

# DRAFT WATER SHARING PLAN NSW BORDER RIVERS REGULATED RIVER WATER SOURCE

PART A | BACKGROUND DOCUMENT

AUGUST 2007



FOR PUBLIC EXHIBITION



NSW Government  
Department of Water & Energy

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NSW BORDER RIVERS REGULATED RIVER WATER SOURCE  
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## Preamble

The NSW Border Rivers Regulated River Management Committee, in accordance with its terms of reference, has prepared this Draft Water Sharing Plan for the NSW Border Rivers Regulated River Water Source under Chapter 2, Part 3 of the Water Management Act 2000.

The Water Sharing Plan consists of two parts:

1. Part A which provides a background to the Draft Water Sharing Plan and outlines the purpose of the Plan, the process of Plan development, the intended outcomes of the Plan, the water sharing provisions and background information on the catchment; and
2. Part B which is the regulatory section of the Draft Plan.

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:

- the water source and its dependent ecosystems;
- basic landholder rights; and
- the entitlements of existing licence holders;

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

The Plan, once finalised and gazetted, will replace any other water sharing plans which applied to the water source.

While this 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:
  1. bulk water sharing between the States
  2. common environmental flow rules
  3. water allocation and access
  4. interstate trading
  5. coordinated monitoring and reporting
- The Queensland Resource Operations Plan will have priority over the Queensland regulated river sections.

The IGA, the NSW Water Sharing Plan and the Queensland Resource Operations Plan 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.

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## 1. Introduction

Water sustains the natural ecosystems essential for socially and economically viable communities. Regulation of our rivers has modified the natural flow regime. With water demand peaking in recent times it is vitally important to establish an acceptable balance between the needs of the environment and water users to ensure that our river system is managed sustainably for the benefit of this and future generations.

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. In general, the riverine ecosystem is considered to be in good condition.

## 2. Purpose of the Water Sharing Plan

The Water Management Act 2000 provides for the sustainable and integrated management of the State's water resources. Under the Act, water sharing plans are being progressively developed for all water sources in the State.

This Plan sets the rules for:

- sharing of water between the environment and consumptive uses;
- sharing between different classes of water users;
- management of environmental water; and
- operation of the river system.

The Water Sharing Plan is a statutory instrument under the Water Management Act 2000 with a lifespan of 10 years, during which period security of access for all water users is provided.

## 3. Process of Plan Development

### NSW PLANNING PROCESS

The then Minister for Land and Water Conservation appointed members of the Border Rivers Regulated River Management Committee 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 State Water Management Outcomes Plan (SWMOP) provided strategic guidance and direction to the Committee. It outlines the policy context, targets and strategic outcomes desired from the management and use of water across the State.

The draft Plan was submitted to the Minister for Climate Change, Environment and Water who has now put it on public display for review and submissions for a minimum of 40 days.

The Committee will then review the Plan in light of the submissions received and submit a final draft to the Minister.

The Minister will make the final Plan with the concurrence of the Minister for the Primary Industries.

The Plan, within its fifth year after being made, will be reviewed to assess whether its provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles. The Minister will also 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.

### **INTER-GOVERNMENTAL AGREEMENT PROCESS (IGA)**

In 1946 an agreement 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, there has been 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 10 principles which will ensure that the Border Rivers catchment will be managed sustainably for the environmental, social, cultural and economic values. The 10 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; and
10. auditing and reporting.

The new IGA will:

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

Both NSW and Queensland will give effect to the IGA through their respective water planning processes.

## 4. Intended Outcomes of the Water Sharing Plan

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; and
- establishment of a framework for increased flexibility in agricultural practices.

### CURRENT STATUS OF THE BORDER RIVERS REGULATED RIVER WATER SOURCE

As in all developed catchments, land uses such as grazing and cropping have increased sedimentation, reduced streambank stability and altered riparian vegetation. While much good work has been done to address these factors, a culture of continuous improvement is considered to be the appropriate way to ensure a sustainable future.

In the Border Rivers pre-development flow patterns have been modified by Glenlyon, Pindari and Coolmunda Dams and other in-stream structures such as weirs. However, with less than 13% of the catchment area behind the dams, natural tributary flows remain the major source of water in the system. The period of highest demand for extractions also coincides with the predominantly summer flow pattern, thus avoiding the major modification of natural flow patterns that occurs in the southern valleys.

Modern irrigation development from the 1960s onwards has now peaked, with the New South Wales and Queensland Governments agreeing to a policy (The Murray-Darling Basin Cap) that there will be no further growth in the diversion of water. This policy provides the opportunity to establish a sound framework for the future by addressing the flow-related aspects of river management such as:

- riverine ecology;
- the extent and quality of riparian vegetation;
- water quality; and
- the effect of weirs on fish populations.

Non flow related aspects are being addressed by broadly-based catchment management activities overseen by the Border Rivers-Gwydir Catchment Management Authority and its equivalent in Queensland.

## **CURRENT OUTLOOK OF THE BORDER RIVERS REGULATED RIVER WATER SOURCE**

The Technical Advisory Panel appointed to provide advice to the former Border Rivers Flow Management Plan process assessed the Border Rivers as being in generally good condition. However, from experience in other catchments where there is a longer history of development, there is a possibility that the current levels of extraction, in the absence of good management practices and effective monitoring, could result in:

- deterioration in the condition of the riverine ecosystem;
- riparian vegetation decline;
- damage to threatened species habitat;
- possible water quality decline; and
- reduction in reliability of supply for both domestic and stock users and licensed water users.

## **5. Background Information on the Border Rivers Catchment and the Border Rivers Regulated River Water Source**

### **THE PHYSICAL SYSTEM**

#### **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 km<sup>2</sup> (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.



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.

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 kilometres 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 kilometres 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.

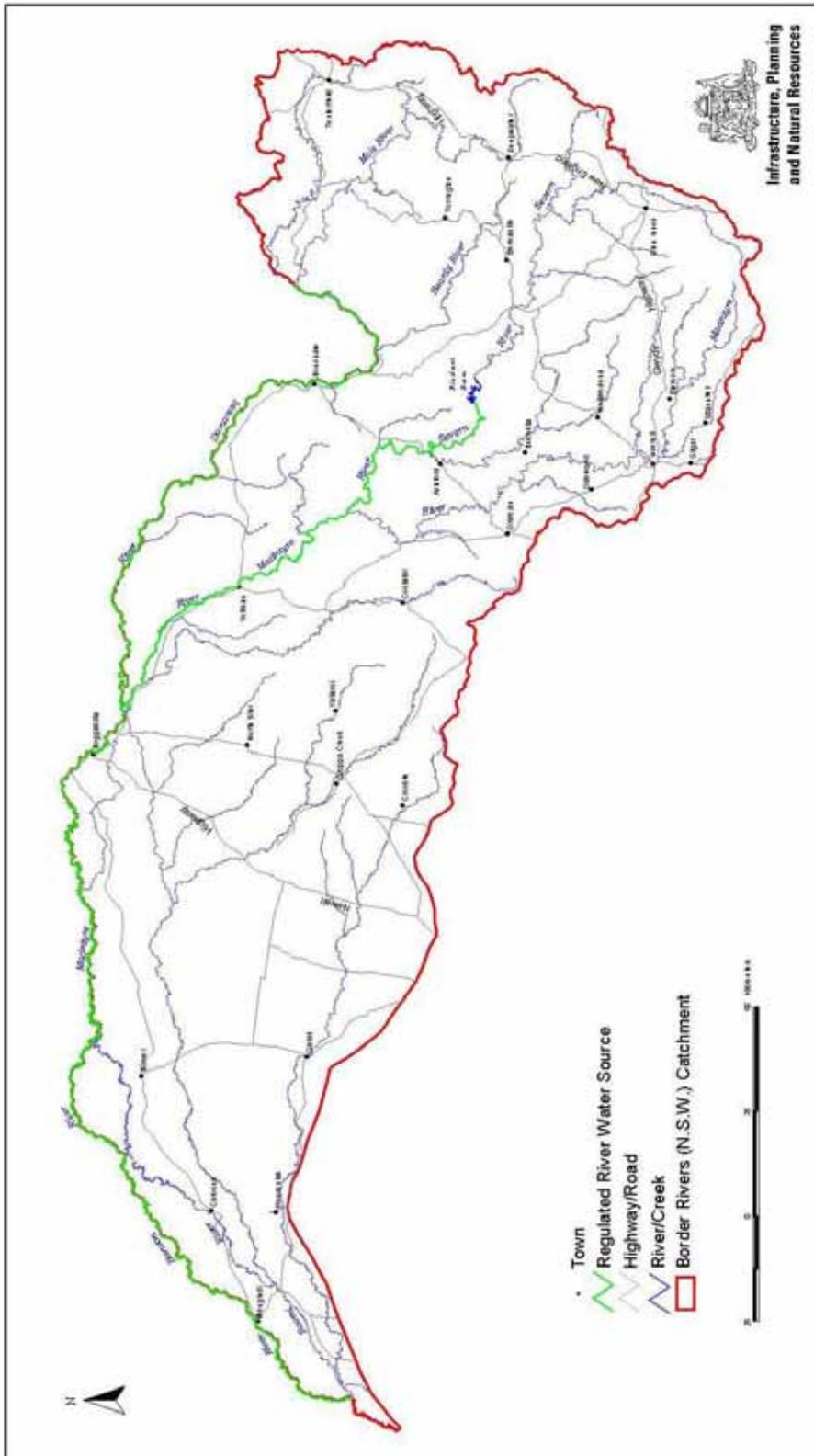
The Macintyre River becomes the Barwon River below its junction with the Weir River (NSW Department of Water Resources, 1995). It flows past Mungindi, the end of the Border Rivers system, and becomes the Darling River below Brewarrina and upstream of Bourke.

### **Water Sharing Plan 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 24,000km<sup>2</sup>. The NSW section is approximately 400km from east to west and 100km 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 Pindari Dam downstream to the junction of the Severn River with the Macintyre River, the Macintyre River to the junction of the Barwon River and the Barwon River downstream to Mungindi Weir (Figure 2). The Dumaresq River from the junction of Pike Creek to the junction of the Macintyre River is also a part of the NSW Border Rivers Regulated River Water Source and is covered by the Plan (this section is supplied from Glenlyon Dam).

Figure 2. The NSW Border Rivers Regulated River Water Source.



## 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 1% of average to over 500% 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 Water Sharing Plan is the integrated protection, maintenance and enhancement of the flow related ecology of the Border Rivers Regulated River Water Source. While the committee appreciates that the Water Sharing Plan is unable to target all environmental features, it has identified the following ecological features that it considered 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	This zone extends from around Yetman to approximately 20km downstream of Goondiwindi on the Macintyre River. The significant areas are: Telephone-Malgarai Lagoon Rainbow Lagoon Kildonan Lagoon Maynes Lagoon Morella Watercourse Boobera Lagoon Serpentine Lagoon Dingo Creek Callandoon Branch Punboogal	These areas rely on natural flow variability and medium (25,000ML/day) to high (80,000-100,000ML/day) floods to maintain health and diversity.

Ecological Feature	Location of Feature	Flow Requirements
Upper Reaches Wetlands	<p>These wetlands have been identified between Pindari Dam and Yetman.</p> <p>The significant areas are:</p> <p>Severn River</p> <p>Severn River d/s Duncanmara Creek</p> <p>Severn River @ crossing d/s of Duncanmara Creek</p> <p>Severn River u/s of Ashford Power Station</p> <p>Severn River @ Kwiambal National Park</p> <p>Macintyre River</p> <p>Macintyre River d/s of Bedwell Downs</p> <p>Macintyre River u/s of Holdfast Crossing</p> <p>Macintyre River d/s of Holdfast Crossing</p> <p>Macintyre River @ Keetah Road Bridge</p> <p>Dumaresq River</p> <p>Dumaresq River u/s of Keetah Bridge</p> <p>Dumaresq River d/s of Keetah Bridge</p> <p>Dumaresq River u/s of Toomelah</p>	<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> <p>A spike-rush species (<i>Eleocharis blakeana</i>) which has been listed as rare</p> <p>A giant waterlily (<i>Nymphaea gigantea</i>)</p> <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 Coolibah (<i>Eucalyptus microtheca</i>) and Coolibah/Black Box (<i>Eucalyptus largiflorens</i>) woodland communities, Lignum (<i>Muehlenbeckia cunninghamii</i>) communities and Carbeen (<i>Eucalyptus tessellaris</i>) communities</p> <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>

Ecological Feature	Location of Feature	Flow Requirements
Riparian Vegetation	These are mainly River She-oak ( <i>Casuarina cunninghamiana</i> ), Bottlebrush ( <i>Callistemon viminalis</i> ), Tea Tree ( <i>Leptospermum brachyandrum</i> ) and River Red Gum ( <i>Eucalyptus camaldulensis</i> ) communities	Riparian vegetation requires natural flow variation and medium to high floods to maintain habitats.
Fish	Species known or expected to occur in the Border Rivers Catchment are: Endangered Species/Populations Purple-spotted gudgeon ( <i>Morgurnda adspersa</i> )  Olive Perchlet ( <i>Ambassis agassizii</i> ) Vulnerable Species Silver Perch ( <i>Bidyanus bidyanus</i> )  Buchanan's Fairy Shrimp ( <i>Branchinella buchananensis</i> ) Murray Cod ( <i>Maccullachella peelii peelii</i> )	Pools and low flows critical. Freshes in Spring important. Water level critical to protect egg mass. Pools and low flows critical. Freshes in Spring important Pools and low flows critical. Over-bank flooding in Spring important. Fluctuations important in Spring and Summer. Pools and low flows critical. Pools and low flows critical. Over-bank flooding and drown-out of barriers.
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	Downstream of Pindari Dam to Boggabilla. Platypus ( <i>Ornithorhynchus anatinus</i> ) Water Rat ( <i>Hydromys chrysogaster</i> )	Aquatic fauna rely on pools, variability of flows and low flows.
Instream Habitats	Natural geomorphic processes forming diverse and quality structural river habitats of local, regional, state and national significance including: 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  Instream habitats are found throughout the Border Rivers Regulated River Water Source.	Frequency (return time), duration, and flow level of low, very low and zero flows compared to natural. Frequency, duration, velocity and magnitude (peak flow) of in channel freshes and floods. 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. Some instream habitats may be dependent on base flows provided by groundwater sources.

## 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 1500uS/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 (0-280uS/cm). The Macintyre River at Holdfast had a medium salinity level (280-800uS/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); and
- 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.**

Process of Influencing Water Quality		
1	Protect natural water levels in pools of creeks and rivers and wetlands during periods of no flow	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	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	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	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	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	Natural rates of rise and fall minimise bank slumping which increase turbidity.
9	Minimise the impact of instream structures	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	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 information in the following section has been provided by the Socio-Economic Services Unit of the Department of Water and Energy based on the Australian Bureau of Statistics (ABS) Integrated Regional Database.

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 Yallaroi in New South Wales. Portions of the Millmerran, Tara, Waroo, Balonne, Inverell, Severn, Moree Plains, Tenterfield and Yallaroi 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.

**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
<b>Total for the Border Rivers Catchment</b>		<b>10,019</b>	<b>4,054</b>	<b>1,451</b>

Source: Australian Bureau of Statistics (2004)

It should be noted that portions of the Millmerran, Tara, Waroo, Balonne, Inverell, Severn, Moree Plains, Tenterfield and Yallaroi Local Government Areas lie outside the boundaries of the Border Rivers Catchment.

## Industry Profiles

### Agriculture

Irrigated cotton production, which takes place on some 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 Queensland and NSW 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 Queensland and NSW 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 Regulated River Water Source 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 1880's 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:

1. gauging of water flows in the carrier rivers (common trunk stream), certain of their tributaries and effluent streams, and intersecting streams west of Mungindi;
2. gauging of all diversions from the carrier rivers;
3. construction, operation maintenance and control of gauging stations;
4. 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; and
5. 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 New South Wales, about 22 kilometres from Ashford. The reliability of supply was very low (45%) 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% (\$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%; and
- to protect the minimum target reliability factor of 70% 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; and
- 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 is establishing its limit through its Water Resource Plan and Resource Operations Plan process. Pending this, a moratorium on new or reconfigured infrastructure in the Queensland Border Rivers has been in place since September 2000.

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 (1st 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% of 'A' component and x% 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, and
3. general security:
  - 30% 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:

1. the maximum volume that can be retained in individual storage accounts is 100% of licensed entitlement; if there is an inflow when an account is full, the water foregone spills over into other individual storage accounts.
2. the maximum volume of on allocation water that can be used in a water year is 100% 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 Water Sharing Plan provides an opportunity to rationalise, under the coordinating framework of the Border Rivers IGA, a set of rules that has become somewhat disjointed.

## **SURFACE WATER ENTITLEMENTS**

The following table outlines the current water entitlements in the NSW Border Rivers Regulated River Water Source.

**Table 5. Current Water Entitlements for the NSW Border Rivers Regulated River Water Source.**

Purpose	Entitlements (ML/year)
Stock	887
Domestic	318
Boomi Domestic and Stock Replenishment	10000
Town Water Supply	620
High Security	
Recreation	10
Horticulture	355
Irrigation	868
General Security	
Recreation	20
Irrigation	264,980
<b>Total</b>	<b>278,058</b>

## 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 entitlements total 318ML/year and stock entitlements total 887ML/year.

**Note that the above domestic and stock entitlements do not include basic landholder rights.**

An allowance is provided from the stored water in this regulated river water source to deliver a domestic and stock replenishment flow in the unregulated Boomi River, which is outside this Water Sharing 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 Entitlement (ML/year)
Boggabilla	120
Ashford	120
Mungindi	380
Total	620

## MAJOR WATER SUPPLY STRUCTURES

### Dams

#### ***Glenlyon Dam***

Glenlyon Dam, an earth and rockfill structure completed in 1976, is situated in Queensland 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 New South Wales and Queensland. 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 New South Wales, about 22 kilometres 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 in New South Wales to the Severn, Macintyre and Barwon Rivers as far as the Mungindi Weir.

**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 <sup>2</sup> )	1,326	1,994
Maximum Discharge (ML/day)	380,000	1,890,000
Maximum Valve Capacity (ML/day) at 100% 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.

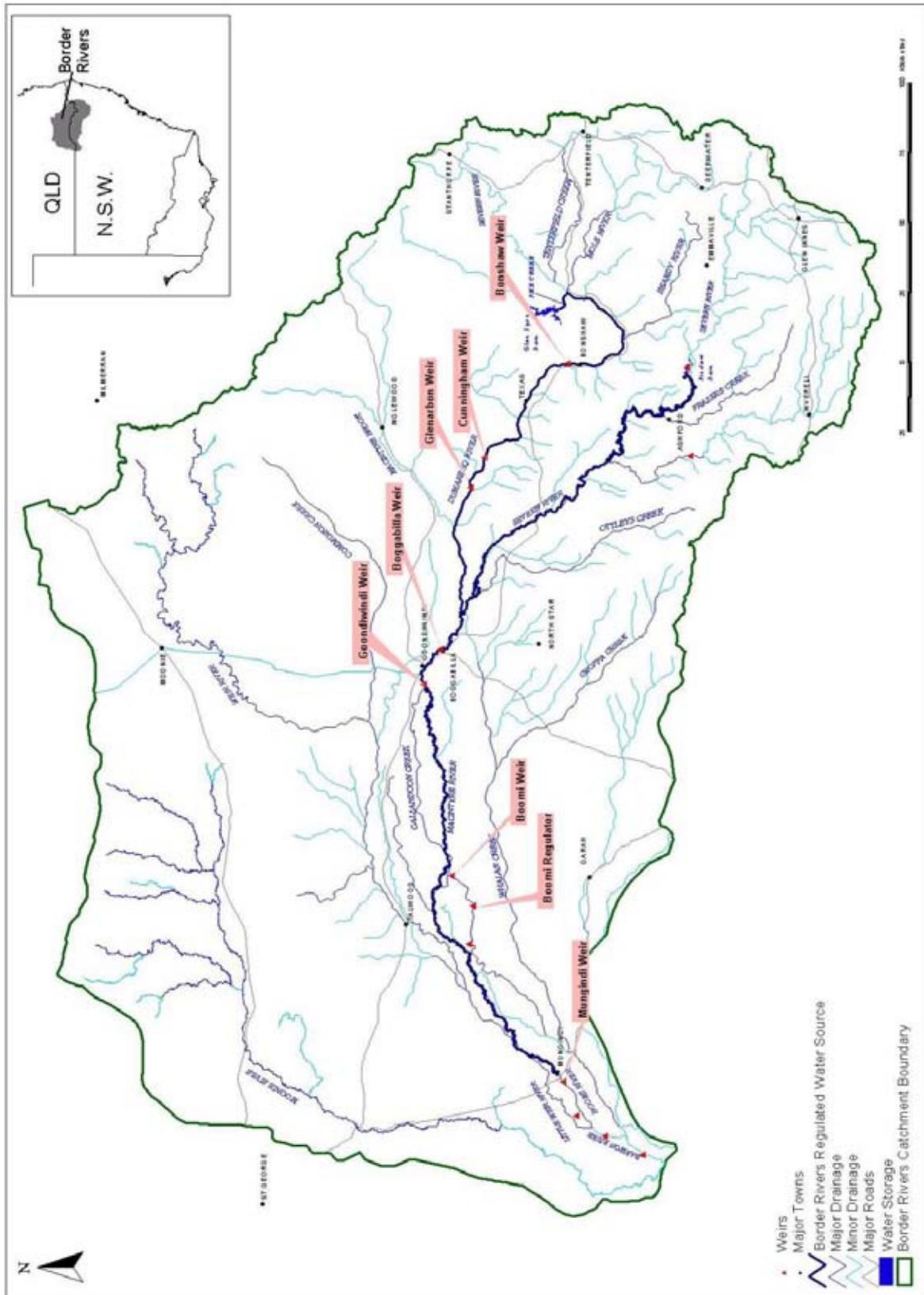
### **Weirs**

The table below 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. Location of weirs within the Border Rivers Catchment.



## 6. Major Elements of the Water Sharing Plan

### SECTION 1 PRELIMINARY DISCUSSION

This section of the Water Sharing Plan outlines the following:

- plan vision, principles and objectives;
- water for the environment;
- water for basic rights;
- water for licensed domestic and stock users and local water utilities;
- managing water extractions;
- access licences;
- access licence transfer guidelines (trading);
- system operation rules;
- mandatory conditions on access licences;
- implementation program;
- amendment of rules within the water sharing plan;
- performance indicators; and
- audit, review and reporting.

### SECTION 2 PLAN VISION, PRINCIPLES AND OBJECTIVES

#### Vision

“A sustainable, healthy working river system that meets community, environmental, agricultural and industrial needs.”

#### Objectives

##### **1. Water Sharing**

To manage the NSW Border Rivers Regulated River Water Source to ensure equitable sharing of water between all uses.

Desired outcomes:

- viable, productive communities;
- efficient use of the resource;
- fair, equitable and reliable access to water for all identified uses; and
- protection and enhancement of the environmental assets of the NSW Border Rivers Catchment.

##### **2. Environmental**

To implement environmental flow rules that protect, maintain and enhance the environmental, cultural and heritage values of the NSW Border Rivers Regulated River Water Source.

Desired outcomes:

- integrated protection, maintenance and enhancement of the flow related ecology of the NSW Border Rivers Regulated River Water Source.

### **3. Water Quality**

To maintain and where feasible improve the flow related water quality in the NSW Border Rivers Regulated River Water Source.

Desired outcomes:

- contribution to achieving:
  1. the Australian and New Zealand Environment and Conservation Council (ANZECC) water quality guidelines;
  2. enhanced and protected environmental, cultural and heritage values of water; and
  3. the NSW Government Water Quality Objectives (WQOs).

### **4. Basic Landholder Rights**

To manage the NSW Border Rivers Regulated River Water Source to preserve and provide for basic landholder rights.

Desired outcomes:

- basic landholder rights defined and protected.

### **5. Cultural and Heritage**

To manage the NSW Border Rivers Regulated River Water Source to preserve and enhance cultural and heritage values.

Desired outcomes:

- cultural and heritage values recognised, preserved and enhanced.

### **6. Consumptive Use**

To provide market based trading of surface water entitlements in the NSW Border Rivers Regulated River Water Source.

Desired outcomes:

- to provide for new entrants to the water market;
- to facilitate the movement of water to higher value uses;
- efficient use of water;
- more flexible agricultural practices;
- increase economic benefit to and viability of communities; and
- increase community value of water.

## **SECTION 3 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, and
- **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 a NSW and QLD Inter-governmental Agreement.

### **Planned Environmental Water**

Planned Environmental Water pertains to water that is generally committed to fundamental ecosystem health and cannot be used for other purposes. In order to manage this Planned Environmental Water, the following environmental water rules have been recommended:

#### **1. Continuous Low Flow Rule**

Maintain a minimum release of 10ML/day from Pindari Dam.

The continuous low flow rule will provide the following benefits:

- riparian flow;
- connectivity of downstream pools/riffles; and
- partial acknowledgment effect of Pindari Dam on curtailing extended recession.

#### **2. Translucency Rule**

“Translucency” refers to the immediate release of specified inflows into the dam.

The translucency arrangements are as follows:

- pass inflows up to 50ML/day during September to May; and
- pass inflows up to 200ML/day during June to August.

The translucency arrangements are intended to provide the following benefits:

- a reflection of natural flows downstream to the next point of significant inflow (Frazers Creek near Ashford),
- best outcome for ecological features in the system, and
- a consistent, deliverable and auditable arrangement.

#### **3. Stimulus Flow Rule**

Stimulus flow is a pulse of water released from Pindari Dam to stimulate natural ecological processes.

The stimulus flow arrangements are as follows.

- a stimulus flow shall be released on 1st September in any one year, triggered by an inflow greater than 1,200ML/day into Pindari Dam in the preceding months of April, May, June, July or August,
- the stimulus flow shall consist of a total of 4,000ML over a seven (7) day release period described below,

Day	ML/day
1	1,200
2	900
3	600
4	450
5	300
6	250
7	200

- there will be no provision for carry over from one year to the next.

The stimulus flow rule is intended to provide the following benefits:

- a flow in the river that mirrors a naturally occurring hydrograph;
- add benefit to any translucency environmental health releases;
- targeted pre-season cues to fish breeding;
- regularly wet and inundate the interconnected riparian areas primarily in the river downstream of Pindari Dam to the confluence with Frazers Creek; and
- an opportunity for more extensive stimulus flows in the system which will extend aquatic benefits further downstream into the known sites of significance to Holdfast.

This Plan also recognises that the Minister, under Section 323 of the Act, can declare under extreme emergency circumstances that a greater share of the flow can be maintained in this Water Source for the environment and human safety.

Instances where this may apply include, but are not limited to:

- algal blooms that threaten human and animal health; and
- chemical or other contaminant pollution (including excessive concentration of naturally occurring salts) where dilution flow is required.

### **Adaptive Environmental Water**

Any water held as part of an access licence which is committed for environmental purposes, either generally or at specific times or in specific circumstances, can either be excluded from extraction, or extracted for enhancing the ecology of a water dependent ecosystem within the conditions of a water use approval.

At the commencement of this Plan there are no access licences committed for environmental purposes in the NSW Border Rivers Regulated River Water Source.

## **SECTION 4 WATER FOR BASIC LANDHOLDER RIGHTS**

The Water Management Act 2000 provides landholders or occupiers of land which fronts a water source (river), and Aboriginal native title right holders, the basic right to extract water for domestic consumption or stock watering purposes without the need for an access licence. The Act also specifies supply of water to holders of licences or other rights must not

prejudice supply to basic rights holders. This means that the water supply to basic rights holders must have priority.

Supply to basic rights holders can be maintained during drought periods if sufficient reserves of water are held in storage and not used to provide allocations for general or high security licence holders. In the NSW Border Rivers Regulated River Water Source 18 months of basic landholder rights reserves are stored in Pindari and Glenlyon Dams.

### 1. Domestic and Stock Rights

Domestic and stock rights provide for household and stock requirements through extractions from this water source. Section 52 of the Act outlines the following domestic and stock rights:

1. an owner or occupier of a landholding is entitled, without the need for an access licence, water supply work approval or water use approval:
  - to take water from any river, estuary or lake to which the land has frontage or from any aquifer underlying the land, and
  - to construct and use a water supply work for that purpose, and
  - to use the water so taken for domestic consumption and stock watering, but not for any other purpose,
2. subsection (1) does not authorise a landholder to construct a dam or water bore without a water supply work approval.

It should be noted that:

- **domestic consumption**, in relation to land, means consumption for normal household purposes in domestic premises situated on the land.
- **stock watering**, in relation to land, means the watering of stock being raised on the land, but does not include the use of water in connection with intensive animal husbandry (eg feedlots).

The domestic and stock requirements for the NSW Border Rivers Regulated River Water Source are shown in Table 9.

**Table 9. Domestic and Stock Requirements for the NSW Border Rivers Regulated River Water Source.**

Water Source	Domestic and Stock Requirement (ML)	
	Volume (ML/yr)	Peak Daily Volume (ML/day)*
Border Rivers Regulated River Water Source	8,000	11

\* Peak volume is based on the water needed on the hottest summer day

If the above estimation proves to be too low during the term of the Plan, the reserves will be increased to satisfy the increased demands.

During exceptional drought circumstances, domestic and stock basic landholder right users can be restricted in accordance with procedures identified in the Implementation Program.

### 2. Harvestable Rights

The Water Act 1912 allowed unlimited development of farm dams for domestic and stock use providing that the capacity of a dam did not exceed 7 ML. This Statewide dam capacity limit was seen as being inappropriate for many parts of NSW as it made no allowance for the size of the property or for climatic variation.

In September 1998 a Farm Dams Policy, known as harvestable rights, was announced. This policy:

- recognised that landholders should have the right to a portion (10%) of the runoff from their property without needing a licence. This is known as the ‘harvestable right.’
- related this right to the size and location of the property rather than to a uniform Statewide dam size limit.
- gave greater flexibility to landholders by removing the restriction on what the water is used for.

The harvestable right:

- can be used for any purpose such as house and gardens, stock watering and irrigation.
- is non-transferable and is therefore attached to the property.
- does not require a licence, compulsory registration, fees or metering of water extraction.

The Farm Dams Policy has been carried over into the Water Management Act 2000 and is given effect by Section 53 of the Act and shall apply over this Plan.

### **3. Native Title Rights**

This allows a native title holder to take and use water without the need for an access licence, water supply work approval or water use approval.

The maximum amount of water that can be taken and used by a native title holder in a year for domestic and traditional purposes will be prescribed by regulations.

Native Title Rights as applied in Section 55 of the Act shall apply over this Plan.

## **SECTION 5 WATER FOR LICENSED DOMESTIC AND STOCK USERS AND LOCAL WATER UTILITIES**

A domestic and stock user will require a licence to use river water if their property does not have direct access to the river. Section 58 of the Water Management Act 2000 specifies that domestic and stock access licences and local water utility access licences must be given priority over regulated river (general security), regulated river (high security) and regulated river (supplementary water) access licences.

Currently the system is managed to ensure that full supply can be maintained to domestic and stock access licences and local water utility access licences during all but the worst droughts. The Plan’s rules continue this practice.

The current licence volumes for domestic and stock access licences and local water utilities in the NSW Border Rivers Regulated River Water Source are as follows:

**Table 10. Current Licence Volumes for Domestic and Stock Access Licences and Local Water Utilities.**

	<b>Current Licence Volume (ML)</b>
Domestic	318
Stock	887
Towns	620
Total	1825

Section 66 of the Water Management Act 2000 allows for variation in local water utility licences at the end of each five year period in response to variations in population or associated commercial activities. The Act also provides for the development and progressive application of drought management strategies to all towns in the State. This Plan allows for these adjustments during the period of the Plan and for any consequent modification of the plan rules.

## **SECTION 6 MANAGING WATER EXTRACTIONS**

### **1. 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 1% to 3% per year.

Growth in water extractions occur for one or more of the following reasons:

- an increase in activation of previously unused licensed entitlements;
- increased development of active licensed entitlements;
- harvesting of overland flows;
- growth in use by towns; and
- new licences.

Such growth can lead to the following undesirable outcomes:

- a weakening of efforts to protect and restore the health of our rivers and undermining of environmental flow rules, which are based on the level of diversions and impact on the flow regime;
- reduction in flows from upstream river systems into downstream systems; and
- reduction in the reliability of water available to existing consumptive users.

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.

The IGA and this Plan have defined specific environmental flow rules which will improve flow regimes and provide a better balance between river health and water diversions. To ensure that the defined environmental flow rules are not eroded it has been necessary to set a Water Sharing Plan Limit. The Water Sharing Plan Limit corresponds with the water use based on the development in 2001/2002, 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.

As water sharing plans will be set for a 10 year period, or longer on the recommendation from the Natural Resources Commission, it is essential that they include a clear strategy for responding to any growth in diversions. The strategy is an important component of the definition of licence holder's rights to access water over the life of the Plan.

In all Murray-Darling systems, including the Border Rivers, water sharing plans must consider two diversion limits:

- a *Water Sharing Plan Limit* – which is the long-term average water diversion based on the level of water use development assumed in the formulation of the water sharing plan and the water sharing plan's environmental rules and water sharing and management rules<sup>1</sup>; and,
- the Cap – the long-term average water diversion based on November 1999 development (as required under the Murray-Darling Basin Agreement).

The Water Sharing Plan for the NSW Border Rivers Regulated River Water Source has established both these limits within the framework of the Border Rivers IGA.

## **2. Adjusting for Growth Above the Water Sharing Plan 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:
  1. the Plan limit, and
  2. the Cap.

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 response trigger for extraction limit management in any one year should be a maximum of 3%. This trigger has been set 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 and Floodplain Harvesting Plans.

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.

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<sup>1</sup> Note: The long-term annual average extraction is defined as the average extraction under the rules established by the water sharing plan, over the IQQM simulation period used for analysis (in the case of the Border Rivers this is 110 years). The simulation allows for climatic variability.

### **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, by Ministerial order, 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) (eg 100%). Other categories of licence (high security, general security and supplementary access) will be described as megalitres per unit share of the licence share component (eg 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 Water and Energy 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 Water Sharing Plan specifies the rules that govern supplementary water licensing and management.

In the first instance, supplementary water access licences will be granted to all regulated river (general security) access licence holders in the ratio of 0.45 of a ML of supplementary access per each one ML share of regulated river (general security) access licence.

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

Access to supplementary water must not affect supply to other higher priority requirements. Therefore, supplementary water access may only be granted 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.

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. Upstream, small volumes of supplementary water are pumped direct onto crop on the recession of flows when low level pumps are able to be put back in position. Downstream, real time flows are able to be pumped into on farm storages at any stage of the flow.

The sections upstream are defined from Pindari Dam to Ashford, Ashford to Holdfast and Glenlyon Dam to Keetah with Ashford, Holdfast and Bonshaw defined as the flow measuring points respectively. Access to the flow is defined by commence to pump at certain flows and cease to pump when flows drop to agreed lower levels. These flows are described in the table below:

**Table 11. Commence to Pump and Cease to Pump Thresholds.**

Location	Summer (1 Sept to 28 Feb)		Winter (1 March to 31 August)	
	Commence to Pump (ML/day)	Cease to Pump (ML/day)	Commence to Pump (ML/day)	Cease to Pump (ML/day)
Ashford	500	150	100	50
Holdfast	1000	250	150	50
Bonshaw	750	250	150	50

For the section downstream of the Macintyre/Dumaresq junction, access will be described as a percentage of the supplementary access licence share component on an event by event basis. When unregulated flows exceed a certain volume at Goondiwindi, the two States will determine if the flow can be shared in accordance with the IGA rules. Each state will then announce access to its own licensees. NSW will announce this access as, for example, 5% of supplementary access share component.

The principle applied to supplementary access downstream of the Macintyre/Dumaresq junction is that:

- supplementary access will be announced downstream of the point of inflow, that is, an announcement should not be delayed to ensure that all users have equal access;
- the trigger to announce access is a total volume of unregulated flow on the current day's flow at Goondiwindi, plus the previous day's flow at Macintyre Brook at Booba Sands, Dumaresq River at Glenarbon and Macintyre River at Holdfast being greater than 5,000ML; and
- of this volume, an estimate of river losses is subtracted, then 25% is reserved for the environment and the balance is shared 50:50 between the States.

For example:

- the total volume of the event may be 10,000ML over the 2 days;
- the estimated losses may be calculated as 2,000ML;
- of the balance 25% is reserved for the environment, that is, a volume of 2,000ML; and
- then, the remaining 6,000ML is shared 50:50 between the 2 states, that is 3,000ML to each State.

At the commencement of this Plan it is estimated that the total NSW supplementary water share component (ie: amount that people with supplementary water licences can access) will be 120,000 ML.

For the first three years of operation, it is proposed that supplementary water access will be supported by the principle of a variable available water determination of 1.25 ML per unit share. This is to allow some time for licensees to adjust their shares closer to their individual historical extraction levels through trading.

### **5. Floodplain Harvesting**

Floodplain harvesting will not be a component of this Water Sharing Plan, but will be managed on a State-wide basis.

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; and
3. Opportunistic diversions from floodplains, depressions or wetlands using temporary pumps or other means.

Floodplain harvesting will be managed according to the State Floodplain Harvesting Policy that is currently being developed.

## **SECTION 7 ACCESS LICENCES**

### **Granting of Access Licences**

In July 1982 a statutory embargo was declared on the issuing of further general and high security licences in the Border Rivers Regulated River Water Source. The exceptions were towns, domestic and stock or research licences. This effectively set a limit to the volume of water that could be allocated for use.

The Water Management Act 2000 overrides this previous embargo and only allows the granting of applications for access licences for domestic and stock, local water utilities and Aboriginal cultural purposes.

### **Mandatory Conditions on Access Licences**

This section identifies examples of mandatory conditions to be placed on access licences. Examples of mandatory conditions are:

- flow meters of an appropriate standard shall be installed and maintained on all works used for accessing licensed entitlements;
- details such as water use, crop type, cropped areas, and property infrastructure shall be provided to the Department annually as specified in the implementation program; and
- licence holders will meet environmental flow rules with regards to extraction, timing and rates.

## **SECTION 8 ACCESS LICENCE TRANSFER GUIDELINES**

The Water Management Act 2000 allows water access licence holders to transfer either the whole or part of their licence. The Act requires that water transfer rules be developed as part of the core provisions of a Water Sharing Plan. It also requires these transfer rules to comply with State-wide transfer principles. An additional requirement for the Border Rivers is compliance with the interstate transfer principles in the Border Rivers Inter-governmental Agreement.

The transfer rules within the Plan set out conditions under which water entitlements can be transferred, such as:

- from this water source to other water sources within the NSW Border Rivers Water Management Area and vice versa (eg from unregulated river to regulated river). The NSW Border Rivers Water Management Area is defined as the area within the NSW Border Rivers Catchment;
- between river reaches within this water source; and
- between high and general security licence categories.

The transfer rules included in this Plan are summarised below:

### **1. Permanent Trading Rules (Transfer)**

The permanent trading arrangements are as follows:

- a regulated to regulated trading of high security water access licences with an exchange rate of 1:1;
- a regulated to regulated trading of general security water access licences with an exchange rate of 1:1;
- a regulated to regulated trading of high security water access licences to general security water access licences or vice versa with an exchange rate to be determined by the Minister;
- a domestic and stock water access licence can be converted to a domestic and stock water access licence (domestic only) subject to the share component volume remaining the same as the old access licence;
- a domestic and stock (stock only) water access licence can be converted to a regulated river (high security) access licence subject to provisions; and
- supplementary to supplementary trading, with the total allowable volume for trade not exceeding the maximum annual volume extracted in that river reach between the period from 1996/97 to 2002/03. (For example, if the maximum annual volume extracted between the period from 1996/97 to 2002/03 was 1,000ML then
- the maximum volume of water that could be traded in any one water year would be 1,000ML).

### **2. Term Trading Rules (Term Transfer)**

Term trades of different licence categories are possible for periods greater than 6 months. This is effectively a lease of a licence for an agreed period of time, which then reverts to the original owner.

### **3. Temporary Transfers (Assignment of Water Allocations)**

The temporary transfer (allocation assignment) arrangements are as follows:

- a regulated to regulated trade up to the buyer's storage account limit, that is, the trade cannot exceed the buyer's ability to store the water. This can be for either high or general security allocations;
- supplementary to supplementary trading, with the total allowable volume for trade not exceeding the maximum annual volume extracted between the period from 1996/97 to 2002/03. Supplementary allocation assignments are only for the duration of a current water year. (For example, if the maximum annual volume extracted between the period from 1996/97 to 2002/03 was 1,000ML then the maximum volume of water that could be traded in any one water year would be 1,000ML); and
- allocation assignments cannot be done from supplementary to any other category of licence.

#### **4. Conversions**

The conversion arrangements are as follows:

- conversions are to be allowed from general security to high security and vice versa subject to the development of an appropriate conversion factor that does not impact negatively on general security reliability; and
- the maximum volume limit for the conversion of general security to high security licences is set at 1% of the total volume of general security licences over the term of the Plan.

#### **5. Other Trading Rules**

Other trading rules include those involving the transfer of water access licences between the NSW Border Rivers Regulated River Water Source and other water sources. These arrangements are as follows:

- trading from regulated to unregulated licence holders is allowed within the NSW Border Rivers Water Management Area subject to the Minister determining an exchange rate that has zero impact on the NSW Border Rivers Regulated River Water Source; and
- regulated entitlements may also be allowed to be transferred from the NSW Border Rivers Regulated River Water Source to the Barwon River downstream of Mungindi under the following conditions:
  1. zero impact on the NSW Border Rivers Regulated River Water Source;
  2. the development of an appropriate loss function; and
  3. the concurrence of the Barwon-Darling Water Sharing Plan.

#### **6. Inter-state Trading Rules**

Trading will be allowed between NSW and Queensland subject to interstate agreements, conversion factors and account limits.

### **SECTION 9 SYSTEM OPERATION RULES**

This section includes rules for the management of the following:

- water supply works;
- flood operation; and
- 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; and
- 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; and
- 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.

## **SECTION 10 IMPLEMENTATION PROGRAM**

Prior to the commencement of a Water Sharing Plan, the Department will prepare a Water Sharing Implementation Program. The Implementation Program will detail the management targets that will deliver the outcomes of the Plan. The Act requires the Implementation Program to be reviewed annually for the purpose of determining whether it is effective in implementing the Water Sharing Plan.

The Implementation Program will be supported by an Implementation Manual, which will provide detailed rules that guide the Department and State Water in its day to day operation and management within the Water Sharing Plan area.

The Implementation Program and Manual must be in accordance with the rules and objectives of this Water Sharing Plan.

## **SECTION 11 ADJUSTMENT OF RULES WITHIN THE WATER SHARING PLAN**

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. Possible factors could include:

- changes to system infrastructure which affect system operation;
- legislative changes (Federal or State);
- operation of other existing Acts (such as Threatened Species);
- legal decisions that force changes in Water Sharing Plan rules; and
- changes to system inflows resulting from inter-basin transfers.

This Plan does not identify any specific areas that will be subject to change under this section of the Act.

Section 323 of the Water Management Act 2000, allows for the Minister to stop or restrict the taking of water temporarily. This temporarily adjusts the rules of the Plan in order for the NSW Border Rivers Regulated River Water Source to respond and implement the temporary water restrictions.

## **SECTION 12 PERFORMANCE INDICATORS**

Performance indicators need to be developed in order to check the functioning of a Water Sharing Plan against its objectives. These will require the monitoring of various aspects of the river system, water use, flows and environmental indicators to allow for future review of the effectiveness of this Plan.

The performance indicators that will be used to monitor the effectiveness of the Plan are outlined in Appendix 4 of Part B.

## **SECTION 13 AUDIT, REVIEW AND REPORTING**

The Act specifies that within the fifth year of the Plan, it is to be reviewed for the purpose of ascertaining whether its provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles (Appendix A1). The monitoring of performance indicators specified in the Plan will inform this review.

This Plan should also be reviewed in conjunction with the IGA.

## **SECTION 14 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% 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.

## **SECTION 15 HOW YOU CAN HAVE YOUR SAY**

The draft Plan is now on public exhibition. Any person may make a submission on the draft Plan. There are four ways you can make a submission.

Send a written response to:

Kristanne Mahony  
Department of Water and Energy  
PO Box U245  
ARMIDALE NSW 2351

Complete the standard submission form and post to the above address, or  
fax to (02) 6773 5290.

More copies of the form can be printed from the Department's website at [www.naturalresources.nsw.gov.au](http://www.naturalresources.nsw.gov.au) or obtained from the Head Office or regional offices.

Send an email to [kristanne.mahony@dnr.nsw.gov.au](mailto:kristanne.mahony@dnr.nsw.gov.au)

The submissions will be forwarded to the Committee for its consideration, review and further advice to the Minister in regard to the draft Plan. The Minister for Climate Change, Environment and Water may then make the water sharing plan by order published in the NSW Government Gazette.

## **SCHEDULE A1 Bibliography**

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NSW Department of Land and Water Conservation, 2001, Riverine condition assessment of the Macintyre catchment, Tamworth, NSW.

NSW Department of Water Resources, 1995, Water Resources of the Border Rivers System in Northern New South Wales, Sydney, NSW.

## SCHEDULE A2 Inter-Governmental 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.

## APPENDIX A1 Water Management Principles

The Water Management Principles as set out in the Water Management Act 2000 are as follows:

Generally:

1. water sources, floodplains and dependent ecosystems (including groundwater and wetlands) should be protected and restored and, where possible, land should not be degraded, and
2. habitats, animals and plants that benefit from water or are potentially affected by managed activities should be protected and (in the case of habitats) restored, and
3. the water quality of all water sources should be protected and, wherever possible, enhanced, and
4. the cumulative impacts of water management licences and approvals and other activities on water sources and their dependent ecosystems, should be considered and minimised, and
5. geographical and other features of indigenous significance should be protected, and
6. geographical and other features of major cultural, heritage or spiritual significance should be protected, and
7. the social and economic benefits to the community should be maximised, and
8. the principles of adaptive management should be applied, which should be responsive to monitoring and improvements in understanding of ecological water requirements.

In relation to water sharing:

1. sharing of water from a water source must protect the water source and its dependent ecosystems, and
2. sharing of water from a water source must protect basic landholder rights, and
3. sharing or extraction of water under any other right must not prejudice the principles set out in paragraphs (a) and (b).

In relation to water use:

1. water use should avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land should be rehabilitated, and
2. water use should be consistent with the maintenance of productivity of land in the long term and should maximise the social and economic benefits to the community, and
3. the impacts of water use on other water users should be avoided or minimised.

In relation to drainage management:

1. drainage activities should avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land should be rehabilitated, and
2. the impacts of drainage activities on other water users should be avoided or minimised.

In relation to floodplain management:

1. floodplain management must avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of

native vegetation or, where appropriate, salinity and, where possible, land must be rehabilitated, and

2. the impacts of flood words on other water users should be avoided or minimised, and
3. the existing and future risk to human life and property arising from occupation of floodplains must be minimised.

In relation to controlled activities:

1. the carrying out of controlled activities must avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land must be rehabilitated, and
2. the impacts of the carrying out of controlled activities on other water users must be avoided or minimised.

In relation to aquifer interference activities:

1. the carrying out of aquifer interference activities must avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land must be rehabilitated, and
2. the impacts of carrying our aquifer interference activities on other water users must be avoided or minimised.

## APPENDIX A2 Border Rivers Regulated River Management Committee Members

### Executive

William Eastgate	Chairman
Tara Schalk	Executive Officer
Emma Mills	Committee Support Officer
Michelle Chittenden	Committee Support Officer

### Members

David Coulton  
Matthew White  
Daryl Cleeve  
Bruce Coward  
Bruce McCollum  
Sarah Moles  
Rachael Young  
Karen Hindmarsh  
Fred Barlow  
Kelly Hudson  
Patrick Dwyer  
Peter Christmas  
Daryl Albertson  
Albert Dennison  
Reginald McGrady

### Stakeholder Organisation

Border Rivers Food and Fibre, Macintyre River Basin Water Users Association  
Border Rivers Food and Fibre, Pindari Water Users Association  
Border Rivers Food and Fibre, Dumaresq Valley Irrigators Association  
Border Rivers Food and Fibre, Mungindi Water Users & Cotton Growers Association  
Border Rivers Food and Fibre, Border Rivers Catchment Management Board  
World Wild Fund for Nature  
Nature Conservation Council of NSW  
Border Rivers-Gwydir Catchment Management Authority  
Local Government Shires Association  
Department of Primary Industries  
Department of Primary Industries  
Department of Water and Energy  
Department of Environment and Conservation  
Border Rivers Aboriginal Community  
Border Rivers Aboriginal Community

### Alternate Members

Susan Marchant  
Tim Ramsay  
Colin Dight  
Jon Grainger  
Paul Magner  
Bob Freebairn  
Adrian Harte  
Julie Whitton

### Stakeholder Organisation

Border Rivers Food and Fibre, Macintyre River Basin Water Users Association  
Border Rivers Food and Fibre, Dumaresq Valley Irrigators Association  
Border Rivers Food and Fibre, Pindari Water Users Association  
Border Rivers Food and Fibre, Mungindi Water Users & Cotton Growers Association  
Border Rivers Food and Fibre, Mole & Sovereign Water Users Association  
Department of Primary Industries  
Department of Water and Energy  
Border Rivers Aboriginal Community

## APPENDIX A3 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%) of the runoff from their property without needing a licence.

**local water utility** means:

1. a water supply authority established by the Act, or
2. 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:

- any watercourse, whether perennial or intermittent and whether comprising a natural channel or a natural channel artificially improved, and
- any tributary, branch or other watercourse into or from which a watercourse referred to in paragraph flows, and
- 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:

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

**water supply** work means:

- a work (such as a pump or water bore) that is constructed or used for the purpose of taking water from a water source, or
- a work (such as a tank or dam) that is constructed or used for the purpose of:
  1. capturing or storing rainwater run-off, or
  2. storing water taken from a water source, or
- 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, or
- 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, or
- 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:
  1. any works that receives water from a water supply work under the control or management of a local water utility, or
  2. any work declared by the regulations as not being a water supply works.