through the Nerang Water Supply Scheme's supply of water to the SEQ Water Grid.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved extensive stakeholder engagement as required by the Act. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Only limited outcomes have been reported against to date given the ROP commenced in December 2009. The WRP annual report indicates that the achievement or otherwise of most specific ecological outcomes will not be assessed until the end of the plan's 10 year life.

# GREAT ARTESIAN BASIN



## WATER RESOURCE PLAN 2006



### Context

The Great Artesian Basin is a multilayered system of pressurised aquifers underlying much of Queensland as well as significant parts of New South Wales, South Australia and the Northern Territory. The Great Artesian Basin as a whole has been the subject of coordinated efforts to promote sustainable management since 1999 through the multi-governmental Great Artesian Basin Consultative Council, with Queensland an active participant.

The water resource plan covers the Queensland component of the Great Artesian Basin which includes approximately 70 per cent of the State. Recharge to the Queensland component of the Great Artesian Basin occurs on the eastern margins of the basin. Natural discharge from the Great Artesian Basin occurs via mound springs in the south and south-west of the basin. The mound springs have high conservation value because of the 'oasis' habitat they provide in otherwise arid lands for a variety of species including plants, fish, and snails that do not occur elsewhere. They also have a high spiritual and cultural value to Indigenous communities.

Water from the Great Artesian Basin sustains much of the pastoral industry in western Queensland and supplies water to many towns. The number of free-flowing bores in the past has resulted in substantial declines in pressure in many areas. This is being progressively addressed through the Cap and Pipe program known as the Great Artesian Basin Sustainability Initiative (GABSI) and is complementary to the water resource plan which provides for the active management of the resource.



## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2006 and the ROP in 2007.
2. Does the plan include key assessments?	Yes	Key assessments for the GAB were undertaken to inform the plan. While water extractions associated with coal seam gas are not licensed under the Water Act, cumulative impact assessments are being undertaken by the Queensland Water Commission.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse of the GAB and subsequent declines in pressure have been recognised. Returning the GAB to sustainable levels of extraction is the main focus of the GABSI, of which Qld is a partner. Actions under GABSI are being taken in parallel with the management strategies contained in the WRP and ROP to effect water efficiencies and sustainable management of GAB water. The WRP only reallocates around 30% of water savings from GABSI to ensure the system is returned to sustainable use. The plan considers eight of the 25 management areas to be fully allocated.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The WRP includes general outcomes with strategies and monitoring linked to these outcomes. Inclusion of more-specific outcomes would assist in ensuring an informed assessment of progress towards meeting plan outcomes.
5. Does the plan facilitate trade?	To some extent	Water licences in the GAB have not been separated from land, although trade of licences is possible and is occurring where sufficient demand exists.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan regulates stock and domestic, irrigation, mining and industry extractions. Coal seam gas exploration and extraction activities occur in a small percentage of the basin. While water extractions associated with coal seam gas are not licensed under the Water Act, the WRP does not make water available for future allocations in affected aquifers.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan addresses connectivity through the protection of flows to springs and surface water flows sourced from the GAB.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains arrangements to ensure groundwater-dependent ecosystems are protected. The planning documents note that investigations are continuing to better understand the hydrology of springs.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	Monitoring has been undertaken and reported. The plan does not identify key risks as such, although it does identify key ecological assets. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	Given that recharge occurs over very long timeframes, climate change and extremes in inflows will not affect the availability of the resource in the foreseeable future. Managing the GAB extractions through the maintenance of surface water pressure is occurring.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP followed the usual path for extensive engagement with stakeholders as specified in the Water Act and included Indigenous as well as interstate interests. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	Yes	The annual report indicates that progress is being made in achieving the WRP outcomes. However, the inclusion of more specific outcomes would assist in ensuring better informed assessments of progress towards meeting the plan outcomes could be made and reported.





# GULF

## WATER RESOURCE PLAN 2007



### Context

The Gulf Water Resource Plan includes eight surface water catchments which flow into the Gulf of Carpentaria as well as designated non-Great Artesian Basin groundwater resources. The rainfall is predominantly seasonal with around 80 per cent of falls occurring between December and March.

The water resource plan covers a diverse area which includes a highly developed water system on the upper reaches of the Leichhardt River around Mt Isa as well as several areas where there are low levels of development with some of these designated for the protection of their natural values under the Wild Rivers Act. The water resource plan also provides water for Indigenous communities to help them achieve their social and economic aspirations.

Entitlements for consumptive use represent less than one per cent of the overall mean annual discharge. Consumptive water use includes urban supply, mining and small-scale irrigation. Non-consumptive uses include tourism as well as recreational and commercial fishing.

## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2007 with the ROP in place since 2010. The plan area includes the Settlement, Gregory, Morning Inlet and Straaten wild river declarations.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the plan, including assessments of the key risks to the future of the water resources.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse and has an extraction limit in place. Environmental flow objectives, including the number of low flow periods, are specified for the catchment with high levels of consumptive use.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes measurable outcomes and monitoring arrangements. Water has also been allocated to an Indigenous reserve to be used to assist Indigenous people to achieve their economic and social aspirations. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	Yes	The plan establishes tradeable allocations in the area of greatest consumptive demand, i.e. the Mt Isa region. Trading of licences is also possible in a reach of the Gilbert River. In other areas licences remain tied to land and are not tradeable, however there is little demand for trading in these areas.
6. Is interception appropriately considered and integrated into the plan?	Yes	Interception activities are incorporated into the plan. In particular, the major mines in the Mt Isa region operate with a water licence and overland flow storages of more than 250 ML require a licence. There is little plantation forestry in the area. Interception from mine dewatering is not considered as a risk in the plan or supporting documents.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	Connectivity between surface water and groundwater is recognised in the plan. Groundwater and surface water are managed as one resource within the plan except for GAB groundwater which is managed under its own plan. The plan includes strategies to ensure that works which access aquifers overlaying the GAB do not inadvertently intercept GAB water.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Four catchments are declared wild river areas where water management arrangements must be consistent with the purpose of the wild river declarations. While there are no explicit environmental flow objectives for most of the plan area, only a small proportion of average flows are available for extraction. In the most highly developed area, the upper Leichhardt River, there are explicit environmental flow objectives that minimise the streamflow impacts of two large-scale in-stream dams.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The requirements for monitoring and reporting are specified in the WRP and the ROP. Monitoring progress in the achievement of plan outcomes is reported through WRP annual reports. Little detail has been provided in the 2009–10 annual report, however the ROP was only finalised in 2010. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions. Short-term extremes and climate variability are dealt with through water allocation decisions and critical water supply arrangements.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP followed the path for engagement with stakeholders specified in the Water Act. Extensive consultation was undertaken at key stages of the water planning process. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The Gulf ROP was finalised in June 2010. As such, the latest available annual report, for 2009–10, could not provide an assessment of the extent to which the plan is meeting its outcomes.

# LOGAN BASIN



## WATER RESOURCE PLAN 2007



### Context

The Logan Basin Water Resource Plan includes the surface water catchments of the Logan and Albert rivers and Redlands area in South East Queensland. The Logan and Albert rivers form the largest component of the plan area. Rainfall across the catchment is highly variable, ranging from 700 mm in the western areas to 3300 mm in the south. Most rainfall occurs during the summer months, but significant falls can also occur during winter.

The plan manages both supplemented and unsupplemented water. Although the plan does not include the management of groundwater or overland flow water, it commits to monitoring groundwater levels and regular assessment of the level of development of works for taking overland flow and subartesian water. There is a proposed amendment to the plan to include the management of surface water and groundwater on the southern Moreton Bay islands, including North and South Stradbroke islands.

The plan area includes the Logan River Water Supply Scheme, which includes Maroon Dam on Burnett Creek, Bromelton and South Maclean weirs on the Logan River and Bromelton Offstream Storage, which diverts water from the Logan River. The resource operations plan is currently being amended to incorporate the newly constructed Wyaralong Dam on Teviot Brook.

Urban water use accounts for most of the water consumption in the plan area but there is also significant water extraction for agricultural purposes. Water resources in the plan area supply water to the SEQ Water Grid for urban water use both within the plan area and in other parts of the South East Queensland region.

## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2007 and the ROP was finalised in 2009.
2. Does the plan include key assessments?	Yes	Key assessments have been undertaken and environmental assets have been identified, although there is no clear process for documenting all risks to the water resource.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse and establishes a cap on extractions. It sets environmental flow and water allocation security objectives through a clear trade-off process.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes outcomes and strategies intended to achieve these outcomes. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	To some extent	Trade has been facilitated through the creation of tradeable supplemented water allocations and tradeable unsupplemented water allocations in the highest priority areas. The plan commits to convert other unsupplemented water entitlements to tradeable water allocations within four years of the commencement of the plan.
6. Is interception appropriately considered and integrated into the plan?	To some extent	Interception of overland flow was considered to be insignificant and was accounted for in the development of the plan. It is unclear whether other forms of interception have been considered, especially the risks of an increase in stock and domestic usage through peri-urban expansion.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The plan identifies areas of connectivity between groundwater and surface water. Mainland groundwater resources were assessed as stable and the plan commits to ongoing monitoring of groundwater levels and development of works to take subartesian water. Potential impact on groundwater is also one consideration when granting new surface water entitlements. The plan is currently being amended to incorporate management of the groundwater resources of the southern Moreton Bay Islands.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains an extensive set of environmental flow objectives. The ROP contains provisions for the resource operations licence holder to release water from storages to provide for environmental flows as well as to monitor and report on release quantities and water quality. Low flows are also partially protected through a requirement to include a flow condition on any new entitlements for taking water from unsupplemented watercourses.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Monitoring is being undertaken and reported regularly in WRP annual reports, however the reports contain little evidence of reported progress towards achieving some plan outcomes. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions, however the issues of climate change and variability have been major drivers of the SEQ Water Supply Strategy and the SEQ Water Grid. The Moreton plan contributes to this strategy through the supply of water to the SEQ Water Grid. Short-term extremes and climate variability are dealt with through water allocation decisions and critical water supply arrangements.
11. Is stakeholder engagement in the planning process adequate?	Yes	Engagement included the consideration of stakeholder and public input during development of both the WRP and ROP. Public feedback was provided on how submissions were addressed in finalising the plans, through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Progress towards identified outcomes has been achieved through the implementation of the ROP rules, which commenced in December 2009. It is too early to assess whether the rules are effective in achieving all of the plan's outcomes.



# MARY BASIN

## WATER RESOURCE PLAN 2006



### Context

The Mary Basin Water Resource Plan includes the surface water catchments of the Mary and Burrum rivers and the Sunshine Coast. The southern part of the plan area is within the South East Queensland region. Annual rainfall across the area varies from 800 mm to 2000 mm and predominantly occurs in summer.

The plan manages supplemented and unsupplemented surface water as well as groundwater in the Cooloola Sandmass Subartesian Area. The plan area includes six water supply schemes and a number of storages.

Water consumption in the plan area is divided almost evenly between urban and agricultural water uses. Water resources in the southern part of the plan area supply water to the SEQ Water Grid for urban water use both within the plan area and in other parts of the South East Queensland region.

The plan contains strategies to minimise impacts on the natural flow regime and maintain the natural values of the area, including the numerous national parks along the ranges and the Ramsar-listed Great Sandy Strait. The Cooloola Sandmass Subartesian Area is managed to support internationally recognised wetlands and groundwater-dependent ecosystems and to prevent seawater intrusion.

## Findings

1. Is there a plan in place?	Yes	A WRP has been in place since July 2006 with the ROP finalised in September 2011.
2. Does the plan include key assessments?	Yes	A comprehensive set of key assessments were undertaken to inform the plan development. These assessments included comprehensive community consultation including with Indigenous traditional owner groups. The key assessments and consultations are explicitly linked to the plan outcomes.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It establishes an extraction limit and sets environmental flow and water security allocation objectives. While trade-off decisions are not explicit, the plan imposes restrictions on the drawing of water from waterholes and lakes to preserve cultural and environmental values. Closer monitoring is proposed in highly developed areas.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly specified outcomes, along with objectives and strategies related to both environmental flows and water allocation security. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	To some extent	Trade has been facilitated through the creation of tradeable supplemented water allocations. The plan commits to the conversion of unsupplemented water entitlements to tradeable water allocations in priority areas within six years of the commencement of the plan.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan places conditions on water harvesting from the general reserve to protect low flows and limits groundwater extractions for stock and domestic purposes to those areas without access to reticulated water. Pre-planning assessments considered that the harvesting of overland flows did not pose a significant risk and so didn't need to be managed through the plan. Plantation forestry is significant in the Mary Basin but water for plantations is not managed by the plan.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan manages surface water as well as groundwater from the Cooloolo Sandmass. While there are no other significant groundwater resources in the plan area, the potential impact on groundwater is one consideration in making decisions about the granting of new surface water entitlements. The plan commits to ongoing monitoring of groundwater levels and the level of development of works to take subartesian water in areas outside of the Cooloolo Sandmass Subartesian Area.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains an extensive set of environmental flow indicators. The ROP contains provisions for the resource operations licence holder to release water from storages to provide for environmental flows as well as to monitor and report on release quantities and water quality. Flow conditions are included in any new entitlements for taking water from unsupplemented watercourses. The potential impacts on GDEs are considered in making decisions about granting additional groundwater entitlements in the Cooloolo Sandmass Subartesian Area.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan contains a detailed monitoring and reporting schedule. Monitoring and reporting are due to commence with the ROP now in place. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions, however the issues of climate change and variability have been major drivers of the SEQ Water Supply Strategy and the SEQ Water Grid. The Moreton plan contributes to this strategy through the supply of water to the SEQ Water Grid. Short-term extremes and climate variability are dealt with through water allocation decisions and critical water supply arrangements.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP involved extensive stakeholder engagement. The formation and use of representative groups for various industry sectors was in addition to the requirements specified in the Act. Public feedback was provided on how submissions were addressed in finalising the plans, through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	While the WRP has been in place since 2006, the ROP was not finalised until September 2011. Reporting against outcomes is due to commence with the 2011–12 annual report.

# MITCHELL



## WATER RESOURCE PLAN 2007



### Context

The Mitchell River flows into the Gulf of Carpentaria and is one of Queensland's most significant river systems by volume. The water resource plan covers almost the entire catchment, however the upper reaches that are supplemented by the Mareeba Dimbulah Water Supply Scheme are included in the Barron Water Resource Plan. The water resource plan also includes designated non-Great Artesian Basin groundwater resources. The rainfall is predominantly seasonal with around 80 per cent of falls occurring between December and March.

There are low levels of development in the Mitchell catchment with entitlements for consumptive use representing less than one per cent of the overall mean annual discharge. The primary driver for water planning is to provide for growth while protecting areas of high conservation value. The water resource plan provides water for Indigenous communities to help them achieve their social and economic aspirations.

Consumptive water use includes urban supply, aquaculture, small-scale mining and small-scale irrigation. Non-consumptive uses include tourism as well as recreational and commercial fishing.

## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2007 and the ROP in 2009.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the plan, including assessments of the key risks to the future of the water resources.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse and limits further extractions to less than 1% of mean annual flows. While the ecological report prepared for the plan area indicates that there is generally a poor level of detail of knowledge of local environmental requirements, the low extraction limit ensures the maintenance of a near-natural flow regime.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly specified outcomes and strategies intended to achieve these outcomes. Water has also been allocated to an Indigenous reserve to be used to assist Indigenous people to achieve their economic and social aspirations. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	To some extent	The plan does not facilitate permanent trade. Additional demand for water can be met through unallocated reserves. The plan establishes volumetric limits on water licences and introduces metering. Seasonal trading is available in the Upper Mitchell sub-catchment area and permanent trading is to be considered in the next iteration of the plan.
6. Is interception appropriately considered and integrated into the plan?	Yes	Overland flow storages of more than 250 ML require a licence. The plan does not consider other interception activities to be a risk to the resource.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	Connectivity between surface water and groundwater is recognised in the plan. Groundwater and surface water are managed as connected resources within the plan except for GAB groundwater which is managed under its own plan. The plan includes strategies to ensure that works which access aquifers overlaying the GAB do not inadvertently intercept GAB water.
8. Does the plan contain accountable environmental water management arrangements?	Yes	There are no explicit environmental watering arrangements, however the plan contains rules to limit the extraction of water to a small proportion of annual flows. Water licences under the WRP must include a volumetric limit and restrictions are placed on licences to protect periods of low flow.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	The requirements for monitoring and reporting are specified in the WRP and the ROP. Monitoring progress in the achievement of plan outcomes is reported through WRP annual reports. Little detail has been provided in the 2009–10 annual report, however the ROP was only finalised in 2009. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions, however the plan takes a precautionary approach through limiting extractions to around 1% of mean annual flows.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP followed the usual path for extensive engagement with stakeholders specified in the Water Act. Public feedback was provided on how submissions were addressed in finalising the plans, through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The Mitchell ROP was finalised in November 2009. All entitlements are now volumetrically specified and meters have been installed, however it is too early to assess the extent to which the plan is achieving its outcomes.



# MOONIE



## WATER RESOURCE PLAN 2003



### Context

The water resource plan includes the Queensland portion of the Moonie catchment in the south-west of the State, and forms part of the Queensland portion of the Murray–Darling Basin. The Moonie River crosses the New South Wales border where it joins with the Barwon River. Rainfall is concentrated in the summer months.

There are no major storages in the system and no water supply schemes. The plan manages unsupplemented water as well as overland flow water.

The dominant industry in the plan area is grazing, focusing on beef cattle and wool production. There is an increasing trend towards mixed farming operations and dryland crop production. Irrigation is mostly associated with isolated pockets of cotton and wheat. Oil and gas production, including coal seam gas, are also important industrial activities in the plan area.

The catchment's waterholes and streams also have important cultural values for Indigenous peoples of the region.

## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2003 with the ROP in place since 2006.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the development of the plan. Environmental assets are specified in the environmental assessments.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It establishes the maximum volumes of water that may be extracted from the plan area to achieve end-of-system flow objectives. The plan also includes flow objectives for a range of flow conditions to prevent seasonal stress.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes measurable outcomes, strategies and monitoring arrangements. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	Yes	Trading has been facilitated in all supplemented and unsupplemented entitlements. The plan clearly explains that water trading rules have been developed to protect security of supply as well as ecological outcomes.
6. Is interception appropriately considered and integrated into the plan?	Yes	The take of overland flow is regulated and managed in accordance with the requirements of the plan. Water use for stock and domestic purposes was assessed as not posing a risk to the water resource.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	Connectivity between surface water and groundwater was considered in the development of the WRP. The area contains limited groundwater in alluvial aquifers which have been assessed as not being significant. Streamflow losses to groundwater have been accounted for in streamflow modelling.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The WRP establishes end-of-system flow objectives. The ROP specifies conditions for accessing water under allocations to ensure flow conditions are met. Unallocated water that was identified in the WRP has been gifted to the Commonwealth Environmental Water Holder.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The WRP and ROP contain a detailed monitoring and reporting schedule. Limited reporting of monitoring against outcomes is provided in the WRP annual reports, with more detail provided in the 2007–08 report including the five-yearly Minister's report. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions. Climate variability is dealt with through pass flow conditions on water allocations.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP involved extensive engagement with a wide cross section of the community and included community meetings and submissions on the draft plan. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	To some extent	The WRP 2009–10 annual report notes that progress has been made towards the achievements of most plan outcomes, although little detail is provided. The report noted challenges with establishing an effective water market due to lack of demand. The WRP annual report indicates that the achievement or otherwise of most specific ecological outcomes will not be assessed until the end of the plan's 10 year life.

# MORETON



## WATER RESOURCE PLAN 2007



### Context

The Moreton Water Resource Plan includes the surface water catchments of the Brisbane, Pine and Caboolture rivers as well as Cabbage Tree Creek and the Pumicestone creeks in South East Queensland. Rainfall is concentrated in the summer months.

The plan manages supplemented surface water, unsupplemented surface water, groundwater and overland flow water in the plan area. The most significant groundwater resources in the plan area are within the Lockyer and Warrill valleys and the Cressbrook Creek Subartesian Area.

The plan area includes seven water supply schemes and the main storages in the plan area are the Wivenhoe, Somerset and North Pine dams, which account for over 80 per cent of the storage.

Urban water use accounts for approximately 75 per cent of consumption, with agricultural water use significant in the Lockyer and Warrill valleys in particular. Water resources in the plan area supply water to the SEQ Water Grid for urban water use both within the plan area and in other parts of the South East Queensland region.

## Findings

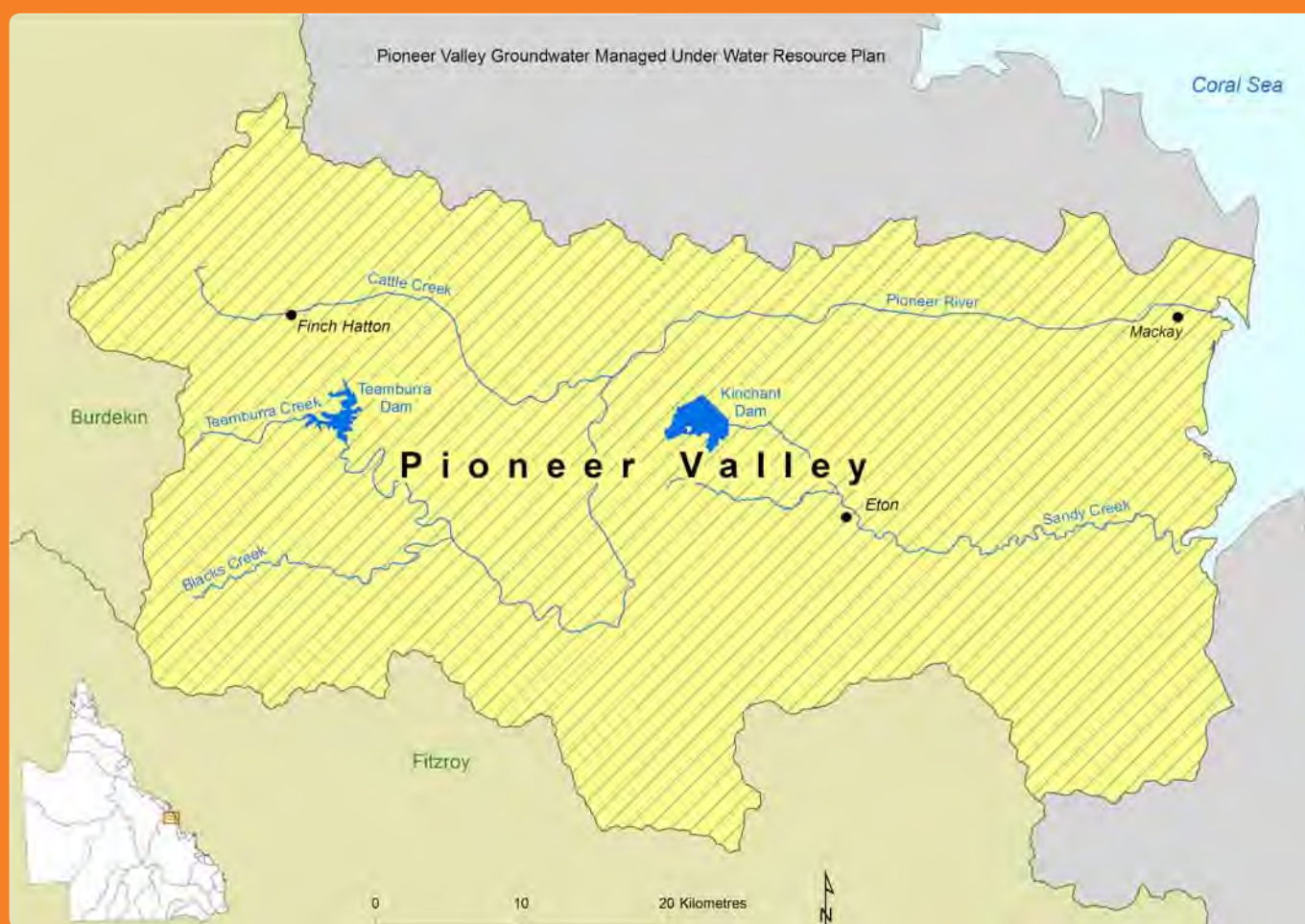
1. Is there a plan in place?	Yes	The WRP has been in place since 2007 with the ROP in effect since 2009. Amendments to the ROP, in accordance with the timetable in the WRP, are required to give full effect to the WRP.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the development of the plan. Assessments were usually undertaken across the broader South East Queensland region.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify any areas of overuse. While trade-off decisions are not explicit, the plan establishes an extraction limit and sets environmental flow objectives and water allocation security objectives. These environmental flow and water allocation security objectives allow for very little additional water entitlements to be granted in the plan area. The provisions for the Lockyer and Warrill sub-catchment areas have yet to be implemented.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The WRP contains clearly specified outcomes and strategies in relation to water security and environmental flows. The ROP contains a detailed specification of the monitoring required to be undertaken by the resource operations licence holders. However, monitoring arrangements lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	To some extent	Trade has been facilitated through the creation of tradeable supplemented water allocations for most water supply schemes in the plan area. The plan commits to the creation of supplemented and unsupplemented tradeable water allocations in priority areas within six years of the commencement of the plan.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan manages the take of overland flow except for stock and domestic purposes. No other interception activities were considered a significant risk in the plan or supporting documents.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan addresses connectivity and regulates the take of water from both surface water and groundwater systems. The plan tightly regulates the take of groundwater in buffer zones considered to be highly connected to stream baseflows.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains an extensive set of environmental flow indicators. The ROP contains provisions for the resource operations licence holders to release water from storages to provide for environmental flows as well as to monitor and report on release quantities and water quality.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Monitoring against outcomes has been reported for the first time in the 2010 annual report following completion of the ROP in December 2009. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions. Short-term extremes and climate variability are dealt with through water allocation decisions and critical water supply arrangements. The issues of climate change and variability have been major drivers of the SEQ Water Supply Strategy and the SEQ Water Grid. The Moreton plan contributes to this strategy through the supply of water to the SEQ Water Grid.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP involved extensive stakeholder engagement as required by the Act. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Only limited outcomes have been reported against to date given the ROP commenced in December 2009. The WRP annual report indicates that the achievement or otherwise of most specific ecological outcomes will not be assessed until the end of the plan's 10-year life.



# PIONEER VALLEY



## WATER RESOURCE PLAN 2002



### Context

The Pioneer catchment is situated in the north-east of Queensland, with the city of Mackay at the mouth of the river. The water exits onto the southern regions of the Great Barrier Reef. Rainfall is highly variable between years, with an annual average of 1000 to 2000 mm across the catchment. Three-quarters of this rainfall occurs in summer.

Consumptive water use includes irrigated agriculture and urban water supply for the city of Mackay. The water resource plan includes management of supplemented water supply schemes, unsupplemented water and subartesian water.

The area has a long history of surface water and groundwater use to support the sugar and other agricultural industries since the late 1880s. Saltwater intrusion into the coastal alluvial aquifer has been recognised as an issue since the 1930s and its extent was first mapped in 1975. Addressing this issue was a significant focus of the amendment to the water resource plan in 2009.

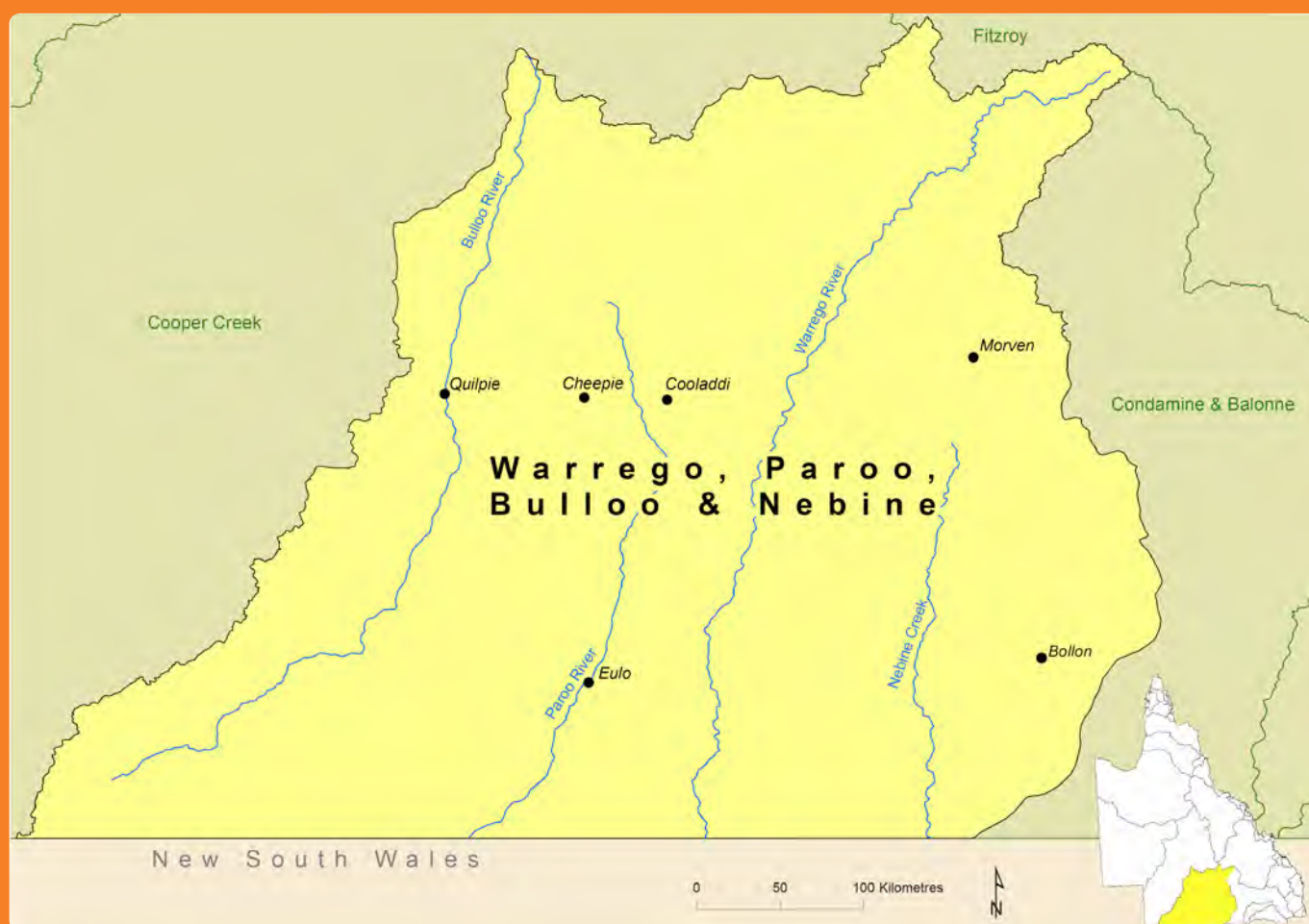
## Findings

1. Is there a plan in place?	Yes	The WRP was finalised in 2002 and the ROP was finalised in 2005. The WRP was amended in 2009 to include groundwater management and the ROP is currently being amended to reflect these provisions.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the plan. Risks to key environmental assets were clearly documented and assessed, as well as the risks and impacts of further seawater intrusion on water quality in the coastal aquifer.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan identifies the coastal aquifer as overused and at-risk from seawater intrusion. The WRP outlines a clear strategy along with specific timeframes to reduce groundwater extraction in this area. The WRP provisions will be fully implemented once the amended ROP is in place. Overuse is not identified in other areas and an extraction limit is in place. The plan clearly identifies environmental assets and contains explicit trade-off decisions.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly specified outcomes and strategies intended to achieve these outcomes. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade and establishes trading zones and rules. The plan explicitly states that the reason for some trading rules is to manage the seawater intrusion problem or socioeconomic impacts.
6. Is interception appropriately considered and integrated into the plan?	Yes	Interception is well considered and is well integrated into the plan. The management measures for stock and domestic bores are comprehensive and address the risks. Interception of overland flow is not considered to be significant in this catchment.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan addresses groundwater and surface water connectivity, and incorporates rules to protect baseflows from bore extractions during dry periods.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains broad environmental objectives and accountable environmental watering arrangements, however environmental assets and their water needs have not been clearly identified. There is, however, scope for the plan to be adapted if new information arises.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Monitoring is being undertaken and reported regularly in WRP annual reports, however only some monitoring provisions are being implemented. This includes only partial assessment of the performance indicators contained in the plan. Reported results also lack detail. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions. Short-term extremes and climate variability are dealt with through water allocation decisions and critical water supply arrangements.
11. Is stakeholder engagement in the planning process adequate?	Yes	Engagement included the consideration of stakeholder and public input during development of the plan. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Monitoring has indicated that some outcomes are being achieved such as encouraging the efficient use of water and security of supply, however there are challenges in many areas such as seawater intrusion and connectivity of flows. Despite the WRP being in place for nine years and the ROP for six years, the 2009–10 annual report has not provided an assessment against several plan outcomes.

# WARREGO, PAROO, BULLOO AND NEBINE



## WATER RESOURCE PLAN 2003



### Context

The water resource plan includes the catchments of the Warrego, Paroo, Bulloo and Nebine rivers in south-western Queensland. The Warrego, Paroo and Nebine catchments lie within the northern Murray-Darling Basin and drain into the Darling and Culgoa rivers in north-west New South Wales. The Bulloo River ends at Bulloo Lakes near the Queensland and New South Wales border. The plan manages supplemented and unsupplemented water, as well as overland flow water.

The dominant industry in the plan area is grazing, focusing on beef cattle and wool production. Irrigation is mostly associated with small-scale operations producing fodder for livestock. Opal mining and natural gas production also occur in the area.

There are two Ramsar-listed wetlands in the plan area and the rivers contribute to numerous lake systems in New South Wales. The catchments' waterholes and streams also have important cultural values for Indigenous peoples of the region.

## Findings

1. Is there a plan in place?	Yes	A WRP has been in place since 2003 and a ROP in place since 2006.
2. Does the plan include key assessments?	Yes	A comprehensive set of key assessments was undertaken to inform the WRP and ROP development. The assessments are explicitly linked to the WRP outcomes.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The WRP does not identify any areas of overuse. The WRP establishes the maximum volumes of water that may be extracted from the plan area modelled to achieve end-of-system flow objectives. The plan establishes flow objectives for a range of flow conditions to prevent seasonal stress.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes measurable outcomes, strategies and monitoring arrangements. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes.
5. Does the plan facilitate trade?	Yes	Trading has been facilitated through the establishment of tradeable water allocations separated from land in all supplemented and unsupplemented entitlements within the four catchments. Trading between established zones is not permitted to ensure environmental and third-party impacts of trade are minimised.
6. Is interception appropriately considered and integrated into the plan?	Yes	Interception from the harvesting of overland flows is managed through licensing arrangements under the WRP. Water use for stock and domestic purposes was assessed as not posing a risk to the water resource.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	Connectivity between surface water and groundwater was considered in the development of the WRP. The area also contains limited groundwater in alluvial aquifers which have been assessed as not being significant. Streamflow losses to groundwater have been allowed for in surface flow modelling.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Two of the four catchments are in near-pristine condition and the WRP preserves 99% of pre-development end-of-system flows. A high proportion of pre-development flows are also preserved in the other two catchments. Conditions are placed on the timing of water extractions, however there are no requirements for environmental releases from the Cunnamulla Water Supply Scheme. The plan also grants unallocated water to the Commonwealth Environmental Water Holder from the Warrego and Nebine catchments.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The WRP and ROP contain a detailed monitoring and reporting schedule. Limited reporting of monitoring is contained in the WRP annual reports with more detail included in the 2007–08 report including the five-yearly Minister's report. Monitoring of environmental assets was not being undertaken in these catchments. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan deals with climate variability using hydrological modelling based on historical data. It does not include modelling of future climatic conditions, however the plan has limited extractions to a low proportion of mean annual flows. Short-term extremes and climate variability are dealt with through water allocation decisions.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP involved extensive engagement with a wide cross section of the community and included community meetings and submissions on the draft plan. Public feedback was provided on how submissions were addressed in finalising the plans, through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	To some extent	The WRP 2009–10 annual report notes that progress has been made towards the achievement of most plan outcomes. However, the report provides little detail and states that the achievement or otherwise of most specific ecological outcomes will not be assessed until the end of the plan's 10 year life.



# WHITSUNDAY



## WATER RESOURCE PLAN 2010



### Context

The Whitsunday Water Resource Plan includes the Proserpine and O'Connell river catchments which flow into Repulse Bay north of Mackay. Rainfall is predominantly seasonal with most falls occurring between December and May. The plan also manages groundwater throughout the plan area.

The water resource plan includes management of the Proserpine River Water Supply Scheme operated by Sun Water, as well as unsupplemented water and subartesian water. The supply scheme is supplied by water from the Peter Faust Dam on the Proserpine River.

Water planning is required to manage the intensive use of the resource, with some areas considered to be fully allocated. Water use is mainly for irrigated agriculture, domestic and industrial purposes. Non-consumptive uses include commercial and recreational fishing as well as tourism. The area contains nationally important wetlands and the maintenance of ecosystems in Repulse Bay and the Great Barrier Reef are also partially dependent on flows from the catchment area.

## Findings

1. Is there a plan in place?	To some extent	The WRP was finalised in 2010. The plan will be in effect once the ROP has been finalised. The ROP is at the consultation draft stage.
2. Does the plan include key assessments?	To some extent	The plan was informed by key assessments to some extent, however significant gaps remained with regard to the environmental impacts of altered flow patterns.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify overuse although the environmental report notes that some of the systems are under ecological stress in part due to the level of extractions. The plan provides for annual limits on extractions as well as defining the quantity of additional water available for allocation. A moratorium on increased extractions continues until a ROP is in place.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly identified outcomes and strategies intended to achieve these outcomes. Monitoring arrangements are also specified, but lack detail on the measurement of progress towards the achievement of plan outcomes. Monitoring and public reporting is required once the ROP is in place.
5. Does the plan facilitate trade?	To some extent	The WRP provides for tradeable water allocations separated from land. Tradeable allocations will not be created until the ROP is in place.
6. Is interception appropriately considered and integrated into the plan?	Yes	Management of overland flows interception has been incorporated into the plan. No other significant interception activities were identified in the plan or related documents.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The treatment of water in the aquifer under the Proserpine River as water in the watercourse provides for effective conjunctive management of these resources. However, the plan does not treat water in aquifers under other watercourses in the area in the same manner.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan includes an extensive set of environmental flow objectives. Releases from the dam must be made in a way that minimises environmental impacts, but there are no requirements to release water to protect environmental values.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The requirements for monitoring and reporting are clearly specified in the WRP and draft ROP, however the plan is not in effect until the ROP is finalised. Monitoring is due to commence once the ROP is finalised. The Water Act contains provisions for compliance and enforcement.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan is based on hydrological modelling using historical data. It does not include modelling of future climatic conditions but does contain strategies such as making provision for critical human water needs and preventing environmental releases from the Peter Faust Dam once storage is at critical levels. The RWSS is intended to address the issue of climate change once finalised.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the WRP was informed through input from a wide cross section of the community and followed the usual path for extensive engagement with stakeholders, as specified in the Act. Public feedback was provided on how submissions were addressed in finalising the plans through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The WRP includes provisions for the monitoring and reporting of progress towards the achievement of plan outcomes, however the plan is not in effect until the ROP is finalised. Plan-specific monitoring and reporting is due to begin once the ROP is in place.

# ARCHER, LOCKHART AND STEWART



## WILD RIVER DECLARATIONS 2009



### Context

The Archer, Lockhart and Stewart basins are located on Cape York in Far North Queensland. They contain some of Australia's most intact river systems, wetlands and estuarine lakes which support a high number of unique plants and animals.

The declarations are natural resource management plans which include water planning and regulation. The declarations manage surface water and water contained in aquifers considered to be highly connected to the major streams.

The declarations' primary aim is to preserve the natural values of the river systems while allowing development activities to occur which do not threaten these values. Extractions for consumptive use are limited to less than one per cent of mean annual flows in each of the systems. The declarations provide water for Indigenous communities to achieve their social and economic aspirations.

## Findings

1. Is there a plan in place?	Yes	The Archer, Lockhart and Stewart basins were declared wild river areas in April 2009. The declarations continue in effect unless revoked by parliament.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the declarations. Potential risks to the water resource, such as the taking of overland flows and groundwater, were considered.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The declarations do not identify any areas of overuse. Total water allocated or available for allocation amounts to less than 0.5% of mean annual flow. Assessment for additional licences must have regard to the protection of the natural values.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The declarations include a generic set of environmental outcomes. In some cases a set of special features are specified to be included in the high preservation zone. They do not specify monitoring arrangements.
5. Does the plan facilitate trade?	No	The declarations do not facilitate water trading. Given the low level of consumptive use, the demand for trading is very low.
6. Is interception appropriately considered and integrated into the plan?	Yes	Interception through the take of overland flows was raised in submissions. Works for the capture of overland flow are regulated through the declarations. Given the low demand for the taking of overland flows, it was not considered necessary to require the take of overland flow water to be licensed or included in the unallocated water reserves. The take of overland flows is not permitted in high preservation areas unless for stock and domestic purposes.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The declarations manage subartesian groundwater extractions within the highly connected high preservation zones through including extractions in the overall allocation limit. Other subartesian groundwater is not managed given a weaker connection with the major streams. Artesian water in the GAB is managed through the GAB WRP.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The declarations contain provisions to preserve the natural values of the basins through limiting water extractions and development activities which may erode these values.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	No monitoring reports are due to date. Monitoring of development activity is based on licensing requirements, satellite imagery and through the Wild Rivers Rangers program. Compliance and enforcement is dealt with through reference to relevant Acts, including the Water Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The declarations deal with climate variability and change through preserving the natural flows of the system. Given the adoption of a precautionary approach, climate change is not expected to have a major impact on the allocation of water.
11. Is stakeholder engagement in the planning process adequate?	Yes	The Wild Rivers Act requires extensive consultation to be undertaken prior to the declaration of a wild river area. Extensive engagement occurred at key stages of the Archer, Lockhart and Stewart basin declaration processes with traditional owners and other stakeholders. Public feedback was provided on how submissions were addressed in finalising the declarations, through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The first report on the implementation of the declaration is due by 2014, five years after the declaration. Subsequent five-yearly reports are required to include a summary of findings relating to the preservation of the natural values in the wild river areas.



# FRASER AND HINCHINBROOK



## WILD RIVER DECLARATIONS 2007



### Context

Fraser Island is located off Queensland's south coast near the regional towns of Hervey Bay and Maryborough. The climate is subtropical, with rainfall mostly occurring between December and April and a mean annual rainfall of more than 1200 mm. Hinchinbrook Island is located off the north coast near the regional towns of Cardwell and Ingham. Situated in the wet tropics, the climate is wet and humid all year round, with an average annual rainfall of more than 2000 mm.

The declarations are natural resource management plans which include water planning and regulation. The wild river declarations manage unsupplemented water on both islands. Subartesian groundwater is also managed on Fraser Island, and overland flow harvesting is managed on Hinchinbrook Island.

National park reserves cover almost all the land on these two islands, with the main industries focusing on tourism and fishing. The islands are both listed World Heritage Areas and include Ramsar-listed wetland systems.

## Findings

1. Is there a plan in place?	Yes	Fraser and Hinchinbrook Islands were declared wild river areas in 2007. The declarations continue in effect unless revoked by parliament.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the declaration. Consideration of potential risks to the water resource is implicit in the development restrictions.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The declarations do not identify any areas of overuse. The Fraser declaration establishes an annual extraction limit that represents a very small proportion of mean annual flows. The Hinchinbrook declaration prevents any increase in allocations for consumptive use. It also manages overland flow harvesting.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Both declarations contain explicit management strategies and the objectives of the declarations are implicitly those of the wild rivers legislation. Reporting arrangements are detailed in the Wild Rivers Act. The declarations do not specify monitoring requirements.
5. Does the plan facilitate trade?	No	The declarations do not facilitate water trading. Given the low level of consumptive use, the demand for trading is very low.
6. Is interception appropriately considered and integrated into the plan?	Yes	The Fraser declaration provides a limit on extractions for stock and domestic purposes and the Hinchinbrook declaration manages the taking of overland flow water for stock and domestic purposes. Other forms of interception are managed through separate legislative planning instruments and it is implicit that these activities are unlikely to occur within the national park areas.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The Fraser declaration recognises the highly connected nature of the groundwater and surface water systems and includes management arrangements for both resources. The Hinchinbrook declaration does not manage groundwater and surface water interactions because there is little evidence of groundwater-dependent flows.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The declarations contain provisions to preserve the natural values of the basins through limiting water extractions and development activities which may erode these values.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	No monitoring reports are due to date. Compliance and enforcement is dealt with through reference to relevant Acts, including the Water Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The declarations deal with climate variability and change through preserving the natural flows of the system. Given the adoption of a precautionary approach, climate change is not expected to have a major impact on the allocation of water.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Declaration proposals for the Hinchinbrook and Fraser Island wild river areas were published for consultation purposes and submissions were sought. No information was available regarding submissions received or how these were considered.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The first report on the implementation of the declaration is due by 2014, five years after the declaration. Subsequent five-yearly reports are required to include a summary of findings relating to the preservation of the natural values in the wild river areas.

# WENLOCK BASIN



## WILD RIVER DECLARATION 2010



### Context

The declaration includes almost all of the Wenlock Basin, located on Cape York in Far North Queensland. The river flows from the Great Dividing Range into the Gulf of Carpentaria. The climate in the area is monsoonal with high flows and extensive flooding in the river system during the wet season and much reduced or intermittent flows for the rest of the year.

The declaration is a natural resource management plan which includes water planning and regulation. The declaration manages surface water and water contained in aquifers considered to be highly connected to the major streams.

The declaration's primary aim is to preserve the natural values of the river systems while allowing development activities to occur which do not threaten these values. The major development activity in the area is a pre-existing bauxite mine operated by Rio Tinto. The declaration provides water for Indigenous communities to achieve their social and economic aspirations.

## Findings

1. Is there a plan in place?	Yes	The Wenlock Basin was declared a wild river area in 2010. The declaration continues in effect unless revoked by parliament.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken to inform the declaration. Consideration of potential risks to the water resource is implicit in the development restrictions.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The declaration does not identify any areas of overuse. Total water allocated or available for allocation exceeds the usual 1% limit adopted for wild rivers given the demand for water to support existing mining operations. The total volume available for extraction amounts to less than 3% of mean annual flow.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The declaration includes a generic set of environmental outcomes and identifies Coolibah Springs as a special feature to be included in the high preservation zone. It does not specify monitoring arrangements.
5. Does the plan facilitate trade?	No	The declaration does not facilitate water trading. Apart from water use for mining, the level of consumptive use is very low indicating the level of demand for trading is also very low.
6. Is interception appropriately considered and integrated into the plan?	Yes	The only significant interception activity is mining which is authorised under a Special Agreement Act. In declaring the wild river area, the volume of the water entitlement to support mining operations was substantially reduced. Given the low demand for the take of overland flows, this was considered as a low risk. The construction of dams requires a permit.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The declaration manages subartesian groundwater extractions conjunctively with surface water within the high preservation zone where connectivity is assumed to be high. Other subartesian groundwater is not managed given a weaker connection with the major streams. Artesian water in the GAB is managed through the GAB WRP.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The declaration specifies the natural values of the area and contains provisions to preserve these values through limiting water extractions and development activities which may erode these values.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	No monitoring reports are due to date. Monitoring of development activity is based on licensing requirements, satellite imagery and through the Wild River Rangers program. Compliance and enforcement is dealt with through reference to other relevant Acts, including the Water Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The declaration deals with climate variability and change through preserving the natural flows and variability of the system. Given the adoption of a precautionary approach, climate change is not expected to have a major impact on the allocation of water.
11. Is stakeholder engagement in the planning process adequate?	Yes	The Wild Rivers Act requires extensive consultation to be undertaken prior to the declaration of a wild river area. Extensive engagement occurred at key stages of the Wenlock Basin declaration process with traditional owners and other stakeholders. Public feedback was provided on how submissions were addressed in finalising the declaration, through the publication of a consultation report.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The first report on the implementation of the declaration is due by 2015, five years after the declaration. Subsequent five-yearly reports are required to include a summary of findings relating to the preservation of the natural values in the wild river areas.





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## 6. South Australia





SOUTH AUSTRALIA



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The context of water planning in South Australia

Water planning in South Australia aims to manage the State’s scarce highly developed water resources. Water allocation plans (WAPs) seek to provide for the equitable allocation and use of water between environmental, social and economic needs and set a rate of water extraction that is sustainable.

Almost all of the State’s water resources are in the southern third of the State. The Murray River is the major surface water resource, representing around 30 per cent of the State’s harvestable water resources, providing a significant proportion of irrigation and urban and regional reticulated water supply from the State’s 1850 GL Murray–Darling Basin entitlement. The groundwater resources of the south east are the largest in the State’s agricultural areas. Most other water is sourced from the developed groundwater resources found across South Australia and the captured and stored surface water within the Mount Lofty Ranges. The ancient resource of the Great Artesian Basin and ephemeral flows of the Lake Eyre Basin occur in the arid north-east of the State.

South Australia is the driest of the Australian states and territories. Many of the State’s relatively limited resources are highly sensitive to small changes in rainfall runoff and recharge, likely to be exacerbated under climate change projections for lower average but higher intensity rainfall events. Others are large, often ancient groundwater resources with very slow, if any, response to rainfall. Scarcity, coupled with projected increased demand driven by a drier climate, pose significant challenges for water management in South Australia. Water affecting land-use change – particularly expansion of plantation forestry in the south east and growth in numbers of farm dams in peri-urban areas of the Mount Lofty Ranges – is also having a significant impact on the sustainability of current water extraction regimes.



# Planning arrangements



## Strategic water demand planning

The South Australian 2009 Water for Good plan projects water supply and demand to 2050 for the Adelaide metropolitan region, and actions to meet this demand. A series of eight Regional Demand and Supply Statements are also being developed by 2012. The statements are intended to provide a long-term (40-year) overview of water supply and demand for each of South Australia's eight natural resources management (NRM) regions. Each statement outlines the status and condition of water resources in a region, demands on these water resources and timeframes for future demand–supply gaps. The South Australian urban and regional water and wastewater utility, SA Water, develops long-term strategic water security plans setting out proposals for additions to and augmentation of its treated reticulated water supply and wastewater services networks to respond to future demand.

## Water allocation planning

Where a water resource needs close management (in response to increased resource development pressures and/or community concern), it is prescribed under the *Natural Resources Management Act 2004* (the NRM Act). Prescription of a resource triggers a series of actions leading to the regulation of water extraction by a licensing regime and the development and implementation of a water allocation plan that sets out how the prescribed water resources will be managed.

There are currently 27 prescribed water resources in South Australia, covering the State's significant developed water resources. Groundwater systems constitute the majority of these prescribed resources. Twenty prescribed water resources have existing water allocation plans and four new plans are being developed.

Statutory water allocation plans lie within a state-wide natural resources management hierarchy including:

- an overarching state *Natural Resources Management Plan* – sets out a 50-year strategy for natural resources management in South Australia and interacts with the state Planning Strategy for Land Use and Development
- statutory regional *natural resources management plans* – prepared by the eight regional natural resources management boards and include information, goals and strategies for integrated management of water and other natural resources in a natural resources management region
- statutory *water allocation plans* for prescribed water resources – developed by the natural resources management boards for each prescribed water resource in their region; water allocation plans set the water extraction and management regime for the resource.

Once made, water allocation plans are taken to be part of the relevant regional natural resources management plan. Provisions of water allocation plans include:

- setting of consumptive pools and extraction limits for each resource (where feasible)
- determination of entitlements and allocations via a licensing regime
- rules for the transfer of water allocations and licenses
- environmental water provision and management
- requirements for the granting of permits and approvals for relevant water affecting activities, and
- monitoring and reporting requirements.

The Department for Water (DFW) is responsible for some aspects of plan implementation, including licence management, resource monitoring and scientific investigations; natural resources management boards also have responsibility for some aspects of plan implementation including issuing permits and resource monitoring.

The Natural Resources Management Act enables water allocation plans to be amended at any time but requires that they be reviewed within five years of adoption and then within consecutive five-year periods, and, if appropriate, amended as a consequence of the review. Ten of the existing water allocation plans are currently being reviewed or amended.

Water resources outside prescribed areas are managed under the relevant water licensing and water affecting activity permitting requirements of the Natural Resources Management Act and in accordance with water resource related provisions of the regional statutory natural resources management plans.

Table 4: Planning instruments

Assessment criteria	NRM Act	State Policy	NRM plans	WAP	Comment
1. Status of plan					WAPs are developed for prescribed water resources. Non-prescribed resources are managed under provision of the relevant NRM plan and NRM Act.
2. Key assessments					Assessments are generally undertaken at the proposed plan area level, with further details on water sources, supply and demand also provided in overarching NRM plans, and Regional Demand and Supply Statements.
3. Overuse status & pathways to sustainable water extraction					WAPs set a limit on the volume of water available to be taken for licensed consumptive purposes and provide for environmental flows and/or protect groundwater levels and quality. Recovery pathways are set out in WAPs (where relevant).
4. Clearly identified & measurable outcomes					The NRM Act sets state-wide NRM outcomes, and each regional NRM plan and WAP include plan objectives, and detail strategies to achieve these objectives.
5. Facilitation of trade					The NRM Act enables the creation of tradeable water access entitlements. WAPs detail the specific transfer rules for each water source within the plan area.
6. Integration of water intercepting activities					Interception activities are generally controlled under WAPs, via entitlement and/or incorporation into extraction limits and through development permits and approvals. Implementation of state-wide plantation forestry policy is subject to legislative amendment.
7. Surface water/ groundwater connectivity					Where significant surface water resources exist, they are generally incorporated in a single plan covering both surface water and groundwater (with the exception of River Murray and Morambro Creek prescribed watercourses). WAPs include assessment of the impact on other water resources.
8. Environmental water management arrangements					The NRM Act outlines overarching requirements for environmental water needs. Individual NRM plans and WAPs specify statutory environmental water provisions.
9. Monitoring, compliance & enforcement provisions					Resource-specific monitoring provisions are detailed in individual WAPs; regional MERI frameworks are under development. DFW undertakes compliance and enforcement as required under the NRM Act.
10. Planning for climate change & extremes in inflows or recharge					WAPs include provisions to deal with variability. WAPs can be amended in response to extreme events. Climate change impacts are noted in WAPs; regional risk assessments are being undertaken.
11. Stakeholder engagement					The NRM Act requires public consultation on the intent to prescribe (pre-development) and draft WAP stages. NRM boards manage WAP development and consultation.
12. Extent to which outcomes have been achieved					The NRM Act requires review of WAPs every five years, and subsequent amendment (if necessary). Annual water resource status reports are being prepared by DFW for each resource.



## Key findings



### Significant progress in addressing overallocation and overuse has been achieved through detailed resource assessments and stakeholder negotiation

Water plans clearly acknowledge the occurrence of overallocation and/or overuse, with significant progress in setting clear pathways to sustainable levels of extraction. New extraction limits are now set (or proposed) for most stressed areas, following a trade-off between current and projected consumptive demands and environmental water requirements. Transparency and documentation around this trade-off process is not well developed.

### The integrity of water access entitlements is improving through the integration of interception activities and surface water groundwater connectivity

Rapid expansion of farm dams and plantation forestry pose significant risk to the integrity of water entitlements in South Australia. New water allocation plans include measures to account for and manage these risks, including incorporating volumetric impacts of farm dams on surface water flows and setting management zone dam capacity targets and thresholds for the issuing of entitlements for extraction from dams. Further expansion of plantation forestry in the State's lower south east is subject to development thresholds which require acquisition of an offsetting water allocation to account for the interception impact.

Surface water and groundwater connectivity is also routinely addressed through resource assessments, setting extraction limits, set-back requirements for groundwater extractions near watercourses and the protection of high recharge zones.

### Long plan development and amendment periods are resulting in incidences of ongoing decline in resource condition

There have been significant delays in the finalisation of many newly developed and amended water allocation plans against initial schedules, with delays of two to five years commonplace. As plan development or amendment may be in response to concern over the condition and/or management of a resource, long delays means that the sub-optimal management arrangements continue, which can extend the decline of resource condition and/or restrictions on resource development.

### The management of risks and the assessment of plan outcomes is undermined by limited evaluation and reporting of monitoring and the lack of a systematic and transparent review process

Evaluation and reporting of water monitoring data has generally been ad hoc and uncoordinated, and the achievement of plan objectives is not routinely or transparently assessed. The lack of specific performance targets in water allocation plans adds to the difficulty of undertaking this assessment. The requirement for five-yearly plan review is specified in legislation, but there are no criteria to facilitate the systematic and transparent review of plan objectives.





## Findings against criteria

- |  |  |
|--|--|
| <b>1.</b> Status of water planning   | Under the Natural Resources Management Act, water allocation plans are perpetual and reviewed every five years. There are currently 27 prescribed water resources in South Australia of which 20 have existing water allocation plans. Of the seven other prescribed areas, four are managed for the purposes of producing salt for industrial processes and water allocation plans are being prepared for the remaining three areas. Ten existing water allocation plans are currently under review and/or amendment. There is ongoing delay in commencing or finalising the amendment of some of these plans. Areas currently without plans in place or scheduled for development generally have little consumptive use. As consumptive use increases in an area, or there is community concern regarding the sustainable use of the resource, an area is prescribed and a water allocation plan development process commences.  |
| <b>2.</b> Do plans include key assessments?  | Resource assessments are prepared as part of the water allocation planning process, with minimum requirements specified under the Natural Resources Management Act. The Act requires plans to include an assessment of the capacity of the resource to meet demand, the potential effect of the plan on other water resources, and the quantity, quality and timing of water needed by ecosystems that depend on water. Assessment of social and economic values is often only qualitative, although recent plans demonstrate deeper assessment of these values to support trade-off decisions.  |
| <b>3.</b> Do plans address overuse and is there a pathway to sustainable extraction? | Water allocation plans aim to prevent overuse through setting of extraction limits based on hydrological and environmental assessments of resource capacity, a community based trade-off process, and the inclusion of resource condition triggers to limit extraction where monitoring indicates resource stress. Where overuse has been identified, clear pathways to sustainable extraction are usually set under the water allocation plan. Monitoring and resource assessments indicate that some early water allocation plans did not prevent or address persistent overuse. A series of amended plans have recently been adopted that set pathways to sustainable extraction through immediate and/or scheduled licensed allocation reductions and measures to mitigate impacts of overuse. Ongoing delay in amending some plans is resulting in persistent overallocation in some areas.   |
| <b>4.</b> Do plans include clearly identified and measurable outcomes?               | General and specific water management objectives are set under the water allocation plans, although these are not underpinned by measurable performance indicators. The Natural Resources Management Act, and State and regional natural resources management plans contain overarching longer-term sustainability objectives.   |
| <b>5.</b> Do plans facilitate trade?   | Water allocation plans clearly facilitate trade, detailing transfer objectives and criteria to support the trade and transfer of licences provisioned under the Natural Resources Management Act. Localised restrictions are detailed in water allocation plans and are generally applied to mitigate environmental and/or third-party impacts, or in recognition of hydrological limitations.   |
| <b>6.</b> Is interception appropriately considered and integrated into the plans?    | Assessment of the risk to resource of relevant interception activities is undertaken in water allocation plan development. Sustainable extraction limits set under water allocation plans account for current and projected volumetric impacts of interception activities. In prescribed surface water areas farm dam development is subject to management zone capacity and density limits and consumptive use requirements. Extraction from stock and domestic bores is licensed in areas of high demand. High impact plantation forestry expansion in the lower south east is currently managed under development regulation, which broadly takes account of forestry impacts on water resources. While interception risk of plantation forestry expansion is identified in relevant water allocation plans, no substantive management arrangements are in place in current water allocation plans. State-wide policy to achieve this integration is awaiting current parliamentary approval of amendments to the Natural Resources Management Act. |

7. Do the plans address surface water and groundwater connectivity as appropriate?	Connectivity is considered in resource assessments and addressed in water allocation plans where relevant. Recognition of potential impact is considered in setting extraction limits. Management approaches include set-back limits for groundwater extractions near watercourses, and consideration of groundwater-sourced baseflow in surface water systems when calculating groundwater extraction limits.
8. Do plans contain accountable environmental water management arrangements?	The Natural Resources Management Act requires water allocation plans to take the needs of the environment into account when determining the quantity of water available for consumptive use. Water allocation plans identify environmental water requirements and set out the principles and rules that allocate water between consumptive users and the environment. Environmental water provisions are typically specified in plans by the setting of extraction limits and conditions, and rules to protect minimum flows at specified times. However, monitoring and evaluation of the effectiveness of the arrangements is not clearly specified or routinely undertaken. The determination, provision and monitoring of environmental water is more sophisticated in new generation water plans.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Resource monitoring requirements are specified under the water allocation plans, although reporting and evaluation is ad hoc and inconsistent. There is little evidence of ecosystem health monitoring. The Natural Resources Management Act specifies the review of water allocation plans every five years (at least), but not the review criteria. Compliance orders for breaches of relevant legislation and water allocation plans provisions are specified under the Natural Resources Management Act. South Australia is currently developing a range of new water reporting tools. A suite of first annual groundwater and surface water status reports for each plan area are being progressively released during 2011–2012.
10. Do the plans deal appropriately with climate change and extremes in inflows or recharge?	Water allocation plans typically include provisions to manage the impacts of periods of low inflows or recharge, but to date have not incorporated potential climate change impacts in a substantive way. Regional assessments of climate change impacts on water resources are currently being undertaken. The five-yearly reviews of water allocation plans provide an adaptive management opportunity to deal with climate change impacts.
11. Is stakeholder engagement in the planning process adequate?	Water allocation plans are developed through a comprehensive program of stakeholder consultation and engagement. Engagement continues from plan pre-development through to plan finalisation and review, usually beyond the requirements of the Natural Resources Management Act. Stakeholder views are typically responded to and trade-offs made between competing demands are embedded in water allocation plan provisions, although these are not routinely transparently explained. Engagement with Indigenous groups to determine Indigenous values is an emerging area.
12. Have identified outcomes been achieved during the reporting period?	Most first generation water allocation plans developed in the early 2000s had limited success in meeting their overarching objectives to keep extraction within sustainable limits, primarily due to heavy extraction and unregulated land-use change in some areas (particularly expansion of plantation forestry in the south east and farm dam development), coupled with the extended period of low rainfall over the past decade. More broadly, it is difficult to determine the extent to which the wider range of identified water allocation plan objectives are being achieved, as reporting of monitoring data is inconsistent and irregular and assessment of plan objectives does not occur in any systematic way. There is no systematic approach to plan review and there is frequent significant delay between review and subsequent amendment (where required) – a particular concern in areas where resource stress persists. Reporting periods of recently adopted plans have not yet been reached and therefore the achievement of objectives cannot be commented on at this stage.



## Glossary and abbreviations

Term	Abbreviation	Definition
Department for Water	DFW	Responsible for the management of the State's water resources.
Groundwater-dependent ecosystem	GDE	
Licensed purpose		Water use in a prescribed area that requires a water licence, e. g. irrigation, public water supply, industrial.
Monitoring, evaluation, reporting and improvement	MERI	
<i>Natural Resources Management Act 2004</i>	NRM Act	Sets legislative requirements for management of State's natural resources, including water management.
Natural Resources Management Board	NRM Board	Statutory Board responsible for land management, animal and pest plant control and water management. Responsible for the development of water allocation plans. There are eight natural resources management boards in South Australia.
Non-licensed purpose		Water use that does not require a water licence, e. g. stock and domestic use, plantation forestry.
Prescribed area		A surface water area, watercourse, lake and/or well declared to be prescribed in accordance with Section 125 of the Natural Resources Management Act; may include a prescribed water resources area, surface water prescribed area, prescribed watercourse or prescribed wells area.
Prescribed water resources area	PWRA	
Prescribed wells area	PWA	
SA Water		South Australian Water Corporation
Water access entitlement		An entitlement to gain access to a share of the consumptive pool to which a licence relates (currently only available for the River Murray Prescribed Watercourse).
Water affecting activity		Activity that requires a permit or approval as determined by a natural resources management plan or a water allocation plan, e. g. drilling a well, constructing a dam, excavating a watercourse.
Water allocation		An allocation of water expressed on a water licence to be used over a specified period of time, usually per water use year.
Water allocation plan	WAP	A plan prepared by a natural resources management board and adopted by the Minister in accordance with the Natural Resources Management Act, which provides the rules for allocation and transfer of water licences, and the rules for the issue of permits and approvals for water affecting activities.
Water licence		Grants the licensee a right to take a water allocation specified on the licence, which may also include conditions on the taking and use of that water; a water licence confers a property right on the holder of the licence and this right is separate from land title.

# Planning areas

## South Australia



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### Location



1	Water Allocation Plan for the Angas Bremer Prescribed Wells Area	298	12	Water Allocation Plan for the Naracoorte Ranges Prescribed Wells Area	320
2	Water Allocation Plan for the Barossa Prescribed Water Resources Area	300	13	Water Allocation Plan for the Noora Prescribed Wells Area	322
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7	Water Allocation Plan for the Marne Saunders Prescribed Water Resources Area	312	18	Water Allocation Plan for the Southern Basins Prescribed Wells Area	332
8	Water Allocation Plan for the Mallee Prescribed Wells Area	310	19	Water Allocation Plan for the Tatiara Prescribed Wells Area	334
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10	Water Allocation Plan for the Morambro Creek and Nyroca Channel Prescribed Watercourses including Cockatoo Lake and the Prescribed Surface Water Area	316	21	Draft Water Allocation Plan for the Eastern Mount Lofty Prescribed Water Resources Area	338
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# ANGAS BREMER PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2001



### Context

The Angas Bremer Prescribed Wells Area (PWA), centred 60 km south-east of Adelaide, covers the unconfined and confined aquifers found in the area. Extraction for irrigation, recreation and town water is drawn from the lower salinity confined aquifer. Consumptive water use is heavily dominated by irrigation, primarily viticulture, horticulture and pasture. Expansive irrigation and a history of over extraction from the confined aquifer have resulted in increasing water salinity across much of the prescribed wells area. Significant allocation reductions occurred before adoption of the current plan. Preventing and managing the impacts of increasing salinity and potential waterlogging associated with irrigation drainage is the key management driver. The Angas Bremer Prescribed Wells Area has been incorporated into the Eastern Mount Lofty Ranges Prescribed Water Resources Area. Consultation on the Draft Eastern Mount Lofty Ranges Water Allocation Plan (which includes policy for the Angas Bremer Prescribed Wells Area) closed in August 2011.

## Findings

1. Is there a plan in place?	Yes	The plan was finalised and adopted in January 2001. The first generation plan was reviewed in 2005. The plan is currently under incorporation into a new Eastern Mount Lofty Ranges WAP.
2. Does the plan include key assessments?	To some extent	All key assessments were undertaken during the preparation of the plan. The key risks to resources and needs of dependent ecosystems are clearly identified. There is very limited assessment of community values and the assessment of economic value of water is qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify overuse. The extraction limit is set at the current level of allocation, reflecting previous reductions in allocations and consequent stabilisation of water levels.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes broad resource sustainability and use efficiency objectives. Monitoring arrangements are not comprehensive. A lack of performance indicators inhibits the transparent and ongoing assessment of the plan objectives.
5. Does the plan facilitate trade?	Yes	Trade can occur in accordance with provisions in the plan and the NRM Act. There are a number of barriers to trade including salinity threshold restrictions. These barriers are justified on resource protection grounds given the degraded and fragile state of the resource in the PWA.
6. Is interception appropriately considered and integrated into the plan?	Yes	There are no significant current or projected interception activities in the area. Stock and domestic extractions account for a very small proportion of extraction and are not expected to increase significantly in the future.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The watercourses found in the PWA provide critical freshwater recharge to shallow aquifers, and aquifers discharge to wetlands. Connectivity is managed by preventing further extraction near rivers and a requirement to maintain groundwater levels at wetland sites.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Water level and quality conditions are set under the plan to maintain groundwater-dependent ecosystems in the condition and distribution at which they were found on plan adoption. Environmental water requirements are provided through limiting extraction and there are attempts to improve water quality through salinity mitigation.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Resource and allocation monitoring requirements are set out under the plan and there is evidence that extensive monitoring has been occurring. Evaluation and public reporting requirements are not specified in the plan and only limited reporting of monitoring has occurred to date. No ecosystem health monitoring provisions are specified. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	No	No consideration has been given in the WAP to the impact of climate change or variability on the resource. The confined resource is largely disconnected from rainfall variability. As such, the direct risk to the resource from climate variability and change is low.
11. Is stakeholder engagement in the planning process adequate?	Yes	A range of public consultation requirements for plan development were specified under the <i>Water Resources Act 1997</i> . However, documented evidence of engagement in the development of the first generation plan is no longer available. To date, a comprehensive engagement process has been undertaken in the development of the new Draft Eastern Mount Lofty Ranges PWRA WAP (into which the Angas Bremer PWA has been incorporated).
12. Have identified outcomes been achieved during the reporting period?	To some extent	Plan objectives were not specifically assessed during the review of the first generation plan. However, recent resource assessments indicate that a sustainable rate of groundwater use appears to have been achieved (water levels have recovered and stabilised). However, groundwater salinity levels continue to rise, suggesting the impacts of water use on the resource have not been minimised. There is no information available to assess achievement of environmental or use efficiency objectives.

# BAROSSA PRESCRIBED WATER RESOURCES AREA



## WATER ALLOCATION PLAN 2009



### Context

The Barossa Prescribed Water Resources Area, centred 60 km north-east of Adelaide, includes the surface water, watercourses and sedimentary and fractured rock aquifers that occur in the area. The majority of surface water runoff and groundwater recharge occurs in the upper reaches of the area, predominately driven by winter rainfall. All resources are highly developed, with the majority of extraction sourced from underground water and surface water runoff stored in farm dams. An increasing volume of water used for irrigation is imported from the Murray River. Consumptive water use includes irrigation (primarily wine grapes), industry and stock and domestic uses. Protecting the fully allocated resources from overuse and mitigating third-party impacts of extraction and use are the key management drivers for the area.

## Findings

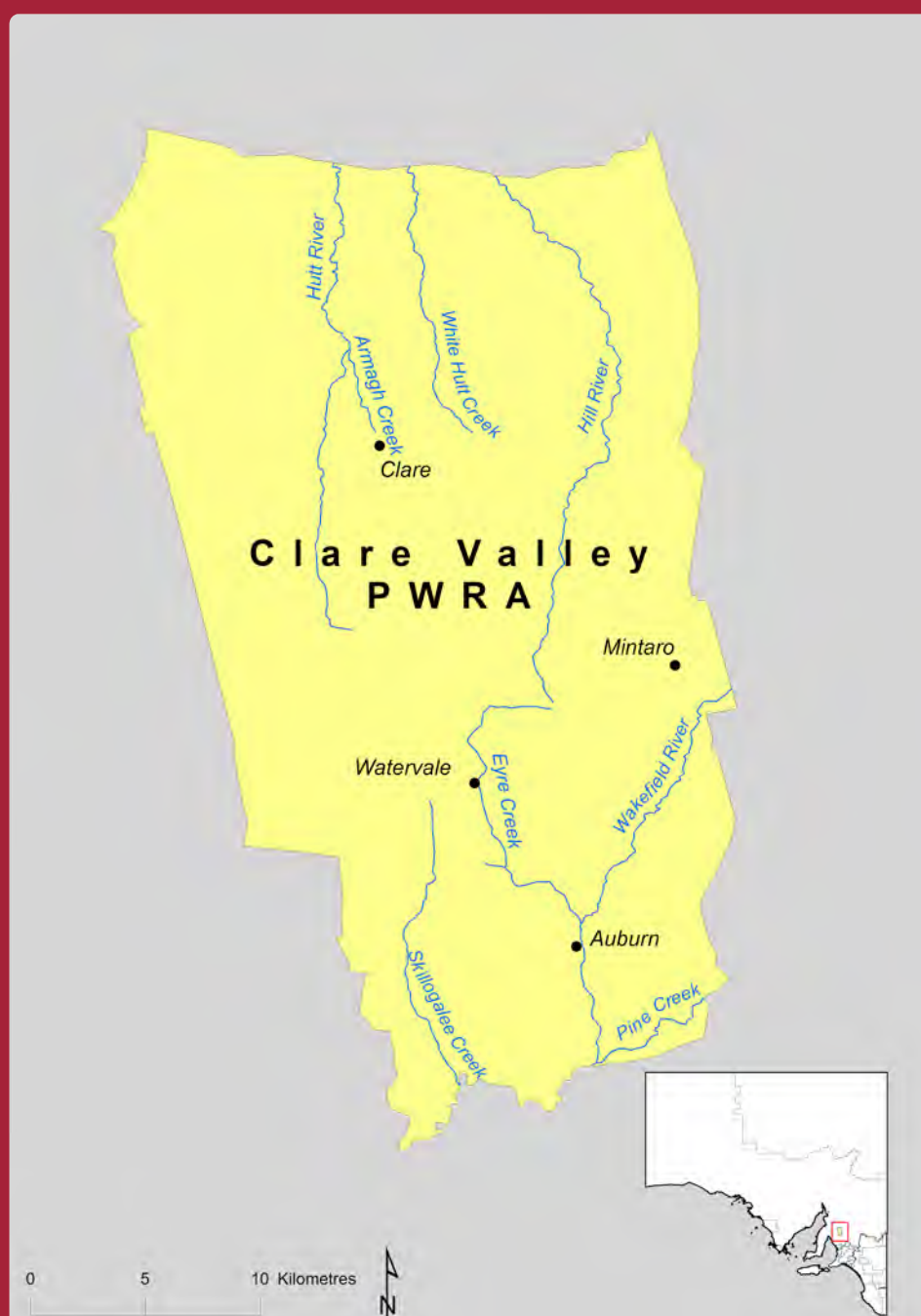
1. Is there a plan in place?	<b>Yes</b>	This second generation plan was adopted in June 2009 and will be reviewed within five years of adoption.
2. Does the plan include key assessments?	<b>To some extent</b>	All key assessments were undertaken during the preparation of the plan, although there is limited information on the quantity of surface water interception. Assessment of community and economic value of water in the area is limited.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	<b>To some extent</b>	The plan does not comprehensively prevent overuse. Some areas of surface water and watercourse resource stress and historical declining groundwater levels are identified in the plan, coupled with increasing demand. The plan sets the extraction limit at the current estimated level of extraction while further information on current allocation volumes is obtained following volumetric conversion of licences under the plan.
4. Does the plan include clearly identified and measurable outcomes?	<b>To some extent</b>	Allocation, transfer and permit objectives are set, underpinned by operating principles, actions and monitoring arrangements. Measurement of progress is hindered by a lack of clear performance indicators and provisions for ecosystem monitoring.
5. Does the plan facilitate trade?	<b>Yes</b>	Trade can occur in accordance with provisions in the plan and legislation. Barriers to trade are justified to protect other users and/or environmental flows. Creation of tradeable volumetric allocations in the PWRA allows for expanded trading options across the area.
6. Is interception appropriately considered and integrated into the plan?	<b>To some extent</b>	Water captured by farm dams is accounted for in the development of management zone capacity limits. The current level of dam capacity across the PWRA is at the limits set under the plan. It is noted that there is limited information on the quantity of current surface water interception.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	<b>Yes</b>	The plan addresses significant connectivity found across the PWRA by setting extraction and well density limits and buffer zones for well construction near watercourses. Connections are highly ecologically significant, particularly in maintaining watercourse baseflows and permanent pools in low flow periods. The ongoing potential for overuse in the PWRA presents a particular threat to ecosystems dependent on resource connectivity.
8. Does the plan contain accountable environmental water management arrangements?	<b>To some extent</b>	The plan sets out objectives and explicit environmental flow requirements for surface water and watercourses. These flow requirements are to be met through a range of measures including extraction limits and controls on the development of water affecting activities. Environmental health monitoring appears limited.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	<b>To some extent</b>	A monitoring and reporting framework is set out under the plan. The recently released first annual Groundwater Status Report demonstrates extensive groundwater monitoring. However, adequacy of surface water monitoring is difficult to assess given the limited reporting of monitoring under the previous plan. Improvement to water-dependent ecosystem monitoring is identified in the plan. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	<b>To some extent</b>	The plan has been developed with consideration to the risk to the environment and other users from periods of low rainfall, inflow and recharge and includes measures to manage these risks. The plan notes further monitoring and resource assessment is required to better estimate and account for climate change and variability impacts.
11. Is stakeholder engagement in the planning process adequate?	<b>Yes</b>	The development of the plan involved extensive engagement with stakeholders throughout the planning process, in line with a detailed consultation plan. Indigenous values were not identified.
12. Have identified outcomes been achieved during the reporting period?	<b>To some extent</b>	No explicit assessment of plan objectives has been undertaken. However, resource reports indicate that the resource sustainability objectives of the first generation WAP were not comprehensively achieved, with persistent declines in groundwater levels and increasing expansion of surface water diversion. The plan was subsequently amended in 2009 to address these issues. The recently released Groundwater Status Report indicates the identified adverse groundwater trends present a low risk to the resource in the medium term.



# CLARE VALLEY PRESCRIBED WATER RESOURCES AREA



## WATER ALLOCATION PLAN 2009



### Context

The Clare Valley Prescribed Water Resources Area, centred 100 km north of Adelaide, includes the surface water, watercourses and sedimentary and fractured rock aquifers that occur in the area. The majority of surface water runoff and groundwater recharge is driven by winter rainfall. Most watercourses are ephemeral. All resources are highly developed, with the majority of extraction sourced from underground water and captured and stored surface water runoff. Consumptive water use includes irrigation (primarily wine grapes), industry and stock and domestic uses. Protecting the fully allocated resources from recurrent overuse and mitigating third-party impacts of extraction and use are the key management drivers for the area.

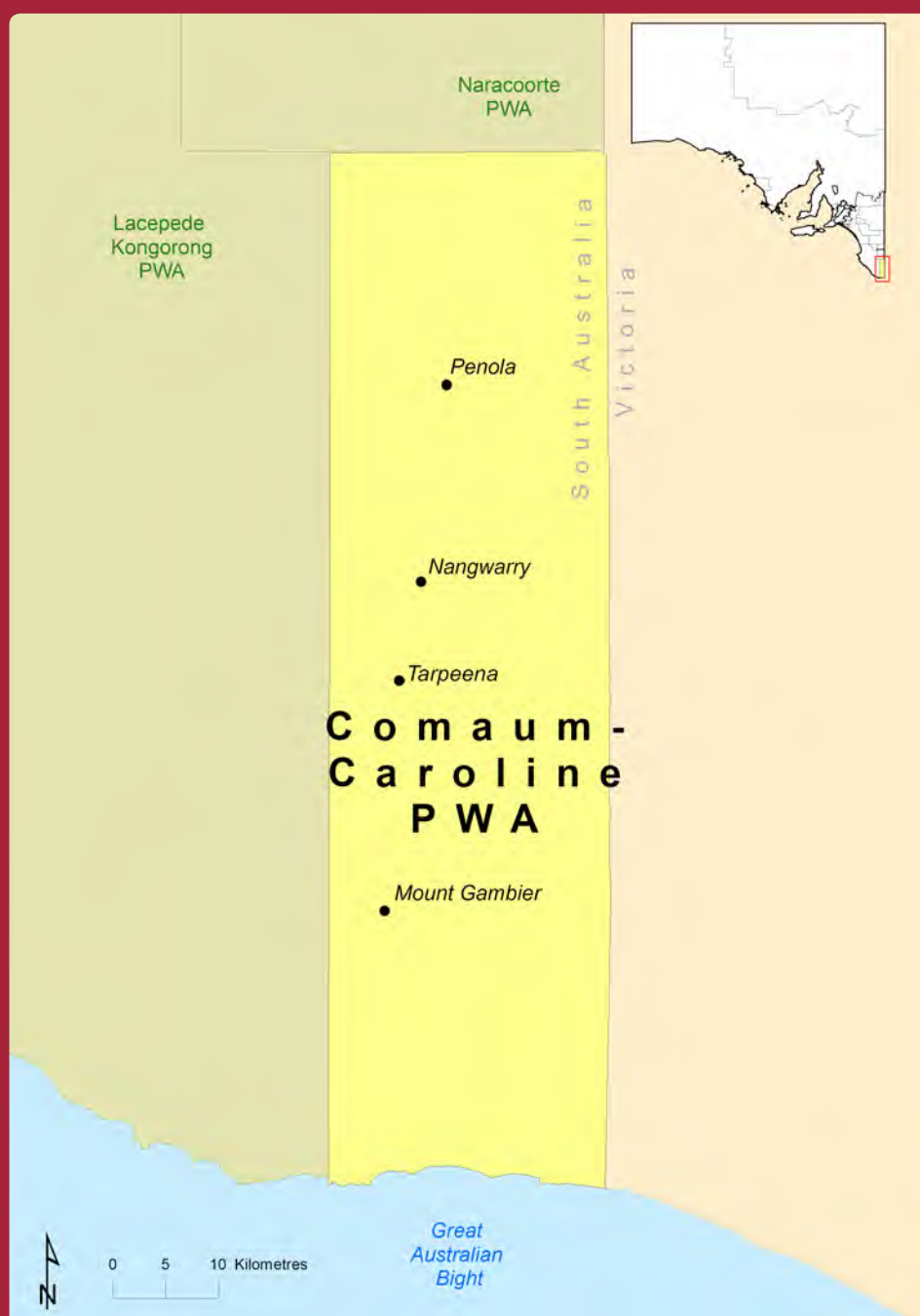
## Findings

1. Is there a plan in place?	Yes	The second generation plan was adopted in May 2009. The plan will be reviewed within five years of adoption.
2. Does the plan include key assessments?	Yes	All key assessments were undertaken during the preparation of the plan. The assessment of social and economic value is qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan notes some areas of surface water and watercourse resource stress and past over extraction of groundwater. Most management zones were overallocated. The plan sets new extraction limits at 5% less than previous limits. There remains considerable scientific uncertainty around the sustainable extraction limit for the fractured rock aquifers and ephemeral streams in this area.
4. Does the plan include clearly identified and measurable outcomes?	Yes	Allocation, transfer and permit objectives are set, underpinned by operating principles, actions and monitoring arrangements. Measurement of progress is hindered by the lack of clear performance indicators.
5. Does the plan facilitate trade?	To some extent	Trade can occur under the plan, and in accordance with the NRM Act. Barriers to trade exist in the plan, with most justified to protect other users and/or environmental flows. Restricting trade to the extracted part only of surface water and watercourse allocations may inhibit flexibility in the local market.
6. Is interception appropriately considered and integrated into the plan?	Yes	Water captured by farm dams is accounted for in the development of management zone and sub-zone capacity limits. The current level of dam capacity across the PWRA is at the capacity limits set under the plan. Bypassing of specified low flows from licensed dams is required. Stock and domestic groundwater extractions are relatively low.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan accounts for strong and ecologically important surface water, watercourse and underground water resource connectivity by setting volumetric extraction and bore density limits and set-back distances between wells and for wells near permanent pools or flowing streams.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental health targets are identified. The plan sets out explicit environmental flow requirements for surface water and watercourses. These flow requirements are to be met through a range of measures including volumetric extraction limits, bypassing of flows from dams in low flow conditions and controls on the development of water affecting activities.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	A detailed resource monitoring framework is set out under the plan, although an ecosystem monitoring program is not detailed. The first annual Groundwater Status Report has been released and the equivalent Surface Water Status Report is to be released in 2012. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan has been developed with consideration to the risk to the environment and other users from periods of low rainfall, inflow and recharge and includes measures to manage these risks. The climate change risks are noted in the plan but further work is required to quantify the impact.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved extensive engagement with stakeholders, in line with the requirements under the NRM Act and a detailed consultation plan. Indigenous values were not identified.
12. Have identified outcomes been achieved during the reporting period?	To some extent	No explicit assessment of plan objectives has been undertaken. However, resource reports indicate that the overarching resource sustainability objectives of the first generation plan were not comprehensively achieved, with areas of persistent resource stress. The new plan, adopted in May 2009, requires allocation reductions and more rigorous resource development regulation to meet resource sustainability objectives. The most recent Groundwater Status Report indicates that groundwater resources are now at low risk in the medium term.

# COMAUM-CAROLINE PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2001



### Context

The Comaum-Caroline Prescribed Wells Area, located in the lower south-east corner of the State, covers the resources of the unconfined and confined aquifers found in the area. The groundwater resources across the south east are highly developed (around 90 per cent of available water is allocated). The unconfined aquifer provides the majority of commercial extraction within the area, with the confined aquifer providing reliable high quality town and domestic water supplies. Consumptive water use is dominated by irrigation (primarily pasture, vines and potatoes). Plantation forestry is also a significant water affecting activity in the prescribed wells area. Remediating existing and preventing further resource stress – particularly that associated with the impacts of plantation forestry – and securing critical needs supplies are the key management drivers.



## Findings

1. Is there a plan in place?	<b>Yes</b>	The plan was adopted in 2001 and reviewed in 2004. An amended plan, to be incorporated into a new WAP for the Lower Limestone Coast PWA is currently under long running development (over seven years).
2. Does the plan include key assessments?	<b>To some extent</b>	Relevant assessments were undertaken during the preparation of the plan. Assessments of community and economic values of the water resource are qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	<b>No</b>	The plan notes that some areas of the unconfined aquifer are subject to ongoing water level decline associated with past over extraction. Extraction limits are set under the plan to preserve storage at current levels and resource condition triggers are detailed. However, the unconfined aquifer remains at risk of overuse given that resource decline continues in highly used areas under current levels of extraction and climatic influences. Recent resource status reports indicate that these resource stress 'hot spots' persist.
4. Does the plan include clearly identified and measurable outcomes?	<b>Yes</b>	The plan provides a detailed set of objectives, operating principles and resource condition triggers. Lack of specific performance indicators inhibits ongoing assessments of plan objectives.
5. Does the plan facilitate trade?	<b>To some extent</b>	Trade can occur in accordance with the plan and NRM Act. The plan includes restriction on trade between management areas to prevent concentration of extraction. These rules appear overly restrictive, given these areas are specified by cadastral units, rather than reflective of hydrogeology and/or resource development. The ongoing specification of licences based on irrigable area rather than volume is also preventing expansion of an efficient water market.
6. Is interception appropriately considered and integrated into the plan?	<b>To some extent</b>	Estimates of plantation forestry recharge interception are included in the allocation limit assessments, although the plan does not include provisions to manage the impacts of any expansion. The 2004 inclusion of commercial forestry as a water affecting activity and the introduction of forestry thresholds requiring an off-setting allocation has helped to mitigate the impacts of forestry expansion. However, these measures are not yet integrated into the planning and allocation framework.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	<b>To some extent</b>	There are some areas of significant connection between the unconfined aquifer and streams, lakes and wetlands in the area. Unconfined aquifer recharge is strongly driven by direct rainfall infiltration. Management of connectivity through the plan's extraction limits is designed to maintain current discharge arrangements.
8. Does the plan contain accountable environmental water management arrangements?	<b>To some extent</b>	The plan provides a detailed description of GDEs in the PWA. However, environmental water requirements are only described qualitatively as hydrologic parameters to broadly maintain ecosystems in their current condition, rather than to meet specific ecological requirements.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	<b>To some extent</b>	A monitoring framework is set out under the plan and there is evidence that generally well-targeted resource monitoring is occurring across the PWA. However, resource reporting to date has been ad hoc. No ecosystem monitoring program is identified. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	<b>To some extent</b>	Resource condition triggers are responsive to periods of low rainfall recharge. There is no consideration of the long-term impacts of climate change in the plan.
11. Is stakeholder engagement in the planning process adequate?	<b>Yes</b>	The development of the plan involved engagement with stakeholders, in line with legislative requirements and a consultation plan. To date, Indigenous values have not been identified.
12. Have identified outcomes been achieved during the reporting period?	<b>To some extent</b>	Plan objectives have not been specifically assessed during the plan review. However, recent resource assessments indicate that the overarching sustainability objectives have not been fully achieved, with persistent declines in water levels in a number of areas of the PWA, and some incidence of increasing salinity. Ongoing area-based specification of licences is a disincentive to trade and water use efficiency. Amendments to the current plan will include conversion to volumetric allocations.



# FAR NORTH PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2009



### Context

The Far North Prescribed Wells Area covers a large part of the State and includes the encompassed artesian and subartesian underground water resources of the Great Artesian Basin in South Australia. Located in the far north-eastern corner of the State, the arid climate of the area is characterised by very low average annual rainfall and very high summer temperatures. The majority of the underground water recharge occurs in the Great Artesian Basin recharge zones in eastern Queensland and New South Wales. The majority of extraction in the area is from the artesian aquifer, and is the major water supply for mining, the pastoral industry and domestic purposes and to support the expanding tourism industry. A number of natural artesian mound springs of high ecological, cultural and social value occur in the area, many of which are listed as threatened ecological communities under the *Environmental Protection Biodiversity and Conservation Act 1999*. A cross-jurisdictional artesian bore capping program implemented over the past decade has seen improvement in pressure levels across the basin. Maintenance of the basin potentiometric surface and water quality are the primary resource management drivers.

## Findings

1. Is there a plan in place?	Yes	Following a delayed development, the plan was adopted in February 2009. The plan will be reviewed within five years of adoption.
2. Does the plan include key assessments?	Yes	All key assessments were undertaken during the preparation of the plan. There is limited assessment of the economic value of water-dependent activities.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan prevents overuse by setting management zone volumetric allocation limits to protect current artesian aquifer pressure and defining buffer zones for well development.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan details objectives and operating principles and actions designed to achieve these objectives. However, measurement of progress is hindered by lack of clear performance indicators and relatively limited monitoring arrangements.
5. Does the plan facilitate trade?	To some extent	Trade can occur in accordance with provisions in the plan and legislation. Preventing trade between different industries is justified on resource and/or environment protection grounds and in the context of the critical supply needs in the arid environment.
6. Is interception appropriately considered and integrated into the plan?	Yes	Groundwater extraction for stock and domestic purposes and mining accounts for the majority of extraction in the area. Both mining and stock and domestic extractions are licensed.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	There is limited groundwater/surface water connectivity identified. Primary connectivity for the confined system is the mound spring discharge. Maintaining discharge to springs is a management objective of the plan.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan sets out environmental objectives and details environmental water requirements (currently understood to a limited extent). A range of measures designed to protect the ecologically significant mound springs and wetlands are in place. The plan details current and planned monitoring arrangements for assets.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	A resource and allocation monitoring framework is set out under the plan, although it is noted that current monitoring arrangements can be improved technically and spatially. Monitoring data will be evaluated and reported at the time of the plan review and through planned annual groundwater status reports. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan notes the potential impact of variability and climate change, with limited medium term impact on the resource. Climate change driven changes in future rainfall patterns across the basin recharge zones will impact future artesian pressure, although this will only be observed over very long timeframes.
11. Is stakeholder engagement in the planning process adequate?	Yes	Development of the plan involved extensive engagement with stakeholders through the planning process, incorporating the interests and values of the identified stakeholders.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan was adopted in March 2009. Resource status reporting has not yet occurred. Public reporting of monitoring and evaluation of plan outcomes is not scheduled until the 2014 plan review.

# LACEPEDE KONGORONG PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2001



### Context

The Lacepede Kongorong Prescribed Wells Area, located in the lower south-east of the State, covers the resources of the unconfined and confined aquifers found in the area. The groundwater resources across the south east are highly developed (around 90 per cent of available water is allocated). The unconfined aquifer provides the majority of commercial extraction within the area, with the confined aquifer providing reliable high quality town and domestic water supplies. Consumptive water use is dominated by irrigation (primarily pasture, vines and potatoes). Plantation forestry and pulp and paper milling are significant water affecting activities in some parts of the area. Remediating existing and preventing further resource stress – particularly that associated with the impacts of plantation forestry – and securing critical needs supplies are the key management drivers.

## Findings

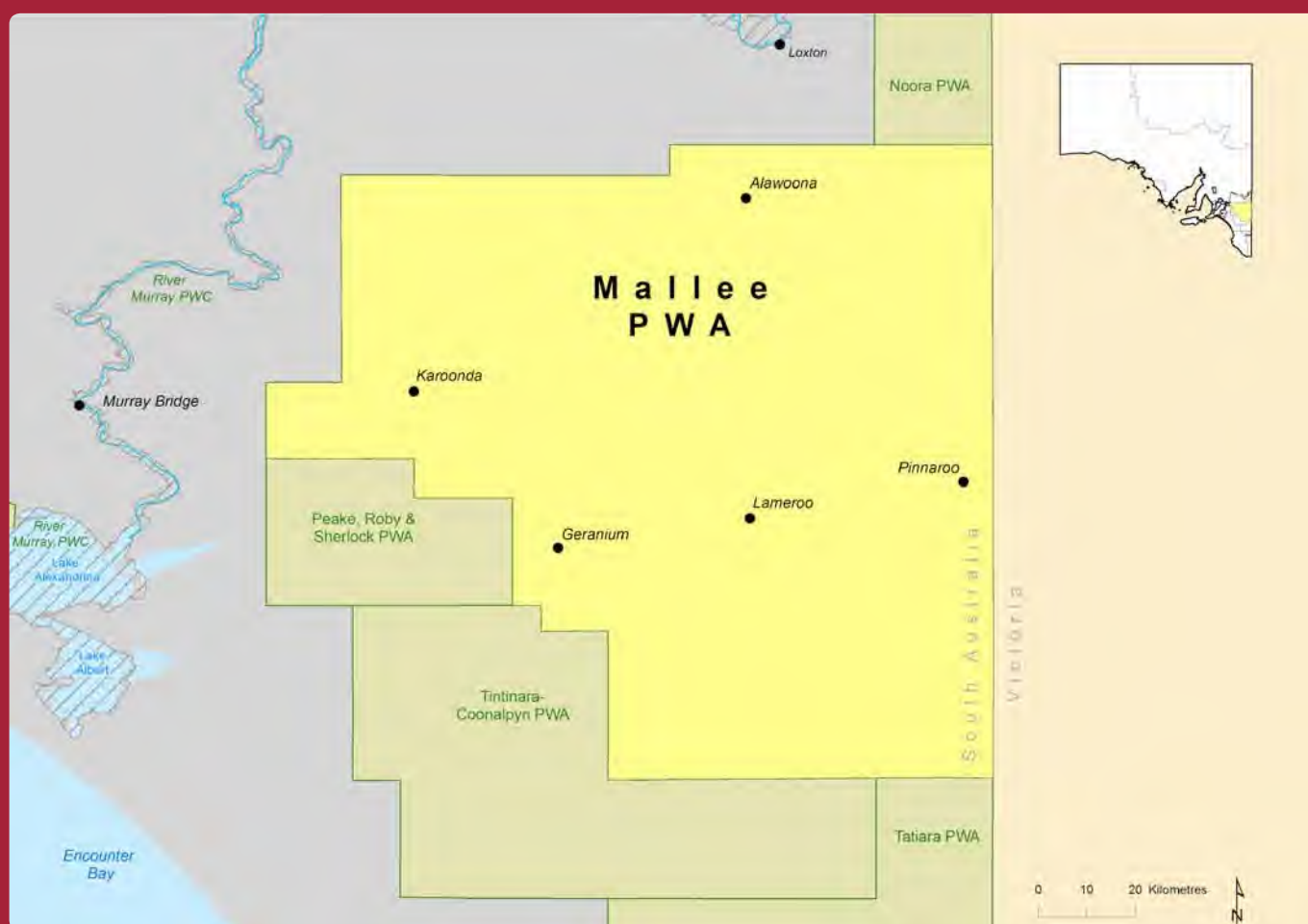
1. Is there a plan in place?	<b>Yes</b>	The plan was adopted in 2001 and reviewed in 2004. An amended plan, to be incorporated into a new WAP for the Lower Limestone Coast PWA, is currently under long running development (over seven years).
2. Does the plan include key assessments?	<b>To some extent</b>	All key assessments were undertaken during the preparation of the plan. The assessment of community and economic values of water resource is qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	<b>Yes</b>	With the exception of the Kingston Management Area, overuse is not identified in the plan. Extraction limits are set for each management area, based on allocating average annual recharge to protect current storage and discharge to ecosystems. Resource condition triggers allow for identification of overuse. Recent resource reports indicate some resource stress 'hot spots' have emerged in the unconfined aquifer, largely associated with the rapid expansion of plantation forestry.
4. Does the plan include clearly identified and measurable outcomes?	<b>Yes</b>	The plan provides a detailed set of objectives, operating principles and resource condition triggers. Lack of specific performance indicators inhibits ongoing assessments of plan objectives.
5. Does the plan facilitate trade?	<b>To some extent</b>	Trade can occur in accordance with the plan and NRM Act. The plan includes a restriction on trade between management areas to prevent concentration of extraction. These rules appear overly restrictive, given these units are specified by cadastral units, rather than reflective of hydrogeology and/or resource development. The ongoing specification of licences based on irrigable area rather than volume is also preventing expansion of an efficient water market.
6. Is interception appropriately considered and integrated into the plan?	<b>To some extent</b>	Estimates of plantation forestry recharge interception are included in the allocation limit assessments. For the unconfined aquifer, recent resource reports indicate some resource stress 'hot spots' have emerged, which are associated with rapid expansion of plantation forestry. The 2004 inclusion of commercial forestry as a water affecting activity and the introduction of forestry thresholds requiring an off-setting allocation has helped to mitigate the impacts of forestry expansion. These measures are not integrated into the planning and allocation framework.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	<b>Yes</b>	The connection between undeveloped surface water resources and the underground water resources varies across the area. The plan hydrogeological assessment found that there is a low risk of impact on connected resources.
8. Does the plan contain accountable environmental water management arrangements?	<b>To some extent</b>	The plan provides a detailed description of GDEs in the PWA. Environmental water requirements are only described qualitatively as the hydrologic parameters to broadly maintain ecosystems in their current condition, rather than to meet specific ecological needs.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	<b>To some extent</b>	A monitoring framework is set out under the plan and generally well-targeted resource monitoring is occurring across the PWA. However, reporting to date has been ad hoc. No ecosystem monitoring program is identified. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	<b>To some extent</b>	Resource condition triggers are responsive to periods of low rainfall recharge. There is no consideration of the long-term impacts of climate change in the plan. Broad adaptive management strategies are set out at the regional level.
11. Is stakeholder engagement in the planning process adequate?	<b>Yes</b>	The development of the plan involved engagement with stakeholders, in line with legislative requirements and a consultation plan. To date, Indigenous values have not been identified.
12. Have identified outcomes been achieved during the reporting period?	<b>To some extent</b>	Plan objectives have not been specifically assessed during the plan review. Recent resource assessments indicate that the overarching productive and ecosystem sustainability objectives have not been fully achieved. It appears that demand projections and allocation limits set under the plan were inadequate, and have been undermined by the rapid expansion of plantation forestry coupled with a period of low rainfall recharge. Ongoing area-based specification of licences is a disincentive to trade and water use efficiency. Amendments to the current plan will include conversion to volumetric allocations.



# MALLEE PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2000



### Context

The Mallee Prescribed Wells Area, located 150 km east of Adelaide, covers the confined and unconfined aquifers of the Murray–Darling Basin that are found in the area. Water in these aquifers flows slowly towards the River Murray, which ultimately drains all aquifers in the basin. Consumptive water use is from the confined aquifer and is heavily dominated by irrigation, primarily potatoes, lucerne, cereal and nut and olive trees. Townships within the prescribed wells area rely on reticulated supply sourced from the aquifer. Key pressures in the prescribed wells area are managing the ancient resource to sustainably meet increasing irrigation demand and preventing unacceptable seasonal drawdown impacts.

## Findings

*Note: Report Card assessment based on amended Draft Plan.*

1. Is there a plan in place?	Yes	Public consultation on the draft amended plan closed in January 2011 and adoption of the final plan is expected in 2012. This plan will replace the first generation plan adopted in 2000 and reviewed in 2005.
2. Does the plan include key assessments?	Yes	All key assessments were undertaken during the preparation of the plan, including identification of risks to resources. There are no identified GDEs in the PWA. Assessment of economic value of water in the PWA is qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse is not identified in the plan, but there are some areas of localised high demand and strong seasonal drawdowns, particularly in drier years. Overuse is prevented by the setting of an area-wide extraction limit based on modelled components of recharge, lateral through flow and mining of storage. Extraction limits are also set for each management zone to prevent concentration of irrigation and aquifer drawdown. The trade-off between long-term resource depletion and meeting growing irrigation demand is made under the plan.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan sets out objectives, operating principles and monitoring arrangements, underpinning the provisions of the plan. Lack of specific performance indicators inhibits ongoing assessments of plan objectives.
5. Does the plan facilitate trade?	Yes	The plan notes that trade between management areas is prohibited or conditional, to prevent unacceptable drawdown impacts associated with concentration of extraction in some areas. The draft amended plan will lift the current overly restrictive cadastral basis for trade between management areas and will include provision of volumetric allocations.
6. Is interception appropriately considered and integrated into the plan?	Yes	Stock and domestic extractions are the only significant interception activity and are expected to remain stable or decline.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Not applicable	There are no significant surface water resources in the PWA, and the potential impact of connection to surface water resources outside the PWA is low.
8. Does the plan contain accountable environmental water management arrangements?	Not applicable	No GDEs are identified in the PWA. There are no areas of aquifer discharge to the surface, and water levels are too deep to support terrestrial vegetation or wetlands.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	A resource and allocation monitoring framework is set out under the plan, and there is well-targeted resource monitoring occurring across the PWA. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The deep and confined resource is largely disconnected from rainfall variability. As such, risk to resource from climate variability and change is low. Seasonal variability in demand is managed through plan extraction limits. Seasonal drawdown is closely monitored.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved engagement with stakeholders, in line with legislative requirements and a consultation plan. To date, Indigenous values have not been identified.
12. Have identified outcomes been achieved during the reporting period?	To some extent	There is no explicit reporting of plan objectives. Recent resource reports demonstrate that the current plan has not comprehensively met the objective to maintain access to water for all users in each management area. It is noted that recent larger than average drawdowns were associated with higher irrigation demand during the recent drought. Cost sharing arrangements are in place to help affected users deepen well infrastructure. Management proposals in the draft amended WAP aim to prevent further concentrations of extraction through consolidation and redefinition of management area boundaries and introduction of resource condition triggers that define the acceptable level of drawdown.

# MARNE SAUNDERS PRESCRIBED WATER RESOURCES AREA



## WATER ALLOCATION PLAN 2010



### Context

The Marne Saunders Prescribed Water Resources Area is located on the western boundary of the Murray–Darling Basin and covers all surface water, watercourse and groundwater resources in the area. The majority of surface water runoff and groundwater recharge occurs in the upper reaches of the area and is highly seasonally variable. All water resources are highly developed (with the exception of the fractured rock aquifer), with the majority of extraction from the limestone aquifer and captured and stored surface water runoff. Consumptive water use includes irrigation (primarily wine grapes and lucerne hay) and stock and domestic uses. A number of springs of high ecological value occur in the lower reaches of the area. Managing the impact of the rapid growth in diversion and extraction, particularly in the numbers and capacity of farm dams, is the primary management driver.

## Findings

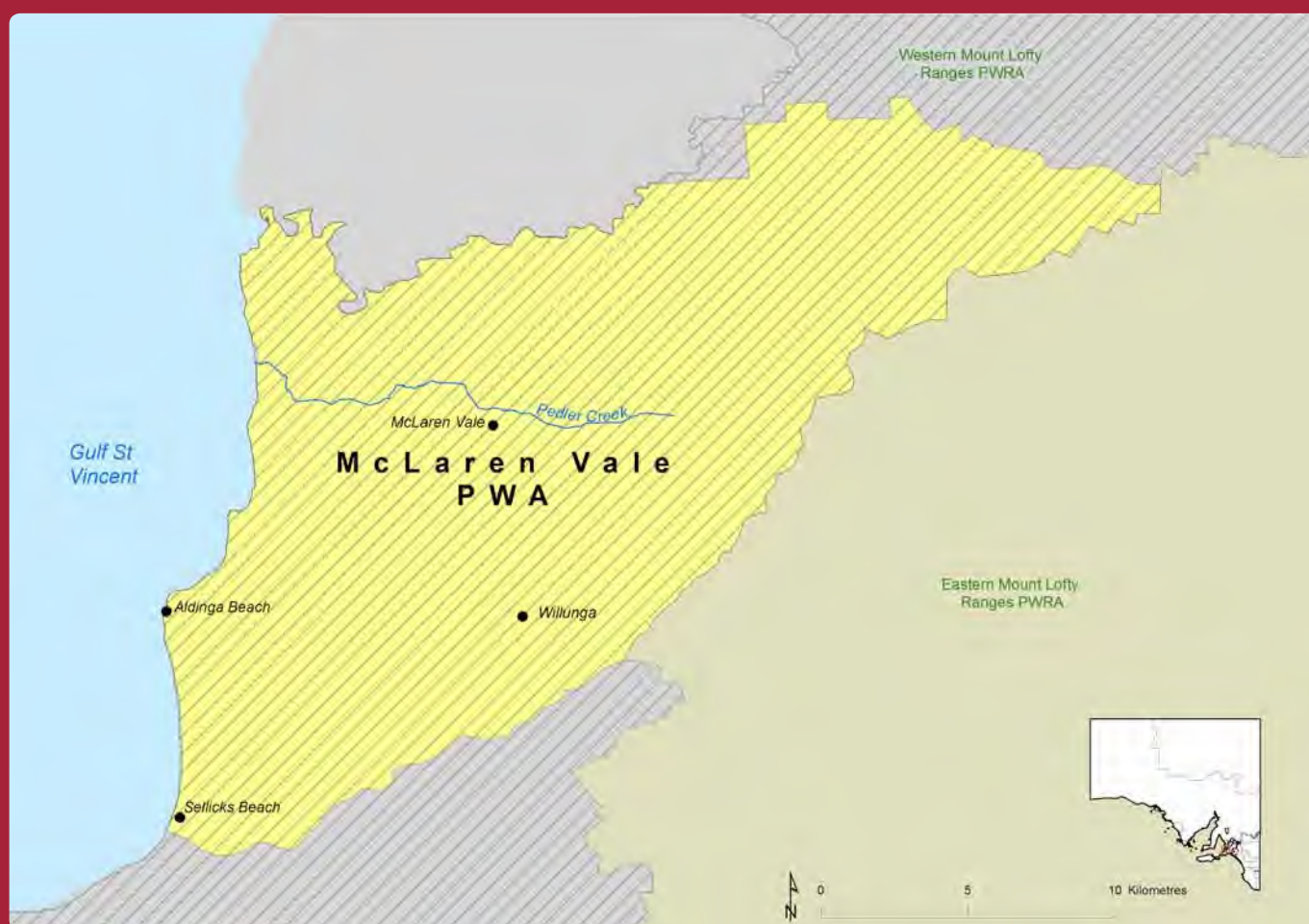
1. Is there a plan in place?	Yes	The plan was adopted in January 2010. The plan will be reviewed within five years of adoption.
2. Does the plan include key assessments?	Yes	All key assessments were undertaken during the preparation of the plan, with thorough hydrological and environmental assessments. Assessment of community and economic value of water in the area is largely qualitative.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan notes that parts of the system have been overused from past over diversion and extraction, due in large part to rapid growth in numbers and capacity of farm dams. Regulation applied outside the plan has reduced entitlements for existing users. Extraction and dam capacity limits are set in the plan to maintain the current ecosystems watering regime. Resource condition triggers and adaptive management measures to protect low flows are included.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan provides a detailed hierarchy of measureable objectives, underpinned by clear operating principles, indicators, actions and monitoring arrangements.
5. Does the plan facilitate trade?	Yes	Trade can occur in accordance with provisions in the plan and the NRM Act. Barriers to trade are justified on physical constraint and environment protection grounds.
6. Is interception appropriately considered and integrated into the plan?	Yes	Water captured by farm dams and extracted from bores for stock and domestic purposes is accounted for in the development of management zone sustainable extraction limits. The plan details runoff sharing provisions to manage existing dam capacity constraints. A requirement for the return of specified low flows is currently suspended.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan accounts for the level of connection in setting extraction and diversion limits and sets integrated management principles for the highly ecologically significant surface water, watercourse and groundwater connections across the area.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan addresses environmental water requirements through limiting extraction, adaptively managing flow arrangements and controlling the development of water affecting activities. These measures are (in part) designed to protect the identified environmental assets in their current condition.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A comprehensive resource and allocation monitoring framework is set out under the plan, however monitoring results are not yet reported. Overarching compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan has been developed with consideration to the risk to the environment and other users from periods of low rainfall, inflow and recharge and includes measures and response triggers to manage these risks. Potential long-term impacts of climate change are to be monitored and assessed in future plan reviews.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved extensive and transparent engagement with stakeholders throughout plan development, well beyond the legislative requirements and consistent with a detailed consultation plan. Indigenous values have not yet been identified.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan was adopted in January 2010. While it appears that an appropriate MERI framework is in place to measure performance against plan objectives, it is too early to assess the extent to which objectives are achieved.



# MCLAREN VALE PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2007



### Context

The McLaren Vale Prescribed Wells Area, located 40 km south of Adelaide, covers the developed resources of the unconfined and confined aquifers found in the area. The confined aquifers provide for the great majority of extraction within the prescribed wells area, with licensed water use dominated by irrigation (primarily wine grapes and almonds). The underground water resources of the area are fully allocated. Remediating existing and preventing further resource stress are the key management drivers. The McLaren Vale Prescribed Wells Area has been incorporated into the Western Mount Lofty Ranges Prescribed Water Resources Area. This plan will be included as an attachment to a new Western Mount Lofty Ranges Water Allocation Plan currently under development.

## Findings

1. Is there a plan in place?	<b>Yes</b>	This second generation plan was adopted in February 2007. The plan will be reviewed five years after adoption.
2. Does the plan include key assessments?	<b>To some extent</b>	Some key assessments were undertaken during the preparation of the plan. Assessment of social and economic values is limited.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	<b>To some extent</b>	The plan does not comprehensively prevent overuse. Previous adjustment to water allocations and reduced demand for groundwater has seen some stabilisation of historical falling groundwater levels and rising salinity. The extraction limits set under the plan are based on estimated sustainable yield, to maintain current water levels and quality. Despite extraction limits being significantly greater than current average use, areas of stress persist.
4. Does the plan include clearly identified and measurable outcomes?	<b>Yes</b>	Allocation, transfer and permit objectives are set, underpinned by operating principles, actions and monitoring arrangements. Measurement of progress is hindered by lack of clear performance indicators.
5. Does the plan facilitate trade?	<b>Yes</b>	Trade can occur under the plan and in accordance with the NRM Act. Barriers to trade are justified to protect GDEs and the resource from further stress.
6. Is interception appropriately considered and integrated into the plan?	<b>To some extent</b>	Unregulated extraction for unlicensed stock and domestic use is a growing interception risk for the prescribed resources, although some metering of this extraction is required under the plan. Given persistent stress in some areas, any increase in unlicensed extraction could undermine resource sustainability.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	<b>To some extent</b>	Connections found in the area are highly ecologically significant, particularly in maintaining watercourse baseflows and wetlands in low flow periods. The plan seeks to maintain current groundwater discharge and recharge regimes through extraction limits and buffer zones near watercourses. Greater quantification of connectivity will allow for more adaptive conjunctive management.
8. Does the plan contain accountable environmental water management arrangements?	<b>To some extent</b>	The plan provides a qualitative assessment of the water needs of identified GDEs, centred on maintaining current GDE watering regimes. Water to meet these needs is protected through setting volumetric extraction and bore density limits.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	<b>Yes</b>	A resource and allocation monitoring framework is set out under the plan, although an ecosystem monitoring program is not detailed. There is evidence that adequate resource monitoring and reporting is occurring in the area. The first annual Groundwater Status Report has now been released. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	<b>To some extent</b>	The plan has been developed with consideration of the risk to the resource from periods of low rainfall recharge; resource condition triggers allow for ongoing monitoring of variability impacts. The plan does not account for climate change impacts. The plan notes further monitoring and resource assessment is required to better estimate and account for climate change.
11. Is stakeholder engagement in the planning process adequate?	<b>Yes</b>	The development of the plan involved extensive engagement with stakeholders, in line with the requirements under the NRM Act and a detailed consultation plan. It's unclear if Indigenous values were identified.
12. Have identified outcomes been achieved during the reporting period?	<b>To some extent</b>	No explicit assessment of plan objectives has been undertaken. However, recent resource reports indicate some progress has been made towards achieving sustainable levels of extraction in the PWA, although areas of resource stress persist. The recently released Groundwater Status Report indicates the identified adverse groundwater trends present a low risk to the resource in the medium term. No recent information on ecosystem health condition is available.

# MORAMBRO CREEK AND NYROCA CHANNEL PRESCRIBED WATERCOURSES

INCLUDING COCKATOO LAKE AND THE PRESCRIBED SURFACE WATER AREA

## WATER ALLOCATION PLAN 2006



### Context

The Morambro Creek and Nyroca Channel, Cockatoo Lake and the prescribed surface water area are located in the upper south-east of the State. The watercourses flow westerly from headwaters in western Victoria and are ephemeral streams that flow on average three in five years. Watercourse and surface water resources are diverted for aquifer recharge in the adjacent Padthaway Prescribed Wells Area, and for stock and domestic, irrigation and recreation purposes. The area supports important and sensitive ecosystems and has high social value. Protecting these values from the impact of increased demand for water for aquifer recharge is the key management driver.

## Findings

1. Is there a plan in place?	Yes	The plan was adopted in 2006 and reviewed in 2011. No amendment was required following review.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken during the preparation of the plan, including detailed assessment of the needs of water-dependent ecosystems. Assessments of economic value of water in the area is qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse of the watercourse resource is prevented through the setting of volumetric extraction limits and the requirement for a minimum threshold streamflow rate to be met before diversions are permitted. Total dam capacity limits for surface water diversions are also set for each management area. Extraction limits are set via flow modelling and are reflective of stakeholder agreement to maintain ecosystems in their current condition. Longer term resource condition triggers are in place and, if exceeded, no further allocations are granted until after the plan is reviewed.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan provides a detailed set of objectives, operating principles and long-term resource condition triggers, underpinning the allocation, transfer and use provisions of the plan. Lack of specific performance indicators inhibits ongoing assessments of plan objectives.
5. Does the plan facilitate trade?	Yes	Trade can occur in accordance with provisions of the plan and the NRM Act.
6. Is interception appropriately considered and integrated into the plan?	Yes	Under the plan, farm dams used for stock and domestic purposes require a permit and are subject to a range of development conditions, including total dam capacity limits for each management area. No other significant interception activities occur in the area.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The surface water and watercourse flows of the area contribute to underlying groundwater recharge, although the extent of recharge is not known. Surface water and watercourse diversion limits set under the plan help protect recharge.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan provides a detailed description of the environmental water requirements of identified ecosystems and assets. Environmental water is provided under the plan through extraction limits and protection of high flow events, aiming to maintain current ecosystem health.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A resource and allocation monitoring framework is set out under the plan and stream gauging infrastructure is in place to monitor flow events. However, no resource reporting is required under the plan and no evidence of recent monitoring is found. Ecosystem monitoring parameters are included in the plan, but a monitoring program is not specified. Compliance and enforcement provisions are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	Climate variability is appropriately managed in the plan. In this ephemeral system, extractions are only permitted once flow exceeds defined thresholds, protecting flows for water-dependent ecosystems during periods of low inflows. There is no consideration of the long-term impacts of climate change in the plan, although broad adaptive managed strategies are described at the regional level.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved extensive engagement with stakeholders, in line with legislative requirements and a consultation plan. Indigenous values have not been identified.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan was reviewed in 2011 and no amendments recommended, implying plan objectives are being met. However, as the review report or other resource status reports cannot be identified, it is not possible to comment on the extent to which plan objectives have been achieved.



# MUSGRAVE PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2001



### Context

The Musgrave Prescribed Wells Area, located in the western Eyre Peninsula, covers the resources of the unconfined and confined aquifers found in the area. The aquifer of the unconfined Quaternary Bridgewater Formation is not continuous across the prescribed wells area, occurring as a series of isolated lenses, highly sensitive to periods of low and high rainfall recharge. These lenses predominately supplement reticulated water supply across the lower Eyre Peninsula, with the confined aquifer providing limited stock and domestic water supplies. Preventing stress on the highly sensitive unconfined aquifer to secure reticulated water supplies is the key management driver.

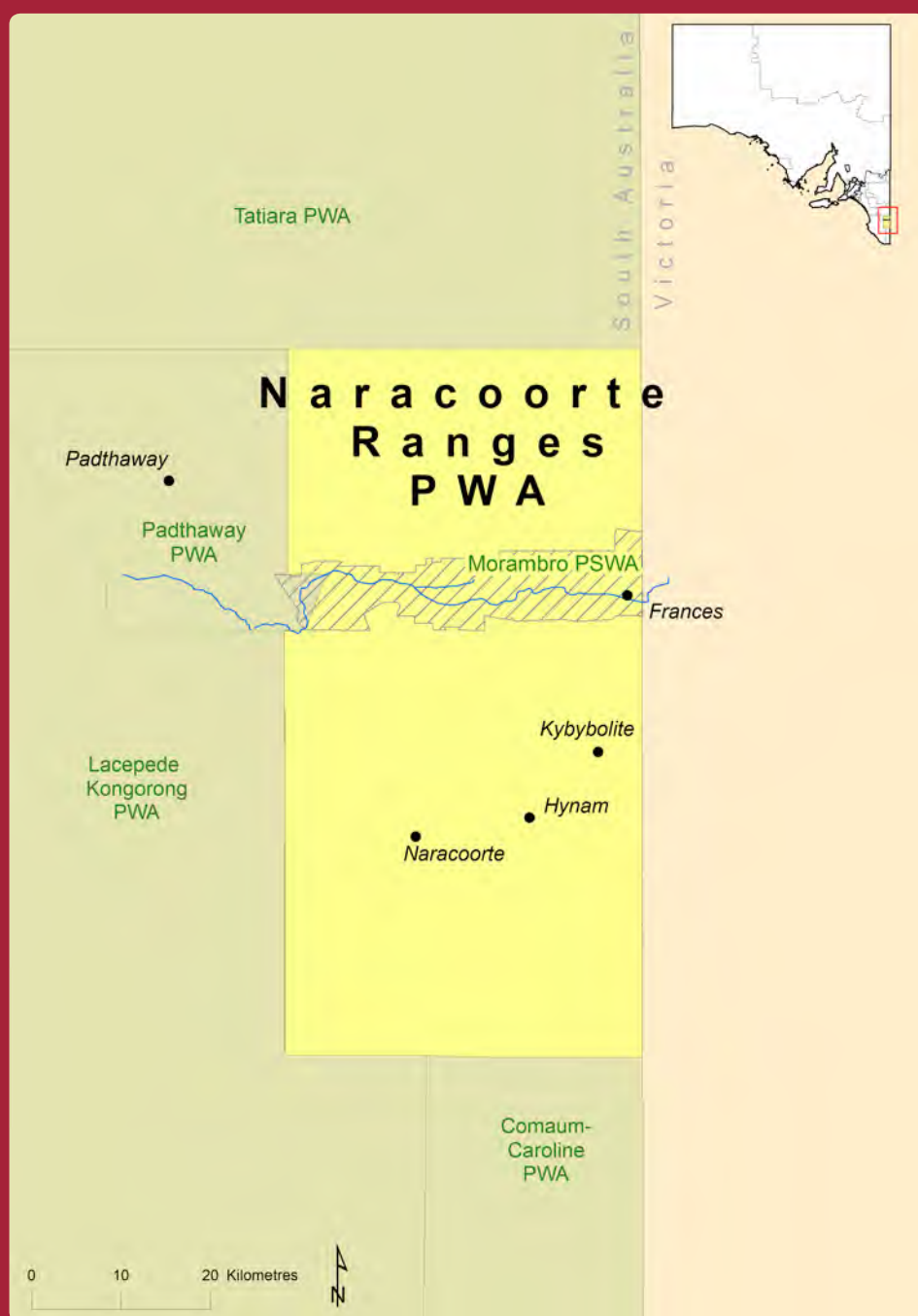
## Findings

1. Is there a plan in place?	Yes	The plan was adopted in 2001 and reviewed in 2006. An amended plan, to be incorporated with the Southern Basins PWA WAP, is currently under development.
2. Does the plan include key assessments?	Yes	All key assessments were undertaken during the preparation of the plan, although the needs of GDEs are identified in relative terms only. A range of technical investigations and scientific assessments have now been undertaken to support development of the amended WAP (the Eyre Peninsula Groundwater Allocation, Planning and Management Project).
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse is prevented by specifying allocations as a percentage of annual recharge to each groundwater lens, reflecting the high rainfall recharge correlation. The plan notes a conservative allocation regime is set, protecting a significant proportion of recharge intended to maintain ecosystems in their current state. There has been a recent restriction on extractions from the Poldia lens in response to extended periods of low rainfall recharge.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Objectives for the plan's allocation, transfer and permit criteria are detailed, underpinned by a range of operating principles and actions and relevant monitoring arrangements. There is a lack of specific environmental objectives in the plan, or performance indicators to allow for ongoing assessment of objectives.
5. Does the plan facilitate trade?	Yes	Trade can occur under the plan and NRM Act. Trading restrictions are reflective of the disconnected nature of the resource or to protect other users and the environment.
6. Is interception appropriately considered and integrated into the plan?	Yes	A small proportion of the groundwater resource is used for unlicensed stock and domestic purposes. Growth in this use is not expected.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The majority of the recharge for the primarily extracted unconfined aquifers is via rainfall infiltration through limestone solution features. Protection of these high recharge zones occurs through water protection zones set under development legislation.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan sets out the general and relative needs of identified underground water dependent ecosystems, and protects a significant proportion of annual recharge from extraction to maintain natural discharge regimes. However, there is a lack of specific environmental objectives in the plan and while ecosystem health monitoring parameters are identified, a monitoring program is not specified.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A detailed resource monitoring framework is set out under the plan. There is evidence that adequate resource monitoring is occurring in the PWA, but reporting has been ad hoc and not in line with plan requirements. There is no evidence of ecosystem health monitoring or reporting. Compliance and enforcement provision are specified under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan attempts to manage the risk of low rainfall recharge to the Quaternary Limestone Aquifer through annual proportional allocations in line with recharge. Potential impacts of climate change and broad adaptive management strategies are considered at the regional level.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved extensive engagement with stakeholders, managed by a community consultative committee and in line with the requirements under the <i>Water Resources Act 1997</i> . Indigenous values have not yet been identified.
12. Have identified outcomes been achieved during the reporting period?	To some extent	There is no explicit reporting of plan outcomes. Recent resource status reports demonstrate that the overarching objective for sustainable use of the resource has not been achieved for all aquifers. Although only limited extractions from the highly developed Poldia lens have been permitted since 2008, water levels continue to decline. These climate driven impacts are being closely examined in the development of the amended plan. The recently released Groundwater Status Report indicates the identified adverse groundwater trends present a low risk to the resource in the medium term.

# NARACOORTE RANGES PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2001



### Context

The Naracoorte Ranges Prescribed Wells Area, located in the lower south-east of the State, covers the resources of the unconfined and confined aquifers found in the area. The groundwater resources across the south east are highly developed (around 90 per cent of available water allocated). The unconfined aquifer provides the majority of commercial extraction in the area, with the confined aquifer providing reliable high quality town and domestic water supplies. Consumptive water use is dominated by irrigation, primarily pasture, lucerne seed and viticulture. Remediating existing and preventing further water level declines and increasing salinity are the key management drivers.

## Findings

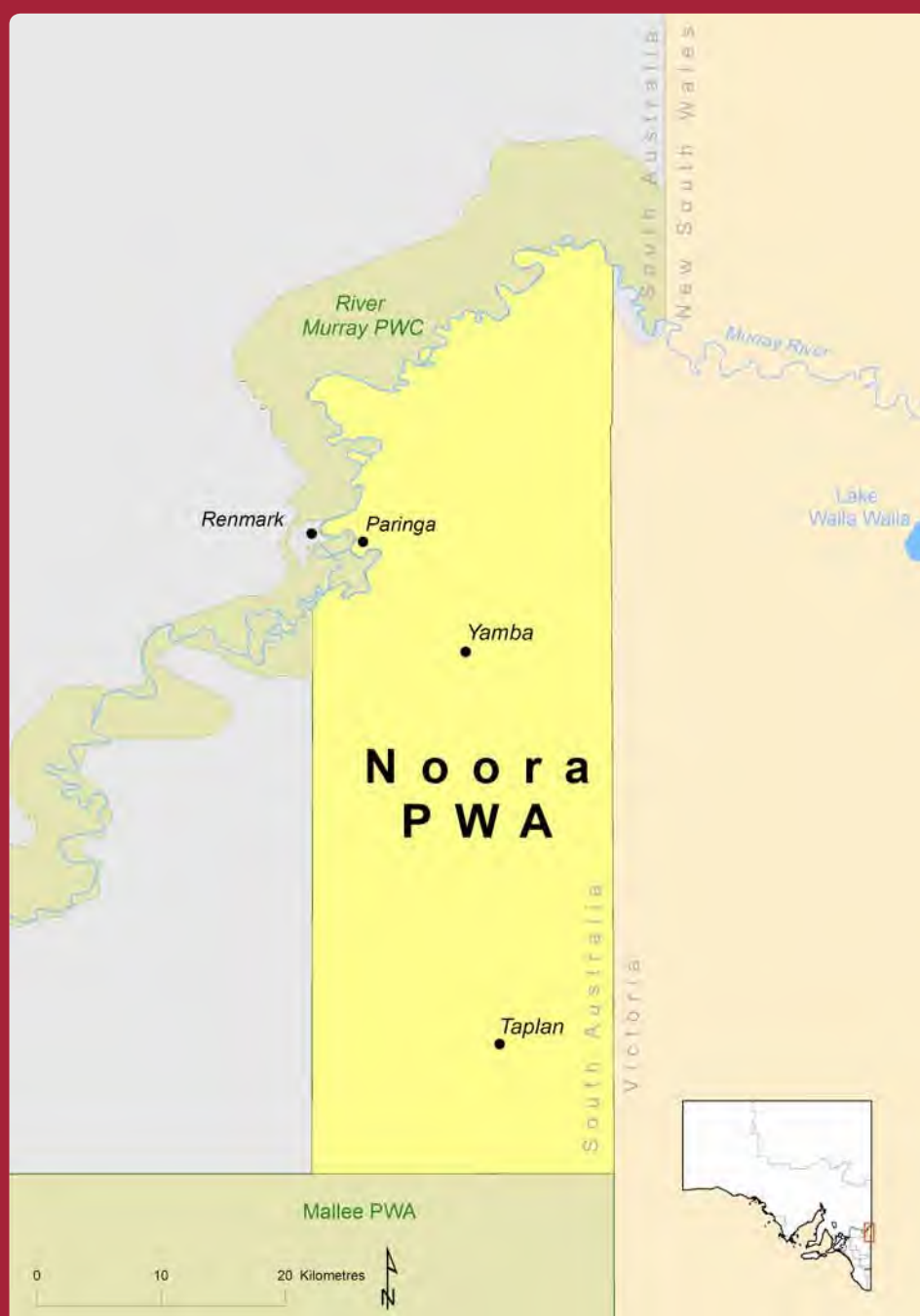
1. Is there a plan in place?	<b>Yes</b>	The plan was adopted in 2001 and reviewed in 2004. An amended plan, to be incorporated into a new WAP for the Lower Limestone Coast PWA is currently under long running development (over seven years).
2. Does the plan include key assessments?	<b>To some extent</b>	All key assessments were undertaken during the preparation of the plan. Assessment of community and economic values of the water resource is qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	<b>No</b>	The plan notes that some areas of the unconfined aquifer are subject to ongoing water level decline associated with climate variability and an extended period of intensive irrigation extraction. Extraction limits for aquifers are set under the plan, to preserve storage at current levels. Resource condition triggers that allow for identification of overuse are detailed. However, the unconfined aquifer remains at risk of overuse given resource decline continues under current levels of extraction. Recent resource reports indicate that these resource stress 'hot spots' persist.
4. Does the plan include clearly identified and measurable outcomes?	<b>Yes</b>	The plan provides a detailed set of objectives, operating principles and resource condition triggers. Lack of specific performance indicators inhibits ongoing assessments of plan objectives.
5. Does the plan facilitate trade?	<b>To some extent</b>	Trade can occur in accordance with the plan and NRM Act. The plan includes a general restriction on trade between management areas to prevent concentration of extraction. These rules appear overly restrictive, given these units are specified by cadastral units, rather than reflective of hydrogeology and/or resource development. The ongoing specification of licences based on irrigable area rather than volume is also preventing expansion of an efficient water market.
6. Is interception appropriately considered and integrated into the plan?	<b>To some extent</b>	Estimates of extraction and recharge interception by stock and domestic users and plantation forestry activities are included in the allocation limit assessments. The plan notes any increase in plantation forestry development in the area could have a significant impact on the already fully utilised resources of the area, but does not include provisions to manage these impacts. Plantation forestry developments are a prescribed water affecting activity and require a permit under the South East NRM Plan.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	<b>Yes</b>	There is generally limited groundwater/surface water connectivity. Underground water discharges to some wetlands in the area, but generally not in the locations of declining water levels.
8. Does the plan contain accountable environmental water management arrangements?	<b>To some extent</b>	The plan provides a detailed description of GDEs in the PWA. However, environmental water requirements are only described qualitatively as the hydrologic parameters to broadly maintain ecosystems in their current condition, rather than to meet specific ecological needs.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	<b>To some extent</b>	A monitoring framework is set out under the plan and there is evidence that generally well-targeted resource monitoring is occurring. Reporting to date has been ad hoc. No ecosystem monitoring program is identified. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	<b>To some extent</b>	Resource condition triggers are responsive to periods of low rainfall recharge. There is no consideration of the long-term impacts of climate change in the plan. Broad adaptive management strategies are set out at the regional level.
11. Is stakeholder engagement in the planning process adequate?	<b>Yes</b>	The development of the plan involved engagement with stakeholders, in line with legislative requirements and a consultation plan. To date, Indigenous values have not been identified.
12. Have identified outcomes been achieved during the reporting period?	<b>To some extent</b>	Plan objectives have not been specifically assessed during the plan review. Recent resource assessments indicate that the overarching productive and ecosystem sustainability objectives have not been fully achieved, with persistent declines in water levels in a number of areas of the PWA. Ongoing area-based specification of licences is a disincentive to trade and water use efficiency. Amendments to the current plan will include conversion to volumetric allocations.



# NOORA PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2001



### Context

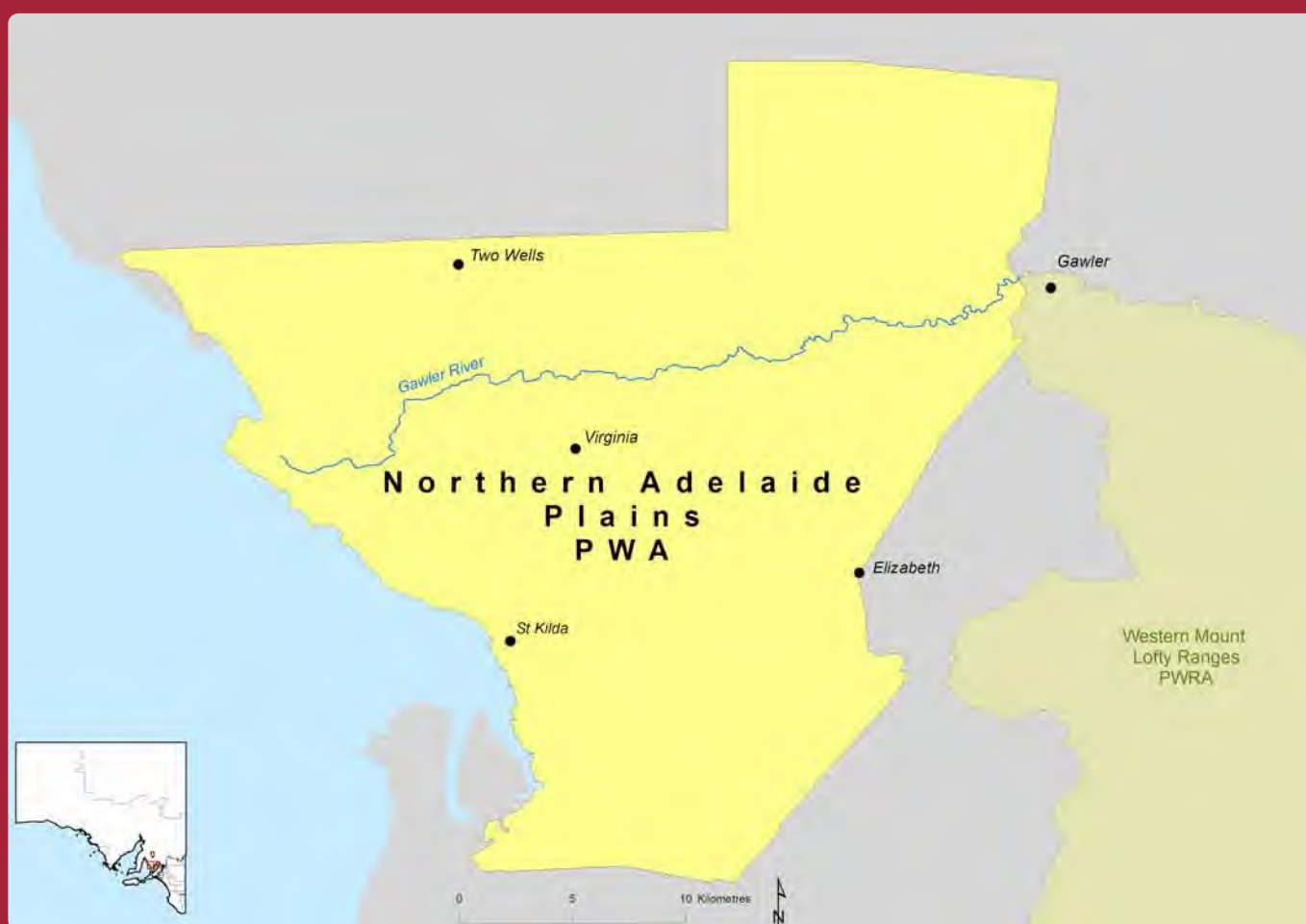
The Noora Prescribed Wells Area, located 250 km north-east of Adelaide, covers the confined and unconfined aquifers of the Murray–Darling Basin that are found in the area. Most resources in the area are saline. There is very limited consumptive water extraction in the area, limited to a small number of stock and domestic users. Salt disposal from the intensive irrigation along the River Murray occurs in the north of the area, where a salt interception scheme is in operation. The key management driver is preventing increased salinity across the area.

## Findings

1. Is there a plan in place?	Yes	The plan was adopted in January 2001. The plan was reviewed in 2006 and it was agreed that only minor amendments be considered via a process not requiring community engagement. On further consideration, a full amendment process is now considered necessary.
2. Does the plan include key assessments?	Yes	Relevant assessments were undertaken during the preparation of the plan, commensurate with the current and projected low demand for water resources in the PWA.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	There is a very low risk of overuse, given the development limitations of the largely saline resource. Overuse is generally prevented by inclusion of annual extraction limits in line with permissible annual volume limits agreed under the groundwater border agreement with Victoria. This extraction limit is based on components of recharge, lateral through flow and mining of storage.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan details measureable objectives, underpinned by operating principles and monitoring arrangements for allocations, transfers and permits.
5. Does the plan facilitate trade?	Yes	Trade can occur under the plan, although there is currently only one licence holder in the PWA. Restrictions on trade into adjacent management areas are justified to protect existing users in these zones.
6. Is interception appropriately considered and integrated into the plan?	Yes	There is a very low risk to resource posed by interception activities. Small volumes of stock and domestic extractions represent the main interception activity. These extractions are included in current allocation limit assessments, and are not expected to increase significantly in the future.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan covers developed underground water resources in the PWA. There are no significant surface water resources in the PWA beyond a small number of connected saline wetlands. Given the very low level of extraction in the PWA, conjunctive arrangements are not required.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Natural and induced saline wetlands occur in the PWA, supported by year-round discharge from saline unconfined aquifers and the salt disposal scheme. Under the plan, discharge to wetlands is protected by preventing extractions in the vicinity of the identified natural wetlands; arrangements under the plan are adequate considering the low level of risk to ecosystems from resource development.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	The plan review and modelling reports note that adequate monitoring is occurring, targeted at key risks, and fit for purpose. Some expansion in the current monitoring network and the introduction of GDE health was suggested at plan review, but no evidence has been found that this has occurred.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	Given the very low level of resource development, and current extractions from the confined aquifer, climate change and variability poses minimal risk to this resource.
11. Is stakeholder engagement in the planning process adequate?	To some extent	While a range of public consultation requirements for plan development were specified under the <i>Water Resources Act 1997</i> , documented evidence of engagement in the development of the first generation plan is no longer available. The plan review involved targeted engagement with identified stakeholders to assess the effectiveness of and attitudes to the existing WAP. Matters raised by stakeholders were considered and responded to in the plan review.
12. Have identified outcomes been achieved during the reporting period?	To some extent	No explicit reporting of achievement of plan objectives has been undertaken, although recent groundwater modelling found no significant impact of irrigation salt disposal and interception scheme on existing users.

# NORTHERN ADELAIDE PLAINS PRESCRIBED WELLS AREA

## WATER ALLOCATION PLAN 2000



### Context

The Northern Adelaide Plains Prescribed Wells Area, located 30 km north of Adelaide, covers the unconfined and confined aquifers found in the area. The confined aquifers provide all commercial extraction within the area, with limited stock and domestic supplies sourced from the unconfined aquifers. Consumptive water use is dominated by irrigation for the extensive horticultural industry long established in the area. Achieving a long-term sustainable extraction regime for the highly developed aquifers, accounting for the effects of rapid land-use change to urban housing and managing the external impacts of localised drawdown are the key management drivers.

## Findings

1. Is there a plan in place?	<b>Yes</b>	The plan was adopted in December 2000 and reviewed in 2004. An amended plan, incorporating the Northern Adelaide Plains, Dry Creek and Central Adelaide PWAs is underway (originally scheduled for adoption in June 2009).
2. Does the plan include key assessments?	<b>To some extent</b>	Key assessments were undertaken during the preparation of the plan. The assessment of social and economic value of water is qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	<b>No</b>	The plan identifies significant and ongoing overallocation in some parts of the PWA. The plan notes that current levels of extraction are at acceptable limits, although allocations significantly exceed current extractions. No sustainable extraction limit or pathway to address overallocation is set under the plan. Measures in the current plan to prevent overuse include prohibiting transfers into areas of stress and only allowing 80% of artificially recharged water to be taken.
4. Does the plan include clearly identified and measurable outcomes?	<b>To some extent</b>	Objectives for each group of plan management criteria are detailed, underpinned by a range of operating principles and actions. Relevant resource monitoring arrangements are specified, although no environmental health monitoring arrangements are included. The lack of performance indicators inhibits the ongoing assessment of objectives.
5. Does the plan facilitate trade?	<b>To some extent</b>	Trade can occur in accordance with the plan and the NRM Act. Lack of an agreed sustainable extraction limit and clearly defined trading zones are inhibiting expansion of an efficient water market in the area.
6. Is interception appropriately considered and integrated into the plan?	<b>Yes</b>	A licence is required for stock and domestic extraction in the Northern Adelaide Plains. No other major interception activities are anticipated in the PWA.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	<b>Yes</b>	Watercourses in the area provide ecologically important freshwater recharges the largely unused shallow unconfined aquifers in the area. Management arrangements are in place for the shallow Quaternary aquifers to maintain current levels of underground water salinity.
8. Does the plan contain accountable environmental water management arrangements?	<b>Yes</b>	The plan sets out the needs of identified GDEs, and provides for these needs through limiting allocations to protect underground water salinity, particularly in summer months.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	<b>Yes</b>	A resource and allocation monitoring framework is set out under the plan and there is evidence that generally well-targeted resource monitoring is occurring. The first annual Groundwater Status Report has been released. Ecosystem monitoring arrangements are not specified. Compliance and enforcement provisions are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	<b>To some extent</b>	Seasonally driven demand is managed through limiting extraction in highly drawn areas. There is no discussion in the plan of climate change impacts. The deep and confined resource is largely disconnected from rainfall variability and, as such, risk to the resource from climate variability and change is low.
11. Is stakeholder engagement in the planning process adequate?	<b>Unable to assess</b>	While a range of public consultation requirements for plan development were specified under the <i>Water Resources Act 1997</i> , documented evidence of engagement in the development of the first generation plan is no longer available.
12. Have identified outcomes been achieved during the reporting period?	<b>To some extent</b>	Plan objectives were not specifically assessed during the review of the first generation plan. Recent resource assessments indicate that the long-term resource stress appears to have stabilised over the life of the plan, but areas of declining water levels and increasing salinity persist. The recently released Groundwater Status Report indicates the identified adverse groundwater trends present a low risk to the resource in the medium term. No information on health of GDEs is available. Development of an amended plan to address stress and improve management arrangements is underway.



# PADTHAWAY PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2009



### Context

The Padthaway Prescribed Wells Area, located in the State's upper south east, covers the unconfined and confined aquifers found in the area. The unconfined aquifer provides all the commercial extraction in the area, with the confined aquifer providing limited stock and domestic supply. Consumptive water use is dominated by irrigation, primarily pasture, lucerne seed and viticulture. Heavy usage, increasing soil and water salinity and high levels of seasonal variability have resulted in persistent resource stress in parts of the area. Alleviating this stress and preventing additional resource stress across the resources are the key management drivers.

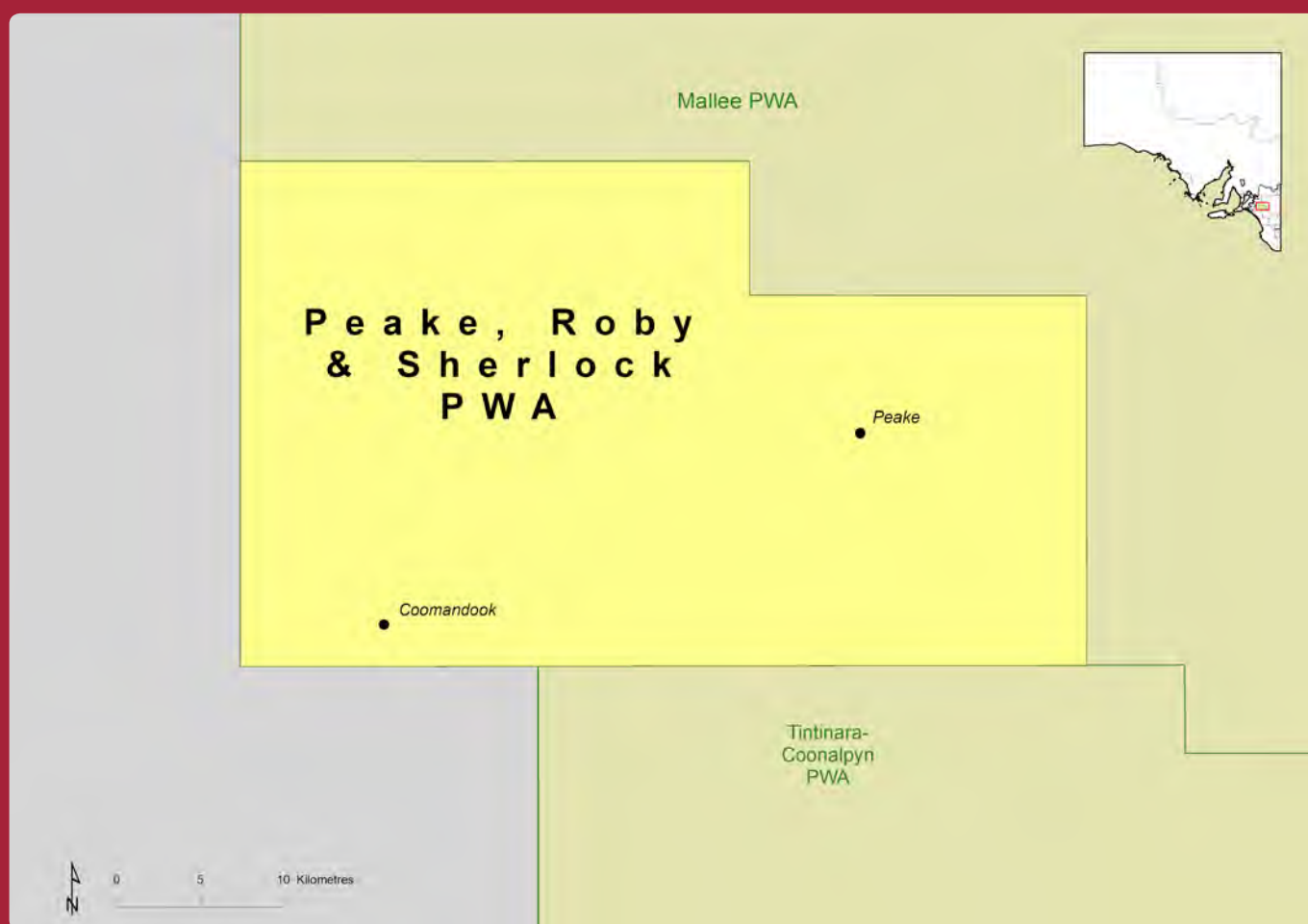
## Findings

1. Is there a plan in place?	Yes	This second generation plan was adopted in 2009. The plan will be reviewed within five years of adoption.
2. Does the plan include key assessments?	Yes	All relevant key assessments were undertaken during the preparation of the plan. The plan notes that the level of dependence of ecosystems on underground water in the PWA has not been fully studied.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan notes historical overuse and overallocation have occurred in the PWA, with persistently lowering water levels and declining water quality. A pathway to sustainable extraction is set through significant reductions to indicative volumetric allocations on adoption of the plan and adaptive management framework for reducing allocations to sustainable limit by 2014. Extraction limits set under the plan are modelled to maintain current water levels, quality and throughflow to flush salts. Resource condition triggers that allow for identification of overuse are included.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan provides a detailed set of objectives, operating principles and monitoring arrangements, underpinning the allocation, transfer and permit provisions of the plan. The lack of performance indicators inhibits the ongoing assessment of objectives.
5. Does the plan facilitate trade?	Yes	Trade can occur in accordance with the plan and the NRM Act. Restrictions on trade between hydrogeologically based management areas justified to prevent localised over concentration of extraction and associated resource and third-party impacts. Volumetric conversion of licences under the plan allows for expansion of a more efficient water market in the PWA.
6. Is interception appropriately considered and integrated into the plan?	Yes	Stock and domestic extractions included in current allocation limit assessments are not expected to increase significantly in the future. The plan does not currently include provisions to manage plantation forestry development, however commercial or farm forestry developments in the PWA are a prescribed water affecting activity and require a permit under the South East NRM Plan.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The connection between watercourse and surface water resources and the groundwater resources is generally low, with the exception of a number of small wetlands that rely on groundwater discharge. Connectivity impacts are managed through extraction limits and well set-back requirements around discharge sites.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan sets water level, quality and throughflow targets to protect identified GDEs. These targets are to be met through limiting the volume and location of extraction of water. The plan notes that improved understanding of the needs of ecosystems on underground water in the area is needed.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A detailed resource and allocation monitoring framework is set out under the plan and there is evidence that appropriately targeted monitoring is occurring. However, reporting arrangements for the amended plan are not specified and past reporting of monitoring data has been ad hoc. Compliance and enforcement provisions are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	Resource condition triggers and flexible allocation and trading arrangements are responsive to climate variability. Risks to the resource from climate change are noted, but there is no assessment of the potential impacts on resource capacity.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved extensive engagement with stakeholders, in line with legislative requirements and a consultation plan. A process to identify and quantify Indigenous water needs is currently underway.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Plan objectives were not specifically assessed during the review of the first generation plan. Resource assessments indicate that the first generation plan did not meet its key objective to ensure extraction remains with sustainable limits. Following a long development period (over seven years) the second generation plan was adopted in April 2009. No information is available to assess the extent to which the amended plan is meeting its objectives.

# PEAKE, ROBY AND SHERLOCK PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2011



### Context

The Peake, Roby and Sherlock Prescribed Wells Area, located 150 km south-east of Adelaide, includes the confined and unconfined aquifers of the Murray–Darling Basin that are found in the area. Water in these aquifers flows slowly towards the River Murray, which ultimately drains all aquifers in the basin. Townships within the area rely on reticulated supply sourced from the aquifer. Unlicensed stock and domestic water use is also extensive. Licensed water use is heavily dominated by irrigation, primarily lucerne and olive trees. Key pressures in the area are preventing and managing unacceptable third-party impacts associated with seasonal drawdown and maintaining structural integrity and water quality in the confined aquifer.

## Findings

1. Is there a plan in place?	Yes	This plan was adopted in March 2011. The plan will be reviewed within five years of adoption.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken during the preparation of the plan, including clear identification of key risks to resources. The qualitative identification of ecosystems is deemed adequate given the identified GDEs are not connected to the main extractive resource. Assessment of economic value of water is qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan identifies the Extraction Management Zone (confined aquifer) as overused. There is a pathway to sustainable extraction in place to reduce extraction to the new modelled allocation limit set under the plan. The extraction limit is set through the clear trade-off of long-term projected salinity increases to meet current demand. Triggers are in place that require action if the monitoring threshold is breached.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan provides a detailed set of objectives, operating principles and monitoring arrangements. The lack of explicit performance indicators hinders ongoing assessment of plan performance.
5. Does the plan facilitate trade?	Yes	Trade can occur in accordance with provisions in the plan and the NRM Act. Trade between management zones are justified on resource and existing user rights protection grounds.
6. Is interception appropriately considered and integrated into the plan?	Yes	Stock and domestic extractions are included in current allocation limit assessments, and are not expected to increase significantly in the future.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	There are no significant surface water resources in the PWA, and the impact of connection to surface water resource outside the PWA is low. Recharge of the primary resource is via slow westerly lateral flows.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The only GDEs identified in the PWA are saline wetlands in the Coastal Plain region, thought to be connected to the currently unused unconfined aquifer. Requirements are implicitly met through setting allocation limits for aquifers and requiring set-back distance for bores around the wetlands. The plan notes that improved understanding of GDE water requirements is needed.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	A detailed resource and allocation monitoring framework is set out under the plan, although monitoring results are not yet reported. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan has been developed with consideration to the risk to the recharge and changes in demand patterns from a drying climate anticipated in south-east Australia. The deep and confined resource is largely disconnected from rainfall variability and, as such, risk to the resource from climate variability and change is low.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved engagement with relevant stakeholders, in line with legislative requirements and a detailed consultation plan. Indigenous values have not been identified.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan was adopted in March 2011. While it appears that an appropriate MERI framework is in place to measure performance against plan objectives, it is too early to assess the extent to which the plan is meeting its objectives.



# RIVER MURRAY PRESCRIBED WATERCOURSE

## WATER ALLOCATION PLAN 2009



### Context

The River Murray Water Allocation Plan covers the prescribed watercourse of the Murray River from the Victorian border to the Murray Mouth and encompasses lakes Alexandrina and Albert and portions of Currency Creek, the Finnis River and the Angas and Bremer rivers. Murray River water is the key supply for metropolitan Adelaide. Water exported from the Murray region supports irrigation and stock watering and provides town water supplies in areas across the State including the Clare Valley, Barossa Valley, Port Pirie, Whyalla, Port Augusta and Keith. Consumptive water use in the vicinity of the river is heavily dominated by irrigation, watering a wide range of horticultural crops, wine grapes and pasture. Equitable allocation of the fully allocated resource between the range of competing social, economic and environmental demands is the key driver for allocation planning.

## Findings

1. Is there a plan in place?	<b>Yes</b>	The plan was first adopted in 2002 and amended in 2009 and 2011. Major revision is underway to incorporate policy changes and to bring the plan into line with the Murray–Darling Basin Plan (where appropriate) currently under development. The amended plan is expected to be adopted by 2014.
2. Does the plan include key assessments?	<b>To some extent</b>	Key assessments were undertaken during the preparation of the plan. Assessment of the social and economic value of water is generally qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	<b>Yes</b>	The Murray–Darling Basin Cap for the State sets the total volume of water that can be diverted from the Murray for consumptive purposes. The cap is fully allocated in SA. Water is shared among consumptive users through the setting of share limits for each water access entitlement class defined under the plan. Water is allocated annually based on water availability and an agreed decision framework. Recent assessments indicate the wetland entitlements under the plan are not adequate to meet the broader environmental water needs. Revised sustainable extraction limits are expected to be set under the Murray–Darling Basin Plan.
4. Does the plan include clearly identified and measurable outcomes?	<b>To some extent</b>	Objectives set out in the plan are underpinned by principles that control water allocation, trade and use. The lack of performance indicators or specification of resource and ecosystem monitoring linked to the plan make ongoing assessment of plan performance difficult.
5. Does the plan facilitate trade?	<b>Yes</b>	Trade can occur under the plan and in accordance with the NRM Act. River Murray entitlements are fully unbundled, providing greater market flexibility and efficiency.
6. Is interception appropriately considered and integrated into the plan?	<b>Yes</b>	Stock and domestic demands are considered in the plan's water sharing arrangements and extractions require a water access entitlement. No other significant interception activities are identified. Interception activities in upstream catchments pose a significant risk to the resource.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	<b>Yes</b>	Evidence outside the plan notes that aquifers in the vicinity ultimately discharge to the river. As such, there is limited scope within the WAP for connectivity management.
8. Does the plan contain accountable environmental water management arrangements?	<b>Yes</b>	The plan sets out explicit environmental requirements for each identified ecosystem group, designed to maintain the current distribution and condition of identified ecosystems. Environmental water provisions are made through wetland and environmental entitlements and underlying flows provided from the State's above cap entitlement flows and in line with an Annual Environmental Watering Program set outside the plan.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	<b>To some extent</b>	Resource and ecosystems monitoring programs are not set out under the plan, however resource reports and online data indicate that extensive monitoring is occurring along the prescribed watercourse. Metering, compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	<b>To some extent</b>	The plan has been developed with consideration to the risk to the environment and other users from periods of low rainfall and inflow. The State's Murray–Darling Basin entitlement is set to protect ecosystems during low flow periods. Further assessments are required to integrate responses to climate change and variability impacts into water allocation arrangements.
11. Is stakeholder engagement in the planning process adequate?	<b>Yes</b>	The development of the plan involved engagement with stakeholders, in line with legislative requirements and a consultation plan. To date, Indigenous values have not been quantified.
12. Have identified outcomes been achieved during the reporting period?	<b>To some extent</b>	Plan objectives were not specifically assessed during the review of the first generation plan, however the plan review notes that current wetland and environmental allocations are not adequate to meet environmental needs. Broader assessment of plan objectives is difficult given the extreme conditions experienced in the Murray system over the past decade. A comprehensive plan amendment is currently underway. Revised sustainable extraction limits are expected to be set under the Murray–Darling Basin Plan.

# SOUTHERN BASINS PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2000



### Context

The Southern Basins Prescribed Wells Area, located in the southern Eyre Peninsula, covers the resources of the unconfined and confined aquifers found in the area. The unconfined Quaternary Bridgewater Formation Aquifer is not continuous across the area, occurring as a series of isolated lenses, highly sensitive to periods of low and high rainfall recharge. These lenses are the major extractive resource in the area, predominately to supplement reticulated water supply and for minor stock and domestic use, irrigation and other industry related activities. Preventing stress on the highly sensitive unconfined aquifer to secure reticulated water supplies is the key management driver.

## Findings

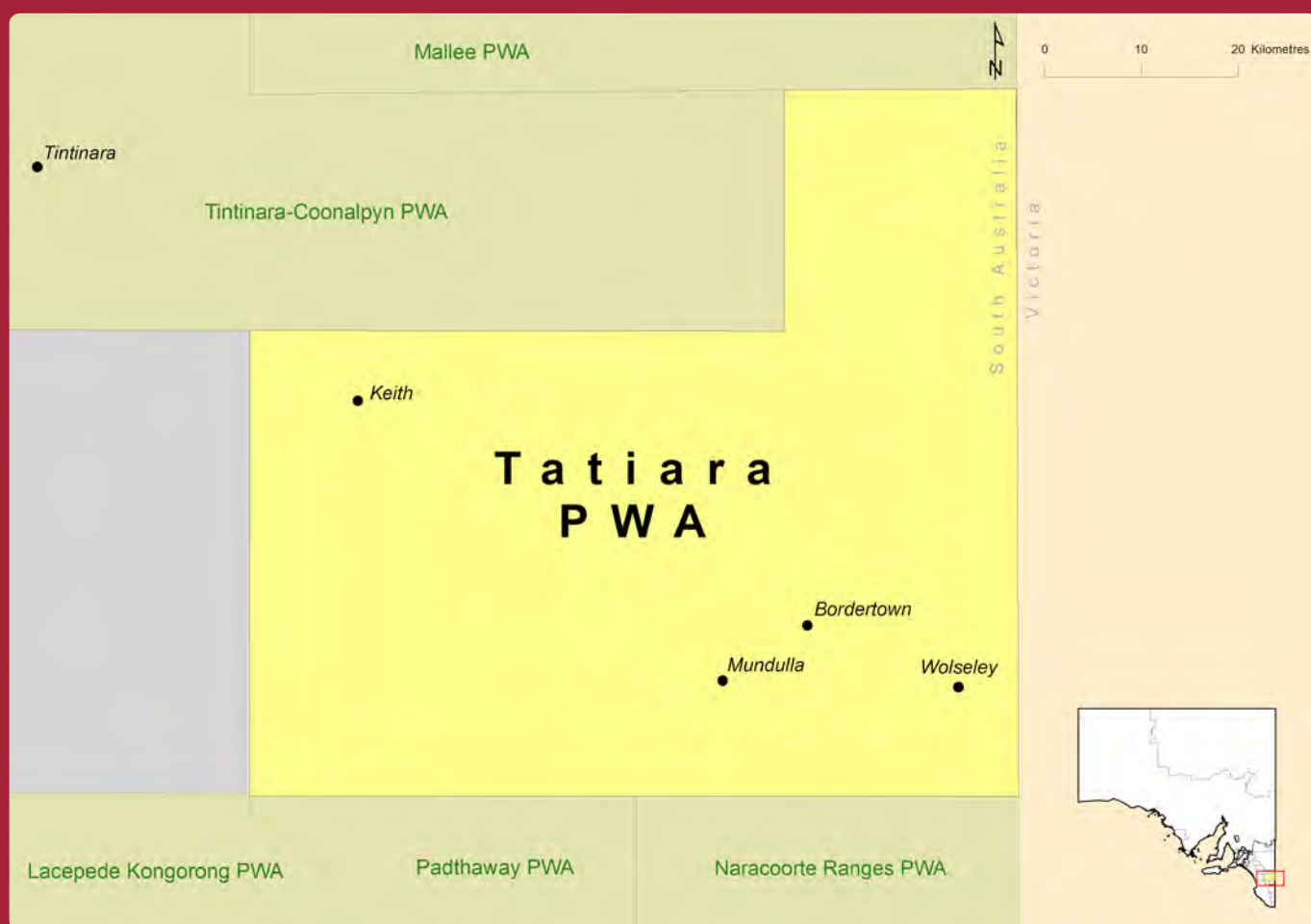
1. Is there a plan in place?	Yes	The plan was adopted in December 2000 and was reviewed in 2006. An amended plan, to be incorporated with the Musgrave PWA WAP, is currently being developed.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken during the preparation of the plan. A range of technical investigations and scientific assessments have now been undertaken to support development of the amended WAP.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	A conservative allocation regime is in place given the highly variable nature of the primary resource and the rapid and strong positive correlation between rainfall and recharge. The resource is protected through specified proportional allocation of recharge from the Quaternary Limestone Aquifer. A significant proportion of recharge is protected to maintain current discharge to dependent ecosystems.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Allocation, transfer and permit objectives are set, underpinned by operating principles, actions and monitoring arrangements. There is a lack of specific environmental objectives in the plan, or performance indicators to allow for ongoing assessment of objectives.
5. Does the plan facilitate trade?	Yes	Trade can occur under the plan and in accordance with the NRM Act. Creation of tradeable volumetric allocations under the plan allows for expanded trading options across the area. Barriers to trade exist in the plan, but are justified on hydrogeological grounds or to protect other users and/or the environment.
6. Is interception appropriately considered and integrated into the plan?	Yes	A small proportion of the groundwater resource is used for unlicensed stock and domestic purposes. Growth in this use is not expected.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	Surface water resources in the PWA are limited to ephemeral wetlands that make a minor contribution to recharge of the underground water resources. The majority of the recharge for the PWA resources is via rainfall infiltration and, as such, protection of high recharge zones is essential.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan sets out the needs of identified underground water dependent ecosystems and provides for these needs through a range of measures including volumetric extraction limits and setting of buffer zones for extractions near GDE sites. Environmental health monitoring and assessment arrangements are identified, but timing and responsibility is unclear. There is a lack of specific environmental objectives in the plan.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A resource and allocation monitoring framework is set out under the plan, although the timing and periods for environmental monitoring is not specified. Monitoring is occurring in the PWA, although reporting has been ad hoc. The first annual Groundwater Status Report has now been released. Compliance and enforcement provisions are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan has been developed with consideration to the risks to the environment and other users from periods of low rainfall and recharge to the Quaternary Limestone Aquifer and manages these risks through annual proportional allocations inline with recharge. The longer term impacts of climate change are not considered under the plan. Potential impacts and broad adaptive management strategies are considered at the regional level.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved extensive engagement with stakeholders, managed by a community consultative committee and in line with legislative requirements. Indigenous values have not yet been identified.
12. Have identified outcomes been achieved during the reporting period?	To some extent	No explicit assessment of plan objectives has been undertaken. Resource reports indicate that the achievement of the overarching plan objective for sustainable use of the resource has been broadly achieved under the plan, particularly due to the key allocation principle that links annual allocation to recharge. Water levels continue to decline irrespective of use. The recently released Groundwater Status Report indicates the identified adverse groundwater trends present no to low risk to the resource in the medium term.



# TATIARA PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2010



### Context

The Tatiara Prescribed Wells Area, located in the upper south east, covers the unconfined and confined aquifers found in the area. Recharge to the unconfined aquifer occurs primarily through direct rainfall infiltration and the confined aquifer receives very limited recharge. The unconfined aquifer provides the vast majority of extraction within the p area. Consumptive water use includes town water supplies, irrigation (primarily pasture and lucerne and oil seed), and stock and domestic uses. Heavy usage, salination and high levels of seasonal variability have resulted in resource stress in parts of the area. Alleviating this stress and preventing additional resource stress are the key management drivers.

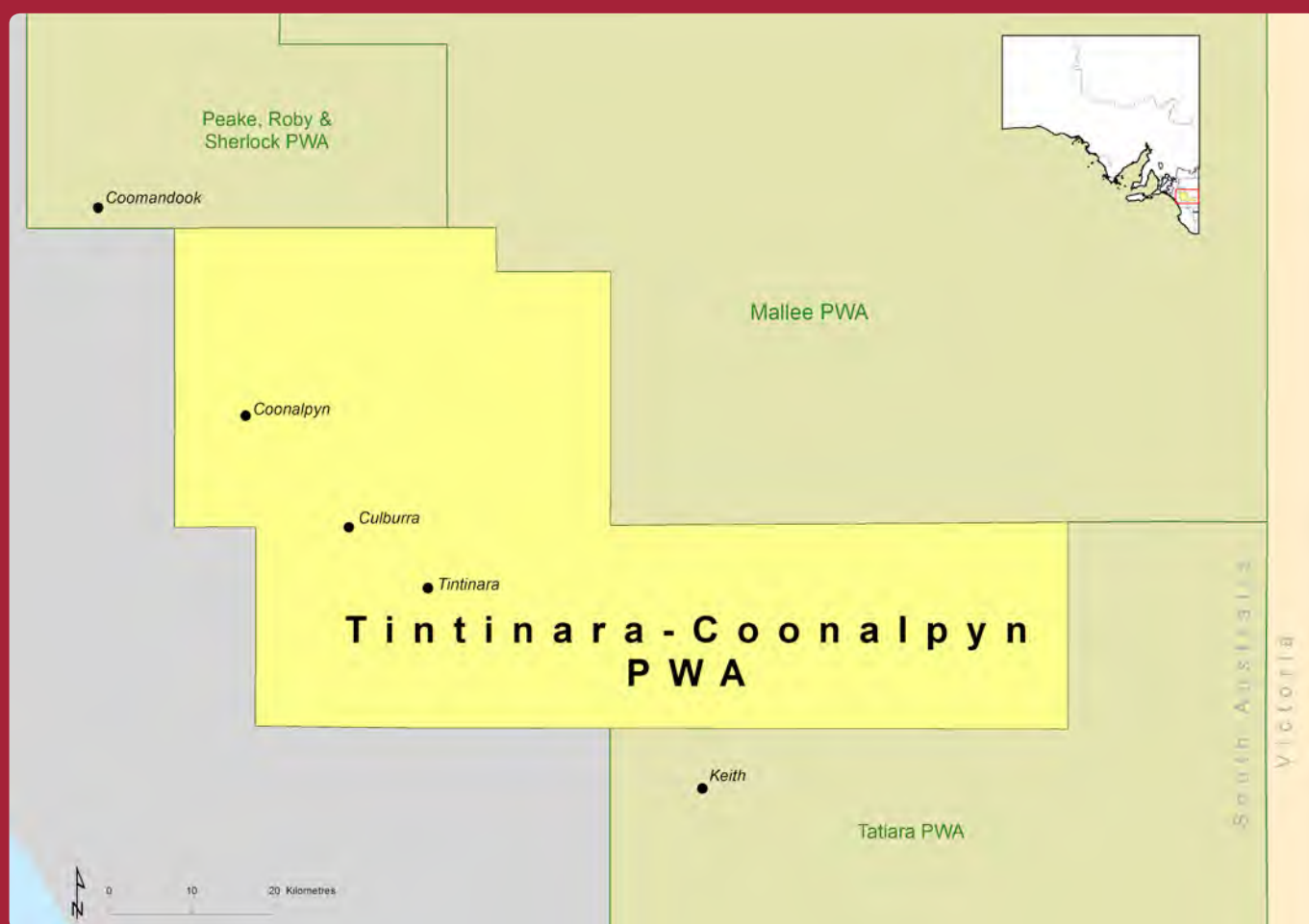
## Findings

1. Is there a plan in place?	Yes	This second generation plan was adopted in June 2010. The plan will be reviewed within five years of adoption.
2. Does the plan include key assessments?	To some extent	All key assessments were undertaken during the preparation of the plan. The plan notes that more detailed assessment of the needs of GDEs in the area is required. Assessment of community and economic value of water in the area is qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	It is noted in the plan that all management zones of the unconfined aquifer are at full allocation or overallocated and some zones are showing signs of overuse, including lower water levels and increased salinity. The plan sets a sustainable extraction limit and adaptive management framework for reducing allocations to the limit by 2012. The extraction limits set under the plan are modelled to maintain current water levels and quality and, where possible, improve declining trends in water tables and rising salinity.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes detailed objectives, operating principles and monitoring arrangements. The measurement of progress is hindered by a lack of clear performance indicators.
5. Does the plan facilitate trade?	Yes	Trade can occur in accordance with provisions in the plan and legislation. Trade between management zones is restricted to a maximum of five years under the plan given all management zones are fully allocated.
6. Is interception appropriately considered and integrated into the plan?	Yes	Stock and domestic extractions are the main interception activity. These extractions are included in the assessment of sustainable extraction limits and are not expected to increase significantly in the future. Subject to proposed regulation being made, any future forestry developments in the area would be deemed a water affecting activity and require a permit under the South East NRM Plan.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan notes that the connection between undeveloped surface water resources and the underground water resources is low and local wetlands and streams are considered to be losing water bodies. Unconfined aquifer recharge is driven primarily by direct, generally unhindered rainfall infiltration.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan sets out environmental objectives and water level and quality targets and set-back distances for new wells to protect identified wetlands. It is noted that improved understanding of GDE water requirements is needed. Targets are to be met through limiting the volume and location of extraction and monitoring water quality.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A detailed resource and allocation monitoring framework is set out under the plan, although evaluation and reporting of monitoring results for the amended plan are not yet due, and there is only limited reporting of monitoring under the previous plan. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan has been developed with consideration to the risks to the resources from periods of low rainfall and recharge and includes measures and response triggers to manage these risks. While risks are broadly identified, there is limited detail on the long-term strategies for managing the effects of climate change within the plan.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved a number of informed public engagement phases with users and other identified stakeholders, inline with a consultation plan. A process to identify and quantify Indigenous water needs is currently underway.
12. Have identified outcomes been achieved during the reporting period?	To some extent	No explicit assessment of plan objectives has been undertaken. Resource reports indicate that the first generation plan did not meet its key objective to ensure extraction remained within sustainable limits. The plan was amended to deal with persistent over extraction and overallocation. While it appears that an appropriate MERI framework is in place to measure performance of the amended plan, it is too early to assess the extent to which the amended plan is meeting its objectives.

# TINTINARA COONALPYN PRESCRIBED WELLS AREA



## WATER ALLOCATION PLAN 2003



### Context

The Tintinara Coonalpyn Prescribed Wells Area, located in the State's upper south east, covers the unconfined and confined aquifers found in the area. Extraction for irrigation, recreation and stock and domestic purposes is drawn from both main resources. Consumptive water use is heavily dominated by irrigation, primarily lucerne seed, horticulture and pasture. Increasing soil and water salinity and persistent residual drawdown in the confined aquifer have resulted in resource stress in parts of the area. Preventing and managing increasing water and soil salinity and alleviating current resource stress are the key management drivers.

## Findings

*Note: Report Card assessment based on amended Draft Plan.*

1. Is there a plan in place?	Yes	Public consultation on the draft amended plan closed in July 2011. This plan will replace the first generation plan adopted in 2003 and reviewed in 2006.
2. Does the plan include key assessments?	Yes	All key assessments were undertaken during the preparation of the plan, including clear identification of risks to resources and dependent ecosystems. Assessment of economic value of water is qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify overuse, but indicates some areas of resource stress and history of over allocation. The draft amended plan sets a pathway to sustainable extraction through the development of new extraction limits and negotiated reductions to existing allocations.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan sets out objectives, operating principles and monitoring arrangements. No explicit performance indicators are set under the plan, making ongoing assessment of plan performance difficult.
5. Does the plan facilitate trade?	To some extent	Trade can occur in accordance with provisions in the plan and the NRM Act. The restriction on trade between management zones is largely justified to mitigate increasing salinity across the PWA. Area-based use restrictions on transfers in some management areas undermine a plan objective to encourage an active water market and confidence in the sustainability of allocation limits in these areas. Area-based restrictions will be lifted when the reduction in allocations has been achieved.
6. Is interception appropriately considered and integrated into the plan?	Yes	Stock and domestic extractions are included in current allocation limit assessments, and are not expected to increase significantly in the future. Subject to proposed regulation being made, any future forestry developments in the area would be deemed a water affecting activity and require a permit under the South East NRM Plan.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	There are no significant connected surface water systems in the PWA at-risk from the plan's extraction regime.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan sets out minimum and optimum water requirements for the identified saline wetlands. It is noted that the main risk to these ecosystems is ongoing rising watertable and increasing salinity, associated with historical land clearing. Managing these risks is largely outside the scope of the extractive regime managed under the plan.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A detailed resource and allocation monitoring framework is set out under the current and amended draft plan and there is evidence that appropriately targeted monitoring is occurring. Reporting arrangements for the amended plan are not specified and only limited reporting of monitoring under the current plan has occurred to date. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	Resource condition triggers and seasonal carry-over provision in the plan help manage short and medium term changes to recharge and demand patterns associated with climate variability. There is no consideration of climate change impacts in the plan. Broad adaptive management strategies are set out at the regional level.
11. Is stakeholder engagement in the planning process adequate?	Yes	The development of the plan involved engagement with stakeholders, in line with legislative requirements and a consultation plan. Indigenous values have not been identified.
12. Have identified outcomes been achieved during the reporting period?	To some extent	No explicit assessment of the first generation plan objectives has been undertaken. While resource condition in most management areas is stable, water level declines persist in some areas following the recent period of low rainfall recharge. The plan is currently under amendment to better manage this persistent stress.



# EASTERN MOUNT LOFTY RANGES PRESCRIBED WATER RESOURCES AREA



## DRAFT WATER ALLOCATION PLAN



### Context

The Eastern Mount Lofty Ranges Prescribed Water Resources Area lies on the south-western boundary of the Murray–Darling Basin and covers the surface water, watercourses and groundwater encompassed within the area. The majority of surface water runoff and groundwater recharge occurs in the upper reaches of the area and is highly seasonally variable. All water resources are highly developed, with the majority of extraction in the area from the diverse groundwater resources and captured and stored surface water runoff. Consumptive water use includes irrigation (primarily wine grapes and pasture) and stock and domestic uses. A number of wetlands and springs of high ecological value occur across the area. Managing the impact of growth in diversion and extraction – particularly in the numbers and capacity of farm dams – is the primary management driver for the prescribed water resources area.

## Findings

1. Is there a plan in place?	No	This is the first WAP being developed for the PWRA. The public consultation period for the draft plan closed on 5 August 2011. The plan incorporates the Angas Bremer PWA (previously managed under a separate WAP). The plan is scheduled for adoption in late 2011.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken during the preparation of the plan, including detailed specification of environmental water needs and resource capacity. Assessment of the economic value of water is generally qualitative only.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	It is noted in the plan that some areas of resource decline have occurred under current levels of demand and are at risk of overuse. A comprehensive extraction and diversion regime is set under the plan to meet current consumptive demands and protect ecologically significant low flows. The plan clearly identifies a proportion of identified environmental water requirements are traded off to meet current consumptive demands. Resource condition indicators and arrangements for any necessary allocation reductions are detailed.
4. Does the plan include clearly identified and measurable outcomes?	Yes	Numerous sets of objectives for the plan's environmental, allocation, trade, permits and monitoring provisions are detailed. There could be greater clarity in how these sets of objectives interact. The lack of performance indicators hinders ongoing assessment of all plan objectives.
5. Does the plan facilitate trade?	Yes	Trade can occur under the plan and in accordance with the NRM Act. Barriers to trade are justified to protect resource condition and maintain access to water for all users.
6. Is interception appropriately considered and integrated into the plan?	Yes	Water intercepted by farm dams and plantation forestry represents a significant proportion of total water extraction in the PWRA. Estimated interception is accounted for in the development of volumetric extraction limits. All new dam developments will require a water affecting activity permit. Overall dam capacity must not exceed specified catchment and zone capacity limits and low flow bypass provisions require returns from all watercourse diversions and all new and some existing dams (all licensed dams and stock and domestic dams with capacity greater than 5 ML). Subject to proposed regulation being made, any future forestry developments in the area would be deemed a water affecting activity and require a permit.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	Significant groundwater/surface water connections are identified across the PWRA. Groundwater contribution to stream baseflow is of high ecological importance in some areas, particularly during periods of low flow. Connectivity is managed through quarantining of groundwater baseflow contribution and buffer zones for extraction near watercourses and GDEs.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental water provisions are clearly identified and managed through the plan's extraction and permitting regime that limits extraction, protects low flows and groundwater discharge and controls the development of water affecting activities. Provisions for specific ecosystem allocations are also included in the plan.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The plan's resource and allocation monitoring framework will be implemented on adoption of the plan. Compliance and enforcement provision are specified in detail under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan has been developed with consideration to the risks to the environment and other users from periods of low rainfall, inflow and recharge and includes measures and response triggers to manage these risks. Potential long-term impacts of climate change are to be monitored and assessed in future plan reviews.
11. Is stakeholder engagement in the planning process adequate?	Yes	To date, the development of the draft plan has involved extensive engagement with stakeholders, in line with the requirements under the NRM Act, and a detailed consultation plan. Indigenous values have not yet been identified.
12. Have identified outcomes been achieved during the reporting period?	Not applicable	The plan is not yet adopted.

# WESTERN MOUNT LOFTY RANGES PRESCRIBED WATER RESOURCES AREA



## DRAFT WATER ALLOCATION PLAN



### Context

The Western Mount Lofty Ranges Prescribed Water Resources Area covers the surface water, watercourses and groundwater encompassed within the area. The majority of surface water runoff and underground water recharge occurs in the upper reaches of the area and is highly seasonally variable. All water resources are highly developed, with the majority of extraction in the area from the captured and stored surface water runoff. Water captured in a series of large storages across the area is the major public water supply for Adelaide. Other consumptive water use includes irrigation (primarily wine grapes, pasture and orchards) and stock and domestic uses. Securing the public water supply and managing the impact of growth in diversion and extraction, particularly in the numbers and capacity of farm dams, are the primary management drivers for the area.

## Findings

1. Is there a plan in place?	No	This is the first WAP being developed for the PWRA. The public consultation period for the draft plan closed on 10 January 2011. The plan is scheduled for adoption in late 2011.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken during the preparation of the plan, including detailed assessment of resource capacity. There could be greater clarity in the assessment of risks to the resource.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	Demand assessment indicates that current demand is high in a number of surface water and groundwater management zones. The plan clearly identifies a proportion of identified environmental water requirements are traded off to meet current consumptive demands. While a comprehensive extraction and diversion regime is set under the plan, it is not clear that current demand will be brought within sustainable limits given current use is estimated only.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Objectives for the plan's allocation, trade, permits and monitoring provisions are included although these are specified in general terms only. It is unclear if plan objectives will be monitored, given the monitoring program is yet to be specified. The lack of performance indicators hinders ongoing assessment of all plan objectives.
5. Does the plan facilitate trade?	Yes	Trade can occur under the plan and in accordance with the NRM Act. Barriers to trade are justified to protect resource condition and inflows to public water supply storages.
6. Is interception appropriately considered and integrated into the plan?	Yes	Water intercepted by farm dams and plantation forestry represents a significant proportion of total water extraction in the PWRA. Non-licensed interception activities are accounted for in surface water and groundwater extraction and diversion limits. All new dam developments will require a water affecting activity permit and farm dams with capacity greater than 5 ML will require a water licence. Low flow bypass provisions for dams are yet to be finalised. Subject to proposed regulation being made, any future forestry developments in the area would be deemed a water affecting activity and require a permit.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	Connectivity is broadly managed through quarantining of groundwater baseflow contribution and buffer zones for extraction and development near watercourses and wetlands. Knowledge exists on connectivity and recharge, but this is not well reflected in the plan.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental water provisions are identified and managed through the plan's extraction and diversion regime that limits extraction, protects low flows and groundwater discharge and controls the development of water affecting activities. Provision for specific environmental water release from major storages is also included in the plan. Specification of an ecosystem monitoring program is yet to occur.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The monitoring and evaluation section of the draft plan is currently being revised. A detailed monitoring framework will be developed through the regional MERI framework. Compliance and enforcement provision are specified under the NRM Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan has been developed with consideration to the risks to the environment and other users from periods of low rainfall, inflow and recharge and includes measures to manage these risks. Potential long-term impacts of climate change are to be monitored and assessed in future plan reviews.
11. Is stakeholder engagement in the planning process adequate?	Yes	To date, the development of the draft plan has involved engagement with stakeholders, in line with the requirements under the NRM Act, and a detailed consultation plan. Indigenous values have not been identified.
12. Have identified outcomes been achieved during the reporting period?	Not applicable	The plan is not yet adopted.





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## 7. Western Australia



# WESTERN AUSTRALIA



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## The context of water planning in Western Australia



Most of the population and development in Western Australia is found towards the coastal and south-west areas, with much of the interior of the State dominated by arid landscapes.

Western Australia relies heavily on its groundwater systems for urban water supplies and for industry and agriculture – more than 50 per cent of Perth’s water supply comes from groundwater. Reduced rainfall over the past decade is affecting surface water and groundwater availability, particularly in the south-west of the State where there has been severe drying compared to long-term averages. Pressure on the surface water and groundwater resources in this area is exacerbated by population growth and increasing demand for water for irrigation and mining developments.

Water allocation planning aims to support growth and development by managing the availability of water for current and future consumptive needs while maintaining water resource condition to meet environmental and other public benefit needs. The importance of managing all water resources is growing as the pressure on surface water and groundwater systems increases.





# Planning arrangements



## Key legislation and policies

The *Rights in Water and Irrigation Act 1914* (the Act) provides the legislative basis for the planning, regulation, management, protection and allocation of water resources. The Minister for Water has delegated responsibility to the Department of Water for administering the Act through the preparation of water allocation plans and administration of water entitlements and water rights.

Water licences are the statutory tool for managing water abstraction. Water abstraction is licensed under Section 5C of the Act (including water abstracted for public water supply, mining, power generation, industrial and irrigation purposes). Water licences can only be issued for water use from proclaimed water resources or from a confined aquifer.

Water allocation plans are generally only created for proclaimed areas. The proclamation of groundwater and surface water areas is a legal process that allows the Department of Water to actively manage water resources through the licensing of water users. Approximately 90 per cent of the State's groundwater resources are in a proclaimed area. While surface water proclamation areas cover only a small proportion of the State (approximately 15 per cent) they proclaim most of the usable water resources in river systems and other surface water systems, in populated regions of the State.

## Planning framework

There are 20 water allocation plans in place, covering 80 per cent of Western Australia's water use. This includes four groundwater water allocation plans under development.

Water allocation plans are non-statutory and follow a consistent and largely transparent development process. Plans are developed to guide licensing decisions and ongoing management of the water resources in areas where water use is 30 per cent or more of the associated allocation limit. Plans identify:

- water that is available for use
- water that is accounted for but exempt from licensing such as stock and domestic and riparian rights
- water set aside for current and future public water supply.

Plans also take into account environmental water requirements. Pre-planning assessments determine what water the environment requires. Environmental water provisions are then established for each resource and implemented through setting of allocation limits and through system-specific management rules and trigger levels.

























The State Water Plan 2007 provides a strategic framework to plan and manage Western Australia's water resources. It sets out broad state-wide directions and policies, a Water Planning Framework, and specific priority actions to be implemented over three to five years. Under the State Water Plan, there were to be eight regional water plans by 2012. The regional plans detail positions on water issues relevant to each region. These positions are implemented through the more specific allocation plans and other plans such as drainage plans, water quality plans and waterways management plans.

The planning framework also includes specific strategic water issue plans which aim to address specific issues such as drought-response initiatives and specific resource development options for a town, sector or region. An example is the Pilbara Water in Mining Guideline (2009) that guides how water is managed for mining operations in the Pilbara region.

State-wide operational policies guide aspects of planning and licensing common to more than one area. For example, trade and managing unlicensed use are covered by operational policies, and allocation plans nominate whether and why a plan has different or has additional local licensing rules for that area. There are 10 operational policies that impact water allocation plans.



Table 5: Planning instruments

Assessment criteria	State		Regional	Catchment	Comment
	Rights in Water and Irrigation (1914) Act	Operational policies	RWP	WAP	
1. Status of plan					The Act provides the statutory basis for licensing water abstraction. Non-statutory allocation plans establish the objectives, local rules and water available for licensing in plan areas. RWPs are under development and will set a broad strategic context.
2. Key assessments					The assessments are undertaken at the plan area level, with resource assessments often based on broader resource scale. Some adjacent plan areas with similar water resources have joint assessments.
3. Overuse status & pathways to sustainable water extraction					Sustainable extraction limits, called water allocation limits, and relevant water recovery measures are specified in plans.
4. Clearly identified & measurable outcomes					Broad outcomes are included in plans, supported by more descriptive objectives and performance indicators.
5. Facilitation of trade					Trade rules are set at a state level under operational policy. Where there are local resource constraints or considerations, additional rules are specified in the plan.
6. Integration of water intercepting activities					Plans identify which intercepting activities have been considered when setting the allocation limit, and account for these where they affect the water balance. Interception by plantations and off-stream dams is not licensed.
7. Surface water/ groundwater connectivity					Plans define the water resources to be managed by the plan, and identify any resources that are treated as connected when setting allocation limits.
8. Environmental water management arrangements					Environmental water needs are assessed in plan development, and inform allocation limits and management rules defined in plans. Environmental water management arrangements are also often included as part of licence conditions or operating strategies.
9. Monitoring, compliance & enforcement provisions					Plans include provisions for monitoring and associated annual plan evaluations. Compliance and enforcement mechanisms are tied to licence conditions. State-wide policies also govern compliance and enforcement.
10. Planning for climate change & extremes in inflows or recharge					Allocation decisions are based on climate records, with newer plans including response to projected climate variability and or change. The State Water Plan 2007 establishes longer term climate change strategies and RWPs discuss the impact of climate change on recharge and streamflow.
11. Stakeholder engagement					Stakeholder engagement in plan development is set out by the Act and internal process documentation. Plans are released for public comment and formal submissions are invited. Statements of response are published with finalised plans.
12. Extent to which outcomes have been achieved					Plans specify review and reporting requirements. Publications of annual evaluation statements for each plan are scheduled to commence in late 2011.



## Key findings



### A risk based approach to water plan development to prioritise planning activities

Western Australia uses a risk based approach to prioritise plan development, and applies planning effort based on the level of water resource development. When a water resource is at least 30 per cent allocated, or is otherwise prioritised, preparation of a water allocation plan is triggered to more closely manage allocation, abstraction and use.

### Newer plans are positioned for effective adaptive management through the setting of clear objectives and strategies for monitoring and reporting

Newer plans have been strengthened by sound resource assessments and the identification of clear planning objectives, management strategies and actions. The purpose of, and arrangements for monitoring, evaluation and review are also delineated and should improve the ability to assess whether plans have been effective.

### Water plans show progress in accounting for climate change and variability

Plan assessments consider climate variability by applying climate data time series. Newer plans quantify the potential impacts of climate variability and change and account for these impacts by basing forecast inflows and recharge on recent dry decades, and in some instances, on projections of future climate impacts.

### Pathways to return overallocated systems to a sustainable extraction regime are not fixed

Plans for overallocated systems identify mechanisms to return systems to a sustainable extraction regime, including increased licence compliance, water use efficiency measures and recovery of unused or under-used allocations. However, the achievement of the identified sustainable allocation and extraction regime is at risk given there are no clear timeframes for allocation recovery.



## Findings against criteria

1. Status of water planning	Approximately 80 per cent of Western Australia's water resources are covered by a non-statutory water allocation plan, or by licence arrangements. There are 20 active water allocation plans across eight regions, relating to groundwater systems or surface water systems. Two of these plans cover connected surface water and groundwater systems. Some older water allocation plans due for review and replacement still apply, as other water plan development or review processes have been prioritised. Plans that are released for public comment are effective from the date of release.
2. Do plans include key assessments?	Key assessments are undertaken as part of water allocation plan initiation and development. The key assessments are completed to a degree of complexity that generally reflects the level of water use in the plan area. Key assessments for newer plans are made publically available.
3. Do plans address overuse and is there a pathway to sustainable extraction?	Water allocation plans aim to prevent overuse by setting allocation limits for licensed extractions. Water resources are categorised from Category 1 to 4, based on the percentage allocation of the allocation limit. Category 4 is allocated greater than 100 per cent of the available water. Water allocation plans that manage overallocated resources have provisions for net allocation reductions or no net increase in extraction. Mechanisms to prevent overuse include additional licence conditions and increased licence compliance, water use efficiency measures and recovery of unused or under-used allocations. Plans do not specify a timeframe for the return of allocations to the allocation limit.
4. Do plans include clearly identified and measurable outcomes?	In newer water allocation plans, objectives and outcomes are clearly stated and linked to water allocation plan actions and monitoring arrangements. Inclusion of performance indicators in water allocation plans also allows for ongoing assessment of outcomes. The measurability of water allocation plan outcomes has improved over time.
5. Do plans facilitate trade?	Plans facilitate trade by reference to state-wide trading policy. Additional specification of local trading rules occurs in some plans. There is a lack of clarity in how some aspects of the state-wide trading policy will be applied. There are aspects of entitlement specification and management that are not consistent with the NWI water access entitlement framework and outcome of efficient and open water markets.
6. Is interception appropriately considered and integrated into the plans?	Intercepting activities are considered and accounted for in surface water and groundwater modelling, and incorporated into the setting of allocation limits. Dewatering of mines is licensed, and is included in water allocation decisions as appropriate. Interception through stock and domestic use is sometimes determined to be minimal, but where relevant is estimated for inclusion in allocation limit decisions.
7. Do the plans address surface water and groundwater connectivity as appropriate?	Water allocation plans acknowledge that groundwater and surface water are linked, and that groundwater systems are connected, where applicable. Connectivity is calculated, or estimated, depending on the level of knowledge. While water allocation plans may be developed separately for groundwater and surface water, the impact of each on the other is captured in setting water extraction limits. Rules for local management of groundwater/surface water and groundwater/groundwater connectivity impacts are set under water allocation plans.

- |  |   |
|--|---|
| 8. Do plans contain accountable environmental water management arrangements?                             | Environmental assets are identified and their water requirements determined through key assessments. Specific environmental water objectives are set out under water allocation plans. The planning framework maintains environmental water needs in situ by setting consumptive allocation limits. Consideration of environmental water needs is documented in the methods reports which accompany newer plans, but not reported in water allocation plans. Some water allocation plans include water level, rate of change and/or ecosystem health triggers relating to environmental water requirements. System-specific rules for environmental flows and groundwater-dependent ecosystems (GDEs) are set under some water allocation plans. Longer term security for environmental water provisions is at-risk given the non-statutory nature of water allocation plans. |
| 9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place? | There are state-wide operational policies that apply to aspects of metering, monitoring and compliance. Most water allocation plans set out a monitoring regime. Linkage of plan outcomes and monitoring has improved over time with the inclusion of performance indicators in newer water allocation plans. While monitoring data for some areas is available online, and there is evidence of monitoring in some areas, comprehensive assessment of the adequacy of monitoring across all water plan areas is difficult given lack of plan reporting. Most water allocation plans require annual public reporting of plan performance, but no reports have been published to date. Where local conditions dictate, additional compliance and enforcement rules are specified in the plan.  |
| 10. Do the plans deal appropriately with climate change and extremes in inflows or recharge?             | Water allocation plans consider climate change by basing forecast inflows and recharge on recent dry decades, with additional consideration based on drier future climate forecasts factored in for some water allocation plan areas. The buffering capacity of some groundwater systems typically helps to limit impacts of short-term extreme events. To maintain reliability of supply, surface water allocation plan allocation limits are developed against low flow records. The State Water Plan 2007 considers the impact of climate change.  |
| 11. Is stakeholder engagement in the planning process adequate?  | Stakeholder engagement in water planning is outlined by policy and undertaken through a variety of formats (media releases, statements of response, method reports, regional water bulletins, Indigenous bulletins and water articles) and approaches (committees, public forums and targeted consultation) to engage stakeholders in the planning process. For some water allocation plans information is available in several languages and formats in an attempt to engage specific stakeholders. A considered element of water allocation plans is targeted engagement of the Indigenous community. Plans are released for a three month public comment period and formal submissions are invited. All submissions and responses are summarised into a Statement of response.   |
| 12. Have identified outcomes been achieved during the reporting period?                                  | There is little publicly available evidence regarding the achievement of outcomes in any plan area. Most water allocation plans indicate that annual evaluation statements will be produced, however these have not been prepared to date. A number of these statements are scheduled for publication from late 2011. All water allocation plans incorporate principles of adaptive management and can be amended if outcomes are not being achieved.   |



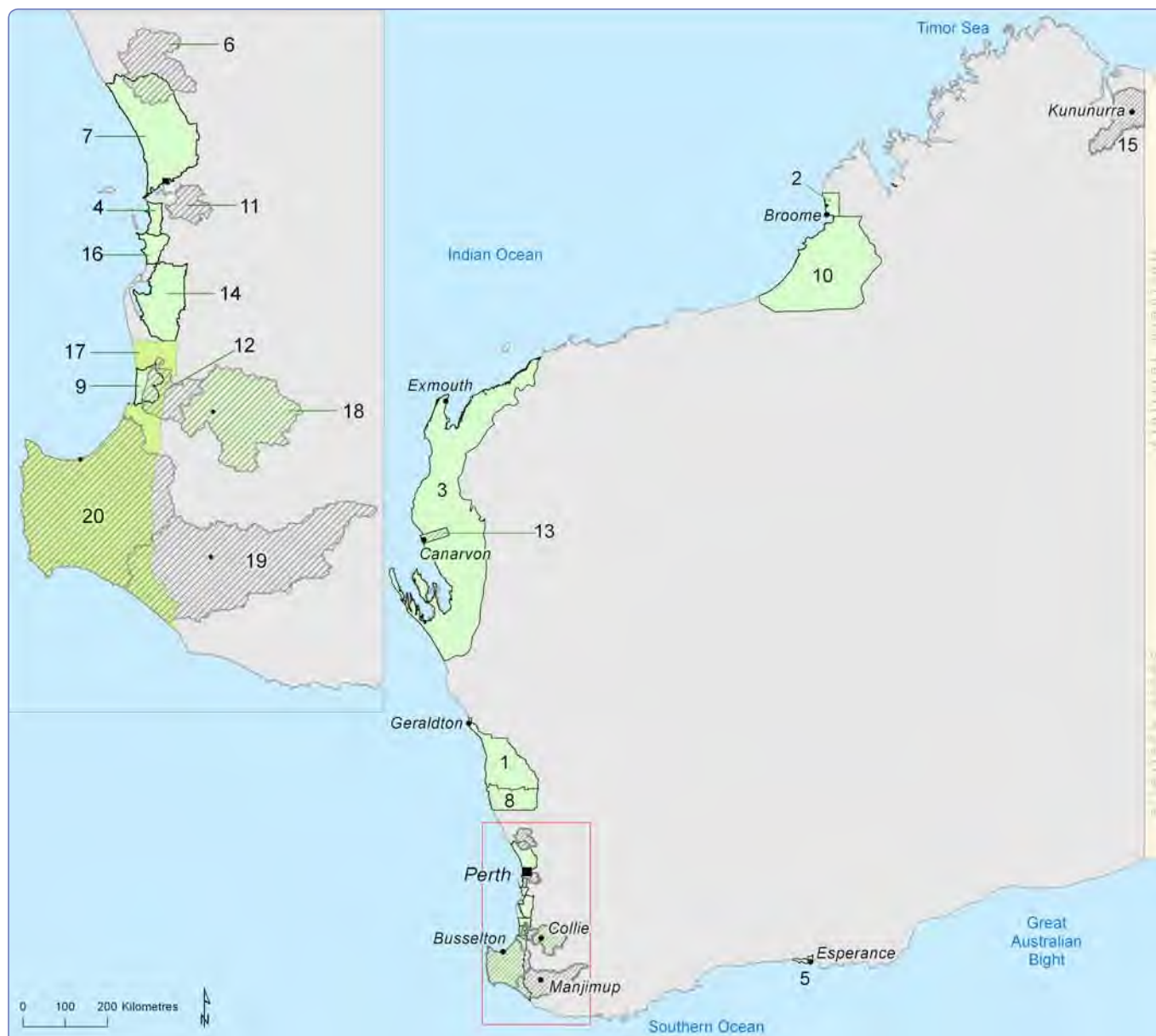


## Glossary and abbreviations

Term	Acronym	Definition
Allocation limit		Annual volume of water set aside for licensed use from a water resource in a water allocation plan area. This is the sustainable extraction limit for the resource.
Groundwater Area		A proclaimed groundwater area.
Groundwater-dependent ecosystem	GDE	Ecosystems that are dependent on groundwater for their existence and health
Methods report		Methods reports contain technical details about the hydrological, ecological, economic and social considerations relating to a water allocation plan.
Proclamation Area		An area declared under the <i>Rights in Water and Irrigation Act 1914</i> , requiring certain water users to have a licence to take water from a watercourse or aquifer.
Regional Water Plan		Eight regionally focused approaches to water management issues, setting the broad context for water allocation plans in the region.
<i>Rights in Water and Irrigation Act 1914</i>		The Act
Statement of response		Water allocation plans are sometimes accompanied by supporting documentation. Statements of response contain all the formal submissions with respect to a water allocation plan released for public comment, and delineate the Department of Water response to each submission.
Strategic Water Issue Plans		A flexible tool to deal with matters outside the scope of a Regional Water Plan or water allocation plan, enabling multiple government agencies to work together.
Water abstraction		Any take of water from a surface water or groundwater source.
Water allocation plan		The planning instrument for a defined area, setting out how much water is available in a surface water or groundwater proclamation area.
Water Management Plan		The name given to older water allocation plans.

# Planning areas

## Western Australia



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### Location



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# ARROWSMITH



## GROUNDWATER ALLOCATION PLAN 2010



### Context

The Arrowsmith Groundwater Allocation Plan area covers the northern most extent of the Northern Perth Basin, centered 300 km north of Perth. The plan covers the unconfined and confined aquifers found in the area. Mining, public water supply and agricultural production are the main water uses, with the majority of extraction from the widely distributed confined aquifers. The increasing competition for water, including the growing demand for public supply in coastal areas, and the complexity of the distributed groundwater systems drives the need for planning.

## Findings

1. Is there a plan in place?	Yes	The plan has been in place since August 2010 and is due for review after 2017.
2. Does the plan include key assessments?	To some extent	The plan is based on limited existing assessments. More detailed assessments are planned to inform development of the next plan.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse has not been identified in the plan area. The plan aims to prevent overuse by restricting the allocation to the limit set under the plan, or by requirement for local hydrogeological investigation in areas where allocation limits are estimated. The allocation limits are generally set to provide for consumptive use and maintain the resource and dependent ecosystems at a low level of risk. Water level triggers are in place in highly used areas.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan sets out resource and management objectives underpinned by relevant strategies and policies. Inclusion of performance indicators allows for the ongoing assessment of objectives.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	Yes	Unlicensed stock and domestic use is recognised in the plan and allowed for in the allocation limit. Mining below the watertable requires a licensed allocation.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The plan sets out minimum water level requirements and triggers to protect baseflow in connected surface water features (in high use areas). However, there is no clear identification of areas of connectivity in the plan or plan assessments.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan sets out broad environmental objectives. There is no clear identification of groundwater-dependent environmental assets and environmental water needs are only discussed in general terms. General provisions are made through quarantining a proportion of recharge from consumptive allocation, and setting minimum water level requirements and triggers to protect discharge to GDEs are specified in high use areas. No specific ecosystem monitoring program is specified.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A monitoring program is set out in the plan although there is limited evidence that monitoring is occurring. The monitoring program is scheduled for review. There is a commitment in the plan to publish an annual public evaluation statement, though the first of these is yet to be prepared. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	Resource impacts of climate variability were considered in the review of allocation limits for the plan as current allocation arrangements were considered appropriate. Climate change impacts are not yet considered.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholders were engaged throughout development of the plan, including identification of Indigenous values. A statement of response to stakeholder submissions is published.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There is a commitment in the plan to report annually on monitoring and achievement of plan objectives. There is no public evaluation statement published to date.

# BROOME



## GROUNDWATER MANAGEMENT PLAN 1994



### Context

The Broome Groundwater Management Plan area is located in the Kimberly region in the far north-west of the State, with a tropical climate dominated by summer rainfall and groundwater recharge. The plan covers use from the unconfined and confined aquifers found in the region. Groundwater, predominately drawn from the unconfined aquifer, is the only substantial potable water resource available to meet local town and industry needs. Demand for water has grown with increasing population. The plan seeks to protect the potable resource from intrusion of poorer quality groundwater and sea water.





## Findings

1. Is there a plan in place?	Yes	The plan has been in place since September 1994. An unpublished review was undertaken in 2008.
2. Does the plan include key assessments?	Yes	The key assessments undertaken are limited, but adequate for water use and development in the plan area.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse has not been identified in the plan. The plan prevents overuse by restricting allocation to the limit set under the plan. There are triggers relating to salinity levels, although specific management responses are absent. Allocation limits and development controls are set to maintain water levels and quality to prevent saltwater intrusion.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Plan objectives have not been clearly identified, although implicit objectives can be inferred from management actions detailed in the plan. The lack of specific objectives and related performance indicators inhibits the ongoing assessment of plan performance.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	Yes	Unlicensed stock and domestic use is included in the plan and allowed for in the allocation limit.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	Maintaining aquifer throughflow to prevent saltwater intrusion is one of the central considerations of the plan. There are no major surface water features in the area.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Identified GDEs are spatially limited in the plan area. The plan seeks to maintain water levels that support GDEs through localised restrictions on well development and extraction.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A monitoring program is set out in the plan although there is limited evidence that monitoring has occurred. A review of the monitoring program is proposed. There is no commitment to public reporting of monitoring or plan performance. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan identifies the impact of high and low rainfall years on recharge and takes this into account in setting allocation limits.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholders were engaged through the development of the plan, including identification of Indigenous values.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There is no specific plan reporting or published evidence of plan performance. It is noted that a recent internal plan review has found allocation arrangements under the plan remain appropriate for the area.



# CARNARVON ARTESIAN BASIN



## GROUNDWATER ALLOCATION PLAN 2010



### Context

The Carnarvon Artesian Basin Groundwater Allocation Plan area is located in the arid remote north-west of the State. The plan covers the artesian groundwater of the Birdrong Aquifer, used for the township of Carnarvon and surrounding pastoral industry. Maintaining artesian pressure and protecting the critical potable water supply is the primary focus of the plan.



## Findings

1. Is there a plan in place?	Yes	The plan has been in place since August 2010 and is due for review by 2015.
2. Does the plan include key assessments?	Yes	The key assessments undertaken are adequate given the nature of the resource and current water development in the plan area.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse is not identified in the plan area. Overuse is prevented through the setting of nominal allocation limits (modelled to maintain minimum artesian pressure) and/or the requirement for development of impact assessments for new licence applications. Some previously free-flowing bores have been capped or refitted under state and federal government programs.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan sets out resource and management objectives, underpinned by a range of relevant management principles and actions. There is a lack of specific performance indicators in the plan to allow for ongoing assessment of plan objectives. Performance indicators have been formulated in the first plan evaluation statement.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	Yes	Stock and domestic extractions are included in allocation limits and licensed. Under legislation, taking of all water from an artesian well requires a licence, regardless of use.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	This plan manages a deep, confined aquifer, which is not connected with other groundwater or surface water systems.
8. Does the plan contain accountable environmental water management arrangements?	Not applicable	There are no GDEs identified in the plan area. There are no areas of aquifer discharge to the surface, and water levels are too deep to support terrestrial vegetation.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Licencee monitoring requirements are set out in the plan, although no area-based resource monitoring program is specified. A monitoring program outside the plan is currently being implemented. There is a commitment to publish plan evaluation statements every two years and there is limited evidence of resource monitoring in the 2009 evaluation. Compliance and enforcement provisions are specified in legislation and additional local licensee requirements are set out in the plan.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The deep and confined resource is largely disconnected from rainfall variability. As such, risk to the resource from climate variability and change is low. Seasonal variability in demand is managed through resource impact conditions.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholders were engaged throughout development of the plan. A statement of response to stakeholder submissions is published. No resource-dependent cultural values were identified.
12. Have identified outcomes been achieved during the reporting period?	Yes	There is a commitment in the plan to two-yearly reporting on monitoring and achievement of plan objectives. The 2009 plan evaluation statement notes early success in achievement of plan objectives.



# COCKBURN GROUNDWATER AREA



## WATER MANAGEMENT PLAN 2007



### Context

The Cockburn Groundwater Area Water Management Plan area is located 30 km south of Perth. The plan covers the unconfined and confined aquifers found in the area. Current use includes horticulture, industry and domestic supply. Groundwater-dependent wetlands with national and international protection status are located in the area. Water level declines in the predominately used unconfined aquifer have occurred over recent years as recharge has decreased in the drying climate and urbanisation and private extraction has increased. The need for planning is driven by increasing competition for water between existing horticultural use, and urban and industrial expansion in the area.

## Findings

1. Is there a plan in place?	Yes	The plan has been in place since December 2007, and is due for review in December 2014.
2. Does the plan include key assessments?	Yes	All key assessments were undertaken in the development of the plan. Current social and economic demands have been documented.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	Overuse is not identified in the plan. Overuse is prevented by setting subarea allocation limits designed to maintain the resource and dependent ecosystems at a low level of risk. One subarea is overallocated and at risk of overuse if unused licences are activated. The plan seeks to prevent overuse through licence management, including recovery of unused or under-used allocations in overallocated areas. However, the plan does not specify a timeframe for the return of allocations to the identified limit.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plans set out resource and management objectives, underpinned by a range of relevant management principles and actions. The lack of specific performance indicators inhibits the ongoing assessment of plan performance.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	Yes	Estimated unlicensed stock and domestic use is included in plan allocation limits.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	Groundwater discharges from the unconfined aquifer to the coastal lake and a large number of drains and wetlands. The plan sets allocation limits and development conditions to maintain these connections.
8. Does the plan contain accountable environmental water management arrangements?	Yes	There are no specific environmental objectives set out in the plan, although protection of GDEs is explicit in plan considerations and policies. Groundwater-dependent environmental assets are identified, and environmental requirements are set out. Environmental water provisions are implemented through limiting extraction to maintain in situ water levels and through local development controls that seek to protect water levels and quality.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A monitoring program is set out in the plan, including targeted monitoring around some GDEs. There is evidence of monitoring, although reporting to date has not met the annual public reporting commitment. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan responds to declining groundwater levels resulting from reduced rainfall recharge by reviewing and adjusting allocation limits. The potential impacts of climate change have not been reflected in plan provisions.
11. Is stakeholder engagement in the planning process adequate?	No	There is no evidence of stakeholder engagement during the planning process.
12. Have identified outcomes been achieved during the reporting period?	To some extent	There is a commitment in the plan to report annually on monitoring and achievement of plan objectives. Evidence sighted suggests that the majority of plan objectives are being achieved. Progress has been made in reducing overallocation, although allocations are not yet at set limits across the area. No public evaluation statement has been published to date.



# ESPERANCE GROUNDWATER AREA



## WATER MANAGEMENT PLAN 2007



### Context

The Esperance Groundwater Area Water Management Plan area is located in the remote far south-east of the State. The plan covers use from the unconfined and confined aquifers of the region. Groundwater from the unconfined aquifer is the only substantial potable water resource available to meet local town and industry needs. Demand for water has grown with increasing population and growth in mining and aquaculture. The plan seeks to protect the scarce potable resource from overuse and intrusion of poorer quality groundwater and sea water.



## Findings

1. Is there a plan in place?	Yes	The plan has been in place since May 2007, and is due for review in 2014.
2. Does the plan include key assessments?	Yes	Assessments were undertaken in the development of the plan, appropriate to the water management context of the plan area.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse is not identified in the plan area. The plan aims to prevent overuse and associated resource degradation (from saltwater intrusion), by setting allocation limits to a percentage of the estimated rainfall recharge in each subarea. To pre-empt overuse, a more thorough investigation of groundwater resources is triggered when use approaches the allocation limit.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan sets out objectives, underpinned by a range of relevant management strategies, policies and actions. The lack of specific performance indicators inhibits the ongoing assessment of plan performance.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	Yes	Estimated unlicensed stock and domestic use is included in plan allocation limits.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	Groundwater discharge to wetlands is identified in the plan. There are no significant surface water resources in the area.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	There are no specific environmental objectives set out in the plan, although protection of GDEs is explicit in plan considerations and policies. Major GDEs are identified, including dependent Ramsar-listed wetlands. Environmental water requirements are discussed, but not quantified, in the plan. Demand triggers are in place that require assessment of specific environmental water requirements and provisions.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A monitoring program is set out in the plan and there is evidence monitoring is occurring. There is no commitment in the plan to public reporting. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The allocation limits set under the plan are linked to average rainfall recharge. The potential impacts of climate change have not been reflected in plan provisions.
11. Is stakeholder engagement in the planning process adequate?	No	There is no documented evidence of stakeholder engagement during the planning process.
12. Have identified outcomes been achieved during the reporting period?	To some extent	While no public evaluation statement has been published to date, sighted evidence suggests the majority of plan objectives are being achieved. However, the trend of increasing coastal saltwater intrusion continues.



# GINGIN



## SURFACE WATER ALLOCATION PLAN 2011



### Context

The Gingin Surface Water Allocation Plan area is located 100 km north of Perth. Surface water resources in the area are characterised by a network of unregulated streams, with a high level of in-stream dam diversion to support horticultural and agricultural use. There has been a marked reduction in rainfall and inflows over the past few decades, particularly in summer months when demand is greatest, resulting in reduced yield and over allocation across the plan area. Equitable re-allocation of the diminishing resources is the primary focus of the plan.

## Findings

1. Is there a plan in place?	Yes	This plan has been in place since April 2011 and is due for review by 2016.
2. Does the plan include key assessments?	Yes	All key assessments were undertaken in the development of the plan, including scenario-based risk assessment.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan area is overused and overallocated due to decreased inflows in the drying climate. Allocation limits have been reduced under the plan as a first step to recovery. Recouping of water licences, including recovery of unused licences, is the primary mechanism to return levels of allocation to the limit, however there is no timeframe for achieving this. The allocation limits are set above the renewable yield, reflecting a trade-off between the needs of consumptive users, and the in situ ecological and social values needs and resource viability.
4. Does the plan include clearly identified and measurable outcomes?	Yes	Broad resource and management objectives are stated, underpinned by a range of relevant management strategies, policies and actions. Inclusion of performance indicators in the plan allows for the ongoing assessment of objectives.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade. It is noted that much of the plan area is in recovery mode and unused allocations are being recouped.
6. Is interception appropriately considered and integrated into the plan?	Yes	Unlicensed stock and domestic use is identified as the major intercepting activity in this area. Current and future demand has been estimated and taken into account in setting allocation limits.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	Groundwater discharge provides stream baseflow during summer months and is anticipated to decline under the projected drying climate. Groundwater recharge and discharge is accounted for in the determination of allocation limits.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Broad environmental objectives are set out in the plan. Ecologically critical low flows are protected through specific low flow thresholds below which extraction is not permitted. Under the plan, recovered allocations will be returned to the system for environmental water. The plan notes the need for a more comprehensive investigation of environmental water needs.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A monitoring and reporting framework is set out in the plan. Given the plan's recent implementation, there is limited evidence available as to the adequacy of monitoring. Compliance and enforcement provisions are specified in legislation and additional local licence requirements are set out in the plan.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	Declining trends in rainfall, streamflow and groundwater discharge are expected to have an increasing impact on user access, particularly during low flow periods. These declining trends are used to set new allocation limits. Seasonal variability is managed through low flow extraction restrictions.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement in plan development has been comprehensive, including consideration of downstream impacts on other users. A statement of response to stakeholder submissions is published.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There is a commitment in the plan to report annually on monitoring and achievement of plan objectives. There is no public evaluation statement published to date.

# GNANGARA GROUNDWATER AREAS



## ALLOCATION PLAN 2009



### Context

The Gnangara Groundwater Areas Allocation Plan area includes the northern Perth metropolitan region, and encompasses the unconfined and confined aquifers found in the area. The Gnangara groundwater resources are Perth's major public water supply source, and are also used for horticulture and other industry in the area. Groundwater levels have declined over the past decade due to reduced recharge from lower rainfall, increased abstraction and urbanisation. The drying climate, ongoing heavy use and marked decline of this critical water source are the central management drivers in this area.



## Findings

1. Is there a plan in place?	Yes	This plan has been in place since November 2009 and is due for review by 2012.
2. Does the plan include key assessments?	Yes	All key assessments were undertaken in the development of the plan.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	Overuse is not explicitly identified in the plan. However, all areas are overallocated and at risk of overuse if unused allocations are activated. The plan sets revised allocation limits as a first step to return allocation levels to the sustainable limit. Overuse is prevented through licence management, including recovery of unused or under-used allocations. However, the plan does not specify a timeframe for the return of allocations to the revised allocation limit. The plan recognises that new water sources for public water supply are expected to provide alternative water sources.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Broad objectives are stated, underpinned by relevant management strategies and policies and monitoring arrangements. Performance indicators are included in the plan, although not all are clearly measureable.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade. It is noted that much of the plan area is overallocated and unused allocations are being recouped.
6. Is interception appropriately considered and integrated into the plan?	Yes	Estimated unlicensed domestic and garden use is included in plan allocation limits.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	Water from the unconfined aquifer discharges to wetlands and streams across the area. The plan seeks to protect surface water systems from the impacts of groundwater extraction through allocation limits and development conditions near some features.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan sets out environmental objectives and identifies groundwater-dependent environmental assets. Environmental water provisions are set through water level criteria at representative sites. GDEs are also protected through restrictions on extraction near sensitive sites. These provisions are formalised under environmental protection legislation. Ecosystem monitoring against criteria is reported to the Environment Protection Agency.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Resource and ecosystem monitoring programs are set out under the plan. Monitoring data is available online, although this is not explicitly linked to plan objectives. Annual plan evaluation statements have not yet been published. Annual compliance reports against environmental criteria are published. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan takes drying climate trends into account in setting allocation limits. Development of alternative supplies helps meet increasing water demand and manage variability in the area.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholders were engaged throughout development of the plan, including identification of Indigenous values. A statement of response to stakeholder submissions is published.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There is a commitment in the plan to report annually on monitoring and achievement of plan objectives. There is no public evaluation statement published to date. Recent resource status reports sighted indicate that the resource stress persists across much of the region.

# JURIEN



## GROUNDWATER ALLOCATION PLAN 2010



### Context

The Jurien Groundwater Allocation Plan area is located in the Northern Perth Basin, 200 km north of Perth. The plan covers the unconfined and confined aquifers found in the area. Public water supply, horticulture, agriculture and mining are the main water uses. The increasing competition for water, including the growing demand for public supply in coastal areas, and the complexity of the distributed groundwater systems drive the need for planning.

## Findings

1. Is there a plan in place?	Yes	The plan has been in place since August 2010 and is due for review after 2017.
2. Does the plan include key assessments?	Yes	Hydrological and environmental assessments have been undertaken appropriate to the level of resource development. The plan notes the need to conduct more rigorous social and economic assessments.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse has not been identified as an issue in this plan area. The plan aims to prevent overuse by restricting allocations to the limit set under the plan, or by a requirement for local hydrogeological investigation in areas where allocation limits are estimated. The allocation limits are generally set to provide for consumptive use while maintaining the resource and dependent ecosystems at a low level of risk.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan sets out objectives underpinned by a range of relevant management strategies, policies and monitoring arrangements. Inclusion of performance indicators allows for the ongoing assessment of objectives.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	Yes	Unlicensed stock and domestic use is included in the plan and allowed for in the allocation limit. Mining below the watertable requires a licensed allocation.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan sets out minimum water level requirements and triggers to protect baseflow in connected surface water features (in high use areas). However, there is no specific identification of areas of connectivity in the plan or plan assessments.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan sets out broad environmental objectives. There is no clear identification of groundwater-dependent environmental assets and environmental water needs are only discussed in general terms. General provisions are made through quarantining a proportion of recharge from consumptive allocation, and setting minimum water level requirements and triggers to protect discharge to GDEs are specified in high use areas.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A monitoring program is set out in the plan, although there is limited evidence that monitoring is occurring. There is a commitment in the plan to publish an annual public evaluation statement, though the first of these is yet to be published. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	Resource impacts of climate variability were considered in review of allocation limits for the plan and current arrangements were considered appropriate. The plan indicates climate change impacts will be considered at next plan review, even though no date has been set for review.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholders were engaged throughout development of the plan. A statement of response to stakeholder submissions is published.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There is a commitment in the plan to report annually on monitoring and achievement of plan objectives. There is no public evaluation statement published to date.

# KEMERTON GROUNDWATER SUBAREAS



## WATER MANAGEMENT PLAN 2007



### Context

The Kemerton Groundwater Subareas Water Management Plan area is located north of Bunbury on the south-western coast of Western Australia. The plan covers the unconfined and confined aquifers found in the area. Current use includes agriculture (stock), horticulture, mining and heavy industry. The area has been designated a strategic industrial site. Sustainable development of water supplies to support economic development in the designated Kemerton Industrial Park is the central focus of the plan.



## Findings

1. Is there a plan in place?	Yes	This plan has been in place since January 2007 and is due for review by 2014.
2. Does the plan include key assessments?	Yes	Assessments have been undertaken appropriate to the level of resource development. The economic assessment is limited to broad discussion of demand.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse has not been identified as an issue in this plan area. The plan aims to prevent overuse by restricting allocations to the limit set under the plan. The allocation limits are generally set to provide for consumptive use while maintaining the resource and dependent ecosystems at a low level of risk. To pre-empt overuse, actions such as increased meter compliance and reducing allocations are triggered if groundwater levels decline.
4. Does the plan include clearly identified and measurable outcomes?	No	The plan does not have clearly identified objectives, although objectives are implicit in plan strategies and policies. There is an absence of performance indicators that would guide measurement of plan performance.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	Yes	Unlicensed stock and domestic use is included in the plan and allowed for in the allocation limit. Mining below the watertable requires a licensed allocation.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	Groundwater/surface water connectivity has been identified and modelled in the area. The plan sets out minimum water level requirements and triggers to protect water level for connected surface water features.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	A number of high conservation value groundwater-dependent wetlands and areas of terrestrial vegetation are identified, although specific requirements are not assessed. Broad environmental water needs are accounted for in setting allocation limits and provided through the setting of critical water level thresholds for ecosystems.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A broad monitoring program is set out in the plan although there is limited evidence that monitoring is occurring. There is a commitment to prepare a resource status report every two years. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	Current climate and variability trends are accounted for in the hydrological assessment and incorporated into the setting of allocation limits. Incorporation of potential climate change impacts on the resource has not yet occurred.
11. Is stakeholder engagement in the planning process adequate?	No	There is no evidence of stakeholder engagement.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There is no evidence of plan performance. Specific reporting of plan performance is not required under the plan and scheduled resource status reports are not found.





# LA GRANGE



## GROUNDWATER ALLOCATION PLAN 2010



### Context

The La Grange Groundwater Allocation Plan area is located in the Kimberly region in the far north-west of the State, with a tropical climate dominated by summer rainfall and groundwater recharge. Groundwater from the unconfined Broome Sandstone Aquifer is the major source of water in this area. Current use includes horticulture, pasture, tourism and domestic supply. Environmentally and culturally significant coastal and inland wetlands and springs are found in the area, including three Ramsar-listed sites. An unrealised proposal to develop the resource for cotton irrigation was the trigger for development of this plan. Interest in developing mining and horticulture continues.

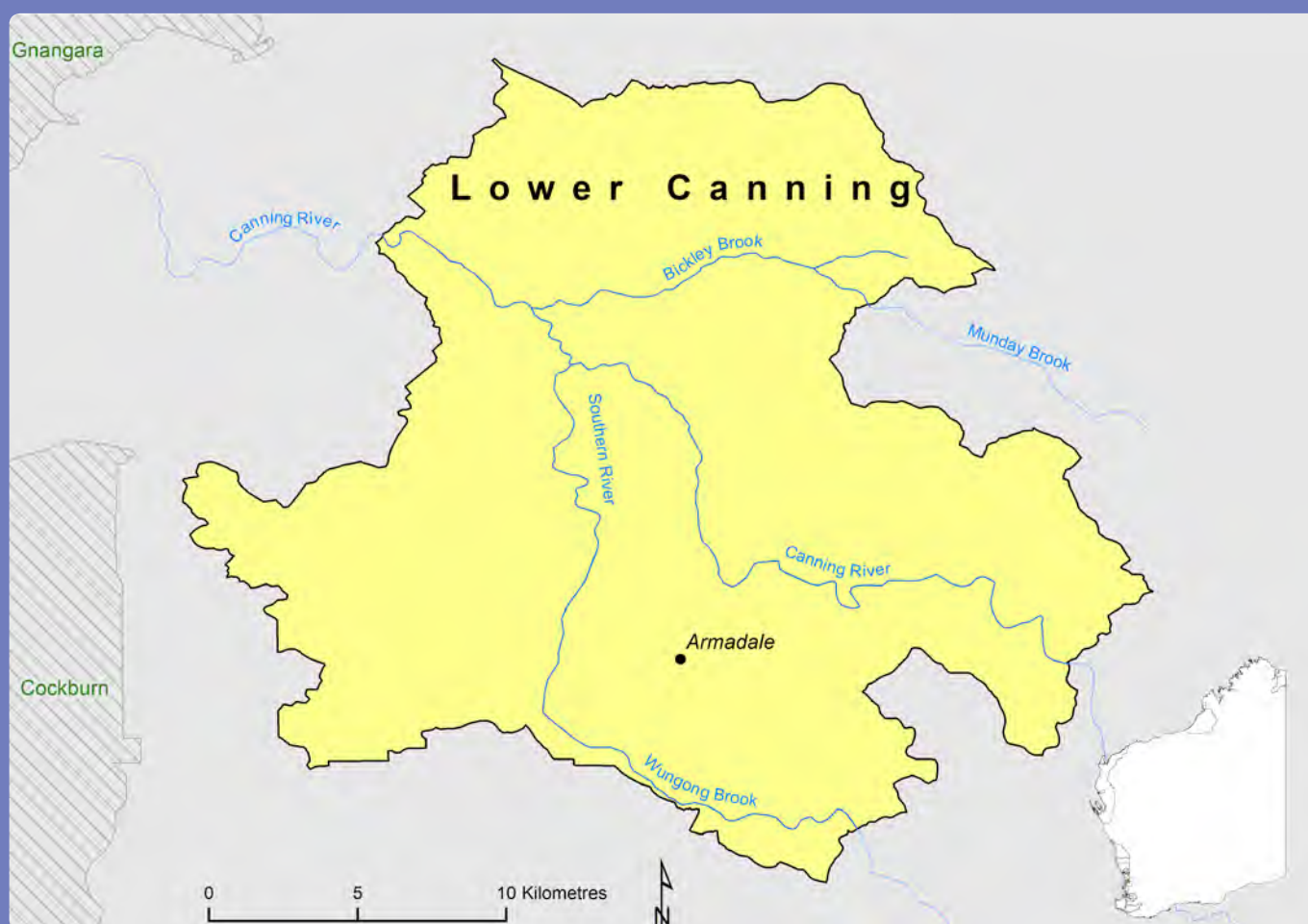
## Findings

1. Is there a plan in place?	Yes	The plan has been in place since February 2010. The plan does not identify a date for review.
2. Does the plan include key assessments?	Yes	Key assessments adequate for current water development in the plan area have been undertaken. Ecological and associated cultural values have been identified, although environmental water requirements have not yet been quantified.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan prevents overuse by setting subarea allocation limits and management triggers responsive to increasing demand. The allocation limits are based on estimated annual recharge and set to maintain current resource condition and meet the needs of identified ecological, cultural and social water-dependent values.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan sets out resource condition and management objectives and details strategies and actions to achieve these objectives. Lack of specific performance indicators and monitoring for the plan inhibits ongoing assessments of plan objectives.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade. The low level of resource development and hence low demand for trading is noted. Trading will not be permitted between subareas.
6. Is interception appropriately considered and integrated into the plan?	Yes	Stock and domestic water use is incorporated into allocation limits. Mining is noted as a possible future water use and mining below the watertable requires a licence.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	Groundwater discharge in the region is highly significant in maintaining the current position of the coastal saltwater interface and supporting identified wetlands. Allocation limits and management provisions set under the plan seek to maintain the current aquifer throughflow and discharge regime to protect against seawater intrusion and maintain discharge to springs and wetlands.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan sets out environmental objectives and discusses environmental water needs (currently understood to a limited extent). Extraction limits maintain in situ water and local development requirements around GDEs seek to protect water levels and discharge. Monitoring arrangements for GDEs are not specified.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan does not set out specific resource or ecosystem monitoring arrangements beyond monitoring of allocation demand. There is a commitment in the plan to publish an annual public evaluation statement; the first of these is yet to be published. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	Climate change is addressed by consideration of past extremes of recharge in setting allocation limits. The intention to use climate change projections in future versions of the plan is noted in the plan.
11. Is stakeholder engagement in the planning process adequate?	Yes	The stakeholder engagement undertaken was adequate for this plan and level of water resource development. Indigenous engagement was undertaken through targeted consultation. A statement of response to stakeholder submissions was published.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There is a commitment in the plan to publish an annual evaluation of the plan objectives. The first evaluation is yet to be completed.

# LOWER CANNING RIVER



## SURFACE WATER ALLOCATION PLAN 2010



### Context

The Lower Canning River Surface Water Allocation Plan area is located along the south-east corridor of Perth's metropolitan region. The plan covers part of the highly modified Canning River downstream from the Canning Dam to the Kent Street Weir. The Canning Reservoir provides a freshwater resource for the city of Perth. Uses of water covered by the plan include horticulture, garden and recreation and public water supply. Riparian demand for water has been decreasing as urbanisation increases along the river. The central focus of the plan is to set an improved ecological flow release regime from the Canning Dam to protect and restore identified ecosystems and recreational values.



## Findings

1. Is there a plan in place?	Yes	The plan (for public comment) has been in place since September 2010. A finalised plan has not yet been released. The plan is due for review in 2017.
2. Does the plan include key assessments?	Yes	Comprehensive hydrological and ecological water requirement assessments form the basis of the plan. Social and economic values were also considered in the plan development.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The system is overallocated and overused in the plan area. Recovery of allocations commenced in 2005 and unused allocations continue to be recouped but there is no timeframe to return allocations to the new allocation limit set under the plan. New allocation limits are designed to best meet identified ecological needs. Reclassification of land use to urbanisation will trigger development controls that will further aid recovery.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clear measureable objectives and implementation strategies. The inclusion of specific performance indicators will allow for ongoing assessment of plan objectives.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade. It is noted the system is overallocated and unused allocations are being recouped.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan manages a highly regulated system. The plan area is confined by a dam and weir with little intra channel interception except via riparian rights. Stock and domestic riparian access is expected to decline with increasing urbanisation.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	Connectivity is not considered in plan development.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental objectives are set out. A detailed assessment of environmental water requirements has been undertaken. Provisions include environmental releases to meet specific ecological flow thresholds, focused on low flow periods.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A monitoring program is set out in the plan. As the plan is not yet finalised, there is no evidence of monitoring available. There is a commitment to prepare annual plan evaluation statements. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan includes management responses for annual rainfall triggers, including management variations for drought conditions. Long-term strategies for dealing with climate change have not been addressed.
11. Is stakeholder engagement in the planning process adequate?	Yes	This plan has been released for stakeholder comment.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is not yet finalised.



# LOWER COLLIE



## SURFACE WATER ALLOCATION PLAN 2011



### Context

The Lower Collie Surface Water Allocation Plan area is located in the south-west of the State, 200 km south of Perth. Surface water resources in the area are characterised by regulated releases from upstream reservoirs and seasonally variable unregulated tributaries. The majority of surface water use in the area is for horticulture and agriculture in the Harvey and Collie irrigation districts and along the river. There has been a reduction in rainfall and inflows over the past few decades, preventing some licence holders from taking their full allocation. The competing demands of agriculture and expanding industry in the drying climate are the central water management drivers in the area.





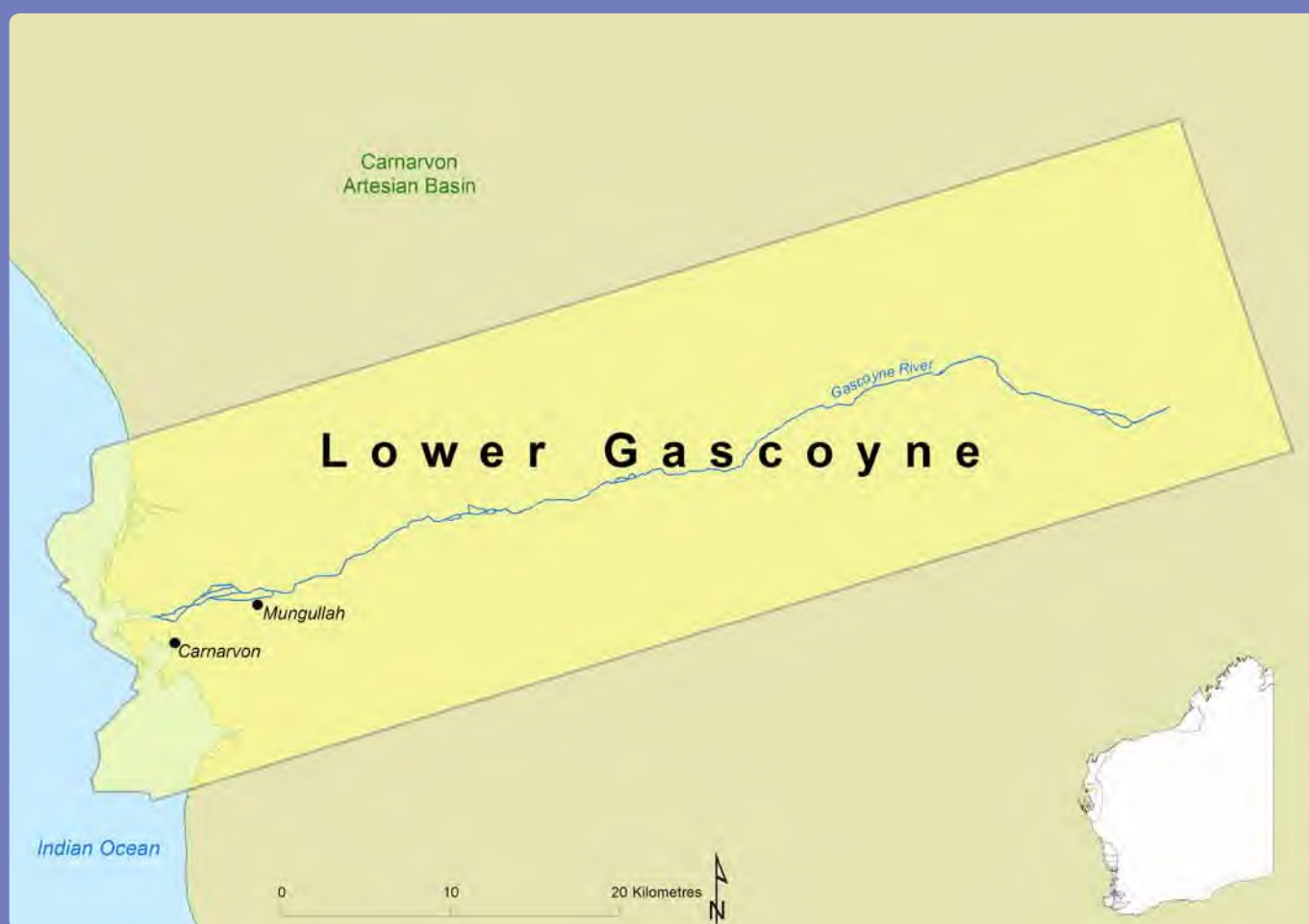
## Findings

1. Is there a plan in place?	Yes	The plan (for public comment) has been in place since May 2011. A finalised plan has not yet been released. The plan is due for review after 2020.
2. Does the plan include key assessments?	Yes	Hydrological, economic, social and environmental issues were considered in the key assessments. Analysis of risks to the water resource and critical human needs were included in assessments.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	There is no significant overuse identified in the plan area, although some parts of the catchment have local overuse or are close to full allocation. Overuse is prevented by setting allocation limits and minimum flow requirements and extraction restrictions during low flow periods. The establishment of the allocation limit included acknowledgment of the trade-off of environmental requirements and to meet current consumptive demand in some tributaries.
4. Does the plan include clearly identified and measurable outcomes?	Yes	Resource and management objectives are stated, underpinned by a range of relevant management strategies, policies and actions. Inclusion of performance indicators in the plan allows for the ongoing assessment of objectives.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade. Trade will be generally restricted to within the same, or connected, surface water resources.
6. Is interception appropriately considered and integrated into the plan?	Yes	Unlicensed stock and domestic use is measured or estimated and included in the allocation limit calculations. An assessment of interception by plantation forestry found the potential impact was insignificant.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan quantifies the groundwater contribution to river baseflow. Significant groundwater extractions in the area are licensed.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental objectives are specified. Environmental water requirements are identified. Provisions for the regulated parts of the system are made through specified volumetric releases that seek to mimic natural flow variations. Provision in unregulated systems is through specified minimum flow thresholds. Ecological monitoring arrangements are identified.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A monitoring program is set out in the plan and the program is under review to better align with plan objectives. Annual monitoring reports and evaluation statements are required by the plan. Compliance and enforcement provisions are specified in legislation, and additional local licence requirements are set out in the plan.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan incorporates climate variability and climate change in setting allocations and flow regimes. Climate change risk, as a function of variability and change, is accounted for in relation to water demand and reliability of supply. The plan suggests that groundwater use is expected to increase as the climate dries.
11. Is stakeholder engagement in the planning process adequate?	Yes	Consultation prior to the release of this draft has been thorough. Consultation includes social value studies of all river and water users, including Indigenous groups.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is not yet finalised.

# LOWER GASCOYNE RIVER



## GROUNDWATER AND SURFACE WATER ALLOCATION PLAN 2010



### Context

The Lower Gascoyne River Groundwater and Surface Water Allocation Plan area is located on the central coast of the State. The predominant water resource is groundwater drawn from the alluvial riverbed deposits. River flow is highly ephemeral, with flow and associated alluvial groundwater recharge events strongly driven by significant rainfall. The primary use of water in the area is for horticulture in the Carnarvon horticulture district. Managing the seasonal variability of the resource and securing resources for horticultural expansion under the State's Gascoyne Food Bowl Initiative is the central focus of the plan.



## Findings

1. Is there a plan in place?	Yes	The plan has been in place since November 2010. It was finalised in October 2011. The plan does not identify a date for review.
2. Does the plan include key assessments?	Yes	Hydrogeological and environmental assessments have been undertaken. Issues scoping included social, cultural and economic value assessments.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse is not identified in the plan. However, one subarea is overallocated. The plan aims to prevent groundwater overuse by restricting allocations to the limit set for each subarea under the plan. The setting of allocation limits has involved the trade-off of 100% supply reliability in some areas to protect resource sustainability. Historical overallocation is being progressively addressed through recouping of allocations, and is expected to be finalised within three years of plan commencement.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan sets out detailed resource and management objectives underpinned by a range of relevant management strategies, policies and monitoring arrangements. Inclusion of performance indicators allows for the ongoing assessment of objectives.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade. To manage the high risk of increased salinity, trading is limited in a subarea.
6. Is interception appropriately considered and integrated into the plan?	Yes	Unlicensed stock and domestic extractions are included in allocation limits and there are currently no other unlicensed water extraction or interception activities in the area.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	Connectivity of the surface water and groundwater systems is clearly identified and highly significant as aquifer recharge is strongly linked to the episodic high river flow events. The strong seasonal variation in recharge is accounted for in setting allocation limits and management rules.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Groundwater-dependent pool and riparian vegetation habitats are identified in the plan. While specific environmental water requirements for these assets is not assessed, general provisions are made through local extraction rules and management triggers linked to water levels.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	A separate linked monitoring program is referred to in the plan and there is evidence of comprehensive historical monitoring. There is a commitment in the plan to publish an annual public evaluation statement, though the first of these is yet to be prepared. Compliance and enforcement provision are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	Extremes of recharge and inflow, and potential climate change risks to resource, have been comprehensively considered in the development of the plan.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholders were engaged throughout development of the plan. A statement of response to stakeholder submissions is published.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan was finalised in October 2011 and an annual plan evaluation statement is not yet due. It is noted in this revised plan that allocations continue to be recouped in the pathway to address overallocation.



# MURRAY



## GROUNDWATER ALLOCATION PLAN 2010



### Context

The Murray Groundwater Allocation Plan area is located in the south-west of the State, 100 km south of Perth. The plan covers the unconfined and confined aquifers found in the area. Current use is dominated by agriculture and industry. The area is undergoing increased urbanisation and intensification of agriculture and industry requirements creating greater demand for water. Sustainably developing the resources to meet this increasing demand is the focus of the plan.



## Findings

1. Is there a plan in place?	Yes	The plan (for public comment) has been in place since April 2010. A finalised plan has not yet been released. The plan is due to be reviewed after 2017.
2. Does the plan include key assessments?	Yes	All assessments have been undertaken in development of the plan. The environmental requirements of shallow groundwater systems in the plan area are being investigated.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Some aquifers are fully allocated and may be locally overused. The plan aims to prevent overuse by limiting allocation to the limits set under the plan and through local licence conditions. Allocation limits are typically set to maintain current water levels and quality. To meet development demand, allocation limits in some areas are set above the modelled yield, with local drawdown impacts managed through licence conditions and extraction density controls.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan sets out detailed resource and management objectives underpinned by a range of relevant management strategies, policies and monitoring arrangements. Inclusion of performance indicators allows for the ongoing assessment of objectives.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade. Trading in overallocated areas is restricted.
6. Is interception appropriately considered and integrated into the plan?	Yes	Estimated unlicensed stock and domestic use is included in plan allocation limits.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	Significant hydraulic connection between aquifers is considered in setting allocation limits (where relevant). There is limited information available as to the extent and significance of groundwater/surface water connections.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Plan objectives include management of GDEs. The plan includes implicit environmental water provisions through extraction limits to maintain in situ water and local restrictions on development and extraction near GDEs. GDEs are not clearly identified and specific environmental water requirements are not specified.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A monitoring program is set out in the plan, however the program is under review to better align with plan objectives. There is a commitment in the plan to publish an annual public evaluation statement. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The long-term rainfall record was used as the basis for estimating recharge and determining allocation limits. The potential impacts of climate change on recharge have not been considered.
11. Is stakeholder engagement in the planning process adequate?	Yes	This plan has been released for stakeholder comment.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is not yet finalised.





# ORD RIVER

## WATER MANAGEMENT PLAN 2006



### Context

The Ord River Water Management Plan area is located in the far north-east of the State, and experiences a tropical climate. This plan applies to the regulated and substantially modified riverine system. The Ord River floodplain, Lake Kununurra and Lake Argyle are Ramsar-listed wetlands. Water is used for irrigation in the Ord River Irrigation Area and along the river, for town water supplies and electricity generation. The plan is currently under revision to improve management of regulated releases to better meet consumptive and environmental needs.

## Findings

1. Is there a plan in place?	Yes	This plan has been in place since December 2006. A plan review is underway.
2. Does the plan include key assessments?	Yes	There are comprehensive key assessments underpinning the plan. The assessments include a detailed study of the ecological water requirements of the lower Ord River and analysis of current and projected irrigation demand.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse is not identified in the plan. The plan prevents overuse by setting allocation limits and minimum flow conditions. Allocation limits are set to maintain the current in-stream ecological process at low levels of risk during the dry season.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan sets broad development and environmental objectives and details strategies and actions to meet these objectives. Lack of specific performance indicators inhibits ongoing assessments of plan objectives.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	Yes	No significant interception activities are anticipated in the plan area. The potential impact of interception through the further regulation of tributaries is recognised.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The risk of rising watertables and increasing groundwater salinity associated with irrigation deep drainage has been identified. Changes to groundwater or surface water recharge and discharge resulting from irrigation or other activities are managed through licence irrigation efficiency targets. The extent of groundwater extraction is not known.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan sets out broad environmental objectives. Environmental water requirements and provisions are clearly identified and provided through conditions on dam operation and downstream diversion licences. Environmental monitoring arrangements have only recently been specified.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	There were no specific monitoring arrangements set out under the plan. A detailed monitoring framework outside the plan has recently been released. An evaluation report for this plan has not yet been prepared and there is no evidence to assess whether monitoring against objectives has occurred. Compliance and enforcement provision are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan clearly reflects the resource impacts of the wet and dry extremes of the region. Provisions to restrict extractions during drought conditions are included in the plan. There is limited consideration of the potential long-term impacts of climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholders were engaged during plan development, and for major assessments, including Indigenous groups. A public process is underway for development of the replacement plan.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There is no public evaluation statement available to date.

# ROCKINGHAM STAKEHILL



## GROUNDWATER MANAGEMENT PLAN 2008



### Context

The Rockingham Stakehill Groundwater Management Plan area is located 50 km south of Perth. The plan covers the unconfined and confined aquifers found in the area. Current use includes recreation, irrigation, horticulture, industry and domestic supply. Groundwater-dependent wetlands with national and international protection status are located in the area. Water level declines in the predominately used unconfined aquifer have occurred over recent years as recharge has decreased in the drying climate. Managing the highly used resource to meet increasing demand is the central focus of the plan.



## Findings

1. Is there a plan in place?	Yes	This plan has been in place since November 2008 and the plan states that it will be reviewed in 2011.
2. Does the plan include key assessments?	Yes	All assessments have been undertaken in development of the plan. Environmental water requirements have not been specifically identified.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	Overuse is not identified in the plan. However, a number of subareas are overallocated and at risk of overuse if unused allocations are activated. There is evidence of declining water levels across the area. Overuse is prevented through licence management, including recovery of unused or under-used allocations. However, the plan does not specify a timeframe for the return of allocations to the revised allocation limit.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan sets out resource and management objectives underpinned by a range of relevant management strategies, policies and monitoring arrangements. Lack of specific performance indicators inhibits the ongoing assessment of objectives.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	Yes	Estimated unlicensed stock and domestic use is included in plan allocation limits. Mining below the watertable requires a licensed allocation. Growth in interception activities is limited by increasing urbanisation in the area.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	Where significant hydraulic connection between aquifers is found, aquifers are jointly managed. Beyond qualitative assessment of groundwater connection to wetlands, there is limited information available as to the extent and significance of groundwater/surface water connections.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	No clear environmental objectives are specified. While GDEs are identified, including high-value Ramsar-listed wetlands, environmental water requirements are not detailed. In situ needs are generally provided through allocation limits on consumptive use and local licence conditions. Limits have been set with consideration of water levels monitored at selected representative sites.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A monitoring program is set out in the plan and there is evidence that relevant monitoring is occurring. There is a commitment in the plan to publish an annual public evaluation statement, though the first of these is yet to be published. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan takes dry climate extremes into account. Future allocation reductions are flagged if the drying trend continues. The projected impact of climate change is not considered.
11. Is stakeholder engagement in the planning process adequate?	No	There is no evidence of stakeholder engagement.
12. Have identified outcomes been achieved during the reporting period?	To some extent	There is a commitment in the plan to report annually on monitoring and achievement of plan objectives. While no public evaluation statement has been published to date, sighted evidence suggests the majority of plan objectives are being achieved. While water level declines across the area are stabilising, there remains concern regarding the protection of water needs for wetlands.





# SOUTH WEST GROUNDWATER AREAS

## ALLOCATION PLAN 2009



### Context

The South West Groundwater Areas Allocation Plan area covers the south-western corner of the State, centred 250 km south of Perth. The plan covers the unconfined and confined aquifers found in the area. Current use is dominated by public water supply, horticulture, pasture and mining. A significant proportion of the area is planted to state forest. Water level declines in the confined aquifers has occurred over recent years as recharge decreases in the drying climate and demand has increased with rapid population growth and land-use change (especially in coastal areas). Much of the plan area is overlain by the Whicher Area Surface Water Allocation Plan. Sustainably meeting this increasing demand is the central focus of the plan.





## Findings

1. Is there a plan in place?	Yes	The plan has been in place since May 2009. The plan states that it will be reviewed in 2011.
2. Does the plan include key assessments?	Yes	All key assessments were undertaken in the development of the plan, including comprehensive social, cultural and Indigenous values and impacts studies.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	Overuse is not identified in the plan. However, a number of subareas are overallocated and at risk of overuse if unused allocations are activated. Overuse is prevented through licence management, including recovery of unused or under-used allocations. However, the plan does not specify a timeframe for the return of allocations to the revised allocation limit.
4. Does the plan include clearly identified and measurable outcomes?	Yes	Plan objectives and outcomes are clearly stated and linked to plan actions and monitoring arrangements. Inclusion of performance indicators in the plan allows for the ongoing assessment of outcomes.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy, with local rules included in the plan. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	Yes	Estimated unlicensed stock and domestic use is included in plan allocation limits and plantation forestry impacts have been considered in setting these limits. Interception by plantations is currently not licensable in WA.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan identifies areas of connectivity that are highly ecologically significant, particularly in maintaining watercourse baseflows and wetlands in low flow periods. The plan seeks to protect surface water systems from the impacts of groundwater drawdown through allocation limits that account for connectivity, development conditions near surface water systems and targeted monitoring.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan sets out environmental objectives and identifies groundwater-dependent environmental assets. Environmental water needs are broadly discussed and modelled at representative sites. Extraction limits maintain in situ water and local development and monitoring requirements in the vicinity of GDEs seek to protect water levels and quality. Specific monitoring arrangements for a small number of representative trigger response GDE sites are identified.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A monitoring program is set out in the plan. There is limited evidence monitoring is occurring. There is a commitment in the plan to publish an annual public evaluation statement, though the first of these is yet to be prepared. Compliance and enforcement provisions are specified in legislation and additional local licence requirements are set out in the plan.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	Climate variability and change are considered in the plan and underlying assessments. The potential impacts of climate variability and change have been estimated and accounted for in setting new allocation limits.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholders were engaged throughout development of the plan, including identification of Indigenous values. A statement of response to stakeholder submissions is published.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There is a commitment in the plan to report annually on monitoring and achievement of plan objectives. There is no public evaluation statement published to date.



# UPPER COLLIE



## WATER ALLOCATION PLAN 2009



### Context

The Upper Collie Water Allocation Plan area is located in the south-west of the State, 200 km south-east of Perth, and covers surface water, groundwater and mine dewater resources in the region. The main water uses in the area are power generation, mining, irrigation and public water supply. Long running coalmine dewatering has led to resources stress in some parts of the area. Meeting current demands and recovery of stressed resources is the focus of the plan.



## Findings

1. Is there a plan in place?	Yes	This plan has been in place since August 2009. The plan does not identify a date for review.
2. Does the plan include key assessments?	Yes	Comprehensive hydrological, social, economic and environmental assessments were undertaken in the development of the plan.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The Cardiff subarea is overallocated and overused due to long running coalmine dewatering activity. The plan allocation limits have been set at current actual extraction. There are steps outlined in the plan to recover water, including recovery of unused or under-used allocations and reduction of allocation limits for renewed licences. However, the plan does not specify a timeframe for the return of allocations to the revised allocation limit.
4. Does the plan include clearly identified and measurable outcomes?	Yes	Plan objectives are clearly stated and linked to plan actions and monitoring arrangements. Inclusion of performance indicators in the plan allows for the ongoing assessment of objectives.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy, with local rules included in the plan. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	Yes	Mine dewatering is acknowledged, quantified and licensed. The impact of plantation forestry and farm dams on inflows and recharge is quantified. Estimated unlicensed stock and domestic use is included in allocation limits. Compared to mining extraction, other interception activities in the area pose a low risk to the resource and entitlements.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan manages surface water and groundwater resources, including recharge and discharge. Groundwater discharge to river pools and baseflows is recognised and is protected through groundwater allocation limits and set-back requirements for bores near watercourses.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan sets out broad environmental objectives and environmental water requirements. Environmental water provision is managed through allocation limits and licence conditions. There are obligations placed on mining water licences to offset dewatering impacts on river pools and baseflow. No specific ecosystem monitoring program is specified.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A detailed monitoring and reporting framework is set out in the plan. There is limited evidence monitoring is occurring. There is a commitment in the plan to publish an annual public evaluation statement, though the first of these is yet to be prepared. Compliance and enforcement provisions are specified in legislation and additional local licence requirements are set out in the plan.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	While the modelled groundwater allocation limit scenarios incorporate an assumed reduction in annual rainfall recharge, surface water limits are based on historical record only. Seasonal variability is managed through low flow extraction restrictions (surface water) and water level triggers (groundwater).
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholders were engaged throughout development of the plan, including identification of Indigenous values. A statement of response to stakeholder submissions is published.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There is a commitment in the plan to report annually on monitoring and achievement of plan objectives. There is no public evaluation statement published to date.



# WARREN DONNELLY



## SURFACE WATER ALLOCATION PLAN 2010



### Context

The Warren Donnelly Surface Water Allocation Plan area is located in the south-west of the State, 300 km south of Perth. Surface water resources in the region are characterised by a network of unregulated rivers and streams, with a high number of in-stream dams in some areas. The main surface water use in the area is irrigated agriculture and public water supply. There are substantial areas of native and plantation forestry. Managing potential overallocation associated with the high density of in-stream dam development in some areas is the focus of the plan.



## Findings

1. Is there a plan in place?	Yes	The plan (for public comment) has been in place since June 2010. A finalised plan has not been released. The plan does not identify a date for review.
2. Does the plan include key assessments?	Yes	Comprehensive hydrological and environmental assessments have been undertaken. Current and future social and economic demands are identified.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse is not identified in the plan, although there is a history of high levels of diversion from the high density of in-stream dams. The plan specifies new allocation limits seeking to maintain reliability of supply to existing users.
4. Does the plan include clearly identified and measurable outcomes?	Yes	Resource and management objectives are set out, underpinned by a range of relevant management strategies, policies and actions. Inclusion of performance indicators in the plan allows for the ongoing assessment of objectives.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The significant cumulative diversion to unlicensed in-stream stock and domestic dams is estimated and included in allocation limits. The interception impacts of potential plantation forestry expansion are not quantified in the plan.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	Surface water/groundwater connectivity is not recognised in the plan or supporting documents.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental objectives are set out in the plan. Ecological flow thresholds are set to monitor low flow events. More comprehensive identification of environmental water requirements is flagged.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A streamflow monitoring program is set out in the plan, however the program is under review to better align with plan objectives. There is a commitment in the plan to publish an annual public evaluation statement. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan considers climate change and variability by modelling reliability of supply under different inflow scenarios, drawing on recent drying climate data. Low flow thresholds are set and are to be monitored.
11. Is stakeholder engagement in the planning process adequate?	Yes	This plan has been released for stakeholder comment.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan is not yet finalised.





# WHICHER AREA



## SURFACE WATER ALLOCATION PLAN 2009



### Context

The Whicher Area Surface Water Allocation Plan area is in the south-west corner of the State, centred 250 km south of Perth. The plan covers a large number of diverse surface water resources with varying levels of use, from high ecological value pristine systems in upper catchments to highly modified lower reaches. The main water uses in the area are horticulture and viticulture, with water accessed largely through streamflow capture and storage by in-stream dams. Increasing demand (particularly viticultural) and land-use change and lower inflows in the drying climate have seen rising levels of resource stress. Much of the plan area is underlain by the South West Groundwater Areas Allocation Plan. This plan was developed to introduce management through licensing to this previously unproclaimed area.

## Findings

1. Is there a plan in place?	Yes	This plan has been in place since September 2009. The plan does not identify a date for review.
2. Does the plan include key assessments?	To some extent	All key assessments were undertaken in development of the plan. Formal environmental water requirements have been assessed following commencement of the plan.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	Overuse is not identified in the plan. Allocation limits are set under the plan and system-wide licensing is introduced as a first step to manage risk of overallocation. Under these arrangements, a number of subareas are fully allocated. Allocation limits in these areas were set at estimated use which is above the modelled sustainable diversion limit. Improved resource understanding is needed to ensure overuse is prevented.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Broad objectives are stated, underpinned by a range of relevant management strategies and policies. Performance indicators are included in the plan, although not all are clearly measurable.
5. Does the plan facilitate trade?	To some extent	Allocation limits and local development and use rules are set under the plan. Trade rules are set out in state-wide policy. There is a lack of clarity in how some aspects of the trading policy will be applied, including the prerequisites for trade.
6. Is interception appropriately considered and integrated into the plan?	To some extent	Estimated diversion to unlicensed stock use dams is included in the calculation of allocation limits. While current forestry interception is implicitly accounted for in setting allocation limits, the potential interception impacts of plantation forestry expansion are not quantified or regulated in the plan.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	Areas of connectivity between surface water and groundwater systems are identified in the plan. Groundwater allocation limits in the corresponding South West Groundwater Allocation Plan account for connectivity.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Environmental objectives are set out in the plan. Broad environmental water needs have been considered in setting yield and diversion limits, and informing allocation limits. However, specific water requirements for the environment have not been quantified. More comprehensive identification of environmental water requirements has recently been published, but these are not yet incorporated into the plan.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	No monitoring program is set out in the plan, although there is evidence of monitoring occurring. There is a commitment in the plan to publish an annual public evaluation statement, and to review current monitoring arrangements to better align with plan objectives. Compliance and enforcement provisions are specified in legislation.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan considers and incorporates climate change and climate variability with respect to the reliability of supply under different inflow scenarios based on recent inflow data.
11. Is stakeholder engagement in the planning process adequate?	Yes	There has been comprehensive stakeholder engagement during development and implementation of this plan. A statement of response to stakeholder submissions is published.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	There is a commitment in the plan to report annually on monitoring and achievement of plan objectives. There is no public evaluation statement published to date.



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## 8. Tasmania



# TASMANIA



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## The context of water planning in Tasmania

Tasmania contains 12 per cent of Australia’s freshwater resources, yet constitutes less than one per cent of its landmass. Tasmania has high relief and a number of small discrete surface water catchments. The distribution of water resources and rainfall across the State varies considerably. The western side of the State has relatively high rainfall and is less developed in terms of its water resources. The eastern side contains most of the farming areas and population and has lower water availability. Water planning has been prioritised to date in the eastern side of Tasmania. Temporal variation of water availability can result in summer periods where demand may exceed the natural streamflow. Water is used for agriculture, power generation and domestic supply and almost exclusively extracted from surface water systems. Groundwater extraction is significant in parts of northern Tasmania, but is not licensed or metered.

The primary current driver for water planning in Tasmania is the future expansion of irrigated agriculture. Planning is being prioritised for areas where proposals for irrigation schemes have been put forward and aim to balance the development of resources and conservation values.



# Planning arrangements



## Key legislation

The *Water Management Act 1999* (the Act) provides the statutory basis for the planning, regulation, management, protection and allocation of water resources in the State and provides for the development of water management plans (WMPs), which are undertaken by the Department of Primary Industries, Parks, Water and Environment (DPIPWE) in consultation with stakeholders. The department is also responsible for implementing the Water Management Act and for overall management and protection of the State's water resources.

## Water management plans

Water management plans outline the day-to-day management arrangements for relevant water resources, including provision of water allocation limits and water access rules. Water management plans are ongoing, and may specify review requirements. All water management plans are required by the Act to include a description of the water regime that best gives effect to the plans' objectives and an assessment of the plans' provisions on current and future users. Water management plans must consider the State Policy on Water Quality Management 1997 and be consistent with the Resource Management and Planning System of Tasmania (RMPS), a set of principles that define the State's sustainable development objectives. Standard Operating Procedures for the Development of Statutory Water Management Plans in Tasmania (SOPs), revised in March 2010, have been developed to assist water management planners in preparing water management plans. Guiding Principles for Water Trading in Tasmania (GPWTT) was developed in 2004 to clarify how trade provisions of the Act were being interpreted.

## Licensing and other arrangements

Water licences are required to take water from a water resource, unless the water is taken in accordance with Part 5 of the Water Management Act, generally for stock and domestic purposes, and taking of groundwater or overland flow. Water licences may specify the surety with which a water allocation can be expected to be available for taking. There are up to eight surety levels in Tasmania; environmental water is at Surety Level 2, with the only higher priority water being stock and domestic and essential town water supplies at Surety Level 1.

Government-owned Hydro Tasmania has a special water licence to take all the water in a hydro-electric district with the exception of any water allocated under water licences to other users. Following a Hydro Tasmania release, water can be allocated to other users downstream. Hydro Tasmania may be delegated responsibility for administration and implementation of water management plans in catchments with Hydro Tasmania infrastructure.

The Department of Primary Industries, Parks, Water and Environment is currently developing a regulatory framework for groundwater management to ensure that the State's groundwater resources are developed and used in an orderly, equitable and sustainable manner. Surface water and groundwater systems are assumed to be 100 per cent connected unless shown otherwise. A system for the licensing of groundwater extraction is also being developed and is expected to be implemented progressively across the State in high priority areas and situations, through the appointment of groundwater areas. There are no groundwater areas currently declared in Tasmania.

Forestry interception impacts have recently been assessed as part of the Tasmania Sustainable Yields project and the Tasmanian Government has developed the Water Availability and Forest Landuse Planning Tool to assess impacts of plantation development on water yields. Use of this tool is intended to be incorporated into the water planning process.



Table 6: Planning instruments

Assessment criteria	State		Catchment	Comment
	Water Management Act	Operational policies	WMP	
1. Status of plan			💧	A WMP may be created under Part 4 of the Water Management Act and provide direction on how the discretionary powers in the Act are to be applied in the area covered by the WMP.
2. Key assessments	💧	💧	💧	The Act specifies that WMPs are required to include a description of the water regime to best meet the plan objectives and the impacts of the plan on current and future use. SOPs describe the process for collecting information to inform plans.
3. Overuse status & pathways to sustainable water extraction			💧	WMPs contain rules to manage consumptive water entitlements and set allocation limits.
4. Clearly identified & measurable outcomes	💧	💧	💧	WMP objectives must be consistent with the Act's objectives and the RMPS objectives.
5. Facilitation of trade	💧	💧	💧	Under the Act, the trading of water access entitlements and allocations is possible and clarified for users in the GPWTT. Region-specific trade rules are included in WMPs if required.
6. Integration of water intercepting activities	💧		💧	The Act regulates interception by farm dams, groundwater bores and the taking of dispersed surface water and provides that a WMP may require licensing. Plantation forestry is not regulated under the Act. Estimation of stock and domestic use is made in some WMPs.
7. Surface water/ groundwater connectivity	💧		💧	Groundwater areas can be declared under the Act, upon which groundwater take is required to be licensed. WMPs define the water resources to be managed by the plan.
8. Environmental water management arrangements	💧		💧	Under the Act, WMPs identify allocation limits and water access rules to provide the water regime to meet environmental objectives.
9. Monitoring, compliance & enforcement provisions	💧	💧	💧	Compliance and enforcement is covered by the Enforcement Policy for the Act. WMPs identify responsibilities for actions, such as monitoring and reporting.
10. Planning for climate change & extremes in inflows or recharge			💧	Climate variability is considered in the development and rules of WMPs.
11. Stakeholder engagement	💧	💧	💧	The Act specifies requirements for public consultation for WMPs. SOPs outline procedures for stakeholder engagement.
12. Extent to which outcomes have been achieved	💧		💧	The measurement of achievement of plan outcomes is intended to occur through annual reports completed by DPIPWE and plan reviews. Continuous monitoring data is provided through WIST.





## Key findings



### Good adaptive management through the progressive incorporation of new knowledge

The level of detail and quality of key assessments has improved for the more recent water management plans in Tasmania. New studies and reports, such as the Tasmania Sustainable Yields project and Climate Futures for Tasmania report, are informing the development of new plans and the review of old plans. The incorporation of new knowledge on emerging challenges is filling information gaps and improving the transparency of allocation decisions.

### Limited monitoring, evaluation and reporting against plan objectives

Monitoring is not clearly aligned to plan objectives aside from streamflow and ecosystem habitat. There is no ongoing monitoring of social and economic objectives and reporting and evaluation at plan scale is not consistent with the schedules outlined in plans.

## Findings against criteria

1. Status of water planning

There are six implemented and four draft water management plans in Tasmania. The first water management plan for Great Forester catchment was finalised and subsequently amended in 2003. Three water plans were finalised in 2005 (lakes Sorell and Crescent, Mersey River and River Clyde), one in 2006 (Little Swanport) and one in 2010 (Ansons River). More recently, prioritisation for water management plans has been aligned with major new irrigation developments. However, not all proposed irrigation areas are currently having plans developed. It is not clear what criteria are applied in the prioritisation of planning in Tasmania. Acknowledging that planning priorities shift over time, there is a lack of information regarding the planning status of areas previously prioritised but where plans have not been completed.
2. Do plans include key assessments?

The quality of key assessments is improving and the selection of assessments is generally appropriate to the context of planning. Plans utilised water balance models and recent plans have drawn on the Tasmania Sustainable Yields project modelling. The understanding of groundwater systems in Tasmania is limited. All water management plans undertake socioeconomic impact assessments as required under the Water Management Act.
3. Do plans address overuse and is there a pathway to sustainable extraction?

Tasmanian water management plans have not identified overuse although some systems are acknowledged to be seasonally or in general fully allocated. Transparency surrounding the setting of sustainable extraction limits has improved over time. Tasmania adopts a number of measures to manage water use, including restriction management triggers, maintaining minimum system flows for the environment, and issuing licences under different surety levels.
4. Do plans include clearly identified and measurable outcomes?

Objectives and strategies are clearly identified in the plans and are location specific. Many objectives are related to streamflow, however there is a consistent lack of performance indicators to measure the objectives of the plans not directly linked to streamflow, for example fostering community support. Reporting requirements are outlined with designated timelines and responsibilities.



5. Do plans facilitate trade?	Water trading demand is low in Tasmania. Trading is administered under the Water Management Act in line with the 2004 Guiding Principles for Water Trading in Tasmania and generally consistent with the NWI. Water management plans specify localised trade requirements where relevant. Groundwater use is not licensed and therefore is not tradeable.
6. Is interception appropriately considered and integrated into plans?	Interception is not well incorporated into the Tasmanian water management plans. Interception by farm dams, groundwater bores and taking of dispersed surface water are regulated under the Water Management Act, but there is little quantification of thresholds in water management plans. Plantation forestry interception is not considered or quantified in water plans. The Water Availability and Forest Landuse Planning Tool has been developed but is yet to be incorporated into water planning.
7. Do the plans address surface water and groundwater connectivity as appropriate?	Plans do not manage groundwater and connectivity is generally not quantified in water management plans. Tasmania attributes this to the low level of groundwater use in planning areas.
8. Do plans contain accountable environmental water management arrangements?	Environmental watering arrangements and responsibilities are defined in all water management plans. Environmental flow regimes are provided by water management plans through cease-to-take provisions on unregulated rivers and minimum flow provisions and restriction management on regulated rivers. Environmental water is given a higher level of surety than all other consumptive uses other than critical human needs and stock and domestic.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	The focus of monitoring is on measuring the flow regime, which is linked to some but not all plan objectives. There is no indication how progress towards socioeconomic objectives will be demonstrated. Continuous streamflow monitoring, some water quality and entitlement information is publicly available on the Water Information System of Tasmania (WIST) website, but this data is not evaluated or linked to water management plans. Monitoring arrangements are commonly stated to be resource permitting in water management plans. A compliance and enforcement framework is in place in Tasmania, but there is limited metering of consumptive use to monitor compliance.
10. Do plans deal appropriately with climate change and extremes in inflows or recharge?	Although long-term climate change is inferred to be a risk to water availability, there are no long-term strategies in place in commenced water management plans. Seasonal variability is considered in water management plans and restriction management is based on triggers of flow volumes and lake levels. The recently completed Climate Futures for Tasmania and Tasmania Sustainable Yields project reports are currently informing the development of hydrological models to project future water yields and have set allocation limits based on long-term climate change. In the interim, past climate is used to determine water yields.
11. Is stakeholder engagement in the planning process adequate?	Transparency in dealing with stakeholder comments is very strong in the drafting of plans. Consultative groups are engaged and all submissions and responses are available to the public. Newer plans have more targeted stakeholder engagement through informal discussions and submissions to the draft plan. No targeted Indigenous engagement has occurred during plan development to date. Water management plans for the new irrigation scheme areas are being drafted prior to development occurring.
12. Have identified outcomes been achieved during the reporting period?	It is not possible to assess the extent to which plan objectives are being met. There is limited public reporting and annual waterways reports, although not explicitly linked to water management plans, are no longer regularly prepared. Plan reviews to date have concentrated on new resource appraisal studies with few statements against plan objectives.



## Glossary and abbreviations



Term	Acronym	Definition
Climate Futures for Tasmania		Study that generated climate projections across the State for input into planning processes.
Conservation of Freshwater Ecosystem Values	CFEV	The CFEV project completed an audit and conservation evaluation of the State's freshwater-dependent values to identify aquatic values and prioritise management for DPIPWE.
Department of Primary Industries, Parks, Water and Environment	DPIPWE	
Enforcement Policy for the <i>Water Management Act 1999</i>		Principles, criteria and measures that DPIPWE use to enforce the provisions of the Water Management Act.
Groundwater-dependent ecosystem	GDE	Ecosystems that are dependent on groundwater for their existence and health.
Guiding Principles for Water Trading in Tasmania (2004)	GPWTT	Provide a policy framework to facilitate effective and efficient water trading in Tasmania.
Resource Management and Planning System	RMPS	Government's policy to build sustainable development principles into key resource management legislation.
Standard Operating Procedures for the Development of Statutory Water Management Plans in Tasmania	SOPs	Procedures to assist new and current water management planners implement a planning process consistent with the Water Management Act.
Water Information System of Tasmania	WIST	The online database is a collection of continuous monitoring information, published documents, CFEV results, and entitlement information.
<i>Water Management Act 1999</i>		The Water Management Act provides the legislative basis for the planning, regulation, management, protection and allocation of water resources and provides for the development of water management plans.
Water management plan	WMP	The water management plan is the statutory water sharing plan made under the Water Management Act.





# Planning areas

## Tasmania



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### Location



1	Ansons River Catchment Water Management Plan	418	6	River Clyde Water Management Plan	428
2	Great Forester Catchment Water Management Plan	420	7	Draft Boobyalla River Catchment Water Management Plan	430
3	Lakes Sorell and Crescent Water Management Plan	422	8	Draft Sassafras Wesley Vale Water Management Plan	432
4	Little Swanport Catchment Water Management Plan	424	9	Draft South Esk River Catchment Water Management Plan	434
5	Mersey Water Management Plan	426	10	Draft Tomahawk River Catchment Water Management Plan	436





# ANSONS RIVER CATCHMENT



## WATER MANAGEMENT PLAN 2010



### Context

The Ansons River Catchment Water Management Plan covers surface water and groundwater resources in the Ansons River catchment in north-east Tasmania. Land use in the catchment is primarily hardwood and softwood forestry, with some dryland grazing for livestock. Water use is low and limited to stock and domestic purposes on small rural holdings. At the time of plan development in 2010, there were no water licences issued within the catchment. Groundwater usage is negligible and there are no records of bores installed within the catchment. The Ansons River is an unregulated river system with a strong seasonal flow pattern, with highest flows occurring over winter from May to October. The flow regime is largely natural and the condition of the aquatic ecosystem is near to pristine. The rationale for plan development is primarily for development purposes. Implementing a water management plan provides the opportunity to preserve the existing ecosystem values while enabling future use and development of the water resources.



## Findings

1. Is there a plan in place?	Yes	The WMP commenced in July 2010 and will be reviewed 10 years after it came into effect. The plan covers the surface water and groundwater resources. At the time of plan drafting, no commercial licences had been issued in the catchment. The plan has been prepared as a development plan.
2. Does the plan include key assessments?	To some extent	Hydrological and environmental assessments underpin the plan. There is less clarity around the assessments of socioeconomic uses, although there is a low level of development in the catchment and no record of groundwater usage. The assessment of risk to the water resource is not explicit and environmental water requirements were calculated based on maintaining a low level of risk to the ecosystem values.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse is not identified as an issue and there are mechanisms in the plan to limit allocations. Thresholds are in place to protect the natural flow regime from increased use.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan identifies environmental, water usage and development, and social objectives. Objectives not related to streamflow are not measurable.
5. Does the plan facilitate trade?	Yes	There were no licences to be traded in the catchment at commencement of the plan. The plan permits trade in line with the Guiding Principles for Water Trading in Tasmania policy document. Restrictions to trade are explained in order to protect other users and the environment.
6. Is interception appropriately considered and integrated into the plan?	Yes	Interception activities of farm dams and forestry are considered in the plan. Due to the low level of development there is not a high level of detail. Potential stock and domestic future use is estimated.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	Although there is no groundwater use in the catchment, the plan is designed to deal with multiple resources. Only surface water use is managed.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental watering arrangements are given considerable attention in the plan. Flow management rules in the form of daily cease-to-take thresholds are based on maintaining environmental values. Tasmania considers that the natural flow regime provides the best guide to the flow requirements of the entire aquatic ecosystem.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Monitoring of streamflow is adequately linked to most plan objectives, but there are limitations around the social objectives and uncertainty around whether additional monitoring is being undertaken given resource constraints. Continuous streamflow gauging is available online on WIST, which demonstrates plan compliance with trigger levels, but no public annual reports have been produced.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan acknowledges the risks to the availability of water under both seasonal variability and climate change, managing seasonal variability with cease-to-take triggers. The plan has approached climate change in a conservative manner to provide a buffer in the absence of specific scientific data.
11. Is stakeholder engagement in the planning process adequate?	Yes	Given the low level of development and no licensed water users in the catchment, the level of stakeholder engagement is adequate.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan commenced in July 2010 so it is not yet clear whether any outcomes have been achieved. The DPIPWE annual report does not provide information on the progress in achieving the plan outcomes. Streamflow gauging has occurred continuously since the plan commenced, but there is no statement of progress against outcomes.



# GREAT FORESTER CATCHMENT



## WATER MANAGEMENT PLAN 2003



### Context

The Great Forester Catchment Water Management Plan was the first plan to commence in Tasmania in 2003. Great Forester River is located in north-east Tasmania and has a strongly seasonal flow pattern, with flow peaking from July to September. The unregulated system has been subject to water extractions for primarily irrigation purposes since the 1970s. Extractions occur along the length of the river system with the exception of the uppermost tributaries. Information is limited on the reasons for prioritisation of the Great Forester catchment for water planning, although there are indications that increasing competition for water resources for agricultural purposes was the key driver. More recently, the proposed Great Forester-Brid Irrigation Scheme has formed part of the North East Dams Catchments project for further developing irrigation in the area, led by the Tasmanian Irrigation Development Board.



## Findings

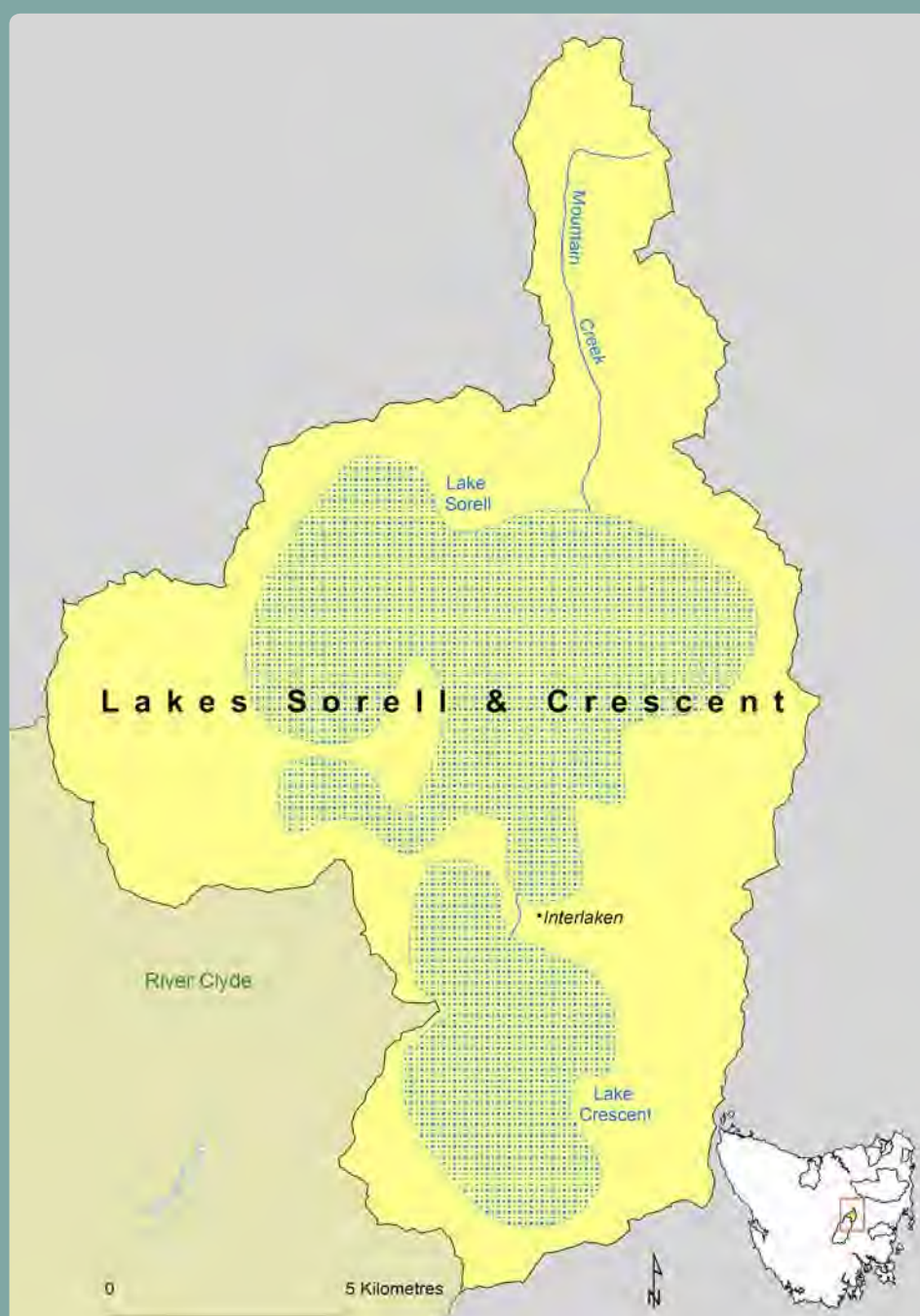
1. Is there a plan in place?	Yes	The Great Forester Catchment WMP commenced in 2003 and covers all water stored in permanent and temporary watercourses, dams and groundwater aquifers within the plan area. The plan was reviewed in 2007.
2. Does the plan include key assessments?	To some extent	Significant key assessments were undertaken pre-planning and additional economic and environmental assessments were completed as part of the review. Groundwater-dependent ecosystems (GDEs) are not identified. A risk assessment was completed to test the provisions of the plan in maintaining habitat for significant taxa.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	Overuse is not identified and the plan manages the risk of overuse through a precautionary approach by restricting water use and the issue of new licences until the three-year review quantified the effectiveness of the plan. Decisions regarding the trade-offs in setting the extraction limits are not clear.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The objectives of the plan mirror those of the Water Management Act. Environmental, water management and land-use monitoring was undertaken to inform the review of the effectiveness of the provisions of the plan in 2007. Performance indicators are not clearly articulated.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade in line with the Guiding Principles for Water Trading in Tasmania policy document. Although the plan contains provisions for groundwater allocations, a register of groundwater entitlements would be required before trade could occur.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The initial plan background documents identified plantation and production forestry to be a major land use in the catchment and small tin mines are present. The plan did not quantify the impacts of these intercepting activities or stock and domestic use.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	No	Despite the plan covering surface water and the highly connected groundwater resources, there are no explicit management arrangements for groundwater. Recent studies identify an anticipated increased demand in groundwater due to restrictions associated with further surface water development. Provisions for managing the resource have not been incorporated into the plan.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Surface environmental water provisions are achieved through restriction management, based on ecological studies and achieving acceptable risk levels related to inundation extent for significant biota and taxa. Restriction management was initially only applied during summer and the review was required to re-assess flow requirements for the whole year.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	The plan stipulates a region-specific monitoring schedule, with clear responsibilities for measuring and reporting against plan objectives. Reporting on the effectiveness of plan provisions was required for the 2007 review. Additional studies were completed to fill information gaps identified at the initial plan drafting stage, but the plan was not revised.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	Climate variability is considered and managed under the plan through restriction management with streamflow triggers. There was no evidence of the consideration of long-term climate change.
11. Is stakeholder engagement in the planning process adequate?	Yes	The draft plan was prepared by DPIWE and the Great Forester Catchment Water Management Planning Consultative Group and the plan stipulates stakeholder involvement during operation of the plan and at the three-year plan review.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Annual interim monitoring and assessment reports have not been produced since 2005 and did not make statements against plan objectives. A significant volume of information was collected to inform the 2007 review including a review of management activities. Statements against achievement of outcomes were not included. Evaluation of monitoring and reporting has not occurred regularly since the 2007 review.



# LAKES SORELL AND CRESCENT



## WATER MANAGEMENT PLAN 2005



### Context

The Lakes Sorell and Crescent Water Management Plan covers surface water and groundwater in the Lakes Sorell and Crescent catchment, and was developed in parallel with the connected River Clyde Water Management Plan. The plan area is located in the driest region in Tasmania and has two major storages, Lake Sorell and Lake Crescent. The area contains Ramsar-listed wetlands. Water levels in both lakes are regulated and flow in the River Clyde is managed at the Lake Crescent outlet to supply water for irrigation and domestic purposes. Land use in the catchment is predominantly agricultural and the water resource is considered to be fully allocated. The key driver behind water planning in the area is low water levels in the lakes, as a result of the dry climatic conditions and the high competition between users, primarily irrigated agriculture and recreational fisheries. The plan aims to address the high competition between users and declines in fisheries, water quality and ecological values.





## Findings

1. Is there a plan in place?	Yes	The Lakes Sorell and Crescent WMP commenced in November 2005. The four-year review of the plan was due to commence in 2009 and is currently on hold while additional information is collected. The plan was developed in parallel with the connected River Clyde WMP.
2. Does the plan include key assessments?	To some extent	Hydrological and environmental assessments and a water balance model informed the plan. The social and economic assessments lacked detail. No groundwater assessment was identified. There is no clear risk assessment within the plan.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan identifies that the demand on the lakes system had exceeded its capacity around the time of plan development and acknowledges the system to be fully allocated, but not overused. Allocations and restrictions are based on the lake height. Both lakes have preferred and critical minimum levels, with exceptions and restrictions on drawing the lakes down further.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Objectives, strategies, reporting requirements and timeframes are clearly identified. Performance indicators for measuring progress towards objectives other than those directly related to lake levels are not identified, for example the socioeconomic objectives. No specific risk monitoring activities are identified, although links may be drawn between the implied risks and monitoring.
5. Does the plan facilitate trade?	Unable to assess	Trade is not discussed in the plan, and assumed to follow the Guiding Principles for Water Trading in Tasmania. Trade is restricted between the lakes and the downstream River Clyde due to water quality issues.
6. Is interception appropriately considered and integrated into the plan?	No	Interception is not dealt with by the plan. Stock and domestic use is the only intercepting activity referenced in the plan and is not quantified. There is no evidence of a risk assessment of intercepting activities for stock and domestic and plantation forestry.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	Despite the plan covering surface water and groundwater resources, there are no management arrangements for groundwater. Links to the connected River Clyde surface WMP are established.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental water is provided by maintaining the lakes at specified levels and lake manipulation aims to be consistent with natural seasonal changes. If demand exceeds supply, restrictions occur gradually for the environment and users. The lakes may be drawn down below critical minimum levels.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	A tailored monitoring framework was created under the plan, requiring annual reports on the hydrological, environmental and monitoring program. There is no statement in the plan that these reports will be public. Reports have not been located and there is limited online reporting (WIST).
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	Seasonable availability of water is assessed using a water availability model in an effort to deal with climate variability. Long-term climate change was not considered in the development of the plan. The impacts of climate change scenarios on water yield have been assessed as part of the Tasmania Sustainable Yields project, but are yet to be incorporated into the plan.
11. Is stakeholder engagement in the planning process adequate?	Yes	A consultative group of stakeholders was formed during drafting of the WMP and are required to be engaged at plan review. Plan objectives were set by DPIPWE and assistance was provided to the consultative group to understand complex information. Submissions on the draft plan were accepted and responded to by DPIPWE.
12. Have identified outcomes been achieved during the reporting period?	To some extent	Annual waterways reports were produced for the River Clyde catchment in 2007 and 2009, but contained no information on the lakes. The focus of the review due in 2009 was ecosystem response to water level manipulation, with significant effort undertaken to understand the response of Golden Galaxias to water regimes. No indication of progress towards non-ecosystem outcomes is given. The review of the plan was put on hold and has not been completed.



# LITTLE SWANPORT CATCHMENT



## WATER MANAGEMENT PLAN 2006



### Context

The Little Swanport Catchment Water Management Plan commenced in 2006 and applies to an area located on the eastern coast of Tasmania. Rainfall across the catchment is comparatively low compared to the rest of Tasmania, and has a moderate level of seasonal variability. Land use across the catchment includes agriculture in the western and eastern regions and production forestry in the northern region. Water planning in the area was prioritised due to concern raised by community stakeholders in 2003 regarding the impacts of a proposed irrigation storage, potential effects of irrigation on water quality, and the perceived lack of reliable information regarding the sustainable yield.



## Findings

1. Is there a plan in place?	Yes	The Little Swanport Catchment WMP commenced in July 2006 and covers all surface water and groundwater resources within the catchment. The review of the plan is due in July 2011.
2. Does the plan include key assessments?	Yes	Key assessments of social and economic values were completed prior to the plan being finalised and a water balance model was created. Limited information was available on GDEs and groundwater connectivity. There is no explicit risk assessment for the system, however environmental flows were determined to maintain a low level of risk to the environment.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse is not identified in the plan and allocations were increased under plan provisions. The cease-to-take thresholds for summer and winter protect minimum environmental flows.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan identifies environmental, water usage and development, and water management objectives. Objectives are linked to plan provisions but are not easily measured.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade in line with the Tasmanian Guiding Principles for Trade. The low level of groundwater use is not licensed and therefore not tradeable. Restrictions to trade are to protect other users and the environment.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan investigated the impact of farm dams on streamflow. Other intercepting activities, such as forestry, were not quantified. Significant changes in land use were noted in the plan requiring the re-calibration of the water balance model.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	Despite the plan covering surface water and groundwater resources, there are no management arrangements for groundwater. The limited groundwater use in the area is not licensed and there is no evidence of the establishment of the groundwater register.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental water is provided through cease-to-take provisions based on summer and winter trigger streamflows to protect minimum environmental flows and allocation limits. These rules were underpinned by environmental water requirement assessments based on maintaining low levels of risk to the environment and are monitored using gauging stations.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Monitoring is not required to be publically reported. Continuous monitoring of streamflow has occurred since implementation of the plan, reported online on WIST. The records indicate the sensors malfunctioned for a portion of time and no flow records exist for this time.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	Climate variability is considered and managed under the plan through the use of restriction management. Long-term climate change was considered in the development of the plan. The impacts of climate change scenarios on the water yield of the catchment have only more recently been assessed as part of the Tasmania Sustainable Yields project due to a lack of flow records at time of plan drafting.
11. Is stakeholder engagement in the planning process adequate?	Yes	The plan was prepared by DPIPWE in consultation with a consultative group, which will be required to be involved at plan review. Public meetings were held to support the engagement process. All public submissions to the draft plan were responded to by DPIPWE.
12. Have identified outcomes been achieved during the reporting period?	No	There is no evidence of reporting against achievement of outcomes. The annual waterways report on the catchment identified that the sensors malfunctioned and due to the dry period, many were not submerged and functional. There is no information on the status of the review due in July 2011.

# MERSEY



## WATER MANAGEMENT PLAN 2005



### Context

The Mersey River catchment is located in north-central Tasmania and is defined by the drainage system of the Mersey and Don rivers. The Mersey River discharges into Bass Strait through Devonport. Water in the catchment is used to support hydro-electric generation, forest harvesting, extensive agriculture and the Wesley Vale pulp mill. The Mersey River catchment is fully allocated as Hydro Tasmania has the right to all unallocated and excess water in the catchment. Community concerns in the 1990s about low river flows and the apparent deterioration of the middle Mersey led to the development of the water management plan.







## Findings

1. Is there a plan in place?	Yes	The Mersey WMP commenced in 2005 and covers the management of surface water and groundwater in the north part of the Mersey catchment. It will be reviewed 10 years after its adoption.
2. Does the plan include key assessments?	To some extent	No hydrological model was linked to the plan. Socioeconomic assessments were completed pre-plan. Environmental assessments were completed, however gaps exist in relation to the assessment of the GDEs in the Karst system. Environmental flows were determined to maintain a low level of risk, and water quality and over extraction are inferred risks.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify overuse and there is no clear statement of the sustainable level of extraction. The plan area is considered to be seasonally fully allocated, meaning there is limited access during summer low flows. The plan provides for access to additional winter storage and imposes cease-to-take triggers for every month of the year to preserve baseflows.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Objectives and strategies of the plan are identified, however there are no performance indicators for measuring progress towards objectives. No specific risk monitoring activities are identified, though links may be drawn between the implied risks and the monitoring, for example for ecosystem health and water quality.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade in line with the Guiding Principles for Water Trading in Tasmania. Groundwater is not licensed and therefore not tradeable. Restrictions to trade are explicit and designed to protect existing users and the environment.
6. Is interception appropriately considered and integrated into the plan?	No	There is no evidence of a risk assessment of intercepting activities. Intercepting activities identified are plantation forestry, stock and domestic use and small quarries. Water use by these intercepting activities is not quantified or managed. Water balance model results on land-use changes have not been incorporated into the current plan.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The plan states that it conjunctively manages surface water and groundwater resources in the area, however there is no active management of groundwater or the identified Mole Creek Karst GDEs. Groundwater take is not licensed in the area.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental water is provided through high reliability daily passing flows and cease-to-take provisions. Provisions are based on monthly trigger volumes and allocation limits. Environmental assessments are based on maintaining low levels of risk to the environment and are monitored using gauging stations.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan outlines the monitoring activities in support of the plan objectives and provisions, including metering, transfer approvals, restriction management and streamflow. The expected annual report has not been made public, with only streamflow volume reported on the WIST website. Some progress has been made in collecting additional information, for example the creation of the water balance model.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	Climate variability is considered and managed under the plan through the use of restriction management and streamflow triggers. Although the impacts of climate change scenarios have been assessed as part of the Tasmania Sustainable Yields project, long-term climate change was not considered in the development of the plan.
11. Is stakeholder engagement in the planning process adequate?	Yes	The plan was prepared by DPIWE in consultation with a consultative group, which provided input into the plan outcomes and will be re-engaged at the 10-year review. Stakeholder submissions were responded to during the drafting of the plan. Indigenous groups were not identified in the consultation documents despite the identification of cultural sites within the area.
12. Have identified outcomes been achieved during the reporting period?	No	Reporting against plan outcomes has not occurred as prescribed under the plan. Annual waterways reports have not been produced since 2009. Annual waterways reports discuss streamflow, allocation, restriction management, water quality and ecosystem health, but results are not linked to plan outcomes.





# RIVER CLYDE



## WATER MANAGEMENT PLAN 2005



### Context

The River Clyde catchment is located in the driest region in central Tasmania and contains two significant storages, Lake Sorell and Lake Crescent. The River Clyde Water Management Plan covers surface water and groundwater from the control structure at Lake Crescent down to the junction with Lake Meadowbank, which also includes a substantial area covered by the River Clyde Irrigation District. The River Clyde catchment is taken as fully allocated as Hydro Tasmania has the right to all unallocated and excess water in the catchment. The River Clyde Water Management Plan was developed in parallel with the Lakes Sorell and Crescent Water Management Plan, and water use in the lakes and River Clyde had long been a subject of debate between stakeholders, such as recreational fishers and irrigators, as the lakes were previously managed as irrigation storages.



## Findings

1. Is there a plan in place?	Yes	The River Clyde WMP commenced development in 2000 and was implemented in November 2005. The four-year review of the plan was due to commence in 2009 and is currently on hold while additional information is being collected.
2. Does the plan include key assessments?	To some extent	Hydrological, social, economic and environmental assessments have been undertaken, although they are more descriptive than quantitative, and phrased in terms of how the provisions will affect users and meet objectives. Metering was not extensively implemented prior to plan development. The risk assessment is very limited in scope.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify overuse and there is no clear statement of the sustainable level of extraction or trade-off process. The system is considered to be fully allocated as a Hydro Tasmania system. A minimum environmental flow is provided by reducing allocations in dry conditions.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Objectives, strategies, reporting requirements and timeframe are clearly identified. Performance indicators for measuring progress towards socioeconomic objectives are not identified. Links can be drawn between risks such as water quality and streamflow monitoring.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade in line with the Guiding Principles for Water Trading in Tasmania, however little detail is provided and it does not appear that any trading occurs in the area. As a Hydro Tasmania system, all new take from tributaries may only be obtained through trade.
6. Is interception appropriately considered and integrated into the plan?	No	Stock and domestic interception is referenced in the plan but use is not quantified. Commercial forest plantations are expected to increase within the catchment, as identified in the Tasmania Sustainable Yields project, however these results have not been incorporated into the current plan. There is no evidence of a risk assessment of intercepting activities in the plan.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	Despite the plan covering surface water and groundwater resources, there are no provisions for groundwater management. No significant groundwater resources have been identified in the catchment. Links to the Lakes Sorell and Crescent WMP are made.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental water is provided through cease-to-take provisions based on monthly trigger streamflows to preserve low flows and maintain a moderate level of risk to the environment which is monitored using gauging stations. The plan links to the upstream Lakes Sorell and Crescent WMP and environmental objectives are linked to management arrangements, although no water released from the lakes is used for environmental flows.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Monitoring of hydrological, environmental and water management parameters are identified in the plan, but reporting is not required to be public. Streamflow gauging information is online on WIST. Annual waterways reports have been produced but lack detail and do not cover all aspects specified in the plan. The four-year review due in 2009 is on hold.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan considers climate variability by operating monthly flow guidelines. The guidelines were established under two climatic conditions (average and dry), with a trigger level to distinguish between the seasons. Long-term climate change was not considered in the development of the plan.
11. Is stakeholder engagement in the planning process adequate?	Yes	A consultative group of stakeholders was formed during drafting of the WMP and are required to be engaged during implementation and at plan review. Stakeholder submissions were accepted and responded to on the draft plan but the outcomes of the engagement were disputed.
12. Have identified outcomes been achieved during the reporting period?	No	Annual waterways reports were produced for the Clyde catchment in 2007 and 2009, however the reports do not contain sufficient detail and do not provide a status of progress against all the plan outcomes, particularly social and community involvement. Review of the plan, due four years after commencement (2009), is currently on hold.

# BOOBYALLA RIVER CATCHMENT



## DRAFT WATER MANAGEMENT PLAN



### Context

The Boobyalla River catchment is located in the north-east of Tasmania and begins in the southern foothills of Mount Horror before discharging into Ringarooma Bay. Land use in the upper and middle reaches of the catchment is dominated by forestry plantations, with an area to the south-east cleared for cropping and grazing. Consumptive water extraction and use is relatively low at the time of plan development, and is limited to stock or irrigation use on small rural holdings. The majority of the Boobyalla River is an unregulated river system in a relatively natural condition that exhibits a strong seasonal flow pattern. The majority of developed land in the southern reaches of the catchment is supplied with water from the Winnaleah Irrigation Scheme. The primary driver for the drafting of the plan is the development of irrigation schemes in the region by the Tasmanian Irrigation Development Board.



## Findings

1. Is there a plan in place?	To some extent	The Draft Boobyalla Catchment WMP was released as a draft in December 2010 and is yet to be finalised. The plan covers surface water and groundwater management within the catchment. Once finalised, the plan will be reviewed in its 10th year of operation.
2. Does the plan include key assessments?	To some extent	Key assessments to inform the drafting of the plan were based on a hydrological model and a risk-based approach to calculate the required environmental flow provisions to protect the identified assets. There were no socioeconomic assessments identified, however there are a small number of users (21 licence holders) in the catchment.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify overuse but overallocation is acknowledged. The direct-take allocation limit has been reached in this catchment and no further direct-take allocations will be issued. The limit was based on a conservative estimate. The plan identified that there is scope to issue new storage allocations.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan identifies environmental and water usage and development objectives. Performance indicators for the objectives are not defined and monitoring arrangements are focused on streamflow. There is discussion in the plan on the relationship between streamflow and objectives and monitoring is subject to departmental resources.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade in line with the Guiding Principles for Water Trading in Tasmania. Groundwater is not licensed and therefore not tradeable.
6. Is interception appropriately considered and integrated into the plan?	To some extent	Intercepting activities identified in the catchment are plantation forestry and stock and domestic use. Stock and domestic use is estimated within the plan, however impacts of plantation forestry were not considered. The Tasmania Sustainable Yields project has identified an expected increase in commercial forest plantations in the catchment which has not been incorporated into the WMP.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	Despite the plan covering the groundwater resource, there are no provisions for groundwater management, and points of connectivity are not identified. Instead, the plan operates under the premise that by retaining the key characteristics of the natural flow regime, groundwater flows and levels critical to surface water flows should be maintained within the bounds of natural variability.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental water is provided by restriction management based on studies of the natural flow regime. The plan provides for a minimal departure from the natural flow regime, which DPIPW considers appropriate to maintain a low level of risk to the environment while providing reliable access to water for consumptive purposes.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	Streamflow, allocations, trades and restriction management monitoring is intended to be collected by DPIPW and reported annually, although public reporting is not required. The monitoring schedule focuses on streamflow to demonstrate achievement of objectives, and monitoring of river health and water quality will occur as resources permit.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The impacts of climate change and variability are considered in the development of the plan. Climate variability is managed through the separation of direct-take entitlements from storage entitlements and monthly cease-to-take triggers. In acknowledgment of the predicted impacts of climate change, the plan stated further assessment work and review of the allocation limits will be considered at review if the allocation limits are approached. Risks to reliability under climate change and variability are broadly described.
11. Is stakeholder engagement in the planning process adequate?	Unable to assess	Public submissions on the draft WMP ended in March 2011. Assessment of stakeholder engagement is difficult until the final report is released, and this plan differs from other plans as there is no indication that a stakeholder group was formed during drafting.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The draft status of the plan does not allow for progress to be demonstrated.



# SASSAFRAS WESLEY VALE

## DRAFT WATER MANAGEMENT PLAN



### Context

The SassafRAS Wesley Vale area is located in northern Tasmania and is part of a broader region characterised by high agricultural water use. The SassafRAS Wesley Vale area is recognised for its high level of agricultural production and most of the land is used for irrigated agriculture. Similar to other catchments in northern Tasmania, surface water hydrology in the area is characterised by high flows in winter and very low flows in summer. Approximately 90 per cent of the annual surface water yield in the area occurs during the winter period. A number of dams have been constructed to capture and store the more reliable winter flows, resulting in a highly modified system. Recent low flow periods during summer have also led to a greater reliance on groundwater by irrigators. The primary driver for the drafting of the plan is the development of the SassafRAS Wesley Vale Irrigation Scheme by the Tasmanian Irrigation Development Board. Pressures from the high demand for water during summer dry periods and the extensive development of dams have also contributed to the need to manage and share the resources between users.



## Findings

1. Is there a plan in place?	To some extent	The Draft Sassafras Wesley Vale WMP was released in November 2009. The final WMP was expected to be released in June 2011, but the current status is not known.
2. Does the plan include key assessments?	To some extent	Key hydrological and environmental assessments were undertaken in the development of the draft plan for both surface water and groundwater resources. There is limited evidence of social and economic assessments, although water user surveys were conducted to gather information during the preparation of the draft plan.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify overuse or a trade-off process to reach a sustainable level of extraction. The system is heavily modified and there is evidence of an increase in frequency and duration of low and zero flow events in recent years. The plan identifies potential available winter storage and imposes cease-to-take triggers to preserve baseflows, but there is no clear strategy to deal with future dry periods.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	Objectives and strategies of the plan are identified, however there are no performance indicators for measuring progress towards objectives. No specific risk monitoring activities are identified, although links may be drawn between the implied risks and the monitoring, for example for over extraction and ecosystem health.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade of surface water licences in line with the Guiding Principles for Water Trading in Tasmania. Groundwater is not licensed at the time of plan development and therefore not tradeable.
6. Is interception appropriately considered and integrated into the plan?	To some extent	Domestic and stock use and the impacts of a large number of farm dams in the plan area are identified and the take is estimated. There is no discussion of plantation forestry and its impacts within the plan.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	The plan recognises connectivity and background studies have shown that there is high connectivity in the plan area. The plan restricts groundwater use under similar provisions for surface water where wells are in close proximity to watercourses.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan clearly identifies environmental objectives which are linked to the plan provisions of allocation limits and restriction management. Cease-to-take provisions are based on river level thresholds, whereby when flows reach this threshold the taking of water is prohibited.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	Streamflow, allocations, groundwater levels, trades and restriction management monitoring will be collected by DPIWPE and reported annually, although public reporting is not required. The monitoring schedule focuses on streamflow and usage metering to demonstrate achievement of objectives, and monitoring of river health and water quality will occur as resources permit.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	There is evidence of the consideration of climate variability through the separation of direct-take entitlements from storage entitlements. Long-term climate change is not addressed in the draft plan, despite the evidence of background reports such as Tasmania Sustainable Yields and Climate Futures. At the time of draft plan development, no specific regional climate change studies were completed.
11. Is stakeholder engagement in the planning process adequate?	To some extent	Stakeholder engagement has been undertaken on the draft through a combination of formal (workshops and public exhibitions) and informal mechanisms. Unlike other plans, there is no evidence that a consultative group was engaged to develop the plan.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The draft status of the plan does not allow for progress to be demonstrated.

# SOUTH ESK RIVER CATCHMENT

## DRAFT WATER MANAGEMENT PLAN



### Context

The South Esk River catchment is relatively large in size and is located in the north-east and midlands of Tasmania. The predominantly unregulated South Esk River catchment supports a productive agricultural industry, focused on irrigated annual cropping and dryland grazing. In addition to agriculture, the catchment supports a range of water uses, including forestry, mining, recreation and tourism. The location of the South Esk River catchment within a Hydro Tasmania hydro-electric district is of key importance to water planning. As Hydro Tasmania captures water in Trevallyn Dam at the lower end of the South Esk Basin, flows throughout the river system have largely been quarantined from allocation to consumptive use. The high reliability of winter flows and large annual discharge has led to the proposed expansion of irrigation in the area, which has driven the need to develop a water plan. The Lower South Esk Irrigation Scheme is one of a number of new irrigation schemes proposed by the Tasmanian Irrigation Development Board.



## Findings

1. Is there a plan in place?	To some extent	The Draft South Esk WMP was released as a draft in September 2009 and is yet to be finalised. The plan covers surface water and groundwater management within the South Esk River catchment upstream of the confluence with the Macquarie River.
2. Does the plan include key assessments?	To some extent	Key assessments undertaken prior to planning included development of a water balance model, socioeconomic studies and identification of environmental assets and condition. Connectivity was not thoroughly investigated. A risk assessment looked at which flow components were needed to maintain the naturalness of the ecosystems.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	Overuse is not identified in the catchment. As a Hydro Tasmania system, the catchment is considered fully allocated and all future allocations require agreement from Hydro Tasmania. The plan identifies the potential volumes of water available under transfer and limits allocation based on the needs of the environment and the reliability levels.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan identifies environmental, water usage and development, and social objectives. Performance indicators for the objectives are not defined and monitoring arrangements are focused on streamflow. There is discussion in the plan on the relationship between streamflow and objectives and monitoring is subject to resources.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade. Consideration is required on the likelihood of detrimental impacts on water quality and other users as all new allocations must be gained through agreement and transfer from Hydro Tasmania.
6. Is interception appropriately considered and integrated into the plan?	To some extent	Intercepting activities identified in the catchment are stock and domestic use, floodplain harvesting, forestry and mining. Stock and domestic use is the only intercepting activity quantified.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	To some extent	The system is acknowledged to have surface water and groundwater connectivity. Due to the assumed low level of groundwater usage in the catchment, Tasmania chose not to actively manage the resource under this plan. The plan operates on the premise that protecting as close to natural surface water flows will adequately protect the groundwater resource.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental water is provided through allocation limits, which are determined by considering the effects of a less natural flow regime through the Tasmanian Environmental Flow Framework. Daily limits on take and threshold flows provide for the protection of baseflows and some flood events.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	Monitoring is not required to be publicly reported and all objectives of the plan are not linked with monitoring arrangements. Streamflow, allocations, trades and restriction management application information is intended to be collected by DPIPWE and reported annually. Monitoring of river health and water quality will occur as resources permit.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The impacts of climate change and variability are considered in the development of the plan. Climate variability is managed through the separation of direct-take entitlements from storage entitlements. New allocations are issued at lower levels of reliability than previous, in acknowledgment of climate change and drought impacts. Risks to reliability under climate change and variability are broadly described.
11. Is stakeholder engagement in the planning process adequate?	Unable to assess	As a draft plan not yet finalised, the full extent of stakeholder engagement to finalise the plan is not yet apparent. A consultative group provided input to the draft plan objectives, management provisions and monitoring program. DPIPWE drafted the plan and issued it for public comment.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The draft status of the plan does not allow for progress to be demonstrated.



# TOMAHAWK RIVER CATCHMENT



## DRAFT WATER MANAGEMENT PLAN



### Context

The Tomahawk River catchment is located in the north-east of Tasmania and drains into Ringarooma Bay. Land use in the catchment is dominated by production forestry and dryland agriculture, but small areas of commercial irrigation also occur. Consumptive water extraction and use is relatively low. The river is unregulated, with only a small number of in-stream dams affecting the natural flow. Similar to other catchments in northern Tasmania, surface water hydrology is characterised by high flows in winter and very low flows in summer. The main driver for the drafting of the plan is the development of irrigation schemes in the region by the Tasmanian Irrigation Development Board. The plan has been drafted with the aim to preserve existing ecosystem values at the same time as enabling future irrigation development and the capacity to support a range of other water uses, including town and stock and domestic supply.





## Findings

1. Is there a plan in place?	To some extent	The Tomahawk River Catchment WMP is currently in draft form and covers the management of surface water and groundwater in the whole of the Tomahawk River catchment. Submissions to the draft closed in March 2011 and the plan may be implemented as an interim plan.
2. Does the plan include key assessments?	To some extent	Key assessments undertaken prior to planning were based on a hydrological model and a risk-based approach to calculate the required environmental flow provisions to protect the identified assets. There were no social or economic assessments identified, however there are a small number of users in the catchment (eight licence holders at the time of drafting).
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify overuse. The allocation limit has been established as a conservative buffer in light of the predicted impacts of climate change and no further licences will be issued. Storage allocations are available under the plan and monthly cease-to-take thresholds are established to preserve low flows.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan identifies environmental and water usage and development objectives. Performance indicators for the objectives are not defined, however the objectives are simplistic and phrased in terms of maintaining streamflow and access. Monitoring arrangements are hence focused on streamflow.
5. Does the plan facilitate trade?	Yes	The plan facilitates trade in line with the Guiding Principles for Water Trading in Tasmania. Groundwater is not licensed and therefore not tradeable.
6. Is interception appropriately considered and integrated into the plan?	To some extent	Intercepting activities identified in the catchment are plantation forestry and stock and domestic use. Stock and domestic use is estimated within the plan, however impacts of plantation forestry were not considered. The Tasmania Sustainable Yields project has identified an expected increase in commercial forest plantations in the catchment which has not been incorporated or referenced in the WMP.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	Despite the plan covering surface water and groundwater resources, there are no provisions for groundwater management and points of connectivity are not identified. The plan operates under the premise that retaining the key characteristics of the natural flow regime, groundwater flows and levels critical to surface water flows should be maintained within the bounds of natural variability. Groundwater extraction was not considered to be significant enough to warrant the implementation of licensing at the time of plan drafting.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan established an allocation limit to preserve environmental water and provide a buffer for climate change impacts. Restriction management based on monthly flow triggers preserves low flows in the system. The environmental objectives permit links to be drawn between the outcomes, strategies and streamflow monitoring.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	Streamflow, allocations, trades and restriction management monitoring will be collected by DPIWE and reported annually, although public reporting is not required. The monitoring schedule focuses on streamflow to demonstrate achievement of objectives.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The impacts of climate change and variability are considered in the development of the plan. Climate variability is managed through the separation of entitlements from storage entitlements and monthly cease-to-take triggers. New allocations were issued for the storage period only and no allocations will be granted under the plan, in acknowledgment of the predicted impacts of climate change. Risks to reliability under climate change and variability are broadly described.
11. Is stakeholder engagement in the planning process adequate?	Unable to assess	Public submissions on the draft WMP ended in March 2011. Assessment of stakeholder engagement is difficult until the final report is released and there is no indication a consultative group was formed during plan drafting.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The draft status of the plan does not allow for progress to be demonstrated.





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## 9. Australian Capital Territory



# AUSTRALIAN CAPITAL TERRITORY



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## The context of water planning in the Australian Capital Territory

Australian Capital Territory water sources provide urban and rural water supply to Australia’s largest inland city and are a major recreation resource. These water resources, particularly surface water, are largely shared with New South Wales. The combination of extended dry periods and occasional flooding results in large flow variability in the region’s waterways. Many Australian Capital Territory water resources, particularly urban lakes and streams, are highly modified as a result of changes in land use, streamflow diversions, wastewater and stormwater discharges, and introductions of exotic biota. There are a number of variables that exert pressure on water security into the future, including population growth, bushfires, and long-term climate change, all of which must be managed within the context of water sharing in the Murray–Darling Basin.



## Planning arrangements

*Think water, act water* (TAW) is the policy strategy that aims to secure a long-term water supply for the Australian Capital Territory, and it is the *Water Resources Act 2007* (WRA) which is the legal basis for allocating water, issuing licences to take water, and providing environmental flows.

The objects of the Water Resources Act provide for the sustainable management of the Territory's water resources, and subsequent sections broadly cover environmental flows, water access entitlements, licensing of water use and bore drillers, construction of waterway works (e.g. farm dams), compliance and enforcement. The Water Sharing Plan is set out in subordinate legislation and comprises two disallowable instruments: DI 193 describes water management areas and DI 191 details the volume of surface water and groundwater that can be taken from each water management area.




































*Think water, act water* aims to provide a framework for cooperation between community, industry and government to manage, use and conserve the water resources of the Territory. It includes a range of measures, which aim to ensure water supply security for the Territory, protect and improve ecological values associated with waterways, and improve the amenity of urban areas. *Think water, act water* also has an associated implementation plan to guide actions for the achievement of objectives.

The Environmental Flow Guidelines are a statutory instrument under the Water Resources Act to determine the water necessary to maintain the health of aquatic ecosystems in the Territory. The Environmental Flow Guidelines 2006 are a disallowable instrument under the Act and apply to all Territory water resources, including water in rivers, streams, dams, lakes and groundwater. Monitoring of the effectiveness of environmental flow allocations has been ongoing since the development of the original Environmental Flow Guidelines in 1999, resulting in their review and eventual replacement by the 2006 Environmental Flow Guidelines.

The Environment and Sustainable Development Directorate has responsibility for strategic water policy, regulation of the Territory's water resources, water efficiency programs, and monitoring and reporting on water quality (e.g. *Think water, act water* progress reports, ACT Water reports).



Table 7: Planning instruments

Assessment criteria	Water Resources Act	TWAW	DIs 191 & 193	EFlow	Comment
1. Status of plan					The ACT water planning framework comprises a number of instruments. TWAW is the overarching water policy strategy and was released in 2004. The legal basis for water management is the <i>Water Resources Act 2007</i> that establishes two DIs which technically form the Water Sharing Plan. The DIs describe management areas and the volumes of water that can be taken from them. Statutory Environmental Flow Guidelines were established in 1999 and updated in 2006.
2. Key assessments					The ACT's water resources are listed in the 2007 DIs, with further details provided in TWAW 2004 Vol 3. Climate and population variables are assessed in the Future Water Options report. Environmental assets and their condition are assessed in the Environmental Flow Guidelines and associated reviews.
3. Overuse status & pathways to sustainable water extraction					The Water Resources Act and TWAW set objectives for sustainable water extraction. The 2007 DIs detail allocations for consumptive use, environmental flows and future water reserves. The Environmental Flow Guidelines detail the water requirements for environmental assets.
4. Clearly identified & measurable outcomes					The Water Resources Act, TWAW and Environmental Flow Guidelines identify objectives for sustainable use and environmental protection. A monitoring and reporting program is detailed in TWAW.
5. Facilitation of trade					The Water Resources Act enables water entitlement dealings and the ACT is generally compliant with trade service standards.
6. Integration of water intercepting activities					The Water Resources Act limits interception from rainwater tanks and farm dams. The potential interception impacts of forestry are regularly assessed.
7. Surface water/ groundwater connectivity					The Water Resources Act, DIs and TWAW provide for integrated management of surface water and groundwater. Environmental Flow Guidelines also acknowledge the importance of connectivity.
8. Environmental water management arrangements					The Water Resources Act requires preparation of Environmental Flow Guidelines. The DIs detail volumes for environmental water allocations in each water management area. A regular monitoring and reporting program are detailed in TWAW and in the Environmental Flow Guidelines.
9. Monitoring, compliance & enforcement provisions					The Water Resources Act identifies offences, disciplinary action and metering requirements associated with compliance. TWAW requires monitoring, review and adaptive management for plan provisions. Under the Act, the Environmental Flow Guidelines must also be regularly reviewed and updated.
10. Planning for climate change & extremes in inflows or recharge					TWAW acknowledges climate change as an important component of water planning and the Future Water Options report regularly assesses assumptions in water planning variables. The Environmental Flow Guidelines identify the need to use different flow guidelines under drought conditions.
11. Stakeholder engagement					The Water Resources Act sets minimum consultation requirements when drafting Environmental Flow Guidelines. TWAW incorporates community consultation on plan development and review.
12. Extent to which outcomes have been achieved					TWAW progress reports provide information on the planned actions that have been implemented. Under the Water Resources Act the Environmental Flow Guidelines are required to be regularly assessed against objectives and reports made available to the public.



## Key findings



### Environmental flow guidelines underpinned by science

The Australian Capital Territory has statutory and adaptively managed environmental watering arrangements, integrating the management of surface water and groundwater for the maintenance of aquatic ecosystems. Many of the waterways in the Australian Capital Territory have been impacted by urban development and Environmental Flow Guidelines were introduced in 1999 with the aim of protecting the health of these water resources based on the best available scientific information. An assessment program, underpinned by empirical research, regularly evaluates environmental watering arrangements to inform future environmental flow releases.

### Regular monitoring and reporting to assess outcome achievement

Regular monitoring and reporting indicate that the Australian Capital Territory has made progress towards the water management outcomes set by *Think water, act water* in 2004. The ACT Water Report is an annual monitoring summary that provides information ranging from water trading statistics to water quality measurements and ecosystem condition assessments. Other sources of publicly available monitoring and assessment information include research reports on biological responses to environmental flows and online water quality data. The consistent monitoring and transparent reporting of findings allows better assessments to be made of the effectiveness of water planning in achieving outcomes.





# Glossary and abbreviations

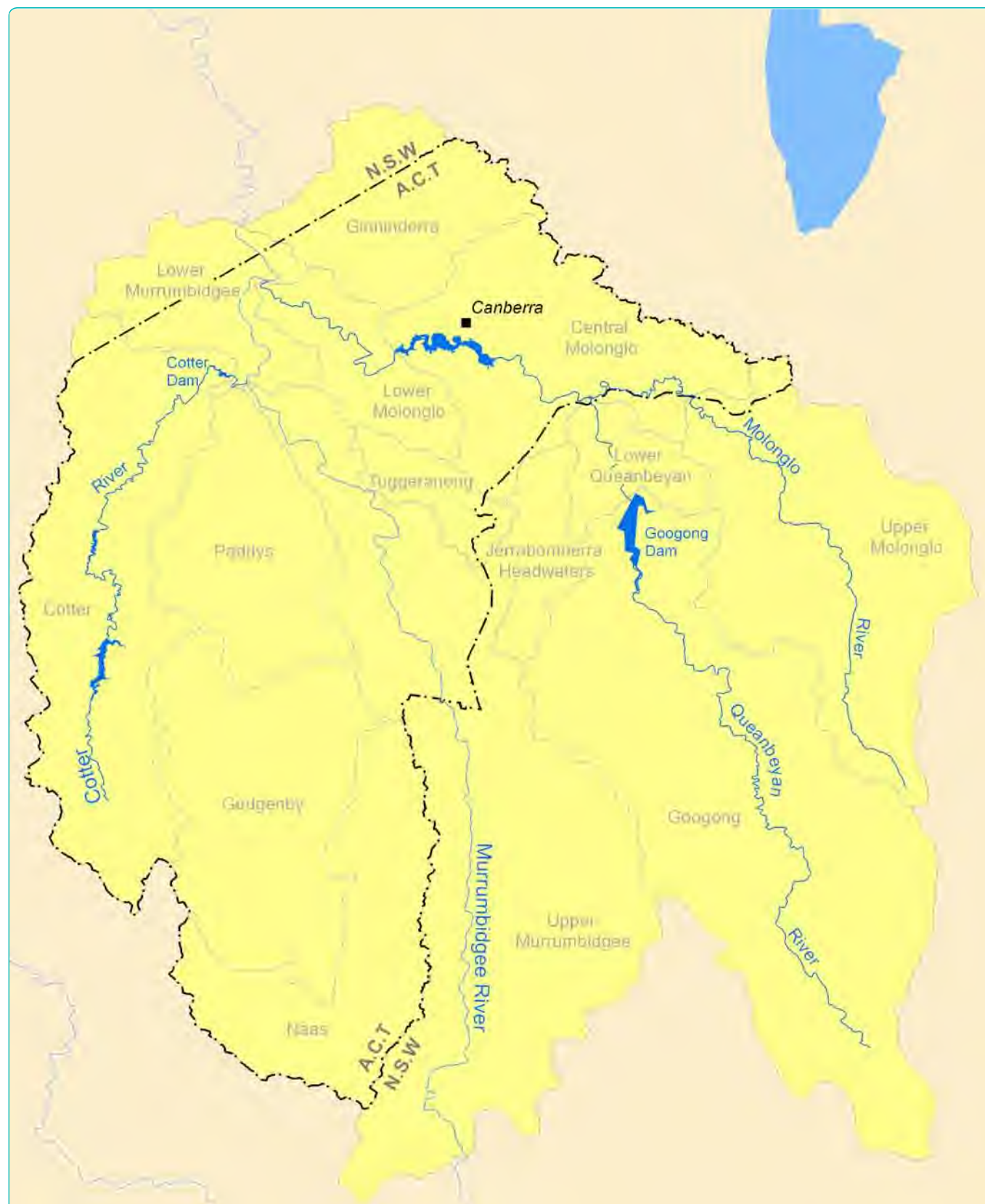
Term	Acronym	Definition
Disallowable instrument	DI	Legislation which is subordinate to the <i>Water Resources Act 2007</i> and describes water management areas in the ACT, as well as the volumes of water available for consumptive uses, environmental flows and future reserves.
Environmental flow guidelines	EFlow	A statutory instrument under the <i>Water Resources Act 2007</i> to determine the water necessary to maintain the health of aquatic ecosystems.
<i>Think water, act water</i>	TWAW	Overarching policy framework which provides for the management of water resources in the Australian Capital Territory.
<i>Water Resources Act 2007</i>	WRA	Legislation for allocating water, issuing licences to take water, and providing environmental flows in the Australian Capital Territory.





## Planning areas

### Australian Capital Territory



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## Findings

1. Is there a plan in place?	Yes	The plan is finalised and operational, covering all surface water and groundwater resources in the ACT. <i>Think water, act water</i> , the policy framework for water management, was released in 2004. The <i>Water Resources Act 2007</i> is the legal basis for controlling all water use. Statutory Environmental Flow Guidelines provide the details of environmental watering arrangements.
2. Does the plan include key assessments?	Yes	Detailed resource information has been compiled and integrated into the water planning process. Water planning variables are regularly reviewed (e.g. population growth, future demand estimates) to address risks to future water availability and quality.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	There were no areas of overuse identified in the ACT plan. Extraction limits have been set for all water sources. The extraction limits reflect environmental and consumptive use trade-offs. Risks to water supply associated with a growing population, in conjunction with drought and climate change, are also being addressed through exploration of future water options (e.g. Cotter Dam expansion, Googong transfer).
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan clearly identifies objectives with associated actions for their achievement detailed in the supporting implementation program. The assessment of outcome achievement is facilitated by regular monitoring, reporting and review procedures.
5. Does the plan facilitate trade?	Yes	Trade is facilitated in the ACT under the Water Resources Act. While interstate trade has been enabled by legislation, it cannot be undertaken due to a lack of appropriate agreements between jurisdictions in practice.
6. Is interception appropriately considered and integrated into the plan?	Yes	Interception activities, such as unlicensed basic landholders' rights, are identified in the plan and there has been some consideration of the impact forest regrowth may have on water supplies after bushfire. The installation of rainwater tanks and farm dams is regulated.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	Integrated management of connected groundwater and surface water occurs in the ACT. There is relatively low usage of groundwater.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Statutory Environmental Flow Guidelines provide clear links between management objectives, required flow volumes and monitoring arrangements. The Guidelines are reviewed regularly and there is evidence of adaptive management, with monitoring of the 1999 Guidelines leading to changes in subsequent environmental watering provisions.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Yes	There are a range of agencies and groups responsible for water resource monitoring in the ACT and research is underway to fill existing information gaps. The Environment and Sustainable Development Directorate coordinates annual reporting on the state of the ACT's water resources.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	Climate change and variability are dealt with in the plan, with detailed analysis of future water options acknowledging the risks of reduced water supply due to climate change and population growth. The water volumes allocated for extraction through disallowable instruments can be amended to deal with changes to water availability within the life of the plan.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement has occurred during all key stages of plan development (e.g. pre-plan consultation, public submissions on draft, feedback on trade-off decisions). Ongoing stakeholder input is also facilitated by provisions of the Environmental Flow Guidelines and occurs on other issues on an ad hoc basis (e.g. enlargement of Cotter Dam). A new round of stakeholder engagement is underway as part of the review of <i>Think water, act water</i> .
12. Have identified outcomes been achieved during the reporting period?	Yes	Regular monitoring and reporting against plan objectives indicate that progress has been made towards water use efficiency and future water security outcomes. However, the achievement of ecological and water quality targets has proved challenging largely due to the impacts of drought and fires.



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## 10. Northern Territory



# NORTHERN TERRITORY



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## The context of water planning in the Northern Territory



Water planning in the Northern Territory aims to provide efficient and transparent allocation of water to support the economic development of the Territory in a manner that protects natural ecosystems and other resources from degradation. Water allocation planning is being implemented to achieve the sustainability of water resources into the future.

The Northern Territory experiences a wide range of climatic conditions ranging from the arid centre to the pronounced wet and dry seasons in the north. In the top one-third of the Territory, water is extracted for consumptive uses from a mixture of both surface water and groundwater resources, with reliance on groundwater during the dry season. In the lower two-thirds of the Northern Territory, surface water flows are highly sporadic and there is a greater reliance on groundwater for consumptive uses. There are no regulated water supply systems in the Northern Territory within any of the plan areas.

The Northern Territory's water resources are generally considered to be under relatively little pressure due to a comparatively small population base and low intensity of land use. However, groundwater and surface water resources in a number of local areas are recognised as being under pressure from resource development.

A number of river systems are in a near-pristine condition, which may also require careful management to ensure their natural values are protected as development pressures increase. Water planning in the Northern Territory also needs to be cognisant of Indigenous values with over half of the Territory being Aboriginal land and Aboriginal people comprising approximately 30 per cent of the population.



# Planning arrangements



## Key legislation and policies

The Northern Territory's *Water Act 1992* (the Water Act) provides the legislative framework for water planning and entitlements for most water resources in the Territory. The Water Act provides for the investigation, allocation, use, control, protection, management and administration of water resources. It also defines the beneficial uses of both surface water and groundwater.

Water extraction for most purposes must be licensed under the Water Act. The Act provides rights to take water from waterways and groundwater for stock and domestic uses. The water licensing provisions of the Act do not apply to the take of water for mining and petroleum operations. Water for these purposes may be licensed under the Mining Act, the Mining Management Act or the Petroleum Act. A memorandum of understanding (MOU) between the Department of Natural Resources, Environment, the Arts and Sport (NRETAS) and the Department of Resources (DoR) provides some measure of conjunctive management of water for mining and petroleum operations and for other purposes, however this has no legislative basis. The Water Act regulates the discharge of wastewater from mining and petroleum operations where the wastewater is not confined to the mining or petroleum site.

The Water Act provides for the Minister to declare water control districts and to subsequently declare water allocation plans (WAPs) within these water control districts.

Subject to alternative arrangements which may be specified in water allocation plans, the Northern Territory has implemented the Northern Territory Water Allocation Planning Framework (WAPF) which establishes contingent allocations for environmental and other public benefit uses as well as consumptive use. Under the framework at least 80 per cent of surface water or groundwater recharge is allocated for environmental and other public benefits in the Territory. In the arid zone, where surface water flows and recharge are sporadic, at least 95 per cent of surface water is reserved for environmental and other public benefits, and total groundwater extraction over a period of 100 years is not to exceed 80 per cent of the total aquifer storage at the start of extraction.

## Water control districts and water allocation plans

The Water Act provides for the declaration of water control districts within the Territory to provide increased management of water. This is usually done in areas where there is a need to avoid stress of groundwater reserves, river flows or wetlands.

At the Minister's discretion a water allocation plan may be developed within a water control district. They are declared under the Act for one or multiple water sources, surface water or groundwater, within a water control district. They provide a blueprint for future sustainability by establishing a framework to share water between environmental and other public benefit needs and consumptive use. They are developed through detailed technical and scientific assessment as well as community consultation to determine a balance between competing requirements for water.

The Water Act provides for water advisory committees to be convened at the Minister's discretion to assist the development and oversight of water allocation plans in order to maximise their social and economic benefits within ecological restraints. The composition of the committee is at the Minister's discretion, however committees typically consist of representatives with relevant government, industry, environmental, Indigenous and other community interests.

Water allocation plans detail the area and water resource to which a plan applies as well as the objectives, strategies and performance indicators of the plan. They also provide a basis for water allocation decisions and methods for making available water determinations.

Water allocation plans also detail the rules and operating mechanisms that ensure that water is shared amongst the beneficial uses in the plan area, and outline monitoring programs to evaluate the performance of the plan and to inform a review. A water allocation plan has a maximum life of ten years and must be reviewed within five years.





Table 8: Planning instruments

Assessment criteria	Territory	Catchment	Comment
	Water Act MOU WAPF	WAP	
1. Status of plan	🔹	🔹	The Water Act provides the legislative basis for WAPs. WAPs establish the planning objectives and define the operational rules.
2. Key assessments		🔹	Assessments are undertaken at the plan area level.
3. Overuse status & pathways to sustainable water extraction	🔹	🔹	Sustainable extraction limits and environmental objectives are specified in each WAP. In the absence of a WAP, the WAPF provides contingent allocation limits.
4. Clearly identified & measurable outcomes		🔹	WAPs specify the outcomes for the plan area.
5. Facilitation of trade	🔹	🔹	The Water Act requires that water licences are able to be traded. Trading rules are detailed in WAPs.
6. Integration of water intercepting activities	🔹	🔹	WAPs determine to what extent intercepting activities are managed in each area. Water for mining is not managed through WAPs. An MOU between the relevant NT agencies provides some level of integration of interception through mining and petroleum activities.
7. Surface water/ groundwater connectivity		🔹	WAPs define the water resources to be managed by the plan and may discuss the interactive nature of these resources where appropriate.
8. Environmental water management arrangements	🔹	🔹	The Water Act requires WAPs to allocate water to the environment. WAPs detail the arrangements in place to provide for environmental water. Where a WAP is not in place, the WAPF provides for environmental water arrangements.
9. Monitoring, compliance & enforcement provisions	🔹	🔹	The Water Act includes compliance and enforcement provisions. It also requires WAPs to be reviewed at least every five years. Monitoring arrangements are detailed in WAPs.
10. Planning for climate change & extremes in inflows or recharge		🔹	WAPs may contain management arrangements to deal with climate change and variability. Short-term climate variability does not impact on the availability of water in deep aquifers within the arid zone.
11. Stakeholder engagement	🔹		The Water Act does not require stakeholder consultation but allows for the establishment of water advisory committees to assist in WAP development and oversight.
12. Extent to which outcomes have been achieved		🔹	Monitoring and reporting arrangements are detailed in WAPs.



## Key findings



### Water planning developing in a proactive manner

The water planning regime in the Northern Territory is still evolving and is well positioned to deal with increasing competition for the resource before water systems reach their allocation limits.

While most water resources are not yet managed through a water sharing plan, the Territory's water resources are currently considered to be under little pressure except for a few localised areas of high demand. The Territory has a number of water plans under development. Provided these plans are completed and declared in a timely manner, there is an opportunity to plan for increasing pressure for water from population growth, as well as mining and horticulture activities.

### The licensing of water rights outside of the Water Act impedes effective and sustainable management of the resource and may impact on water security for other licensed users or the environment

The licencing provisions of the Water Act do not apply to mining and petroleum activities, including associated exploration activities. The extraction of, or interference with, water from these activities is authorized under separate legislation. Although an administrative arrangement between the relevant Government agencies provides some scope for conjunctive management, volumes of water extracted or intercepted by mining and petroleum are not volumetrically controlled and it is unclear how the needs of other water users and the environment are to be protected by existing arrangements.

### Lack of monitoring and reporting

Arrangements for monitoring, reporting and the need to address existing knowledge gaps are well described in water plans, including commitments to produce annual monitoring reports. To date however, no annual reports have been publically released with just one monitoring report released as part of the 5 year review of the Ti Tree Water Allocation Plan. The need for the implementation of an effective monitoring and evaluation framework remains.



## Findings against criteria

1. Status of water planning	Water allocation plans are currently in place for three water planning areas, and one draft plan is on public exhibition. Water allocation plans have a lifespan of 10 years and are required to be reviewed at least every five years. There are seven water allocation plans currently being developed, with plans for a total of 16 water allocation plans across the Territory. Water allocation plans have been put in place or are well advanced for some areas where pressures on the water resources appear lower than for other areas where plans are not well developed. As such, it is not clear what criteria have been applied in the prioritisation of planning in the Territory. However, in the absence of water allocation plans, the Water Allocation Planning Framework provides for environmental and cultural flows and guides water allocation decisions.
2. Do plans include key assessments?	Hydrologic and environmental assessments have been completed for all plans and later plans are incorporating social and economic assessments. Summaries of these assessments are described within the plan and its associated documentation which remain publicly available for the life of the plan. The plans acknowledge a need to develop an improved understanding of recharge rates and the needs of groundwater-dependent ecosystems (GDEs).
3. Do plans address overuse and is there a pathway to sustainable extraction?	No areas of overuse are identified and all plans have sustainable extraction limits that have been developed by an informed trade-off process. The two declared arid zone plans manage the extraction of groundwater within the Territory's Water Allocation Planning Framework whereby no more than 80 per cent of total aquifer storage will be extracted within 100 years. Plans are reviewed within five years and adjustments made if necessary.
4. Do plans include clearly identified and measurable outcomes?	The later plans have clearly identified and measurable outcomes. The original Ti Tree plan did not contain outcomes, however they were incorporated following the five-yearly plan review.
5. Do plans facilitate trade?	Trade is enabled in water plans but is subject to a number of barriers such as buyers being required to demonstrate a clear need to use the water for an approved purpose and sellers having made genuine efficiencies. There has been little demand for trade to date.
6. Is interception appropriately considered and integrated into plans?	Unlicensed stock and domestic extraction is integrated into the hydrologic considerations. Mining and petroleum activities are not integrated, as water for these activities are authorised outside of the Water Act. It is not clear whether water extracted or intercepted by mining activities is able to be adequately accounted for in water plans as this relies on the effectiveness of a non-binding memorandum of understanding between the relevant agencies. Mining has not impacted on other water users to date as activities have not occurred in areas of high water use. However, the lack of integration of planning and management of water for mining operations with that for other purposes has the potential to compromise water security for consumptive users and the environment if mining or petroleum activities expand into areas of high water use.
7. Do the plans address surface water and groundwater connectivity as appropriate?	Plans acknowledge connectivity and most plans have conjunctive management arrangements. However, while the Katherine plan manages the Tindall Aquifer so that discharges into the Katherine River are maintained during the dry period, it does not manage surface water extractions from the Katherine River, limiting the extent of conjunctive management arrangements in this area.

8. Do plans contain accountable environmental water management arrangements?	Plans contain environmental water management arrangements. In most cases there is little scientific evidence available to provide a basis for these arrangements, however the plans have adopted a precautionary approach to the setting of extraction limits in line with the Water Allocation Planning Framework and also outline relevant monitoring activities. The Katherine Water Allocation Plan does not manage surface water extractions for consumptive use and so there is potential for these extractions to threaten the achievement of the plan's environmental objectives.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Compliance and enforcement provisions are included in the Water Act. The Water Act also requires water allocation plans to be reviewed at least every five years. Reports of assessments conducted to inform the five-yearly review of the Ti Tree Water Allocation Plan are the only publicly available monitoring reports to date. Implementation targets included in water allocation plans have flagged an intention to undertake more regular monitoring and reporting, however these schedules have not been adhered to.
10. Do the plans deal appropriately with climate change and extremes in inflows or recharge?	<p>The two declared and one draft water allocation plans in the arid zone have considered the impacts of climate change in the plan area using future climate projections. Recharge of these groundwater resources is thought to occur mainly through infrequent major rainfall events. The plans have not made any specific allowance for changes in recharge due to climate change, however the potential impact of climate change on the recharge of the aquifers is unclear. Variability is also not incorporated into these plans given that short-term fluctuations in rainfall do not have a significant impact on recharge or the availability of water resources from deep aquifers.</p> <p>While the preparation of the Katherine plan specifically excluded consideration of climate change, the plan states that any relevant climate change developments will be incorporated into the five-year review of the plan. Variability is managed well in this plan.</p>
11. Is stakeholder engagement in the planning process adequate?	While the Water Act provides for the formation of water advisory committees, there is no legal requirement for consultation in preparing plans. To date, the development of draft water allocation plans has involved substantial input from community-based water advisory committees. These committees have included Indigenous and other relevant stakeholders. Following the release of draft plans, further community input has been sought through community meetings and submissions processes.
12. Have identified outcomes been achieved during the reporting period?	It has not been possible to assess the extent to which water allocation plan outcomes have been achieved given that no reporting against plan outcomes has occurred to date. The five-year review of the Ti Tree Water Allocation Plan did not comment against plan outcomes given the absence of outcomes in the plan prior to the review. The Alice Springs Water Allocation Plan is due for a five-year review in 2011 and the Ti Tree Water Allocation Plan is due to be replaced in 2012. Both events may shed some light on the extent of achievement of plan outcomes.



## Glossary and abbreviations

Term	Acronym	Definition
Arid zone		The southern two-thirds of the Northern Territory where surface water flows are highly sporadic and most water extractions are from groundwater.
Department of Natural Resources, Environment, the Arts and Sport	NRETAS	Northern Territory department with primary responsibility for water planning.
Groundwater-dependent ecosystem	GDE	Ecosystems that are dependent on groundwater for their existence and health.
Memorandum of understanding	MOU	Administrative agreement between relevant NT government agencies in respect of water rights for mining and non-mining purposes.
Water advisory committee		Statutory bodies formed under the Water Act. Members are drawn from the community and are selected for their particular expertise to develop and oversee a water management plan.
Water allocation plan	WAP	The instrument that defines the water sharing allocations and plan for an area where water extraction needs to be closely managed.
Water Allocation Planning Framework	WAPF	Framework used by the Northern Territory to provide contingent allocations for environmental and other public benefit provisions and for consumptive use.
Water control district		An area where water extraction is in greater demand and is more intensively managed than other areas of the Territory.
Water resource strategy		The instrument that defines the water sharing allocations and plans in the Alice Springs area. More recent water plans are called water allocation plans (WAPs).



# Planning areas

## Northern Territory



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### Location



1	Alice Springs Water Resource Strategy	464	3	Ti Tree Water Allocation Plan	468
2	Water Allocation Plan, Tindall Limestone Aquifer, Katherine	466	4	Water Allocation Plan, Western Davenport Water Control District (draft)	470

# ALICE SPRINGS



## WATER RESOURCE STRATEGY 2006–2015



### Context

The Alice Springs Water Resource Strategy incorporates the township and surrounds of Alice Springs, a regional centre in the arid zone of central Australia. The strategy covers the Todd River surface catchments as well as the groundwater aquifers in the immediate vicinity of the Alice Springs township. Almost all of the water supplies in the strategy region are drawn either from alluvial sediments or from rock aquifers, with the exception of some surface water retention in small dams for stock use.

Alice Springs is a high priority area because the urban centre of Alice Springs is entirely dependent on groundwater resources. In addition to supporting the area's unique environment and areas of traditional significance, the water resources of the Alice Springs region support all major economic activities of Alice Springs including residential development, tertiary industries (including tourism and regional support functions), defence, pastoral production and horticulture. The strategy was developed to coordinate management of the water resources to avoid the issues of over extraction, salinity and poor water quality.

## Findings

1. Is there a plan in place?	Yes	A plan has been in place since 2006 with a review due by 2011.
2. Does the plan include key assessments?	To some extent	The key assessments were included in the plan, however there is little discussion of environmental issues. There was no explicit discussion of risks.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. It aims to prevent overuse from occurring by managing water within the NT WAPF which allows for a gradual drawdown of the resource. The plan was informed by a transparent trade-off decision process.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes a set of principles; however they are not clearly measurable or clearly linked to the monitoring arrangements.
5. Does the plan facilitate trade?	To some extent	The plan allows trading although licences are not fully NWI compliant and barriers to trade are not explained by the plan. There is a low level of demand for trading in the area.
6. Is interception appropriately considered and integrated into the plan?	Yes	Stock and domestic use is considered and managed by the plan. It is not clear whether other forms of interception, such as mining, are or may become significant in the area.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	Yes	The plan manages both surface water and groundwater. The plan also has conjunctive management arrangements between the aquifers. Aquifer recharge is protected through limiting surface water extractions to 5% of mean annual flows.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	Environmental watering arrangements have adopted a precautionary approach and are based on limiting the volume of groundwater extractions. The extraction limits are based on broad assumptions in the absence of scientific information.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan contains a monitoring and reporting strategy, however monitoring arrangements relating to the plan's environmental outcomes are unclear and public reporting of monitoring activities is not occurring. The five-yearly review of the plan, due in 2011, was not available as of 30 September 2011. Compliance and enforcement mechanisms are managed by the Water Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan considers that the impact of climate change or variability in the area is expected to be minimal over the life of the plan. As such, there are no mechanisms to manage climate variability in the plan.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement occurred through the water advisory committee, community meetings and written submissions. Indigenous community members and representatives were involved in this process and feedback was provided on final decisions. There are also requirements for further consultation to occur during review or amendment of the plan.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	Monitoring has not been publicly reported to date and so the Commission could not assess whether any planning principles have been maintained or achieved.

# TINDALL LIMESTONE AQUIFER (KATHERINE)



## WATER ALLOCATION PLAN 2009–2019



### Context

The Tindall Limestone Aquifer in the Katherine region represents one of the Northern Territory's highest yielding, good quality groundwater resources. The Tindall Aquifer supplies the Katherine township and Tindal RAAF base with water for drinking and maintenance of green spaces, along with domestic and garden supplies for rural residents. The aquifer also supports agricultural and industrial activities including beef cattle, crops and horticulture.

An important feature of the Tindall Aquifer is that it discharges into the Katherine River through upwelling directly into the river and through springs. By providing these baseflows, the Katherine River continues to flow during the dry season.

The increasing consumptive demand for groundwater in the area has increased the potential for environmental values of the highly connected Katherine River to be adversely affected and driven the need for a water allocation plan to manage use of the groundwater and maintain the important perennial nature of the river.

## Findings

1. Is there a plan in place?	Yes	A WAP was finalised in 2009 with a review due by 2014.
2. Does the plan include key assessments?	Yes	The plan contains transparent pre-planning assessments, however there is no explicit discussion of risks.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	Yes	The plan does not identify any areas of overuse. The plan establishes extraction limits using a clear trade-off process and contains strategies to manage use within these limits.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The plan includes clearly identified and measurable outcomes, and monitoring arrangements are clearly linked to the plan's outcomes.
5. Does the plan facilitate trade?	To some extent	The plan allows trading and barriers to trade are explained by the plan, although licences are not fully NWI compliant. There is a low level of demand for trading in the area.
6. Is interception appropriately considered and integrated into the plan?	Yes	The plan addresses extraction for stock and domestic uses, and other forms of interception have not been identified by the plan to be significant within the catchment.
7. Does the plan include/ address surface water and groundwater connectivity as appropriate?	To some extent	The plan recognises the connectivity between groundwater and surface water. It manages groundwater extractions to protect Tindall Aquifer discharge into the Katherine River, however it does not include management of surface water extractions.
8. Does the plan contain accountable environmental water management arrangements?	Yes	The plan contains accountable environmental watering arrangements with appropriate management arrangements that aim to protect identified assets.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	Public reporting of monitoring activities is not occurring as scheduled in the plan. Compliance and enforcement provisions are provided in the Water Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	To some extent	The plan manages variability in climate through triggers and management responses, however there is no consideration of future climate change incorporated into the plan. The plan review will include an updated historical climate sequence and take account of available information on future changes to climate.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement occurred through the water advisory committee, community meetings and written submissions, although there was a limited submission period on the draft plan. Indigenous community members and representatives were involved in this process and public feedback was provided on final decisions.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	The plan has mechanisms in place to support the assessment of plan outcomes, but monitoring is not publicly reported so the Commission could not assess whether any plan outcomes had been achieved.



# TI TREE



## WATER ALLOCATION PLAN 2009



### Context

The Ti Tree Water Allocation Plan covers an area of approximately 14 000 square kilometres in the arid zone of central Australia. While predominantly a groundwater plan, the water allocation plan includes the Ti Tree Groundwater Basin Aquifer and its surface water catchments. Rainfall is infrequent and surface water generally ephemeral in nature. Groundwater recharge rates are not known, however in general the aquifer is topped up during major rainfall events that usually occur every few years, with more significant recharges occurring every few decades. Most water-dependent ecosystems in the region rely on surface water or localised aquifers rather than the main Ti Tree Groundwater Basin Aquifer. The main uses of water are for public water supply and irrigated agriculture such as horticulture.

This region was the first area in the Northern Territory to undergo water planning. The need for management was identified in order to protect the environmental values of the area and their important cultural significance within the context of this area being widely recognised as having potential for expanded development of the limited available water resources.

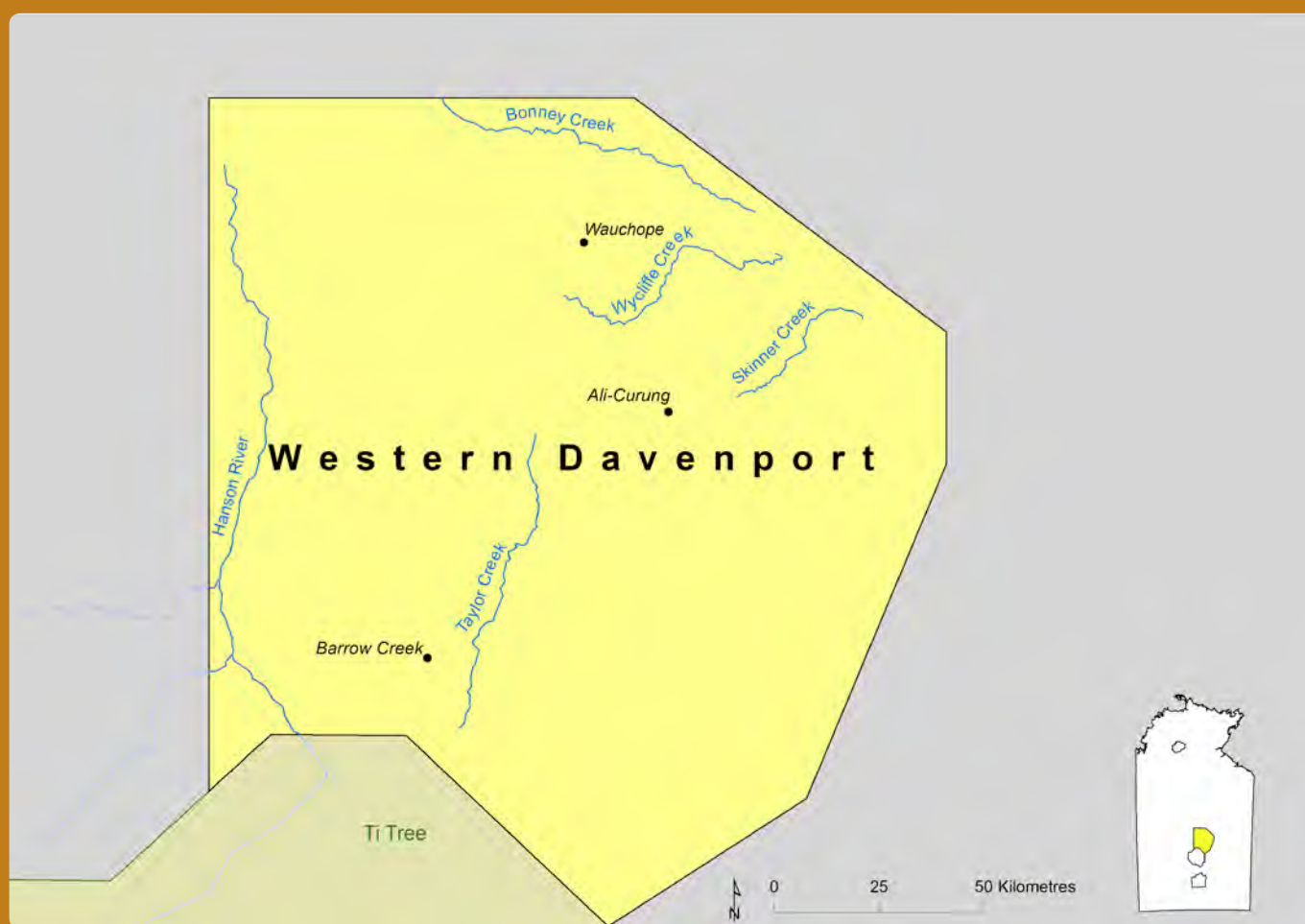
## Findings

1. Is there a plan in place?	Yes	A plan has been in place since 2002, with the revised plan in place since 2009. The plan is due to be replaced in 2012.
2. Does the plan include key assessments?	Yes	Key assessments were undertaken for the plan and plan revision. Consultation with stakeholders informed key assessments.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify any areas of overuse. It manages the extraction of groundwater within the Territory's WAPF whereby no more than 80% of total aquifer storage will be extracted within 100 years. Monitoring suggests that the current allocation regime in the Ti Tree farms area can only be sustained for 20–30 years. This was not addressed in the 2009 plan revision.
4. Does the plan include clearly identified and measurable outcomes?	Yes	The original plan did not specify outcomes. The revised plan identifies measurable outcomes and includes a risk-based approach to the planning of monitoring. The plan identifies trees along watercourses and Stirling Swamp as GDEs to be protected.
5. Does the plan facilitate trade?	To some extent	The plan allows trading although licences are not fully NWI compliant and barriers to trade are not explained by the plan. There is a low level of demand for trading in the area.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The only significant interception activity discussed by the plan is possible future mining activity. Water to support mining activity is provided through an authorisation outside the Water Act, however an MOU between the relevant agencies states that new authorisations in an area covered by a WAP will not impinge upon other allocations.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan manages both surface water and groundwater. Estimates of recharge have been determined through modelling calibrated against water level monitoring data. Aquifer recharge is protected through limiting surface water extractions to 5% of mean annual flows.
8. Does the plan contain accountable environmental water management arrangements?	Yes	Environmental watering arrangements have adopted a precautionary approach and are based on limiting the volume of groundwater extractions. Strict extraction limits have been included for the northern zone to protect the ephemeral Stirling Swamp.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	To some extent	The plan contains an extensive monitoring and reporting schedule, however monitoring reports are now prepared only after five years of plan operation to inform the plan review or replacement. The 2005–06 report does not address all outcomes included in the 2009 revision of the plan. Compliance and enforcement provisions are provided in the Water Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	The plan considers that the impact of climate change or variability in the area is expected to be minimal over the life of the plan. As such, there are no mechanisms to manage climate variability in the plan.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement occurred through the water advisory committee, community meetings, written submissions and a stakeholder survey. Indigenous community members and representatives were involved in this process. The revised WAP was endorsed by the water advisory committee. It is not clear to what extent feedback was provided on final decisions taken.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	Identified outcomes were only included at the 2009 revision to the plan. No reporting has occurred since that time to indicate whether the stated objectives are being achieved. Assessment is expected to provide input to the replacement plan due in 2012.

# WESTERN DAVENPORT WATER CONTROL DISTRICT



## DRAFT WATER ALLOCATION PLAN



### Context

The Draft Western Davenport Water Allocation Plan covers an area of approximately 25 000 square kilometres in the arid zone of central Australia. While predominantly a groundwater plan, the water allocation plan also includes surface water catchments.

Rainfall is infrequent and surface water generally ephemeral in nature and as a result there are no significant extractions of surface water. Groundwater recharge rates are not known, however in general the aquifer is topped up during major rainfall events that usually occur every few years, with more significant recharges occurring every few decades.

The area hosts significant water resources which are primarily used for public water supply and horticultural development, as well as for traditional uses by the community and pastoral purposes. The plan is important for managing the use of the limited water resources, as well as protecting natural assets which maintain Indigenous cultural and environmental values over the long term.

## Findings

1. Is there a plan in place?	To some extent	A draft plan was released for public consultation in June 2010. The plan has not yet been finalised.
2. Does the plan include key assessments?	To some extent	A number of assessments were undertaken to inform the plan, however these acknowledged an absence of scientific information. The plan adopts a precautionary approach in the absence of this information.
3. Does the plan address overuse and is there a pathway to sustainable extraction?	To some extent	The plan does not identify any areas of overuse. It limits extractions to 80% of the estimated recharge in the absence of more precise hydrological information. This is planned to be revisited at the five-year review stage.
4. Does the plan include clearly identified and measurable outcomes?	To some extent	The plan includes clearly identified and measurable outcomes although monitoring activities could be more explicitly linked to these outcomes. It is not clear whether a risk assessment informed monitoring arrangements.
5. Does the plan facilitate trade?	To some extent	The plan allows trading although licences are not fully NWI compliant and barriers to trade are not explained by the plan. There is a low level of demand for trading in the area.
6. Is interception appropriately considered and integrated into the plan?	To some extent	The plan discusses interception activity with estimates made for stock and domestic use. The plan also mentions exploratory mining activity, however water for mining is provided through authorisations outside of the Water Act.
7. Does the plan include/address surface water and groundwater connectivity as appropriate?	Yes	The plan manages both surface water and groundwater. Estimates of recharge are used in the absence of more precise hydrological information. Aquifer recharge is protected through limiting surface water extractions to 5% of mean annual flows.
8. Does the plan contain accountable environmental water management arrangements?	To some extent	The plan protects environmental assets through limiting use of surface water. An assumption has been made that these assets are not groundwater dependent, although the plan acknowledges a lack of knowledge in this area.
9. Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?	Unable to assess	The draft plan includes a list of desirable actions including monitoring, and states these will be prioritised on the basis of available resources. There is no commitment to publicly report the results of monitoring before the five-year review. Compliance and enforcement provisions are provided in the Water Act.
10. Does the plan deal appropriately with climate change and extremes in inflows or recharge?	Yes	Climate change and climate variability have been noted in the plan. No specific allowance has been made given the large groundwater reserves and the intention to revisit these issues at the five-year review stage.
11. Is stakeholder engagement in the planning process adequate?	Yes	Stakeholder engagement is occurring through the water advisory committee, community meetings and written submissions. Indigenous community members and representatives are involved in this process.
12. Have identified outcomes been achieved during the reporting period?	Unable to assess	As this is a draft plan, it is too early to comment on reporting or the achievement of actions, outputs or outcomes.



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## 11. Appendix



# Appendix 1—National Water Planning Report Card framework



The National Water Planning Report Card assessment criteria and standard answers, developed in consultation with the jurisdictions, are presented below.

The tables indicate the sub-criteria applied to all water plans (baseline) and the sub-criteria applied to only the water plans selected for detailed analysis (detailed).

## Baseline vs Detailed assessment

All plans underwent a ‘baseline’ assessment against all criteria and a limited set of sub-criteria. The National Water Commission developed additional sub-criteria applied across a selection of water plans to provide a more in-depth analysis of water plans that are representative of each jurisdiction. The water plans for detailed analysis were selected based on multiple factors, including date of release, type of water resource covered, key water planning issues addressed and level of development within the water plan area. This detailed approach provided greater insight into the current direction of water planning in each jurisdiction, and provided flexibility to address areas with different issues in appropriate detail. This more detailed assessment was not able to be applied to all water plans due to the enormity of the task and limited time and resource constraints.

The individual Report Cards in this report identify whether a baseline or detailed assessment was undertaken for the water plan.

## National Water Planning Report Card framework (B – Baseline sub-criteria, D – Detailed sub-criteria)

1. Status of plan		B	D
<i>Is there a plan in place?</i>			
1a	Is there a plan in place?		
1b	What is the status of water planning in this area?		
1c	Were criteria used to determine if or when a plan would be created?		
2. Key assessments.		B	D
<i>Does the plan include key assessments?</i>			
2a	Is there a hydrological assessment that describes and quantifies all water resources within the plan area?		
2b	Is there an assessment of the community values and attitudes to water in the plan area?		
2c	Is there an assessment of the economic value of water in the plan area?		
2d	Is there an assessment that identifies and quantifies the water needs of environmental assets?		
2e	Is there an assessment of the risks to the water resource?		
2f	Were key assessments informed by a consultation process?		
3. Overuse status and whether there is a pathway to return to a sustainable water extraction regime.		B	D
<i>Does the plan address overuse and is there a pathway to sustainable extraction?</i>			
3a	Is the sustainable level of extraction specified by the plan?		
3b	Does the plan address any indicators for approaching overuse?		
3c	If there is overuse, does the plan recognise overuse and provide a clearly defined pathway to correct it within a specific timeframe?		
3d	If there is overuse, have actions to address overuse been implemented to date?		











#### 4. Inclusion of clearly identified and measurable outcomes.

B

D

*Does the plan include clearly identified and measurable outcomes?*







4a	Does the plan identify measurable outcomes and outputs that can be assessed within the plan's timeframe?		
4b	Are the provisions in the plan linked to the plan outcomes?		
4c	Are the monitoring arrangements within the plan linked to the plan outcomes?		
4d	Do monitoring arrangements address the identified risks?		

#### 5. Facilitation of trade (absence of barriers, meeting service standards for trade, etc.).

B

D

*Does the plan facilitate trade?*








5a	Does the plan enable trade in line with the NWI?		
5b	Are there any barriers to trade?		
5c	If barriers exist, are they explained?		

#### 6. Integration of mining, forestry and other water intercepting activities within the water planning and entitlements system where appropriate.

B

D

*Is interception appropriately considered and integrated into the plan?*







6a	Do assessments include major interception activities?		
6b	Is the potential for interception recognised in the plan, including the identification of any risks to the water resources from changes to intercepting activities?		
6c	Where interception is an identified risk to water resources, does the plan include rules to ensure that interception activities (including mining and coal seam gas) within the plan area do not compromise the plan outcomes?		
6d	Does the plan require any metering or monitoring of intercepting activities?		
6e	Does the plan include a threshold level for intercepting activities, beyond which water access entitlements are required?		

**7. Surface water/groundwater connectivity.**

**B**

**D**

*Does the plan include/address surface water and groundwater connectivity as appropriate?*













<b>7a</b>	Is GW/SW connectivity recognised in the plan?		
<b>7b</b>	Does the plan include conjunctive management arrangements for connected GW and SW resources?		
<b>7c</b>	If the plan deals with a single resource, is there reference to a plan or management arrangements for other water resources within the plan area?		

**8. Accountable environmental water management arrangements, together with a comprehensive environmental watering plan (or other appropriate environmental water management arrangement).**













**B**

**D**








*Does the plan contain accountable environmental water management arrangements?*

<b>8a</b>	Does the plan include environmental water management arrangements or a comprehensive environmental watering plan?		
<b>8b</b>	Are the environmental water management arrangements or environmental watering plan explicitly linked to the plan outcomes?		
<b>8c</b>	Does the plan describe the environmental objectives and outcomes proposed during the life of the plan?		
<b>8d</b>	Does the plan clearly assign responsibilities (positions or agencies) for all environmental watering provisions?		
<b>8e</b>	Was the selection of environmental strategies for the plan based on science?		
<b>8f</b>	Does the plan include monitoring arrangements to assess if the environmental objectives are being achieved?		
<b>8g</b>	Does the plan include triggers to amend or change the environmental water arrangements as a result of the outcomes of monitoring or research or new information?		
<b>8h</b>	Does the plan reference other relevant environmental management plans?		










**9. The adequacy of monitoring, compliance and enforcement provisions.***Is there adequate monitoring occurring, and are there compliance and enforcement mechanisms in place?***B****D**

<b>9a</b>	Is there a monitoring framework for the plan?		
<b>9b</b>	Are plan outcomes being monitored?		
<b>9c</b>	Is the monitoring reporting schedule being followed?		
<b>9d</b>	Is action being taken to collect additional information required to implement the plan?		
<b>9e</b>	Is there a review process that allows for changes to the plan based on information arising from monitoring?		
<b>9f</b>	Is monitoring addressing the identified risks?		
<b>9g</b>	Are there arrangements for compliance and enforcement?		

**10. Planning for climate change and extremes in inflows or recharge that may occur during the planning cycle.***Does the plan deal appropriately with climate change and extremes in inflows or recharge?***B****D**

<b>10a</b>	Have climate change or climate variability and extreme scenarios been considered in the development of the plan?		
<b>10b</b>	Is there an indication of the risks to the condition, or continued availability, of the water resources that arise from the effects of climate change or climate variability?		
<b>10c</b>	Are there long-term strategies in the plan for dealing with the effects of climate change or climate variability?		
<b>10d</b>	Does the plan include triggers, management responses and responsibilities in the plan for responding to unexpected changes in water availability?		
<b>10e</b>	If the plan cannot be amended during its life to respond to unexpected changes in water availability, are there other transparent mechanisms for dealing with this?		

**11. Assessment of the adequacy of stakeholder engagement in planning processes.***Is stakeholder engagement in the planning process adequate?***B****D**

<b>11a</b>	Was there a strategy for stakeholder engagement that covered the entire planning process?		
<b>11b</b>	Were all stakeholders relevant to this plan area identified?		
<b>11c</b>	Was stakeholder input considered at all key points in the planning process?		
<b>11d</b>	Was the stakeholder engagement tailored to maximise community input?		
<b>11e</b>	Was stakeholder input considered in the development of the plan?		
<b>11f</b>	Are decisions made available to the public?		

12. The extent to which identified outcomes have been achieved during the reporting period.		B	D
<i>Have identified outcomes been achieved during the reporting period?</i>			
12a	Does the plan include clearly identified and measurable outcomes?		
12b	What is the reporting period for the plan?		
12c	Does the plan clearly assign responsibilities (individuals or agencies) for all implementation activities under the plan?		
12d	Have plan outcomes been achieved to date (noting the reporting period for the plan)?		
12e	Have any actions or outputs been achieved that demonstrate progress against plan outcomes?		
12f	Do monitoring results support any stated progress in achieving actions or outputs that demonstrate progress against plan outcomes?		
12g	Have identified risks been mitigated?		
12h	Have monitoring results shown a need for change in the plan?		
12i	If the need for change was identified, has the plan been adapted or changed?		

A set of standard answers that apply to the National Water Planning Report Card framework were developed (see Table 9 below).

**Table 9: Standard answers to the National Water Planning Report Card framework**

Standard Answer	Comment
1. Yes: the issue is covered adequately	The issue is addressed for this water plan area.
2. To some extent: the issue is only partially covered	The issue is not adequately addressed in terms of coverage or quality for this water plan area.
3. No: the issue is not included in the plan	Major deficiencies in coverage or detail were identified for this water plan area.
4. Unable to assess: insufficient supporting information is available	It is not possible with the information available to make a judgement against this criterion.
5. Not applicable*	Does not apply to this water plan.

*\* Not all criteria within the framework are relevant to all water plans, so not all criteria were assessed. For example, very recently released water plans would not be expected to have achieved all the stated outcomes at the time of the assessment.*





