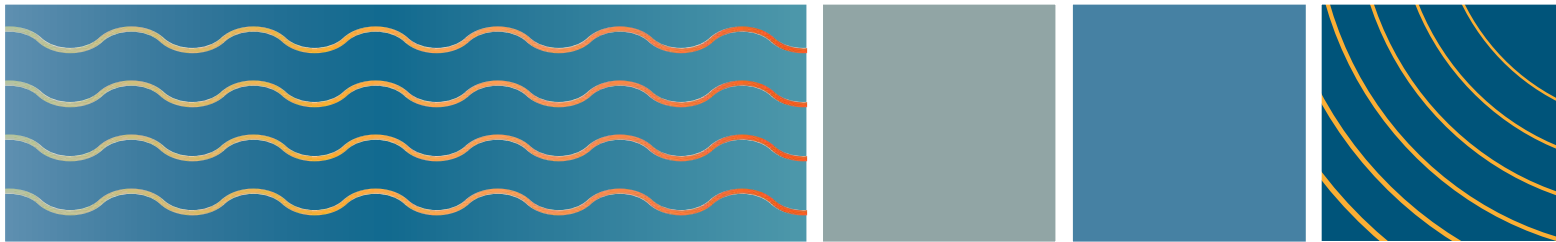


WATER SHARING PLAN

NSW Border Rivers regulated river water source

Background document

June 2009



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Introduction

Water sharing plans are being progressively developed for rivers and groundwater systems across the State following the introduction of the *Water Management Act 2000 (the Act)*. A number of plans have already been completed. These plans protect the health of our rivers, while also providing water users with the greater certainty over future access to water and increased trading opportunities.

This background document to the Border Rivers Regulated Water Sharing Plan (the Plan) outlines:

- the purpose of the Plan
- the process of Plan development
- the intended outcomes of the Plan
- the water sharing provisions
- background information on the catchment.

This document is part of a range of material available specifically on the Border Rivers Regulated WSP including:

- *The Water Sharing Plan for the Border River Regulated River Water Source 2009* (the legal plan written in its required statutory format)
- *A guide to the Water Sharing Plan* (a plain English version explaining the key Plan sections and rules).

The intent of the Plan, in accordance with the guiding principles of the Act, is to establish surface water sharing provisions within the NSW Border Rivers Regulated River Water Source that protect:

1. the water source and its dependent ecosystems
2. basic landholder rights
3. the entitlements of existing licence holders

while maximising the social and economic benefits of water for the community.

The Plan replaces any other water sharing plans which applied to the water source prior to this Plan taking effect.

While the Plan will have priority over the management of the NSW section of the Border Rivers Regulated River Water Source it should be noted that:

- An Inter-governmental Agreement (IGA) (Schedule A2) between New South Wales and Queensland, established by the Border Catchments Ministerial Forum, addresses the following:
 - Bulk water sharing between the States.
 - Common environmental flow rules.
 - Water allocation and access.
 - Interstate trading.
 - Coordinated monitoring and reporting.
- Queensland's Border Rivers Resource Operations Plan 2008 (ROP) has priority over the Queensland regulated river sections.

The IGA, the Plan and the ROP have been developed in parallel to enable the difference in State water policy and operational management to be minimised and to maximise the benefits to the environment and water users.

This Plan is in accord with the IGA between New South Wales and Queensland.

Purpose of the water sharing plan

Why are water sharing plans prepared?

To provide certainty for the environment and water users

Continued expansion of water use across NSW has placed the State at the limit of its available water. In addition regulation of our rivers has modified the natural flow regime. This has seen increasing competition between water users, (towns, farmers, industries and irrigators) for access to water. In addition, this has placed pressure on the health and biological diversity of our rivers and aquifers. Water sharing plans (WSPs) are therefore needed to provide a legal basis for sharing water between the environment and consumptive purposes.

Under the *Water Management Act 2000*, the sharing of water must firstly protect the health of the water source and its dependent ecosystems, followed by basic landholder rights. Amongst licensed water users, priority is then given to water utilities and licensed stock and domestic use, ahead of commercial purposes such as irrigation and industry.

The Border Rivers catchment has some special characteristics that make it highly suitable for a range of irrigated production. These include soil types, climate, topography and river flow patterns. This production occurs on only a small percentage of the catchment area and has limited impact on the landscape, but there are some impacts on low to medium river flows.

To facilitate water trading

WSPs set the rules by which irrigation licences can be traded. It is expected that over time, there will be an enhanced water market, where licences will be traded both permanently and temporarily.

Intended outcomes of the WSP

The intended economic, social, cultural and environmental outcomes of the Plan are:

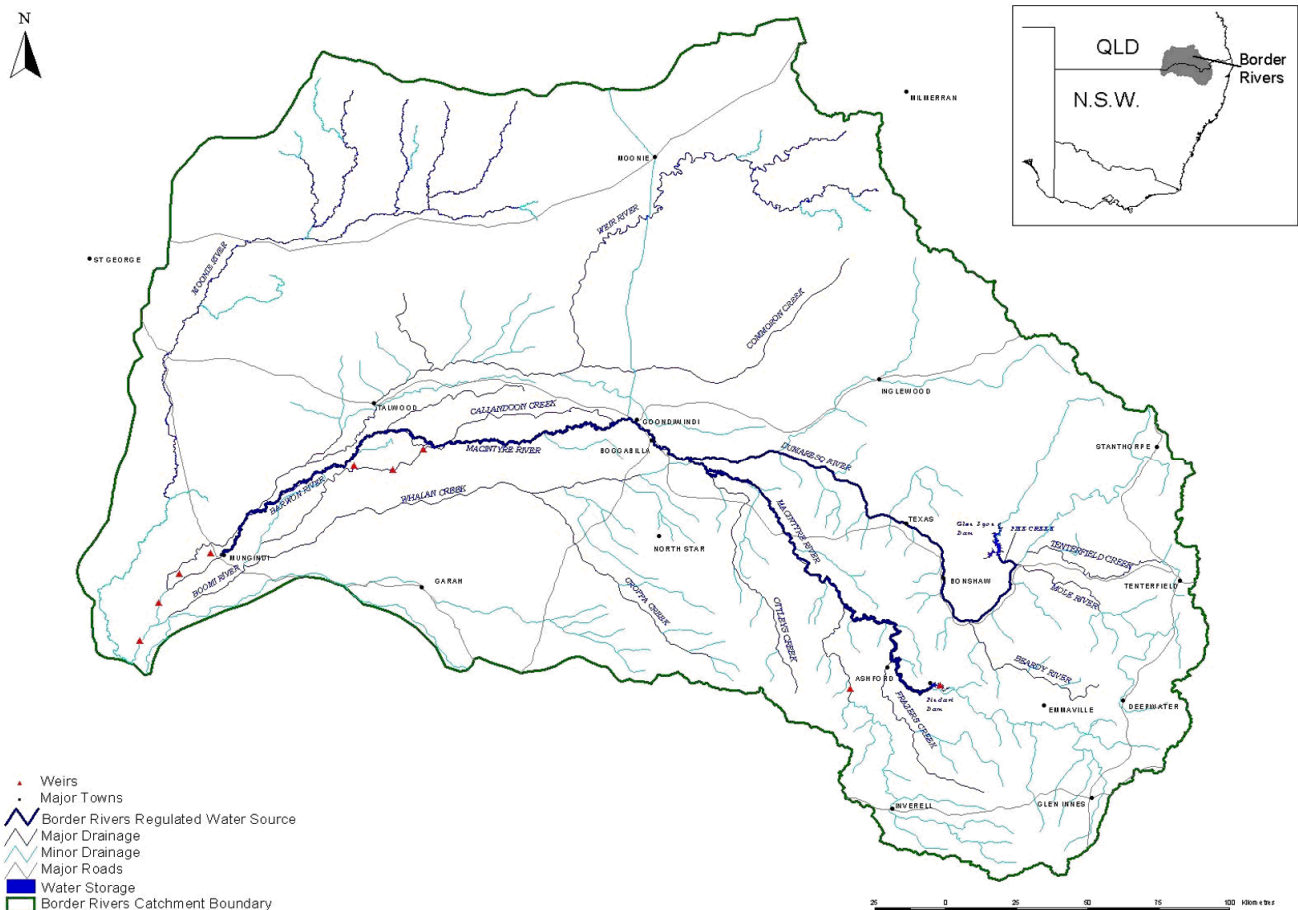
- viable, productive communities benefiting from efficient water use
- fair, equitable and reliable access to water for all identified uses
- maintenance and enhancement of the flow related ecology of the water source
- contribution to the achievement of Australian and New Zealand Environment and Conservation Council (ANZECC) water quality guidelines and Water Quality Objectives (WQOs)
- protection and enhancement of the environmental, cultural and heritage values of water
- rules for delivering beneficial environmental flows for the NSW Border Rivers Regulated River Water Source
- definition and protection of basic water rights
- provision of market-based opportunities for higher value uses of water by existing and new users
- establishment of a framework for increased flexibility in agricultural practices.

Description of the Plan area

The Border Rivers Catchment

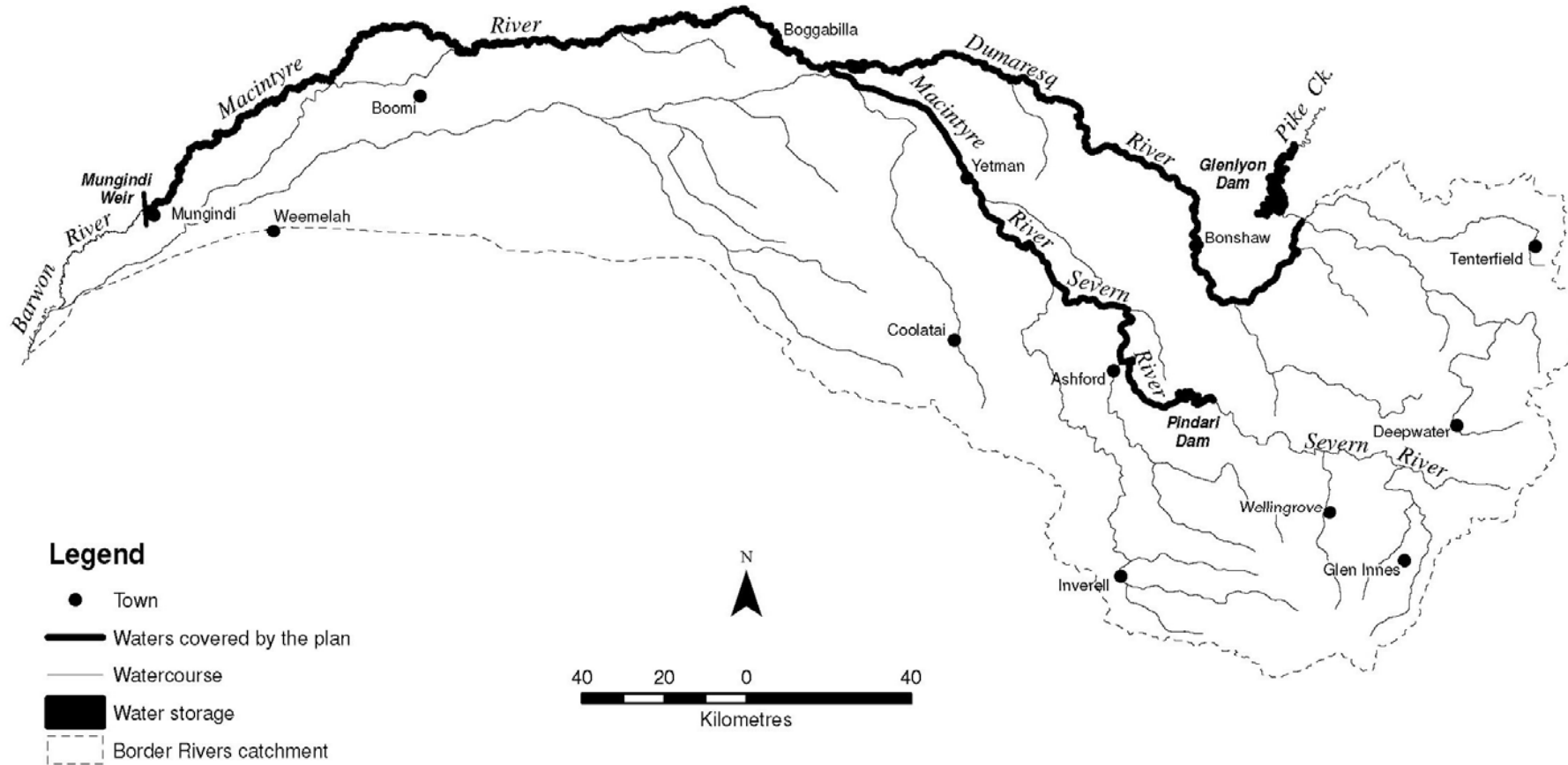
The Border Rivers Catchment is located west of the Great Dividing Range with approximately equal sections in Northern New South Wales and Southern Queensland. The total catchment area is approximately 49,500 kilometres² (km) (NSW Department of Water Resources, 1995). A headwaters catchment of the Murray-Darling Basin, its eastern boundary is the Great Dividing Range, with steep topography and high relief. The terrain grades into undulating hills around Ashford and Texas before merging into the extensive floodplains west of Boggabilla (Figure 1).

Figure 1: The Border Rivers Catchment



Principal streams are the Macintyre River and Severn River (NSW) in the south-east, the Dumaresq River and Severn River (QLD) in the east, and Macintyre Brook and the Weir River in the north and north-west respectively. The state border follows the Dumaresq River and the Macintyre River below its junction with the Dumaresq River downstream to Mungindi. This is referred to as the common trunk stream.

Figure 2: The NSW Border Rivers regulated river water source



The Macintyre River drains in a north-westerly direction through large areas of relatively flat terrain except around Ashford and to the east, where hilly to steep slopes predominate. The Severn River (NSW), the Macintyre's principal tributary, originates in the elevated region between Emmaville and Ben Lomond. The Macintyre River joins the Dumaresq River 16 km upstream of Boggabilla.

The Dumaresq River begins at the junction of the Severn River (QLD), the Mole River and Pike Creek about 50km west of Tenterfield. Tenterfield Creek flows into the Severn River just above this junction. The principal tributaries of the Dumaresq River are the Beardy River and Ottleys Creek. About halfway between Texas and Boggabilla it is joined by its last major tributary, the Macintyre Brook, located entirely in Queensland. The Dumaresq River becomes the Macintyre River below its junction with that river.

In the lower catchment there are a number of effluent streams and lagoon systems that flow away from the trunk stream only when certain river levels are reached. These include Whalan Creek (NSW), Callandoon and Dingo Creeks (QLD), the Boomi River (NSW) and the Little Weir River (QLD). The only significant tributary downstream of Boggabilla is the Weir River. For its entire length it flows through Queensland and joins the Macintyre River 23 km upstream of Mungindi. At Newinga the Weir River and Macintyre River almost join. When there is a sizable flow event in the Macintyre, water can flow from it into the Lower Weir River. If there is an event in the Weir River, the situation is reversed.

The Macintyre River becomes the Barwon River below its junction with the Weir River (NSW Department of Water Resources, 1995). It flows past Mungindi, the end of the Border Rivers system, and becomes the Darling River below Brewarrina and upstream of Bourke.

WSP area of application

The NSW section of the Border Rivers catchment is located south of the NSW/QLD border and has an area of approximately 24,000 km². The NSW section is approximately 400 km from east to west and 100 km from north to south. The catchment is bounded by the Queensland border to the north and west, the Gwydir Catchment to the south and the Great Dividing Range to the east. The major river systems are the regulated Dumaresq, Severn and Macintyre Rivers and the unregulated Tenterfield Creek, Mole River, Severn River, Macintyre River and Frazers Creek.

The water sharing plan applies to all regulated river sections in the NSW Border Rivers Water Management Area. This includes the upper limit of Pindari Dam including all tributaries downstream to the junction of the Severn River with the Macintyre River, the Macintyre River from its junction with the Severn River to the junction of the Barwon River, the Barwon River downstream to Mungindi Weir and the Dumaresq River from the junction of Pike Creek to the junction of the Macintyre River (refer Figure 2).

River flows

A network of gauging stations throughout the NSW section of the Border Rivers Catchment measures and records flows in the main rivers and tributaries. The earliest records are those for Mungindi which date back to 1886.

Before Glenlyon Dam and Pindari Dam were built natural river flows were highest in summer (October through February) and lowest in late winter. The operation of both Glenlyon and Pindari Dams has altered downstream flows, particularly by reducing low flow variability. With irrigation water demand peaking in summer/autumn, the change in the downstream average flow pattern is not as marked as it is in the southern catchments of the Murray-Darling Basin which experience naturally dominant winter flows.

Natural unrestricted flows in the NSW Border Rivers Catchment exhibit a high degree of variability. At Boggabilla the long term average annual flow is 1,200,000 megalitres (ML) per annum, but annual flows have ranged from less than one per cent of average to over 500 per cent of it. Before Glenlyon Dam was built the Macintyre River at Boggabilla ceased to flow, on average, during one year out of four.

Flooding is one extreme of variability with the river level at Boggabilla exceeding 9.1 metres (m) sixty times between 1890 and 2004. This is the height at which major flooding commences. The highest floods recorded have been in April 1890, February 1976, April 1988, January 1996 and July 1998 (NSW Department of Water Resources, 1995 and NSW Department of Infrastructure, Planning and Natural Resources, 2004). Goondiwindi is now the common local reference point for flood level information.

Flow dependent ecological features

One of the intended outcomes of the Plan is the integrated protection, maintenance and enhancement of the flow related ecology of the NSW Border Rivers Regulated River Water Source. While the Plan is unable to target all environmental features, the following ecological features have been identified as important for the continued health of the Border Rivers Catchment.

Table 1: Identified ecological features in the Border Rivers Regulated River Water Source

Ecological feature	Location of feature	Flow requirements
Billabong zone	<p>This zone extends from around Yetman to approximately 20 km downstream of Goondiwindi on the Macintyre River.</p> <p>The significant areas are:</p> <ul style="list-style-type: none"> • Telephone-Malgarai Lagoon • Rainbow Lagoon • Kildonan Lagoon • Maynes Lagoon • Morella Watercourse • Boobera Lagoon • Serpentine Lagoon • Dingo Creek • Callandoo Branch • Punboogal 	<p>These areas rely on natural flow variability and medium (25,000 ML/day) to high (80,000-100,000 ML/day) floods to maintain health and diversity.</p>
Upper reaches wetlands	<p>These wetlands have been identified between Pindari Dam and Yetman.</p> <p>The significant areas are:</p> <ul style="list-style-type: none"> • Severn River • Severn River d/s Duncanmara Creek • Severn River @ crossing d/s of Duncanmara Creek • Severn River u/s of Ashford Power Station • Severn River @ Kwiambal National Park • Macintyre River • Macintyre River d/s of Bedwell Downs • Macintyre River u/s of Holdfast Crossing • Macintyre River d/s of Holdfast Crossing • Macintyre River @ Keetah Road Bridge <p>Dumaresq River</p> <ul style="list-style-type: none"> • Dumaresq River u/s of Keetah Bridge • Dumaresq River d/s of Keetah Bridge • Dumaresq River u/s of Toomelah 	<p>These areas rely on natural flow variability and medium floods to maintain health and diversity.</p>
Water plants	<p>Western Floodplain of the Border Rivers Catchment – of particular importance are:</p> <ul style="list-style-type: none"> • aspike-rush species (<i>Eleocharis blakeana</i>) which has been listed as rare • a giant waterlily (<i>Nymphaea gigantea</i>). <p>The floodplain area of the Border Rivers catchment extends west of Boggabilla to the Barwon River.</p>	<p>These areas rely on natural flow variability and medium floods to maintain health and diversity.</p>
Remnant floodplain vegetation	<p>These are mainly:</p> <ul style="list-style-type: none"> • Coolibah (<i>Eucalyptus microtheca</i>) and Coolibah/Black Box (<i>Eucalyptus largiflorens</i>) woodland communities • Lignum (<i>Muehlenbeckia cunninghamii</i>) communities • Carbeen (<i>Eucalyptus tessellaris</i>) communities. <p>The floodplain area of the Border Rivers catchment extends west of Boggabilla to the Barwon River.</p>	<p>Remnant floodplain vegetation requires natural flow variation and medium to high floods to maintain habitats. Some areas of remnant floodplain vegetation may be dependent on base flows provided by groundwater sources.</p>
Riparian vegetation	<p>These are mainly:</p> <ul style="list-style-type: none"> • River She-oak (<i>Casuarina cunninghamiana</i>) communities • Bottlebrush (<i>Callistemon viminalis</i>) communities • Tea Tree (<i>Leptospermum brachyandrum</i>) communities • River Red Gum (<i>Eucalyptus camaldulensis</i>) 	<p>Riparian vegetation requires natural flow variation and medium to high floods to maintain habitats.</p>

Ecological feature	Location of feature	Flow requirements
	communities.	
Fish	<p>Species known or expected to occur in the Border Rivers Catchment are:</p> <p>Endangered species/populations</p> <ul style="list-style-type: none"> Purple-spotted Gudgeon (<i>Morgurnda adspersa</i>) Olive Perchlett (<i>Ambassis agassizii</i>) <p>Vulnerable species</p> <ul style="list-style-type: none"> Silver Perch (<i>Bidyanus bidyanus</i>) Buchanan's Fairy Shrimp (<i>Branchinella buchananensis</i>) Murray Cod (<i>Maccullachella peelii peelii</i>) 	<p>Pools and low flows critical. Freshes in Spring important. Water level critical to protect egg mass.</p> <p>Pools and low flows critical. Freshes in Spring important.</p> <p>Pools and low flows critical. Over-bank flooding in Spring important. Fluctuations important in Spring and Summer. Pools and low flows critical.</p> <p>Pools and low flows critical. Over-bank flooding and drown-out of barriers.</p>
Macroinvertebrates	Macroinvertebrates are abundant and diverse in the Border Rivers Regulated River water source.	A high number of macroinvertebrates rely on pools and riffles for survival, therefore low flows are critical. Flow variability and duration of flow is also very important.
Aquatic fauna	<p>Downstream of Pindari Dam to Boggabilla.</p> <ul style="list-style-type: none"> Platypus (<i>Ornithorhynchus anatinus</i>) Water Rat (<i>Hydromys chrysogaster</i>) 	Aquatic fauna rely on pools, variability of flows and low flows.
Instream habitats	<p>Natural geomorphic processes forming diverse and quality structural river habitats of local, regional, state and national significance including:</p> <ul style="list-style-type: none"> flood-out areas and rare geomorphic features such as riffle pool sequences, prior stream areas and intact billabong areas drought refuge of natural pools, river and billabongs and stony bed habitats and habitat value of riffles in all of the nominated water sources. <p>Instream habitats are found throughout the Border Rivers Regulated River water source.</p>	<p>Frequency (return time), duration, and flow level of low, very low and zero flows compared to natural.</p> <p>Frequency, duration, velocity and magnitude (peak flow) of in channel freshes and floods.</p> <p>Depth and velocity of flow over riffles and associated flow level/percentile for key habitat areas. Timing (season, month) of flow (depth and velocity) over riffles to support migration and recruitment.</p> <p>Some instream habitats may be dependent on base flows provided by groundwater sources.</p>

Water quality

Data collected for the riverine condition assessment of the Border Rivers Catchment (Department of Land and Water Conservation, 2001) and water quality management options in the Border Rivers Catchment (McGloin, 2001) identify that water quality in the Border Rivers is generally good. In particular:

- electrical conductivity (EC) levels meet the stock water and raw water for drinking guidelines with no sites in the catchment exceeding 1,500 μ S/cm (microsiemens per centimetre); however, some scientists caution that increases in EC are possible in the future. The Barwon, Macintyre and Dumaresq Rivers did not have any salinity problems, and all sites along these rivers, except the Macintyre River at Holdfast, had medians that were in the low salinity level category (0-280 μ S/cm). The Macintyre River at Holdfast had a medium salinity level (280-800 μ S/cm) (McGloin, 2001)
- turbidity levels increase with distance downstream, thought to be related to the changes in land use from grazing to cropping. The Macintyre River at Holdfast had the highest turbidity median (20 Nephelometric Turbidity Units (NTU)) in the sub-catchment. The Severn River had a low turbidity median (3.8 NTU) with no increasing trends apparent (McGloin, 2001)
- total phosphorous concentrations were at the upper recommended limit of 0.01-0.1 milligrams/litre and in some areas did not meet the ANZECC (2000) guidelines for the protection of aquatic ecosystems (Department of Land and Water Conservation, 2001)
- pesticide concentrations were detected in the Severn River at Yetman, the Macintyre River and the Dumaresq River (Department of Land and Water Conservation, 2001). While the detected concentrations are not viewed as significant, even the smallest amount of pesticide in the water source can have a detrimental effect on fish and macroinvertebrates.

Water quality is the result of a complex interaction between various land use and river flow characteristics. It typically varies over time and between river reaches. For water quality problems that are related to altered river flows, a flow regime that mimics as closely as possible important characteristics of the natural flow regime is desirable.

Table 2 summarises how the implementation of River Flow Objectives (RFOs) can positively influence water quality.

Table 2: The influence of River Flow Objectives on water quality

	River Flow Objective	Process of influencing water quality
1	Protect natural water levels in pools of creeks and rivers and wetlands during periods of no flow.	<ul style="list-style-type: none"> Decreases the rate at which water quality detrimentally changes in pools that represent refuge habitat. Prevents further concentration of pollutants.
2	Protect natural low flows.	<ul style="list-style-type: none"> Improves pool connectivity and minimises stagnation and stratification of pools, preventing further concentration of pollutants during low flows. Suppresses conditions favourable to blue-green algal blooms. Minimises the impact of groundwater recharge where groundwater is saline.
3	Protect or restore a proportion of moderate flows (freshes) and high flows.	<ul style="list-style-type: none"> Freshes transport sediment, nutrients and organic carbon downstream, increase dissolved oxygen, and break up stratification of pools. Freshes wet banks and benches of rivers to maintain habitat, stimulating ecological processes that regulate water quality.
4	Maintain or restore natural inundation and distribution of floodwaters supporting natural wetland and floodplain ecosystems.	<ul style="list-style-type: none"> Regular floods add floodplain inputs to stimulate natural processes that regulate water quality. High flows support healthy riparian zones that act as buffers and stabilise banks.
6	Maintain or mimic natural flow variability in all streams.	<ul style="list-style-type: none"> Natural variable flows disadvantage exotic species such as carp, which cause water quality problems. Variable flows minimise stratification of pools and conditions favourable to blue green algae. Natural variable flows help maintain a dynamic ecosystem and diverse biological community, in turn stimulating ecological processes that regulate water quality.
7	Maintain rates of rise and fall of river heights within natural bounds.	<ul style="list-style-type: none"> Natural rates of rise and fall minimise bank slumping which increase turbidity.
9	Minimise the impact of instream structures.	<ul style="list-style-type: none"> Flow management and structure operation can prevent or address weir pool stratification and accumulation of pollutants. Minimising weir pool stratification can reduce or eliminate conditions favourable to blue green algae. Structure operation should attempt to minimise low level releases which may be cold or high in sediment, nutrients and/or toxicants.
11	Ensure river flow management provides for contingencies.	<ul style="list-style-type: none"> In some circumstances, can provide flushing flows.

Socio-economic characteristics of the Border Rivers

The retention of a sustainable water source and associated environment is necessary to support a productive economy and the resultant social benefits. It is therefore vitally important to understand the socio-economic base so that acceptable water management options are implemented.

Geographic location

The Border Rivers Catchment is covered by the local government areas (LGAs) of Inglewood, Stanthorpe, Millmerran, Goondiwindi, Tara, Waroo, Balonne and Waggamba in Queensland and the local government areas of Inverell, Glen Innes Severn, Moree Plains, Tenterfield and Gwydir in New South Wales. Portions of the Millmerran, Tara, Waroo, Balonne, Inverell, Glen Innes Severn, Moree Plains, Tenterfield and Gwydir LGAs lie outside the boundaries of the Border Rivers Catchment.

Population

The population of the Border Rivers Catchment is approximately 59,315 (Australian Bureau of Statistics, 2004), with the breakdown shown in Table 3. Note that the data in Table 3 and Table 4 was current prior to local government amalgamations which took place in 2004 in NSW and in 2008 in QLD.

Table 3: Population of local government areas in the Border Rivers Catchment

	Local government area	Population
Queensland	Inglewood	2,701
	Stanthorpe	10,602
	Millmerran	1,935
	Goondiwindi	4,952
	Tara	2,321
	Waroo	75
	Balonne	1,121
	Waggamba	3,005
	QLD total	26,712
New South Wales	Inverell	13,728
	Glen Innes	5,987
	Severn	1,313
	Moree Plains	6,946
	Tenterfield	2,654
	Yallaroi	1,975
	NSW total	32,603
Total Border Rivers catchment population		59,315

Source: Australian Bureau of Statistics (2004)

Employment

Areas of employment in the Border Rivers Catchment are as diverse as they are numerous. Table 4 shows the breakdown of employment for the agricultural, retail and tourism industries.

Table 4: Number of people employed in the agricultural, retail and tourism industries

	Local government area	Agricultural industry	Retail industry	Tourism industry
Queensland	Inglewood	436	118	46
	Stanthorpe	1,108	519	212
	Millmerran	549	127	98
	Tara	656	106	35
	Waroo	324	28	15
	Balonne	1,055	309	122
	Waggamba (includes Goondiwindi)	845	110	30
	QLD Total	4,973	1,317	558
NSW	Inverell	1,039	985	234
	Glen Innes	210	380	148
	Severn	580	73	43
	Moree Plains	1,962	908	296
	Tenterfield	651	301	142
	Yallaroi	604	90	30
	NSW total	5,046	2,737	893
Total for the Border Rivers Catchment		10,019	4,054	1,451

Source: Australian Bureau of Statistics (2004)

Industry profiles

Agriculture

Irrigated cotton production, which takes place on approximately 40,000 hectares in the NSW portion of the Border Rivers Catchment, is valued at an average of \$150 million per annum. Another 4,000 hectares of irrigated land is used to produce a range of fruit, vegetables, wine grapes, lucerne, cereal crops, fine grains, field crops such as corn and peanuts, green chop for feedlots, and specialty crops such as herbs and medicinal plants.

Dryland farming, principally of winter cereals and summer grain and oilseed crops, along with grazing of cattle and sheep contribute to the agricultural production of the Border Rivers Catchment. There are also several major feedlots across the catchment.

Retail Trade Sector

This is an important sector and the number of retail trade businesses provides a useful indicator of overall economic activity. Moree, Inverell, Goondiwindi, Glen Innes, Tenterfield, Warialda, Texas, Boggabilla and Mungindi are the main retail trade centres that service both the NSW and QLD sections of the Border Rivers Catchment.

Tourism

Tourism, whilst important in its own right, is a relatively small industry in the catchment compared to some other regions in NSW. The number of people employed in this industry is 558 and 893 in the NSW and QLD sections of the Border Rivers Catchment respectively.

River related cultural heritage features

Aboriginal river related cultural heritage features

The land and waters of the NSW Border Rivers Catchment contain places of deep significance to Aboriginal peoples. They are central to their religious and spiritual belief systems, often celebrated in ritual, ceremony, stories, dance and art works.

Maintenance of the biological diversity of the waters of the catchment is a cornerstone principle for the wellbeing, identity and cultural heritage of Aboriginal communities. The rivers are also extremely important for fishing and food gathering.

European river related cultural heritage features

European settlement in the region was motivated by the development of new grazing lands in the early to mid 1800s, with Talwood, Callandoon and Beebo Stations being some of the earliest taken up. The availability of water was central to these enterprises, and locations were selected with this in mind. The significance and value of the river system has been recognised ever since, primarily for the life support and the recreational opportunities it provides (McCosker, 1996).

Landuse activities

Landuse activities in the NSW Border Rivers Catchment include grazing, dryland farming, irrigated production, intensive industries such as feedlots, forestry and recreation.

Landuse during the early years of settlement was almost exclusively pastoral. Forestry and grazing still comprise the major forms of landuse in the NSW Border Rivers Catchment. Grazing of native and improved pastures remains the predominant land use across the Catchment.

Intensive animal industries such as cattle feedlots and piggeries can also be found in the Border Rivers Catchment. There are approximately nine cattle feedlots with licensed pen capacities in excess of 1,000 head.

By the 1880s a thriving tobacco industry was established on alluvial terraces of the Dumaresq River around Texas. The industry endured several 'boom-bust' cycles, but declined substantially to the point where it no longer exists.

Cereal cropping became established with improved mechanisation in the post World War II period with wheat, barley and sorghum being the most common crops planted.

In recent years cotton has become an important crop in the Boggabilla to Mungindi area (McCosker, 1996). Production is largely confined to the floodplain areas of the catchment and is a major economic contributor to the catchment (refer to 'Socio-Economic Characteristics of the Border Rivers').

History of water management

Prior to 1946 there was little if any formal management of water in the catchment. Demand was very low in relation to overall supply, and water was simply used as the need arose.

In 1946 (QLD) and 1947 (NSW) Acts were passed in each State along with the Dumaresq-Barwon Border Rivers Agreement. These were considered to be necessary as each State wanted to construct works for water conservation, water supply and irrigation. The Dumaresq-Barwon Border Rivers Commission (BRC) was constituted to give effect to the Acts and Agreement. Its main roles were specified as:

- gauging of water flows in the carrier rivers (common trunk stream), certain of their tributaries and effluent streams, and intersecting streams west of Mungindi
- gauging of all diversions from the carrier rivers
- construction, operation maintenance and control of gauging stations
- construction of:
 - a dam on the Dumaresq River at a site to be selected by the Commission with a ‘capacity as large as is reasonably practicable’
 - such weirs on the carrier rivers as may be found necessary to meet the requirements of irrigation along those rivers (including diversions of water by gravitation for irrigation), to be not less than six and not more than twelve in number exclusive of the Goondiwindi Weir and the Mungindi Weir
 - regulators on effluent streams, up to four in number, to provide for the control of the flow in the carrier rivers during periods of regulated flow
- operation and control of the works on the basis of provision of equal shares to each State.

With regard to waters of tributaries downstream of the storage, the Agreement stated that each State shall have ‘full right and liberty’ to use the waters of all its tributaries and may use the carrier rivers, subject to losses being taken into account, to convey these waters to their point of use. The waters used are not part of the water to be shared under the terms of the Agreement.

As a result of the Agreement, Glenlyon Dam with a storage capacity of 256,000 ML was constructed on Pike Creek and completed in 1976 after the original preferred site on the Dumaresq River at Mingoola was deemed to have unsatisfactory foundations. It is believed that the original dam would have had a capacity of some 1,300,000 ML. A second dam was to be built on the Mole River when use from Glenlyon Dam reached its full capacity, but this has not happened.

The original 37,000 ML Pindari Dam, completed in 1969, is situated on the Severn River in northern NSW, about 22 km from Ashford. The reliability of supply was very low (45 per cent) and to address this situation, a Memorandum of Understanding (MOU) was entered into in 1990 by the NSW Government and the NSW Border Rivers irrigators to enlarge Pindari Dam to 312,000 ML. Under the terms of the MOU irrigators contributed 50 per cent (\$37.5 million) of the total cost, in consideration of which the Government agreed:

- not to issue any new irrigation licences until the proven reliability factor of water supply to irrigators is a minimum of 70 per cent
- to protect the minimum target reliability factor of 70 per cent through changed river and water management practices.

The enlarged dam was completed in 1995 and first filled in February 1996.

It should be noted that water stored in Glenlyon Dam is shared between NSW and QLD water users, whereas water stored in Pindari Dam is shared amongst NSW water users only.

To supplement the headwaters storages and increase the reliability of licences, both Governments made supplementary water (NSW off allocation, QLD water harvesting) available from tributary inflows and encouraged the private development of on farm storages. This has resulted in some 155,000 ML of on farm storage in NSW and 300,000 ML in QLD. The difference in on farm storage capacity is explained by the fact that NSW has over three times as much headwaters storage as QLD, whose irrigators are therefore much more reliant on access from natural tributary flows.

The practical necessity of sharing tributary inflows between the States was recognised by the BRC in the late 80s and early 90s. For ease of operation, it was decided to share all tributary inflows regardless of their State of origin during a particular event on the premise that shares would average out over time. This avoided an otherwise complex process of identifying and allocating water on the basis of state of origin. After an analysis of installed pump capacity, an operational rule of allocating multiples of 3% of licensed entitlement to NSW irrigators and one day's pumping to QLD irrigators was introduced. This was done on the basis that:

- each State received its rightful share of each flow event
- irrigators within each State shared the available water equitably.

This arrangement remains in place today. Since the early 1990s NSW has had a maximum annual diversion limit of 120,000 ML of off-allocation water. QLD has established its limit through its Water Resource Plan and Resource Operations Plan process.

On allocation water was originally allocated by the annual accounting process. Depending on the volume of water in storage, a percentage allocation was announced at or near the beginning of the water year (1 October). When Pindari Dam was being enlarged, an 'A' component of the lesser of 60 ML of licensed entitlement was introduced to support the viability of smaller water users. Thus an annual allocation announcement would typically be in the form 100 per cent of 'A' component and x per cent of the remainder ('B' component of entitlement).

Under the annual allocation system, any water not used at the end of the water year was forfeited and went back into the pool for redistribution. This encouraged an inefficient 'use it or lose it' attitude to individual water management. For this reason carryover accounting was introduced, initially for three months and then for a full 12 months. The announcement then became "carryover + 100% of 'A' + x% of 'B'". This arrangement reduced the unnecessary ordering of water before the end of the water year, but still meant that irrigators could lose water if they did not use it within a two year timeframe. It also had the unintended consequence of allowing water users who carried over large volumes to take up significantly more space in the dam than their licensed entitlements. When the dams were at, or near full capacity, this came at the expense of other water users.

To overcome these problems, a detailed consultation process between the State agencies and irrigators was undertaken, resulting in the introduction of a five year trial of continuous accounting at the beginning of the 2002–03 water year. Under this system all water in the dams is allocated in the following priority order:

1. Storage losses (evaporation and seepage, calculated as a function of surface area); this category of reserve is kept topped up to provide a 12 month forward supply.
2. Essential supplies (urban, stock and domestic, and high security water, including a volume for transmission losses in delivering it); are kept topped up to provide an 18 month forward supply.
3. General security:

- thirty per cent of the volume committed to general security supply is set aside for transmission losses
- the remainder is distributed in proportion to individual licensed entitlement up to the limit of storage accounts of licence holders.

The 'A' and 'B' components of licences are preserved under continuous accounting by distributing the 'A' component to each licence as soon as it is available after a specified date. Once this has been done, a resource assessment is carried out monthly or after a major dam inflow event and any available water is distributed according to the priorities above.

For general security individual storage accounts this is done in proportion to the 'B' component of licensed entitlement.

Two other important rules under continuous accounting are:

- the maximum volume that can be retained in individual storage accounts is 100 per cent of licensed entitlement
- if there is an inflow when an account is full, the water foregone spills over into other individual storage accounts
- the maximum volume of on allocation water that can be used in a water year is 100 per cent of licensed entitlement
- water traded is treated as usage by the trader.

Water management has evolved over time in response to changing patterns of supply and demand, regulatory requirements and the needs of water users. This Plan provides an opportunity to rationalise and determine a set of rules under the coordinating framework of the Border Rivers IGA.

Surface water entitlements

Table 5 outlines the current water entitlements in the NSW Border Rivers Regulated River Water Source.

Table 5: Water Entitlements at the commencement of the water sharing plan for the NSW Border Rivers Regulated River Water Source 2009

Purpose	Entitlements (ML/year) or shares
Domestic and Stock	1,205
Town Water Supply	620
High Security*	1,233
General Security – A class*	21,000
General Security – B class*	244,000
Supplementary water	120,000
Total	388,058

* indicates that entitlements are specified as a number of shares
Boomi domestic and stock replenishment is not an entitlement.

Licensed domestic and stock requirements

The Border Rivers Regulated River Water Source not only provides water for the environment and the irrigation industry, but also licensed domestic and stock requirements. Domestic and stock entitlements total 1,205 ML/year. Note that the above domestic and stock entitlements do not include domestic and stock rights.

An allowance is provided from the stored water in the water source to deliver a domestic and stock replenishment flow in the unregulated Boomi River, which is outside the Plan area.

Local water utilities

Water from the NSW Border Rivers Regulated River Water Source supplies water to three towns. Table 6 outlines the towns supplied and their current entitlement.

Table 6: Current local water utility (town water supply) entitlements

Town	Current entitlements (ML/year)
Boggabilla	120
Ashford	120
Mungindi	380
Total	620

Major water supply structures

Dams

Table 7 provides details for both Glenlyon Dam and Pindari Dam.

Glenlyon Dam

Glenlyon Dam, an earth and rockfill structure completed in 1976, is situated in QLD on Pike Creek, seven kilometres upstream of its junction with the Dumaresq River. It is operated by SunWater under contract to its owner, the Border Rivers Commission, and supplies users in NSW and QLD. It provides regulated flows for domestic, stock, industrial and irrigation purposes to the Dumaresq, Macintyre and Barwon Rivers as far as Mungindi Weir.

Pindari Dam

The original 37,000 ML Pindari Dam, completed in 1969, is situated on the Severn River in northern NSW, about 22 km from Ashford. The enlarged rockfill with concrete face structure dam, which now stores 312,000 ML, first filled in February 1996. It provides regulated flows for domestic, stock, industrial and irrigation purposes.

Table 7: Features of Glenlyon and Pindari Dams

Features	Glenlyon Dam	Pindari Dam
Completion date	1976	1969 1995 (enlargement)
River/watercourse	Pike Creek (QLD)	Severn River (NSW)
Storage capacity (ML)	256,000	312,000
Full supply water storage area (ha)	1,750	1,050
Catchment area (km ²)	1,326	1,994
Maximum discharge (ML/day)	380,000	1,890,000
Maximum valve capacity (ML/day) at 100 per cent capacity	2,900	6,000-7,000
Structure	Earth and rockfill	Rockfill with concrete face
Embankment height (m)	62	85
Embankment length (m)	445	970
Variable outlet tower	No	Yes
Hydro-power generation	No	Yes

Source: NSW Department of Water Resources 1993

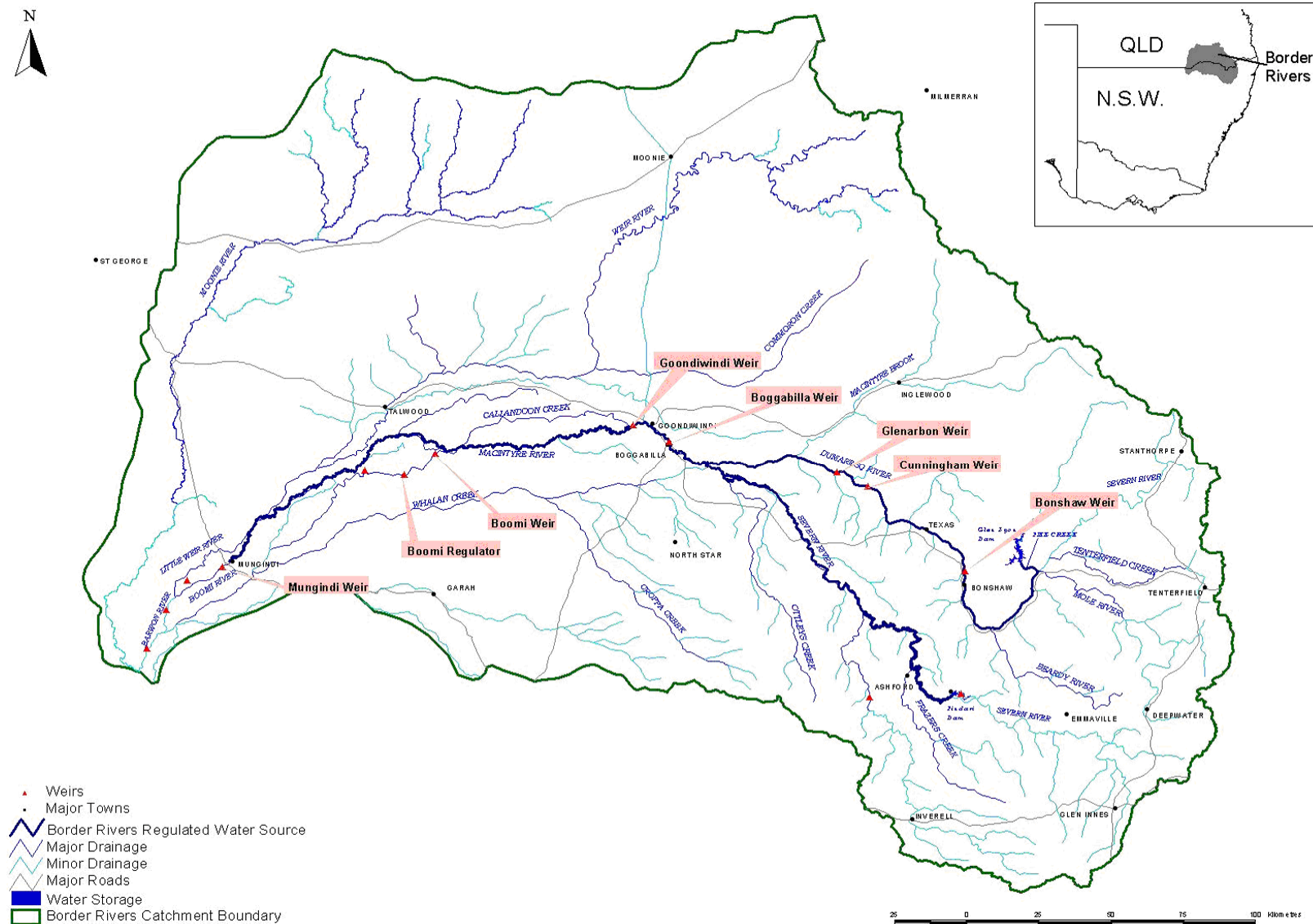
Weirs

Table 8 describes the major weirs that are located in the Border Rivers Catchment. Refer to Figure 3 for the locations of these weirs.

Table 8: Major Weirs in the Border Rivers Catchment

Weir	River/ watercourse	Completion date	Fish passage	Total storage capacity (ML)	Comments
Bonshaw Weir	Dumaresq River	1958	No	620	Irrigation.
Cunningham Weir	Dumaresq River	1954	No	543	Irrigation.
Glenarbon Weir	Dumaresq River	1959	Installed	353	Irrigation.
Boggabilla Weir	Macintyre River	1992	Installed	5,400	Store and re-regulate river flows.
Goondiwindi Weir	Macintyre River	1942	Installed	1800	Town water supply, irrigation, recreation
Boomi Weir and Regulator	Macintyre River	1960	No	n/a	Controls diversions from Macintyre River into Boomi River.
Mungindi Weir	Barwon River	1936 Upgraded 1965	No	730	Town water supply, irrigation.

Figure 3: Weirs in the Border Rivers Catchment



Plan development process

NSW planning process

Members of the Border Rivers Regulated River Management Committee were appointed by the Minister to recommend a water sharing plan for the NSW Border Rivers Regulated River Water Source. The Committee was comprised of representatives from a range of interest groups and government.

The draft Plan was placed on public exhibition with submissions received during this period. The Committee then reviewed the Plan in light of the submissions received and submitted a final draft to the Minister. The Minister then made the final Plan with the concurrence of the Minister for the Environment.

The Minister will audit the Plan at least every five years to ensure that its provisions are being properly implemented.

The Minister, on the recommendations of the Natural Resource Commission, may extend a Plan for a further 10 year period after the Plan was due to expire.

Intergovernmental agreement process

In 1946 an intergovernmental agreement (IGA) between NSW and Queensland under the *New South Wales-Queensland Border Rivers Act (QLD 1946, NSW 1947)* established water sharing arrangements for the common streams and water from the jointly owned water storages.

Since that time, due to a general awareness in emerging water management issues and the announcement of the COAG water reform framework and the Murray-Darling Basin Agreement, it became evident that a new formal IGA was required to replace the 1946 agreement.

The first step towards developing a new IGA was the establishment of a Ministerial Forum. The Forum members agreed that there was a need to build on the common interests and cooperation between the States in sharing the water resources, and in protecting the riverine environment and water dependent ecosystems. The Forum also emphasised its commitment to working with all water users in the Border Rivers catchment.

The IGA is based on ten principles which will ensure that the Border Rivers catchment will be managed sustainably for the environmental, social, cultural and economic values. The ten principles are as follows:

1. Whole of catchment approach.
2. State cooperation.
3. Community support.
4. Environmental protection.
5. Water sharing and access.
6. Accounting.
7. Interstate trading.
8. Monitoring.
9. Management review.
10. Auditing and reporting.

The new IGA:

- establishes state water sharing arrangements
- provides each state with surety to its right to use water
- establishes common environmental flow management on those streams that are shared between the states
- establishes an adaptive approach to extraction and environmental flow management that ensures environmental protection while supporting economic output
- provides for adequate flows to the Darling Basin downstream of Mungindi
- establishes a framework for interstate trading of water entitlements
- ensures consistency with the Murray-Darling Basin Agreement and initiatives.

Both NSW and Queensland have given effect to the IGA through their respective water planning processes.

The policy context

There are a number of policies and initiatives that impact on and direct the development of water sharing plans. Water sharing plans are required to be guided by the **River Flow Objectives (RFO)**.

WSPs are also consistent with **the National Water Initiative** (see www.nwc.gov.au for details). This intergovernmental agreement includes provisions on water planning and specifically:

- recognises that settling the trade-offs between the competing outcomes of secure ecological and resource security outcomes will require best available science and socio-economic analysis, as well as community input
- ensures the achievement of the environmental and other public benefit outcomes, including arrangements necessary to sustain high conservation value rivers, reaches, and groundwater areas
- ensures that environmental and other public-benefit outcomes are achieved, including actions to sustain high-conservation value rivers, reaches, and groundwater areas.

WSPs also comply with the **NSW Natural Resource Commission (NRC) statewide standard** and contribute to the relevant statewide targets (see www.nrc.nsw.gov.au for details). The NRC was established in 2003 to develop statewide natural resource management standards and targets and to review the water sharing plans against these targets. As with the National Water Initiative, the state standards focus on the use of the best available knowledge, use of appropriate information management systems, delivery of integrated outcomes, engagement of the community and regular monitoring, measuring, evaluation and reporting.

Major elements of the water sharing plan

Water for the environment

The *Water Management Act 2000* recognises two classes of environmental water. These are:

- **planned environmental water** – water that is committed by management plans for fundamental ecosystem health or other specified environmental purposes, either generally or at specified times or in specified circumstances, and that cannot, to the extent committed, be taken or used for any other purpose
- **adaptive environmental water** – water that is committed by the conditions of access licences for specified environmental purposes, either generally or at specified times or in specified circumstances.

The Act requires this Plan to define rules for the identification, establishment and maintenance of Planned Environmental Water and to contain provisions that relate to Adaptive Environmental Water.

Environmental water for the river section from Pindari Dam to the junction of the Severn River with the Dumaresq River was negotiated through the NSW Border Rivers Regulated River Management Committee process. Environmental water for the remainder of the NSW Border Rivers Regulated River Water Source was defined in the IGA.

Managing water extractions

1. Long term average annual extraction limits

Growth in water extractions in most of the major inland regulated rivers in NSW between the mid 1980s and mid 1990s was in the range of one to three per cent per year.

In 1995 the State Governments in the Murray-Darling Basin and the Australian Government agreed that a Cap should be placed on future water extractions. The NSW Border Rivers is a special case with regard to Cap because the Pindari Dam enlargement was under construction before the cap benchmark year of 1993–94, but was not completed until after it was applied to other catchments. It was therefore agreed that the Cap for the NSW Border Rivers will be based on the long-term annual average water extraction based on the 1993–94 level of development and management plus an allowance (uplift factor) for the enlarged Pindari Dam. The Cap is aimed at preventing further growth in extractions and further deterioration in overall flow regimes in the water source.

In order to meet the sharing arrangements set under the IGA, this Plan has defined specific environmental flow rules which will also improve flow regimes and provide a better balance between river health and water diversions. To ensure that the flow improvements the environmental flow rules provide, are not eroded it has been necessary to set a long-term average annual extraction limit. This limit corresponds to the water use associated with the level of development in 2001–02, the share components existing at the commencement of the Plan and the rules in the Plan and must not exceed the Murray-Darling Basin Cap.

In order to protect the Plan's flow and sharing outcomes it is essential that it include a clear strategy for responding to any growth in diversions.

2. Adjusting for growth above the long term annual average extraction limit

Audit and reporting of regulated valley extractions will be undertaken annually and be based on a comparison of:

- current development – the long-term average modelled extraction produced by a hydrologic computer model set to represent the development and management in place at the time of the audit
- the long-term average modelled extractions produced by hydrologic computer model runs, which represent the Plan limit.

If this assessment establishes that growth above the Plan Limit has occurred, then the response is based on adjustments to the rules that determine how much water is made available for extraction. Such adjustments are intended to return the long-term level of water extractions to those set by the Plan and provide clear and immediate disincentives to further growth.

A three per cent exceedence threshold has been set for determining when a management response should be undertaken. This threshold has been determined to avoid overly frequent adjustments occurring as a result of very transitory, minor changes in patterns of water use. The primary response is a reduction in the maximum amount of water that can be taken by supplementary water licence holders.

It is intended to establish volumetric entitlements, measurement and long term limits for floodplain harvesting during the life of the Plan. Volumetric entitlements, measurement and long term limits for floodplain harvesting will be established through the development of a NSW Floodplain Harvesting Policy.

Reduction in supplementary water access is in line with the priorities set by the *Water Management Act 2000*. Water available to general and high security licence holders will only be reduced in the highly unlikely event that all access to supplementary water has been eliminated and assessments indicate that it is necessary to further reduce water availability to stay within water use limits.

The *Water Management Act 2000* gives domestic and stock licences, major utility access licences and local water utility licences the highest priority. There will be no adjustment to the rules affecting supply to holders of these licences.

3. Determining water availability (allocations) and managing water accounts

Available Water Determinations (AWDs)

Under the continuous accounting process used in the NSW Border Rivers, water resource assessments are made each month or when there is a significant change in the storage volume in Pindari and/or Glenlyon Dams. Allowance is made for evaporation and seepage losses from storage, essential supplies (basic rights, and licensed domestic and stock and water utility requirements), and transmission losses associated with general security water.

AWDs are made for each category of licence.

Some categories of licence (domestic and stock and local water utilities) are described as a percentage of the licence share component (entitlement) (e.g. 100 per cent). Other categories of licence (high security, general security and supplementary access) will be described as megalitres per unit share of the licence share component (e.g. 0.75 ML/unit share).

4. Management of supplementary water

In the past, extractions of supplementary water have been termed 'off-allocation' because the water taken was not counted against the licence holders regulated supply water allocation. It was, however, metered and accounted for as a component of total diversions.

Supplementary water is a significant and vital source of supply for NSW Border Rivers Regulated River licence holders. It is an integral part of the package that determines total water availability and hence reliability of supply. Tributary inflows are also important for the maintenance of river and wetland health. Because they are naturally occurring high flows, they provide the environmental triggers (seasonal and temperature) for spawning and migration of fish, and can result in wetland inundation. The way in which supplementary water is managed, therefore, has important environmental and productivity consequences.

Under the *Water Act 1912*, the Department of Natural Resources had wide discretion when it declared off-allocation periods and how it managed access. The *Water Management Act 2000* now requires that access to supplementary water be licensed. This means that the rules for identifying this water and allowing access must also be clarified so that its management can be consistent.

The Plan specifies the rules that govern supplementary water licensing and management.

Supplementary water access licences will be issued to all regulated river (general security) access licence holders. The total amount of supplementary water access licence share components has been limited to 120,000 shares. The 120,000 shares have been distributed to individual supplementary water access licences in proportion to the size of the holder's regulated river (general security) access licence share component.

Thereafter, supplementary water access licences will be totally independent of general security access licences, that is, they will be separately tradeable.

Supplementary water access may only be permitted after other needs (environmental and supply to all other regulated river licences) have been met.

This reflects the existing circumstances that must now occur before off-allocation periods are declared.

In general, access rules for supplementary water will be different for the river sections upstream of the Macintyre/Dumaresq junction and the main river downstream of the junction in recognition of the fundamentally different circumstances that apply.

5. Floodplain harvesting

Floodplain harvesting is the collection, extraction or impoundment of water flowing across floodplains. Floodplain flows can originate from local runoff that has not yet entered the main channel of a river, or from water that has overflowed from the main channel of a stream during a flood.

Floodplain harvesting can generally be put into one of three categories:

1. Diversion or capture of floodplain flows using purpose built structures or extraction works to divert water into storages, supply channels or fields or to retain flows.
2. Capture of floodplain flows originating from outside of irrigated areas using works built for purposes other than floodplain harvesting.
3. Opportunistic diversions from floodplains, depressions or wetlands using temporary pumps or other means.

It is intended to establish volumetric entitlements, measurement and long term limits for floodplain harvesting during the life of the Plan. Volumetric entitlements, measurement and long term limits for floodplain harvesting will be established through the development of a NSW Floodplain Harvesting Policy. The Plan may be amended at a later date in order to deal with the management of floodplain harvesting.

Access licence dealings

The *Water Management Act 2000* allows water access licence holders to undertake various types of access licence dealings subject to the rules established in any Access Licence Dealing Principles order in force under section 71Z of the Act and the rules in the Plan. The access licence dealing rules established in the Plan are summarised below:

1. Assignment of rights (permanent transfers)

Access licences of the same category can permanently trade their share components except where it involves a supplementary water access licence and it would cause total share components of supplementary water access licences upstream of the Macintyre River and Dumaresq River junction to exceed those that existed at the commencement of the Plan.

2. Assignment of water allocations (temporary trading)

The trading of water allocations from individual access licence water allocation accounts is permitted except:

- from a supplementary water access licence account to an account of any other category of access licence
- to a supplementary water access licence account from an account of any other category of access licence.

3. Nominating alternate or additional water supply works

Dealings to nominate different or additional water supply works are permitted except where it would cause total share components of supplementary water access licences nominating works upstream of the Macintyre River and Dumaresq River junction to exceed those that existed at the commencement of the Plan.

4. Conversion of licence category

Conversion of licence categories are permitted from general security to high security and vice versa subject to the application of a conversion factor, established by the Minister to protect the reliability of supply to basic landholder rights and other licence holders. Prior to any access licence conversion from general security to high security, the amount of water in the account of the general security licence must be equal to or greater than the amount of the general security share component.

5. Trading between NSW water sources

Dealings to change the water source specified on a licence are permitted provided:

- the new water source is within the Border Rivers Water Management Area
- the licence is not a specific purpose licence
- the change of water source is not from an unregulated water source to a regulated river water source
- the change of water source is not from a groundwater source to a surface water source or vice versa.

A conversion factor, to be determined by the Minister, that protects environmental water, basic landholder rights and reliability of supply to all other licence holders must also be applied to the change of water source.

Trading of water allocations between licences in this water source and licences in other NSW water sources are not permitted.

6. Trading between NSW and Queensland

Licences will not be able to transfer between NSW and Queensland. However, the NSW and Queensland licences will be permitted to nominate water supply works in the other State. For example, a NSW licence can be linked to works in Queensland that extract water from a river that is regulated by Glenlyon Dam and Coolmunda Dam. This will allow the water allocations accrued under the NSW licence to be taken from Queensland. Similarly, a Queensland entitlement that permits the extraction of water from a river that is regulated by Glenlyon Dam or Coolmunda Dam can be linked to works in NSW. These dealings will be permitted subject to administrative and accounting arrangements agreed to by the States.

Trading of water allocations between licences in NSW and those in Queensland are permitted subject to administrative and accounting arrangements agreed to by the States.

System operation rules

This section includes rules for the management of the following:

- water supply works
- flood operation
- infrastructure failure.

1. Water supply works

All water supply storages and water management works within the Plan area must be operated to satisfy the requirements and the rules of the Plan. These works include:

- Pindari Dam
- Glenlyon Dam
- Bonshaw Weir
- Cunningham Weir
- Glenarbon Weir
- Boggabilla Weir
- Goondiwindi Weir
- Boomi Weir and Regulator
- Mungindi Weir

Whilst the above lists the main structures on the regulated river system, some of the weirs are fixed-crested structures and have little operational influence.

2. Flood operation

Pindari Dam and Glenlyon Dam are operated during floods to maintain the safety of the infrastructure. Consistent with this objective, releases are manipulated to mitigate flood inflows (where possible), provided these actions do not conflict with the existing environmental flow rules. The methodology used by State Water is contained in the document *'Flood Operation Manual – Pindari Dam'* and the BRC is contained in the document *'Flood Operation Manual – for Glenlyon Dam'*.

The basic concepts around which the flood operation is based are:

- the storage should be as full as possible at the completion of the flood
- the peak outflow rate should be minimised and is not to exceed the peak inflow rate
- the general rate of increase of outflow is not to exceed the rate of increase of inflow.

Whilst the primary objective of flood operations is to safe guard the dam, a secondary benefit is that the flood operation should try to minimise flood damage at downstream locations by manipulation of the release rates in conjunction with downstream flow activity.

3. Infrastructure failure

In a regulated system it is possible that structures may fail or other circumstances such as bank collapse may occur. This may require the system to be managed in a way other than that specified in the Plan. For example, reserves in storage may have to be varied if a mid stream re-regulating structure is out of action, or supply may have to be restricted to users along some portion of river.

Adjustment of rules within the WSP

Section 45(1)(b) of the Act allows for rules within a Water Sharing Plan to be adjusted or altered provided the circumstances and the extent of any changes have been identified in the Plan. The Plan allows for changes:

- to the extent of the water source
- separate the long-term extraction limit, compliance and AWD rules for floodplain harvesting
- that may be required as a result of any change to the IGA, the *New South Wales-Queensland Border Rivers Act 1947* or the Border Rivers Agreement 1947.

Impacts of the water sharing plan on flows and access to water

This Plan provides protection of flows in the upstream sections that are likely to inundate critical natural river benches before supplementary access is allowed. This is in addition to rules to provide for the passage of some inflows through Pindari Dam (translucency releases) and the periodic release of pulse flows to stimulate downstream ecological processes.

It further contributes to the protection of a proportion of flows for the environment in the lower river sections in accordance with the IGA outcomes, although the Plan's environmental flows are targeted for the Severn River below Pindari Dam to Ashford.

It should be noted that the NSW Water Sharing Plan and the Queensland Resource Operations Plan are the legal instruments which give effect to the IGA. This Plan contributes to the agreed inter-state end of system outcome of 60.8 per cent of average annual natural flows passing Mungindi.

This Plan provides account management arrangements to ensure basic landholder rights are protected, domestic and stock licences and local water utilities are given priority and general security access licences are to be managed by the individual licensees through continuous accounting arrangements.

This Plan ensures that long term extractions will be contained to a Plan limit to protect the environmental outcomes described in the Plan and to ensure stability for water users in the water source.

Adaptive management

Adaptive management is an important part of a water sharing plan. The term refers to making provision within the Plan to change the access or trading rules in response to new information obtained during the life of the Plan. Adaptive management is a requirement of both the *Water Management Act 2000* and the National Water Initiative.

Monitoring and review

Monitoring

The Plan includes a number of performance indicators that will be monitored over the life of the Plan.

DWE is currently developing a Monitoring Evaluation Reporting (MER) Framework. This framework will be developed in collaboration with key stakeholders, and be consistent with the MER needs of the Natural Resource Commission and the National Water Commission. The intention is that the framework can be applied to existing water sharing plans, macro water sharing plans, and the SWMOP to enable the development of a specific MER plan.

It is not practicable to monitor all issues in all water sources. The performance indicators identify that monitoring will be undertaken for specific issues in key water sources. A risk assessment approach will be used to identify specific issues and high risk water sources where detailed MER needs to occur.

An Implementation Program is to be established that sets out the key milestones to achieve the provisions of this Plan. The priorities for monitoring of the performance indicators will be detailed in the Implementation Program.

Plan review

The MER framework (described above) will consider the statutory requirements for the different types of evaluation:

- The Plan will be audited at intervals of no more than five years, for the purpose of ascertaining whether its provisions are effective. This audit is to be carried out by an audit panel appointed by the Minister.
- The Plan will be reviewed by the Natural Resource Commission to assess to what extent the water sharing provisions have contributed to the relevant state wide targets, and natural resource standards and targets in the relevant Catchment Management Authority Catchment Action Plan. The Natural Resource Commission will call for public submissions when undertaking its review.
- Annual review of Implementation Programs.
- In addition, information from the relevant monitoring and evaluation programs may inform progress against the relevant state wide targets and requirements of the National Water Commission under the National Water Initiative.

Implementation

Implementation programs

An Implementation Program is to be established that sets out the means by which the provisions of this Plan are to be achieved. The priorities for monitoring of the performance indicators will be outlined in the Implementation Program. An annual review of the Implementation Program will be conducted to determine whether the program is being effective in implementing the water sharing provisions. The results of this review will be included in DWE's Annual Report.

Monitoring water extractions

Each water sharing plan indicates the relevant mandatory conditions for extraction, including that all licences undertake measurement of use. DWE will develop a measurement of use strategy to meet the objectives of the NSW Water Extraction Monitoring Policy.

Measurement of use may be via meters or other forms of monitoring devices fitted to approved works, or via alternative monitoring systems, in order to provide water extraction estimates.

In relation to monitoring devices, different types of devices will be required depending on the nature of the water supply work installation, the size of the work, and the effect that the operation of the work may have on the water source and other water users.

It is anticipated that assessment of water sources will be undertaken across the State to identify priority areas of measurement of use and to determine the most suitable measurement options. It is likely that this will be implemented in high priority areas initially, with roll out to all water sources over time, as appropriate.

Note: Decisions regarding the timetable for introduction of measurement of use are still under consideration. In the interim, water users are encouraged to use other forms of self-measurement to assist them to extract water in line with Plan provisions.

Compliance

DWE will undertake compliance activities as necessary to enforce the provisions of the Plan once it is implemented. Some reliance is placed on local water users to identify inappropriate or unlawful behaviour and report this to the Department.

Glossary

access licence means an access licence referred to in Section 56 of the Act, and includes a renewal of an access licence. For that period of time after the Plan commences prior to the access licence provisions of the Act being commenced, references to access licences in this plan shall be interpreted as applying to corresponding entitlements under the *Water Act 1912*.

Act means the *Water Management Act 2000*.

approval means a water use approval, a water management work approval or an activity approval, and includes a renewal of an approval.

available water, in relation to a water management area or source, means the water that is available in that area or water source in accordance with an available water determination that is in force in respect of that area or water source.

available water determination means a determination referred to in Section 59 of the Act.

basic landholder rights means domestic and stock rights, harvestable rights or native title rights.

direct irrigation means water pumped directly onto crop on the recession of a flow event.

domestic and stock rights means that the owner or occupier of land is able to extract water from a river without the need for an access licence if the land fronts the river.

floodplain harvesting means the collection, extraction or impoundment of water flowing across floodplains. The floodplain flows can originate from local runoff that has not yet entered the main channel of a river, or from water that has overflowed from the main channel of a stream during a flood.

harvestable rights means that landholders have a right to a portion (10 per cent) of the runoff from their property without needing a licence.

local water utility means:

- a. a water supply authority established by the Act
- b. a council or county council exercising water supply functions under Division 2 of Part 3 of Chapter 6 of the *Local Government Act 1993*.

native title holder, in relation to any waters, means a person who holds native title rights in relation to those waters pursuant to a determination under the *Native Title Act 1993* of the Commonwealth.

native title rights mean non-exclusive rights to take and use water for personal, domestic and non-commercial communal purposes (including the purposes of drinking, food preparation, washing, manufacturing traditional artefacts, watering domestic gardens, hunting, fishing, and gathering and recreation, cultural and ceremonial purposes).

regulated river means a river that is declared by the Minister, by order published in the Gazette, to be a regulated river.

river includes:

- a. any watercourse, whether perennial or intermittent and whether comprising a natural channel or a natural channel artificially improved
- b. any tributary, branch or other watercourse into or from which a watercourse referred to in paragraph flows
- c. anything declared by the regulations to be a river, but does not include anything declared by the regulations not to be a river.

unregulated river means a river that is not a regulated river.

water allocation means the water to which the holder of an access licence is entitled from time to time under the licence.

water entitlement means the entitlements specified on a licence, and includes annual volumetric entitlements and daily flow shares where they have been issued.

water management area means an area of land that is constituted as a water management area by an order in force under Section 11 of the Act.

water management works means a water supply works, a drainage works or a flood works.

water source means:

- a. any river, lake or estuary
- b. any place where water occurs naturally on or below the surface of the ground, and includes the coastal waters of the State.

water supply work means:

- a. a work (such as a pump or water bore) that is constructed or used for the purpose of taking water from a water source
- b. a work (such as a tank or dam) that is constructed or used for the purpose of:
 - i. capturing or storing rainwater run-off
 - ii. storing water taken from a water source
- c. a work (such as a water pipe or irrigation channel) that is constructed or used for the purpose of conveying water to the point at which it is to be used
- d. any work (such as a bank or levee) that has the effect of diverting away from a water source any overflow from the water source
- e. any work (such as a weir) that has the effect of impounding water in a water source, including a reticulated system of such works, and includes all associated pipes, sluices, valves and equipment, but does not include:
 - i. any works that receives water from a water supply work under the control or management of a local water utility
 - ii. any work declared by the regulations as not being a water supply works.

Schedule A1

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Schedule A2

Intergovernmental agreement

Statement of principles for an intergovernmental agreement between New South Wales and Queensland for water management in the Border Rivers

The Border Catchments Ministerial Forum agrees that an Inter-governmental Agreement based on the following principles will ensure that the Border Rivers catchment will be managed sustainably for its environmental, social, cultural and economic values.

1. Whole-of-catchment approach

The states will manage all aspects of water and related natural resource activities on a water catchment basis so as to balance water resource use and protection of ecosystems.

2. State cooperation

The states will recognise the Border Rivers as a special case and customise their individual policies to meet its unique requirements.

The states' agencies will ensure that policies and legislation pertaining to the Border Rivers are not in conflict.

The management of the Border Rivers will take into account each state's commitment to the Murray-Darling Basin Agreement.

3. Community support

Proposals to put to the wider community will be developed by government in partnership with stakeholders.

The states will engage the community to seek community understanding, support and ownership of the Agreement.

4. Environmental protection

Agreed-upon environmental outcomes will enhance and sustain identified environmental values. These outcomes will be protected against impact from increases in water use.

The states will develop coordinated joint access management rules for the common streams and will ensure rules on other streams will support the agreement outcomes.

5. Water sharing and access

Water sharing arrangements between the states will recognise the current water sharing arrangements. Access to water entitlements will be in accordance with the states' planning and legislative frameworks.

Management of access by water users in one state will not impact on the allowed access by water users in the other state.

6. Accounting

The states will implement transparent and freely available accounting procedures, consistent with trading rules.

All current and future water entitlements within the entire catchment will be accounted for on a volumetric basis to meet the agreed environmental and water use targets.

7. Interstate trading

The states will establish systems for interstate trading of water to allow water to move to its highest value use, while ensuring minimal impact on other users and on the environment.

8. Monitoring

The states will establish an integrated cost-effective monitoring and measurement program to support the ongoing assessment of the effectiveness of the Agreement.

9. Management review

An adaptive and transparent approach will be used for extraction and environmental flow management, and this will include regular formal reviews.

Management responses will be tailored to the issues identified by the monitoring program.

10. Auditing and reporting

Data, analysis and policy information will be openly exchanged between the states and the community.

All usage and compliance with management rules will be subject to regular reporting and auditing.