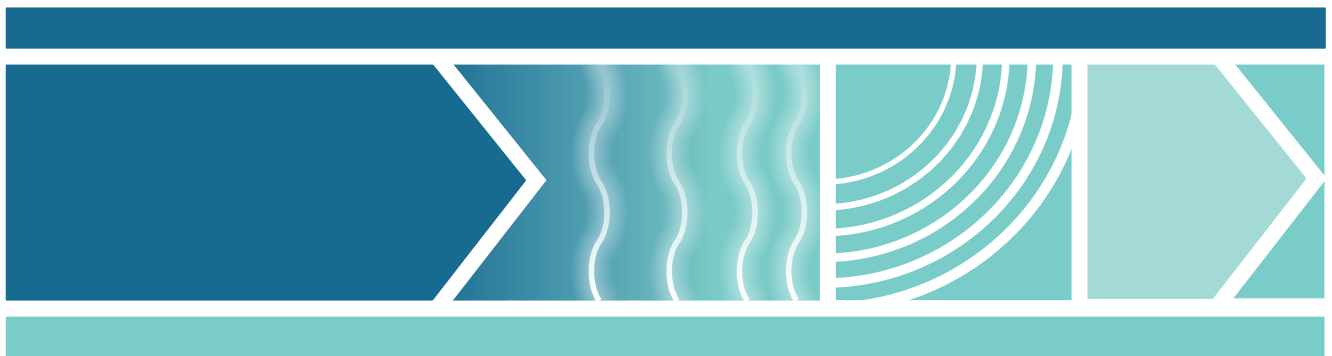


# Water sharing in the major inland alluvial aquifers

Progress report 2006 to 2008



**Publisher**

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May 2009

ISBN 978 0 7347 5658 9

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## Introduction

Water Sharing Plans (WSPs) for the Lower Gwydir, Lower Macquarie, and Lower Murrumbidgee Groundwater Sources commenced on 1 October 2006. Plans for the Upper and Lower Namoi, and the Lower Murray Groundwater Sources commenced on 1 November 2006. The plan for the Lower Lachlan Groundwater Source commenced on 1 February 2008. The plans were developed as part of the NSW Government's commitment to achieving the sustainable management of our water resources. To achieve this outcome, they quantify the available water and contain rules for how water is shared between the environment and licensees and between the different categories of licences.

Since the plans commenced, there has been significant progress in implementing their provisions. This report provides a summary of some of the key implementation activities.

## Water for the environment

All plans provide for a portion of the physical water contained in the storage component of each aquifer being reserved for the environment.

The plans, except the Lower Murray plan, provide for the needs of groundwater dependant ecosystems to be reviewed within five years of commencement and the portion of the recharge reserved for the environment to be adjusted to ensure these need are met. The plan for the Lower Murray Groundwater Source does not make provision for a portion of the recharge to be provided for the environment. This is because:

1. the plan does not include the shallow groundwater source on which most groundwater ecosystems are dependant
2. studies have been undertaken which have not identified any groundwater ecosystems dependant on the deep groundwater source.

The proportion of recharge water that can be extracted without compromising the integrity of the water source and the ecosystems that depend on it is known as the extraction limit or sustainable yield. At the start of the plans, extraction levels were above the sustainable yield. However, over the ten year life of the plans, entitlements will be reduced so that extractions will be within the sustainable yield. Details are provided below.

## Water for extraction under access licences

The plans provide for domestic and stock access licences, local water utility access licences, aquifer access licences and supplementary water access licences. In all over-allocated water sources entitlements have been reduced to the sustainable yield of the aquifer plus the total entitlement of Supplementary Water Access Licences when the plans commenced.

In each plan, a special category of licence called a Supplementary Water Access Licence (SWAL) has been created. To assist licensees adjust to reduced entitlements, SWALs have been issued to licensees who have in the past used more water than their new entitlement. The SWAL entitlements are generally the difference between the licence holders' Aquifer Access Licence entitlement and their history of extraction volume. These licences will be cancelled in the last year of the plan.

On commencement of the plans, the Department of Water and Energy converted some 2,850 existing licences issued under the *Water Act 1912* to 1,667 new licences and approvals under the *Water Management Act 2000*. An additional 734 SWALs were also created as part of the conversion process.

## Reducing extraction to sustainable levels

Management of groundwater systems to the sustainable yield is one of the main objectives of the plans. Groundwater allocations in each of the six major inland alluvial aquifers will be progressively reduced to the sustainable yield over the life of the plans.

The volume of water allocated to SWALs will be progressively reduced over the term of the plan through Available Water Determinations (AWD). In the last year of each plan no water will be allocated to SWALs and entitlements will then be managed to the sustainable yield.

Total entitlements were reduced from 1,723 gigalitres (GL) per year to 1,003 GL per year on commencement of the plans and will be further reduced to 804 GL per year by the end of the plans. This is a total reduction of 54 per cent.

## Managing to extraction limits

The plans set the long-term average extraction limit (LTAEL) at the sustainable yield plus the requirements for supplementary water access licences.

Monitoring compliance with the LTAEL is undertaken on a three year rolling average. That is, metered extraction for the previous three years is averaged and compared to the LTAEL. If the average extraction exceeds the LTAEL by five per cent or greater, then subsequent allocations of water will be reduced to return extractions to the LTAEL. The first assessment of extraction against the LTAEL will be undertaken in 2009–10 once the plans have been in place for three years. To allow this to happen, water accounts have been established for all licence holders. Water use information from metering is entered into these accounts.

## Reviewing recharge and environmental water

In keeping with the principle of adaptive management, all these plans apart from the Water Sharing Plan for the Lower Murray Groundwater Source allow the recharge and the proportion of the recharge reserved as planned environmental water to be varied during the life of the plan. In most cases any variation is to be based on further assessments of recharge, and/or groundwater water dependent ecosystems. Table 1 provides an update on the progress of studies on recharge and environmental water in the priority groundwater plan areas.

**Table 1 Studies on recharge and environmental water in inland alluvial groundwater sources**

Groundwater Source	Update on progress
<b>Lower Lachlan</b>	A regional groundwater flow model has been developed for the aquifer. Changes have been made to the model to include the areas outside the groundwater management unit. A review undertaken by the Natural Resources Commission recommended this work.
<b>Lower Macquarie</b>	A groundwater model has been developed and draft report completed. Some preliminary work on Groundwater Dependent Ecosystems has commenced. Additionally, work has commenced on scenarios to assess the reliability of the current estimate of contribution of recharge sources and impact of pumping. Identification and the associated level of water usage using remote sensing has been carried out and reporting will commence this water year.
<b>Upper and Lower Namoi</b>	In the Upper Namoi the groundwater flow model is being extended to assist in recharge volumetric contributions for the various sources. Work has commenced in the Maules and Cox's Creek alluvial aquifers which will be used in assessing recharge values.

## Achieving Sustainable Groundwater Extractions Program

To assist licence holders to adjust to reduced entitlements, the NSW and Australian Government's have invested in the Achieving Sustainable Groundwater Entitlements Program (ASGE).

The program has four main components:

- the reduction of water entitlements based on historical extraction
- a financial assistance package for licence holders of \$125 million
- a Community Development Fund of \$9 million to help strengthen communities
- \$1 million for the implementation of the ASGE program including the costs for completing valuations and consultation.

To date, the Government has paid some \$111.5 million under the program. Payments under the program are continuing.

## Local Impact Management

The plans set rules to ensure that each groundwater source is also managed sustainably at a local scale. They do this by allowing for the establishment of Local Impact Management Areas (LIMA). Each plan varies in terms of the triggers to identify when a LIMA should be established. Once established, a LIMA can have specific rules designed to:

- minimize extraction interference between neighbouring bores
- protect water levels, by restricting pumping when water levels have reduced
- protect water quality by restricting pumping when water quality has declined
- protect priority Groundwater Dependent Ecosystems (GDE) by pumping or other restrictions.

Other, more specific local impact rules, can be applied, and vary from plan to plan.

The plans also specify buffer conditions or distance restrictions for the construction of new and in some cases, replacement bores. These protect existing users, local water quality and quantity and priority GDEs.

## Adaptive environmental water

The plans allow for licence holders to have an Adaptive Environmental Water (AEW) condition attached to their licence. Additionally, an AEW condition can also be attached to a licence created through water savings or by buy back of entitlement. Once an AEW condition has been attached to a licence it must be managed for the benefit of the environment in accordance with the condition and any Adaptive Environmental Water Use Plan nominated in the condition. To date no AEW conditions have been attached to licences in these groundwater sources.

## Clear water rights and trading

The plan establishes rules for how water is shared between extractive users. Information on access licences, including conditions, entitlements, available water announcements and trading is available on public registers established by the Department in 2004 (web site reference at [www.dwe.nsw.gov.au](http://www.dwe.nsw.gov.au)).

## Basic rights

The plans provide water to satisfy basic landholder rights. An approval is required for a bore to extract basic landholder rights.

Reasonable Use Guidelines for the extraction of basic rights water are currently being developed. The guidelines will prescribe limits on the taking and use of water for domestic and stock rights.

## Available Water Determinations

An Available Water Determination (AWD) is the volume of water that is made available to licences within each category of access licence in a water source. It is the main tool that is used to ensure that average water use does not exceed the LTAEL and to reduce the amount of water available to Supplementary Water Access Licence holders over the term of the plans. AWD announcements are made at the start of each water year. Apart from SWALs, all categories of licence have received an AWD of 100 per cent or 1 megalitre (ML) per share unit each year since the plans commenced. AWDs for SWALs have been, and continue to be, made according to the rules in the plan.

## Water markets

Temporary trading of groundwater allocations was permitted in most water sources prior to the commencement of the plans. Permanent trading of entitlements independently of the land was generally not permitted.

On commencement of the plans the water licences were separated from land and a range of dealing (trading) options introduced. These include the assignment of shares (permanent trading) assignment of allocation (temporary trading), and the leasing of licences.

The implementation of the plans also removed other barriers to the efficient operation of water markets, facilitating more efficient and better informed trades. Key mechanisms include clear rules for trading (as outlined in each plan, the Access Licence Dealing Principles Order and the Water Management Act), and the establishment by the Department of public registers in showing the volume and price paid for access licence share assignments and allocation assignments. Figures 1 and 2 shows both water allocation and share component trades within the six major inland alluvial water sources from July 2006 to June 2008.

Figure 1 Share component trading in inland groundwater sources July 2006 to June 2008.

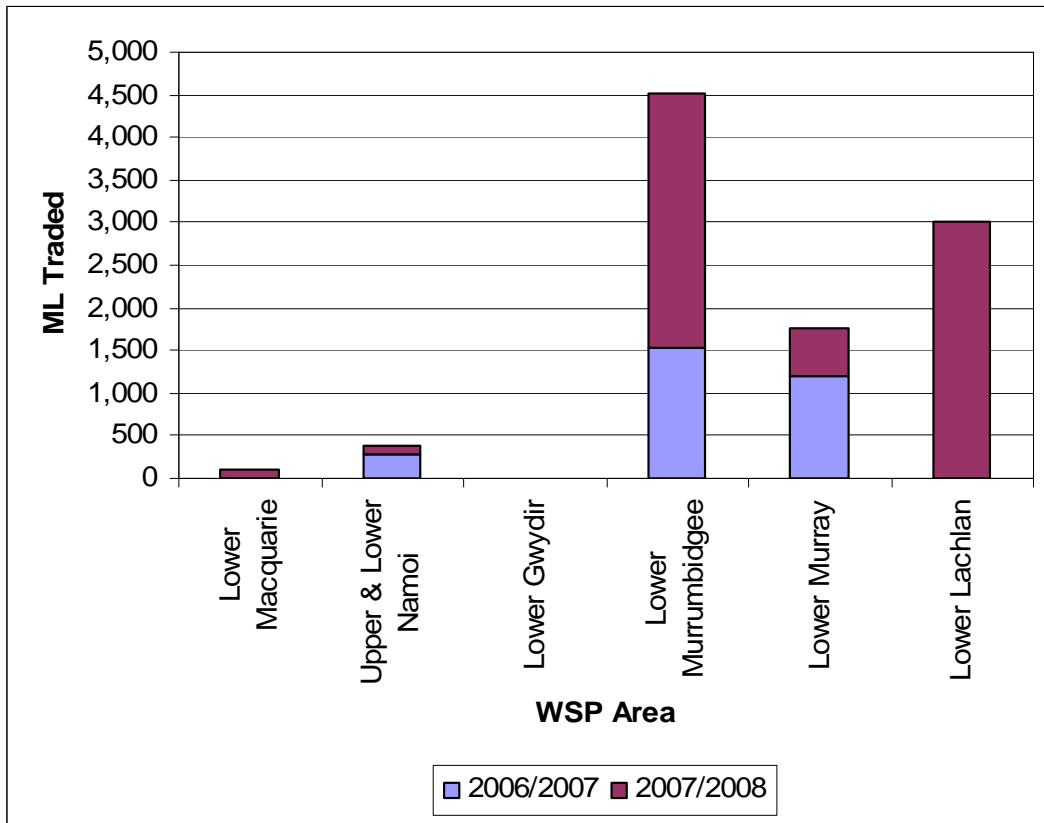
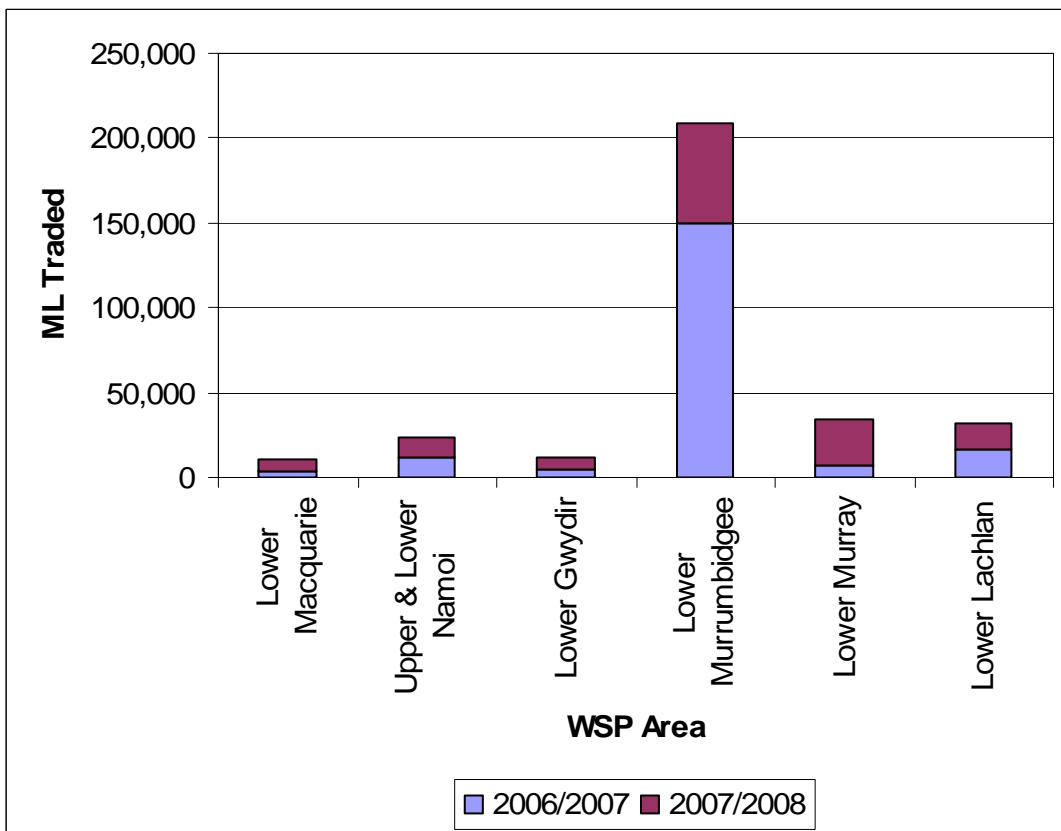


Figure 2 Water allocation trading in inland groundwater sources July 2006 to June 2008.



## Monitoring

Each plan includes performance indicators for assessing the effectiveness of the plan in achieving its objectives. The effectiveness of plans will be assessed by the Natural Resource Commission in the second half of the plan's 10 year term. The Department is developing methods for long term monitoring of the water sources to support this assessment.

Monitoring bores have been established in all six of the inland alluvial groundwater sources. The bores will be used to assess trends in groundwater levels and quality over the term of the plan and beyond. Such information forms an important component of plan review. Additionally, the studies outlined in Table 1 will assist in the review of the plans. Table 2 shows the number of monitoring bores in each plan area.

**Table 2 Number of monitoring bores in each WSP area**

Water Source	Number of monitoring bores	
	Water Level	Water Quality
Lower Gwydir	70	0
Upper and Lower Namoi	624	20
Lower Macquarie	143	20 (salinity)
Lower Lachlan	209	0
Lower Murrumbidgee	323	0
Lower Murray	67	20 (salinity)

## Plan amendments

The plans allow for a number of changes to be made over their term. These include changes to recharge estimates, environmental water provisions, and extraction limits based on further studies. Additional high priority groundwater dependent ecosystems can also be added to the plans over their term.