Department of Primary Industries
Water

Water Sharing Plan for the Tuross River Unregulated and Alluvial Water Sources

Background document

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Water Sharing Plan for the Tuross River Unregulated and Alluvial Water Sources: Background document

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More information

Rural Water Planning

www.dpi.nsw.gov.au

Acknowledgments

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Introduction

Water sharing plans are being progressively developed for rivers and groundwater systems across New South Wales following the introduction of the *Water Management Act 2000* (WMA 2000). These plans protect the health of our rivers and groundwater while also providing water users with perpetual access licences, equitable conditions, and increased opportunities to trade water through separation of land and water.

The first round of water sharing plans commenced on 1 July 2004. The development of these plans resulted in around 80% of the water use in NSW being managed under the WMA 2000. By the end of 2012, over 95% of all water extracted in NSW was covered by a water sharing plan. By the end of 2016 it is anticipated that all extraction in NSW will be covered by a water sharing plan.

Water sharing plans for the unregulated[1] rivers and groundwater systems have been completed using a broad scale 'macro' approach based on whole river catchment or aquifer systems. Each macro plan covers a large river basin rather than a single subcatchment, or in the case of groundwater systems, cover a particular type of aquifer (for example fractured rock). These river basin or aquifer macro plans will generally apply to catchments or aquifers where there is less intensive water use.

This document provides background to the development of the rules in the Tuross River water sharing plan. It includes information on the purpose of the plan and the policy framework that supports it, a description of the Tuross catchment including land and water use, and the process of developing the various water sharing rules in the plan.

This document is part of a range of material available specifically on the plan including:

- the *Water Sharing Plan for the Tuross River Unregulated and Alluvial Water Sources 2016* - a legal instrument written in its required statutory format
- *An overview of water sharing plans for unregulated and alluvial water sources in coastal NSW*
- Rule summary sheets for each water source detailing the management rules.

General information on the macro planning process is available in the water sharing plans section of the DPI Water website www.water.nsw.gov.au. This includes:

- *Macro water sharing plans – the approach for unregulated rivers. A report to assist community consultation* – explains the method used to classify and set water sharing rules for unregulated streams across the state
- *Macro water sharing plans – the approach for unregulated rivers. Access and trading rules for pools* – explains the method used to set access and trading rules for pools in unregulated water sources across the state
- *Macro water sharing plans – the approach for groundwater. A report to assist community consultation* – explains the method used to classify and set water sharing rules for groundwater across the state
- *Setting rules for water sharing plans* – information outlining the key steps for developing the rules.

[1] The supply of water in unregulated rivers is typically not controlled by releases of water from dams but rather is dependent solely on rainfall and natural river flows.

Why are water sharing plans being prepared?

Expansion of water extraction across NSW in the twentieth century has placed most valleys at or close to the limit of sustainable water extraction. This has seen increasing competition between water users (towns, farmers, industries and irrigators) for access to water. This has also placed pressure on the health and biological diversity of our rivers and aquifers.

In December 2000, the NSW parliament passed the WMA 2000 which has the overall objective of "sustainable and integrated management of the State's water for the benefit of both present and future generations" (DLWC 2001). Water sharing plans play a major role in achieving this objective by providing a legal basis for sharing water between the environment and consumptive water users.

Under the WMA 2000, water sharing plans must protect water sources and their dependent ecosystems, and must protect the basic rights of landholders to extract water. In this way, environmental water and basic landholder rights are afforded priority over licensed water extractions. Among licensed water users, priority is given to water utilities and licensed stock and domestic use, ahead of commercial purposes such as irrigation and other industries.

Water sharing plans also recognise the economic benefits that commercial users such as irrigation and industry can bring to a region. When a plan commences, access licences held under the *Water Act 1912* are converted to access licences under the WMA 2000 which separates the water licences from land tenure. This facilitates the trade of access licences and encourages more efficient use of water resources. It also allows new industries to develop as water can move to its highest value use.

In conjunction with the WMA 2000, water sharing plans also set rules so that commercial users can continue to operate productively. In general, commercial licences under the WMA 2000 are granted in perpetuity, providing greater commercial security of water access entitlements. Water sharing plans define the access rules for commercial users for ten years providing all users with greater certainty regarding sharing arrangements.

Benefits for water users

The introduction of water sharing plans will benefit water users by providing:

- greater certainty by setting water sharing arrangements for a 10 year period
- clear trading and access rules which will help foster trading of water
- greater security with existing water licences converted to perpetual water access licences under the WMA 2000

Environmental considerations

Water sharing plans are required to reserve water for the overall health of the river and to protect specific ecosystems that depend on river flows, such as wetlands, lakes, estuaries and floodplains. This share of water reserved for the environment is also intended to sustain the river system's aquatic fauna and flora. The Tuross River water sharing plan sets rules for unregulated streams and alluvial aquifers in the plan area.

Unregulated streams

Rivers naturally experience a range of flows which are necessary for different hydrologic, geomorphic, biological and chemical processes to occur. Flood flows are required to scour channels, rework sediments, and inundate floodplains; medium flows oxygenate water and allow fish passage; and low flows maintain connectivity and assist the survival of aquatic and riparian flora and fauna. To preserve a healthy river system this range of stream flows must be maintained.

In order to protect a proportion of these flows for the benefit of the environment, water sharing plans impose new access restrictions on days when stream flows are low. This is

achieved by establishing cease-to-pump rules that require users to stop taking water when flows fall below a set level.

Each water source in the Tuross River water sharing plan area has been classified as having high, medium or low instream values. Water sources with high instream value are protected through the plan by not allowing any water licences to be traded into the water source. Trades are allowed into some water sources with lower value in order to encourage the movement of extraction from higher to lower environmental value areas.

Alluvial aquifers

Aquifers are underground layers of water-bearing permeable rock or unconsolidated materials (gravel, sand, silt or clay) from which groundwater can be extracted. Aquifers can store large volumes of water, often accumulated over thousands, or tens of thousands of years. Water enters (or recharges) aquifers via rainfall, surface flows from rivers and lakes, or flow from adjacent aquifers. Water sharing plans aim to achieve sustainable groundwater extraction by limiting extractions to a proportion of the aquifer recharge. The remainder of the recharge is reserved for the environment.

The Tuross River water sharing plan defines cease-to-pump rules for alluvial aquifers in the plan area. Water sharing rules for fractured rock and porous rock aquifers are dealt with in the *Water Sharing Plan for the South Coast Groundwater Sources 2016* (hereafter referred to as the South Coast groundwater sharing plan).

The Tuross River water sharing plan also includes rules on the location of new works and extraction from existing works to protect high priority groundwater dependent ecosystems and other environmentally sensitive areas such as rivers or streams.

A water sharing plan for the Tuross River

Water users in the Tuross catchment have been voluntarily sharing water for many years. This water sharing plan formalises water sharing arrangements in the river and provides a consistent approach to managing water across the plan area.

Replacement plan for Wandella Creek

The *Water Sharing Plan for the Wandella Creek Water Source 2004* commenced on 1 July 2004. This plan was one of the first water sharing plans in NSW and expired in 2016. In May 2014 the Minister for Land and Water approved the replacement of this plan based on reports from the Natural Resources Commission and the former NSW Office of Water (NRC 2013 and DPI Office of Water 2013). The Minister advised that any proposed changes to these early plans must be permitted under the WMA 2000 and need to consider the significant amount of consultation that was undertaken in their initial development.

The development of a water sharing plan for the whole of the Tuross River catchment provides the opportunity to merge the water sharing arrangements for Wandella Creek into the Tuross River water sharing plan, bringing it into line with the current legislative and policy framework for water sharing in NSW. All unregulated water in the Tuross River will now be governed by the one plan. The *Water Sharing Plan for the Tuross River Unregulated and Alluvial Water Sources* will set the rules for water sharing arrangements until 30 June 2026 providing certainly to water dependant businesses and the environment.

Changes to the provisions of the original Wandella water sharing plan have occurred for a number of reasons including: changes to policy, updates to legislation, updated data, outcomes of audits, and stakeholder requests. As the provisions in this plan area have been operating for over a decade, and the initial plans were developed in close consultation with stakeholder groups, DPI Water has aimed to avoid unnecessary changes and focus on improving provisions based on the information sources mentioned above.

Objectives of the plan

The objectives of the Tuross River water sharing plan are to:

a) protect, preserve, maintain and enhance the important river flow dependent and high priority groundwater dependent ecosystems of these water sources, and

b) protect, preserve, maintain and enhance the Aboriginal, cultural and heritage values of these water sources, and

c) protect basic landholder rights, and

d) manage these water sources to ensure equitable sharing between users, and

e) provide opportunities for enhanced market based trading of access licences and water allocations within environmental and system constraints, and

f) provide water allocation account management rules which allow sufficient flexibility in water use, and

g) contribute to the maintenance of water quality, and

h) provide recognition of the connectivity between surface water and groundwater, and

i) adaptively manage these water sources, and

j) contribute to the “environmental and other public benefit outcomes” identified under the “Water Access Entitlements and Planning Framework” in the *Intergovernmental Agreement on a National Water Initiative (2004)*.

Scope of the plan

The Tuross River water sharing plan covers two discrete water resources: unregulated rivers and alluvial groundwater. Since there are no regulated rivers in the plan area, the water sharing plan applies to all rivers in the plan area. Incorporating both the surface and groundwater resources into the one plan recognises their interaction and allows for the development of water sharing rules that are linked and are equitable within and between these resources.

Water sharing plans divide plan areas into several 'water sources', which usually coincide with sub-catchment boundaries. Access and trading rules are developed for each of these water sources. If water sharing rules need to be more refined, water sources may be divided into management zones. Conversely, rules about annual extractions are generally made at a broader scale within extraction management units (EMUs), which usually consists of several water sources.

The Tuross River water sharing plan defines 22 water sources and two EMUs. The Tuross River EMU includes 16 water sources and the Tuross Coastal Streams EMU includes six water sources.

The Wandella Creek Water Source is further divided into two management zones:

- Wandella Creek Upstream Management Zone (upstream of Illawambra Weir)
- Wandella Creek Downstream Management Zone (downstream of Illawambra Weir).

The location and extent of these water management units are shown on the map in Appendix 1 and listed in Appendix 2.

Policy and planning framework

A number of national, state and regional plans and policies guided the development of water sharing plans for the NSW South Coast, including:

- *Water Management Act 2000*;
- *Access Licence Dealing Principles Order 2004*;
- National Water Initiative;
- Natural Resource Commission state-wide targets;
- Catchment Action Plans; and
- Water planning policies and other considerations.

The Water Management Act 2000

The *Water Management Act 2000* (WMA 2000) was passed by NSW Parliament in December 2000, establishing a new statutory framework for managing water in NSW. The objective of the Act is to ensure the sustainable and integrated management of the state's water for the benefit of both present and future generations.

The WMA 2000 is based on the concept of ecologically sustainable development – managing current development so that it will not threaten the availability of resources for future generations. The WMA 2000 also recognises the need to allocate water for the environmental health of our rivers and groundwater systems, while also providing licence holders with more secure access to water and greater opportunities to trade water through the separation of water access from land title.

Water sharing plans are the main tool through which the WMA 2000 achieves its objective. The major changes required to water management have meant that the WMA 2000 has been progressively implemented, and the *Water Act 1912* progressively phased out as water sharing plans commence.

The latest copy of the Water Management Act 2000 is available from the NSW government legislation website.

Access Licence Dealing Principles

The *Access Licence Dealing Principles Order 2004* (hereafter referred to as the Dealing Principles) draws on the objects and water management principles of the WMA 2000 and provides state-wide guidance and rules for applications to undertake water dealings including trade.

The Dealing Principles specify that dealings must consider:

- the impacts on other water users;
- the impacts on the water source;
- the impacts on indigenous, cultural, heritage and spiritual matters; and
- maximising social and economic benefits.

The Dealing Principles specify rules for different types of dealings (such as conversion to a new category, subdivision, consolidation, assignment of rights or allocation, changing water sources, amending extraction components and interstate dealings). They specify the requirements that must be met for a dealing to be permitted, and the conditions under which a dealing is prohibited.

Water sharing plans must be consistent with the Dealing Principles. Water sharing plans can also put additional restrictions in place such as restricting trade into a particular area due to its environmental values or hydrologic stress.

National Water Initiative

The National Water Initiative (NWI) was signed by the Council of Australian Governments (COAG) in June 2004. Through the NWI, governments across Australia have agreed on actions to achieve a more cohesive national approach to managing, measuring, planning, pricing and trading water. The NWI recognises the continuing need to increase the productivity and efficiency of Australia's water use, whilst servicing rural and urban communities, and ensuring the health of river and groundwater systems.

Until the end of 2014 the NWI was implemented and monitored by the National Water Commission. Its responsibility for assessing each state's progress with the NWI and providing independent advice to the Commonwealth Government has now been taken over by the Commonwealth Productivity Commission.

Natural Resource Commission targets

The Natural Resource Commission (NRC) was established in 2003 to provide the NSW Government with independent advice on natural resource management issues. To achieve this, the NRC has developed a Standard for Quality Natural Resource Management, along with 13 state-wide targets for natural resource management which have been embedded in the NSW State Plan. The Standard is designed to apply to natural resource management at all scales including at the state, regional, catchment and local level.

The NRC's Standard requires the use of the best available knowledge, appropriate information management systems, delivery of integrated outcomes, engagement of the community and regular monitoring, measuring, evaluation and reporting to specify how delivery of the targets are progressing. The NRC reviews water sharing plans against this standard and its associated targets. In 2013 the NRC reviewed 31 water sharing plans that were due to expire in 2014, and extended to 2016, and provided advice to the Minister for Primary Industries.

In 2012 the NRC reviewed the state-wide standard and targets, including monitoring, evaluation and reporting arrangements in NSW. They recommended five new state-wide targets that provide a sharper focus on the key long-term issues of concern to the Government and community and revised the monitoring, evaluation and reporting strategy to support the implementation of the new targets.

Catchment Action Plans

Catchment Action Plans are statutory, non-regulatory plans that were previously prepared by the state's catchment management authorities under the *Catchment Management Authorities Act 2003* (now repealed). In January 2014 the NSW Government established Local Land Services and transferred the functions of catchment management authorities into this new organisation. South East Local Land Services are responsible for continuing the delivery of natural resource management programs on the south coast.

The Southern Rivers Catchment Action Plan 2023 is a 10-year strategic plan that sets the direction for the sustainable use and care of the natural resources of the south coast and Snowy region. The Tuross River water sharing plan contributes to the goals and targets of this plan, in particular Goal 3, relating to the maintenance of diverse, healthy, connected and productive natural environments. The implementation of water sharing plans on the south coast is one of the key strategies to be implemented in supporting land and water managers to maintain or improve the condition of priority freshwater, marine and estuarine assets (SRCMA 2013).

Water planning policies and considerations

A number of policies and guidelines have been developed since commencement of the WMA 2000. These policies have arisen in response to specific water management issues that need to be considered during the development of water sharing plans. These policies directly influence the planning process and the formulation of water sharing rules.

Protecting pools, lagoons and lakes

Pools in NSW can provide an important source of water for licence holders, landholders and communities. Pools also have a key ecological function as a critical refuge and habitat for flora and fauna. For the purpose of this policy a pool refers to any lentic water bodies (standing water) within or associated with unregulated rivers in NSW, including water bodies that fall within the definition of a lake according to the Dictionary of the WMA 2000 (the exception is tidal pools and estuaries).

The policy document *Macro water sharing plans – the approach for unregulated rivers. Access and trading rules for pools* can be found on the DPI Water website www.water.nsw.gov.au. This document provides guidance for Interagency Regional Panels in setting water access and trading rules for pools that are covered by unregulated river water sharing plans.

The general approach is to establish a default access rule where no draw down is allowed below full pool capacity for the majority of pools. This default rule may be reviewed where it is justifiable and feasible to do so, to allow limited access to pools based on local hydrological, environmental and socio-economic considerations.

Default rules vary depending on the pool type. Generally the default rule for artificial pools is to adopt the existing licence conditions; however in some circumstances where this may not be appropriate, alternate rules will need to be developed. For natural pools, the default rule requires users to stop pumping when the pool is less than its full capacity (approximated by the greatest pool volume at which there is no visible flow leaving the pool).

The plan process does allow for more lenient access rules to be set if the default rules would significantly impact on current irrigation operations.

Managing surface water and groundwater connectivity

A key objective of the NWI is ‘recognition of the connectivity between surface and groundwater resources and connected systems managed as a single resource’. Most alluvial aquifers have a relatively high degree of connectivity with their associated surface water sources. Accordingly, most alluvial water sources are included in a water sharing plan that covers both surface water and its connected alluvial groundwater. Conversely, most porous rock, fractured rock and coastal sands aquifers are considered to have a lesser degree of connectivity and are included in groundwater-specific plans.

The document *Macro water sharing plans – the approach for groundwater. A report to assist community consultation* provides further information about the principles used to develop water sharing rules for groundwater sources.

Protecting basic landholder rights

As defined under the WMA 2000, basic landholder rights (BLR) consist of domestic and stock rights, harvestable rights and native title rights. Water may be extracted under these rights without the need for a water access licence; although where groundwater is accessed under a domestic and stock right, the bore must still be approved by DPI Water.

The WMA 2000 requires that water sharing must protect BLR. The plan does this by identifying the requirements for domestic, stock and native title rights at the start of the plan and considering these requirements when designing the rules for licensed water extraction. Because the access rules for licensed extraction do not apply to BLR, extractions taken under BLR are afforded higher priority than licensed extractions.

The requirements of harvestable rights have been inherently considered in the water sharing process, as access rules are based on river flows that result after harvestable rights extractions have occurred. There are currently no extractions for native title rights, however the plan allows for these rights should they be activated during the plan's ten year term.

Domestic and stock rights can be restricted by the Minister to protect the environment or public health, or to preserve existing BLR. However, these restrictions are outside the framework of the water sharing plan.

The Tuross River water sharing plan provides an estimate of the water requirements for BLR within each water source, noting that these rights may increase during the life of the plan. The water sharing plan cannot limit or restrict these rights, but the WMA 2000 provides for restrictions on BLR through the development of mandatory guidelines.

Protecting town water supply access

Under the WMA 2000, extractions for town water supply are afforded a higher priority than extractions for commercial purposes such as irrigation. Water sharing plans recognise this priority by ensuring that a full share of water is allocated for annual town water supplies except where exceptional drought conditions prevent this. Local water utilities (LWUs) such as local councils are issued with local water utility access licences. The WMA 2000 allows for annual trade but not permanent trade of entitlement between local water utility access licences.

Protecting Aboriginal values

Aboriginal people have a spiritual, customary and economic relationship with land and water that provides an important insight into natural resource management. The NSW Government established the Aboriginal Water Initiative in 2012 to facilitate effective engagement with Aboriginal communities in the water sharing process and ensure that measurable Aboriginal water outcomes are achieved. The Initiative aims to build Aboriginal peoples' capacity to participate as water users, protect their rights to water, maintain a healthy environment, and take full advantage of economic opportunities.

Water sharing plans recognise the importance of rivers and groundwater to Aboriginal culture. The plans will allow Aboriginal communities to apply for water access licences for cultural purposes such as manufacturing traditional artefacts, hunting, fishing, gathering, recreation and for cultural and ceremonial purposes. Aboriginal cultural licences can also be used for drinking, food preparation, washing and watering domestic gardens. These cultural licences are limited to 10 ML/yr per application. Opportunity for granting licences for Aboriginal cultural purposes throughout the Tuross catchment is included in the water sharing plan.

For further information refer to *Our Water Our Country. An information manual for Aboriginal people and communities about the water reform process* which is available from the DPI Water website www.water.nsw.gov.au.

Protecting estuary health

Streamflow and groundwater discharge have an influence on many ecological components of an estuary, and play a significant role in the health of these systems. Water extraction from surface water or groundwater sources may have an impact on the ecological health of estuaries. Some estuaries are highly sensitive to freshwater inflows, whilst others are more resilient to changed inflows. The size and shape of estuaries vary and this, combined with the amount of freshwater inputs and extractions, determines the estuary's overall sensitivity to freshwater extraction. Where possible, extractions will be limited in catchments found to be highly sensitive to freshwater inflows.

The document *Macro water sharing plans – the approach for unregulated rivers. A report to assist community consultation* provides further information about the principles used to determine estuary sensitivity to freshwater inflows.

Water interception activities

Changes in land use activities can potentially result in the interception of significant quantities of surface runoff and throughflow. Activities that can impact on water quantity include increased farm dam capacity or the development of significant areas of new forestry plantations in a catchment. Under the National Water Initiative, significant interception activities should be accounted for within a plan's extraction limit.

Water sharing plans cannot restrict the volume of water collected under harvestable rights[2] but can place restrictions on instream dams – dams that are located on streams of third order or higher. Under state-wide policy the construction of new instream dams is prohibited in those water sources in which high instream values have been identified.

Placing restrictions on forestry activities is beyond the scope of the water sharing plan. DPI Water recognises the potential impacts of forestry activities on catchment hydrology and is currently developing state-wide policy in relation to this issue.

[2] The maximum harvestable right dam capacity is calculated based on providing the ability to harvest 10% of the mean annual runoff from the landholder's property. It is determined using a calculator provided on the DPI Water website, with input parameters being property location and property size.

Description of the plan area

Catchment description

The area covered by the Tuross River water sharing plan (Appendix 1) comprises the Tuross River catchment and adjoining coastal catchments of Brou Lake, Coila Lake, Corunna Lake, Lake Mummuga, Tilba Tilba Lake and Wagonga Inlet. It contains a total of 22 water sources covering an area of around 6,900 km^2 on the south coast of NSW. The Tuross River catchment consists mainly of steep, heavily forested land. The major towns of Tuross Head, Bodalla, Dalmeny, Kianga and Narooma are all located on the coastal plain.

The Tuross River catchment is bounded to the north by the Deua River catchment, to the south by the Bega - Brogo River Basin, and to the west by the Kybeyan Range which forms part of the Great Dividing Range. The major tributaries that enter the Tuross River include Wadbilliga River, Belimbla Creek, Wandella Creek, Gulph Creek, Reedy Creek and Bumbo Creek.

The Tuross River terminates in a complex estuarine lake and wetland system which opens to the sea at Tuross Head. The Tuross estuary covers 15.5 km^2 and is classified as a barrier estuary which is wave dominated with an open entrance (OEH 2012). The tidal limit in the Tuross River is located at Comerang 19 km from the ocean entrance (9 km upstream of the Princes Highway Bridge).

A number of small coastal streams that do not flow directly into the Tuross River are included in the Tuross River water sharing plan. These are Coila Lake to the north and Brou Lake, Corunna Lake, Lake Mummuga, Wagonga Inlet and Tilba Tilba Lake which are all south of the Tuross River. With the exception of Wagonga Inlet all of these catchments comprise small coastal streams that terminate in shallow estuarine lakes that are intermittently open to the sea.

Wagonga Inlet is a wave dominated estuary that covers an area of 6.9 km^2 with an identified catchment area of around 110 km^2. The entrance of the inlet has been open to the sea permanently since the construction of two entrance training walls in the 1970s.

Water management structures

All of the rivers and creeks in the Tuross River water sharing plan area are unregulated, having no major dams for water supply or instream structures. Most water users rely on natural flows for their water supply, although some small dams and weirs may be present.

Bega Valley Shire Council maintains Illawambra Weir in the upper catchment of Wandella Creek. This small dam has a capacity of 4.5 ML and has in the past been used for supplying water for Cobargo and Wandella households. It is currently not being used by Council.

From time to time a temporary sand barrage is built across the river at the tidal limit when local farmers have recognised that flows are low and salinity levels reach a point that can be harmful to stock and damage dairying equipment (Dedden 2010). The barrage is of a temporary nature and washes away with the natural flow of the river; however concerns have been raised regarding the effect of the structure on the river and its ecosystem.

In recent years the NSW DPI Fisheries has required a temporary fishway to be installed in the barrage to mitigate the impacts on fish travelling up and down the river (Dedden 2010). Operation of the barrage is not controlled by the Tuross River water sharing plan. Any future applications for a permit to install the barrage will need to meet the legislative requirements as detailed in the WMA 2000.

Aboriginal history

Prior to European settlement, the Brinja-Yuin people were the traditional custodians of the region. For at least 6000 years they occupied an area stretching south from the Moruya River

to Wagonga Inlet and were thought to have a population of around 1000-1500 people at the time of European settlement (Parker 2008). Aboriginal people of the Tuross region travelled throughout the coastal zone and west into the Monaro tablelands for a variety of reasons including the sharing of resources and ceremonial purposes. Traditional ceremonial activities were also conducted around the shores of Coila and Tuross lakes and many middens, open campsites and bora ceremonial grounds occur in the area (Goulding and Waters 2005).

The Brinja-Yuin people were displaced from their land due to European settlement and the associated landuse changes that occurred in the region. The arrival of whaling and sealing vessels travelling to the south coast during the early 1800s may have also transmitted diseases to the local Aboriginal people resulting in declining population numbers (Goulding and Waters 2005).

In the 1860s a number of Aboriginal Reserves were established in the Tuross area at Wagonga Inlet, Tuross Lake and Narooma, although not all reserves were occupied. By the early 20th century Aboriginal population in the catchment appeared to be centred around Central Tilba where the Aboriginals Protection Board recorded a population of 165 people in 1902. This had declined to 128 people by 1915 (Goulding and Waters 2005).

Early European settlement and land use

George Bass provided a brief description of the Tuross Lake area prior to European settlement during his voyage of exploration along the south coast in 1797:

> "The form of the ground in general is either low and swampy or at once inclining to the mountainous, there being little or none upon a plane. The whole is intersected by extensive salt swamps and the arms of a branching lagoon that comes to the sea about a mile to the northward of the point. The qualities of the soil are but very indifferent. Some of the best of the low ground before you approach the edges of the swamps is thickly covered with long grass and fern, but the soil is sandy and light. A wet salt marsh then leads you down into the swamps. The sides of the hills where they do not rise up from the lake or swamp side very suddenly are really meadows, but these are few in number. The tops of some of the lower hills are well grassed, but the soil is too poor and sandy for cultivation. The country seems to be at all time but sparingly watered, but it is now in a state of drought. In the course of our round of not less than 12 or 14 miles we could not find a drop of fresh water, altho' the heat of the day made us search for it with extreme eagerness (quoted in Goulding and Waters 2005)."

Early European settlement in the area was patchy due to the rugged nature of the landscape. Land south of Moruya was outside the bounds of official settlement as declared in 1829, although there was still much interaction between Aboriginal populations and European settlers (Goulding and Waters 2005). The 1830s and 1840s saw European settlement slowly increase due to the granting of more land for new properties. Many of the people and stock that moved into the area at this time came down from the tablelands via Braidwood and Araluen while others came by sea (Gibbney 1980).

In the 1850s alluvial gold was discovered in many of the valleys of the south coast. The first major gold discovery was at Eden in 1852 followed by the discovery of major deposits at Mogo, Moruya, and Mount Dromedary during the mid-1850s. One of the largest goldfields was developed in the Tuross catchment at Nerrigundah. By 1861 there were 200 to 300 miners working in the area, and this is said to have increased to 400 in the following years (Goulding and Waters 2005).

Although the miners were a largely transient population, this new phase resulted in the development of roads and the establishment of coach services and roadside inns. The gold rushes also led to greater demand for agricultural products to feed the dramatically increased population (Goulding and Waters 2005). The towns of Wagonga Inlet (later Narooma), Mogo, Nerrigundah and Tilba Tilba all developed during this period and a major port became established at Wagonga Inlet to service the Nerrigundah and Mount Dromedary goldfields. All of the major goldfields continued to be worked into the 20th century but mining had largely ceased by 1920.

As well as the mining activity, new land acts in 1861 encouraged further settlement on the south coast as large pastoral leases were broken up into smaller allotments. From the mid-1860s the dominant landuse on the south coast moved from beef cattle to dairy cattle. Bodalla and Tilba Tilba were one of the first areas developed intensively for dairying. By the end of the 1870s all of the good dairying land had been selected (Pacey and Hoyer 1995) and during the 1880s and 1890s a significant butter and cheese industry developed in the region (Goulding and Waters 2005).

The timber industry began along the south coast in the 1840s with sawmills proliferating in the 1860s. The late nineteenth century saw a dramatic increase in the industry as contracts to supply sleepers for the state's developing railway network were acquired.

Current land use

The main agricultural land use in the Tuross River water sharing plan area is livestock grazing which occupies 10.5% of the catchment. Irrigation (predominantly for dairy pasture) covers just 1.3% of the catchment (Bureau of Rural Sciences 2001). Irrigated dairy farms are found along the Tuross River (near Eurobodalla and Bodalla) at Corunna Lake and Tilba Tilba Lake (Hope and O'Connor 2001).

Oyster farming is also an important local industry and there are currently around 80 oyster leases in the Tuross estuary (Haines 2004). Commercial fishing has not been permitted in the Tuross estuary since May 2002, when NSW DPI declared the estuary a 'recreational fishing haven'. Anecdotal reports indicate that fish numbers have increased since 2002 and that tourists are becoming attracted to the area because of the improved fishing opportunities offered by the estuary (WMB Oceanics 2005). Boating, swimming, waterskiing and jetskiing are other popular uses of the estuary.

Coila Lake supports an active commercial fishing industry, which focuses on the Eastern King Prawn. The lake is one of the most intensively fished lakes on the south coast and is one of the top five major estuaries on the south coast for commercial crustacean and finfish catches (Haines 2004). The lake and its foreshores also support a large range of recreational activities including canoeing/kayaking, sailing, swimming, and bird-watching.

Wagonga Inlet supports around 80 oyster leases and is popular with recreational fishers. The estuary is protected as part of the Batemans Marine Park and supports recreational activities including sailing, waterskiing and canoeing (Nelson Consulting 2001).

Large areas of the catchment remain vegetated and protected as national park, nature reserve or state forest. These protected areas account for 70% of the Tuross River water sharing plan area, covering over 153,000 ha (Bureau of Rural Sciences 2001). These forests and protected areas are located primarily in the headwaters of the catchment and along the coastal fringe. The major national parks are Deua and Wadbilliga which cover large areas of the upper catchment, Gulaga National Park which includes Mount Dromedary and the headwaters of Wagonga Inlet, and Eurobodalla National Park along the coast. In addition to these forests and conservation areas, a further 15% of the catchment consists of privately owned forest or other native vegetation (Bureau of Rural Sciences 2001).

Urban development is limited with approximately 0.03% of the Tuross River catchment currently zoned for urban development (Haines 2004). Over 7,000 people live in the Tuross River catchment, primarily in the major towns of Tuross Head (2,149), Narooma (2,417) and Bodalla (527) as well as numerous rural villages throughout the catchment (ABS 2013).

There is a great demand for rural lifestyle properties in Eurobodalla Shire due to its proximity to Canberra, Sydney and the coast. Population growth in Eurobodalla Shire was well ahead of the state average from the late 1980s to 2009, with continued growth still occurring (OCSE 2009). Eurobodalla Shire Council has prepared a settlement strategy and reviewed some Local Environmental Plans to assist in protecting the environment whilst accommodating growth within the area.

Climate

The Tuross River catchment is characterised by a temperate climate. Average annual rainfall varies from 700 mm in the upper Tuross River catchment to more than 1,100 mm in the ranges bordering the north and south of the catchment (Figure 1). The mean annual rainfall on the coast is 915 mm at Narooma and 927 mm at Tuross Head (BOM 2016). Rainfall is highest in summer and autumn with July, August and September being the driest months (Figure 2). Mean monthly rainfall varies from 49 mm in July to 104 mm in March.

January and February are the hottest months with the mean maximum temperature being 23.6°C at Narooma. Winter temperatures rarely fall below 6°C which is the mean minimum temperature for July (BOM 2016).

Figure 1: Average annual rainfall in the Tuross River catchment

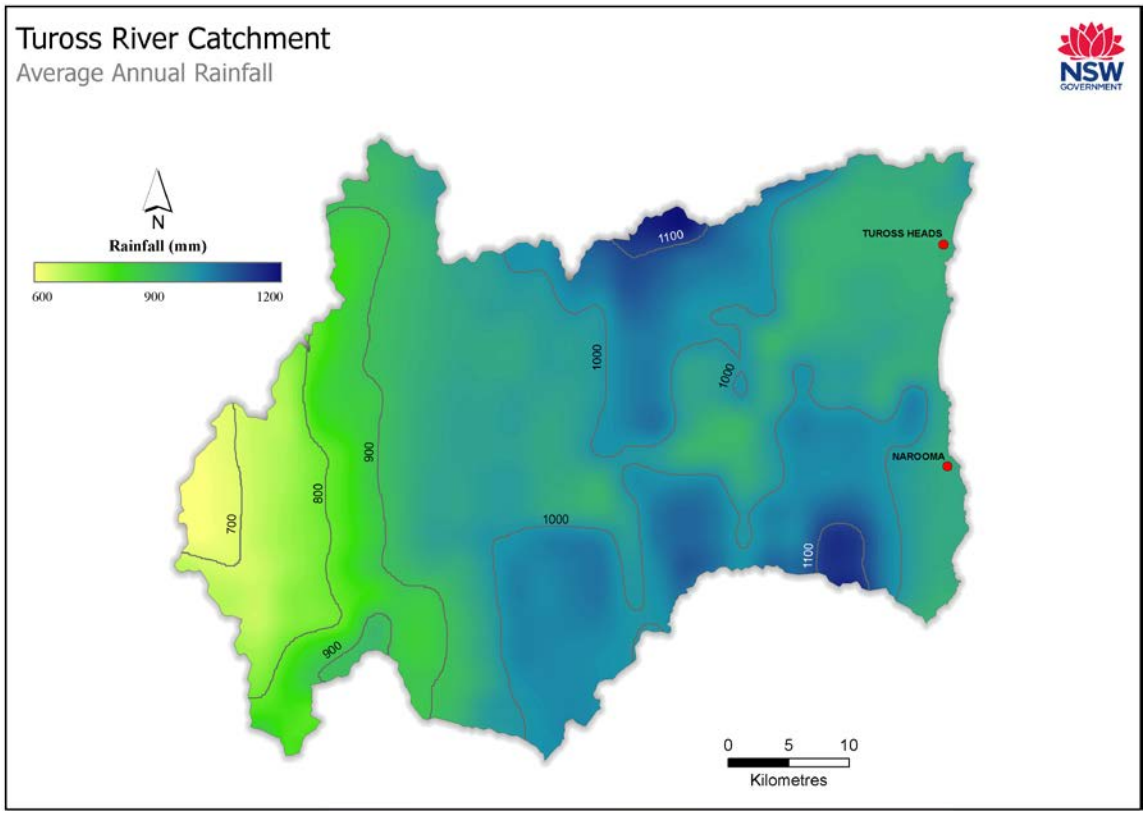
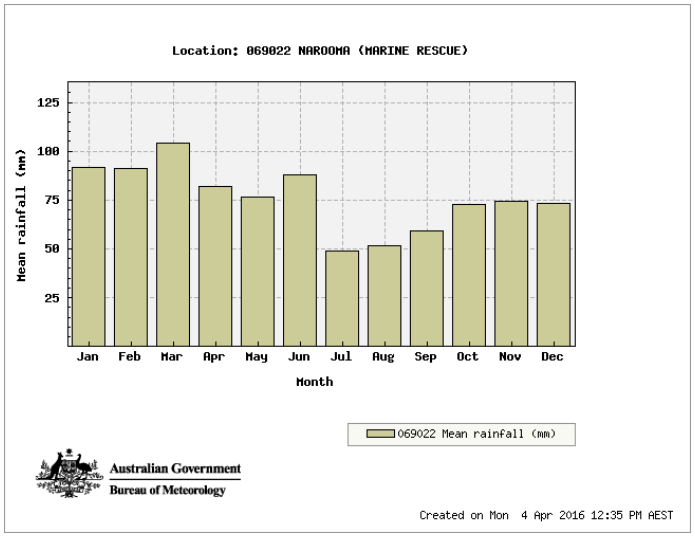


Figure 2: Mean monthly rainfall at Narooma (1910-2016)



Ecological values

Within the coastal zone of the Tuross River catchment there are 53 discrete wetland areas that are protected under State Environment Planning Policy 14 for Coastal Wetlands. These wetlands cover an area of 7.96 km^2. The majority of these are associated with the Tuross estuary but almost all of the estuaries within the plan area support some SEPP 14 wetlands.

Coila Creek and the Tuross River Estuary are both listed as nationally important wetlands in 'A Directory of Important Wetlands in Australia' (Department of the Environment 2010). Coila Creek supports a saltmarsh community that is dominated by *Wilsonia rotundifolia*, a prostrate sub-shrub listed as endangered under the NSW *Threatened Species Conservation Act 1995* (TSCA 1995). This plant is only known to occur in three coastal sites in NSW and the plants at Coila Creek form a relatively large and healthy population (Department of the Environment 2010).

The catchment's coastal lagoons and estuaries support 12 threatened bird species. The Tuross and Coila Lakes alone host approximately 198 species of birds. A number of these are listed as either endangered or vulnerable under the TSCA 1995. An important breeding site occurs at South Tuross beach for a number of shore birds including the Little Tern, Pied Oyster Catcher and Red-Capped Plover (Haines 2004).

A total of 197 species of birds have been recorded for Wagonga Inlet. The tidal flats and sand flats around the inlet are considered important habitat for waders and sea birds (Kevin Mills and Associates 1994). Large numbers of several species are regularly recorded, including the Pied Oystercatcher, Red Knot and the Bar-tailed Godwit. Of the 14 wader species recorded, ten are protected under international agreements on migratory birds, and four are listed as endangered under the TSCA 1995 (Nelson Consulting 2001).

Wagonga Inlet is an important fish nursery. It supports valuable mangrove colonies and some of the most extensive seagrass beds on the South Coast (NSW Fisheries 1999). It is also home to the Estuary Cod, a protected species under the NSW *Fisheries Management Act 1994*. The Weedy Sea Dragon may also occur in the inlet, as it is known to inhabit strapweed beds along the coast (Nelson Consulting 2001).

Wagonga Inlet is also considered of regional significance for aquatic fauna. It supports the most diverse and one of the most abundant assemblages of zooplankton and benthos within estuaries on the Eurobodalla Coast. Twenty-five species of zooplankton have been recorded within Wagonga Inlet which constitutes a diverse community for the size of the estuary (Nelson Consulting 2001).

Threatened species

The ecological values and threatened species known or expected to occur in each of the Tuross River water sources are identified in Appendix 3. These species have been considered as part of the macro-classification approach in determining water sources with high environmental values.

The Wandella Creek water sharing plan was prepared prior to the development of the macro-plan approach and the Wandella Creek Water Source is therefore not included in the table in Appendix 3. However a list of identified fauna was considered during development of the original water sharing and these species are listed separately in Appendix 3.

The Tuross River catchment supports a known population of Australian Grayling, an endangered fish species that is listed as vulnerable under the TSCA 1995. The Australian Grayling occurs in coastal streams and lagoons from the Shoalhaven River southwards to the Otway Ranges of Victoria and in Tasmania. Adult fish spawn in freshwater and the newly hatched larvae drift downstream and out to sea where they remain for around six months. Juveniles then return to the freshwater environment in late spring where they remain for the rest of their lives (Backhouse *et al*. 2008).

There are no reliable population estimates for Australian Grayling however the species is reported to be relatively uncommon. All rivers and streams where this species is found are therefore important to the species' survival as it is unknown which populations are the most effective in terms of reproductive success (Department of the Environment 2013). Australian Grayling have been recorded in fish surveys by NSW DPI in the Tuross River, Gulph Creek and Wagonga Inlet. Further research and surveys on the size and distribution of Australian Grayling populations are being undertaken as part of a national recovery plan for the species (Backhouse *et al.* 2008).

A number of threatened frog species are known to occur within the Tuross catchment including the Giant Burrowing Frog, Green and Golden Bell Frog, Littlejohn's Tree Frog, Southern Bell Frog and Stuttering Barred Frog.

Waterwheel plant (*Aldrovanda vesiculosa*) is an aquatic member of the sundew family that is listed as endangered in NSW under the TSCA 1995. It is known to occur in freshwater lagoons and wetlands from the Clyde catchment south to Wallaga Lake. The plant floats below the water surface where it traps and digests aquatic insects.

Estuary sensitivity

Estuary specialists from the Office of Environment and Heritage and former Department of Water and Energy have assessed each of the state's estuaries to determine how sensitive they are to changes in freshwater inflows (DWE 2009).

The assessment ranks the sensitivity of estuaries based on their physical attributes – size, shape and the ratio of catchment size to the surface area of the estuary. Small estuaries, such as the coastal lagoons within the Tuross catchment, tend to be highly sensitive to inflow variations, with most being only intermittently connected to the ocean. Barrier estuaries such as the Tuross River estuary and Wagonga Inlet are generally less sensitive to inflow variations. As they mature and infill with sediment they tend to be long and narrow 'river' estuaries.

Table 1 lists the sensitivity of each of the estuaries in the Plan area. The method used for assessing estuary sensitivity is detailed in *Macro water sharing plans – the approach for unregulated rivers. A report to assist community consultation*.

Table 1: Inflow sensitivities for the estuaries within the plan area

Name of estuary	Inflow sensitivity - low flows	Inflow sensitivity - high flows
Coila Lake	High	High
Tuross Lake	Medium	Medium
Lake Brunderee	High	Medium
Lake Tarourga	High	Medium
Lake Brou	High	High
Lake Dalmeny	High	Medium
Kianga Lake	High	High
Wagonga Inlet	Low	Low
Little Lake	High	High
Nangudga Lake	High	High
Corunna Lake	High	High
Tilba Tilba Lake	High	Medium

Groundwater

Groundwater aquifers in the Tuross River catchment are primarily found in fractured rock, unconsolidated alluvial sediments and coastal sands. The fractured rock of the Lachlan Fold Belt Coast Groundwater Source is the most utilised aquifer in the catchment.

Water sharing rules for the Lachlan Fold Belt Coast Groundwater Source and the South East Coastal Sands Groundwater Source are included in the South Coast groundwater sharing plan. Alluvial aquifers are included in the Tuross River water sharing plan.

The main alluvial aquifer stretches along most of the Tuross River, to upstream of the Wadbilliga River junction. More alluvial aquifers occur in the headwaters of the Tuross River around and upstream of Two Waters Plain.

The following creeks and rivers also contain long stretches of alluvial aquifer:

- Gulph Creek;
- Reedy Creek;
- Wadbilliga River;
- Big Belimbla Creek;
- The upper reaches of Belimbla Creek;
- The upper reaches of Mellion Creek;
- Victoria Creek in the Tilba Tilba Lake Water Source;
- The upper half of Olsens Creek in the Corunna Lake Water Source;
- Wagonga Inlet Water Source, specifically along Burrimbidgee Creek, Punkally Creek, Matthews Creek, James Creek, Billa Bilba Creek, Cowdroy Creek;
- Lake Mummuga Water Source, specifically along Lawlers Creek and Kianga Creek;
- Brou Lake Water Source, specifically along Whittakers Creek and Stony Creek; and
- The mid-section of Coila Lake, upstream of and around Coila.

River flows

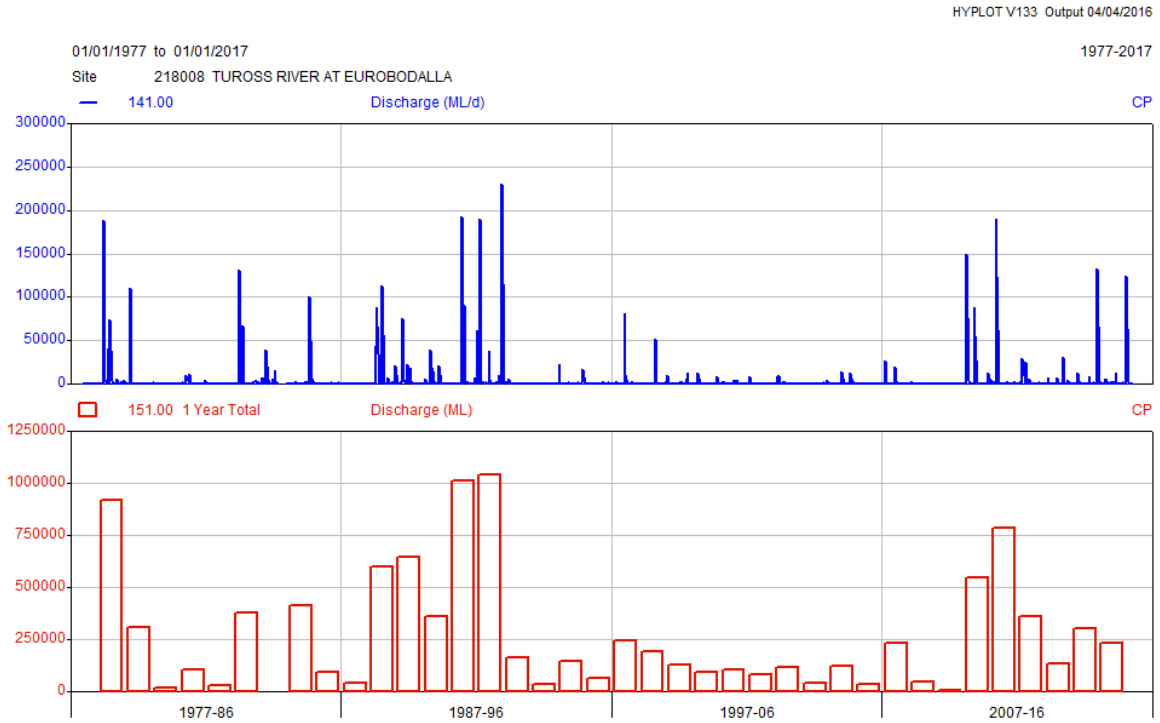
There are currently four active gauges within the Tuross River catchment that monitor streamflows on a daily basis (Table 2). These four gauges are the flow reference points which are used to define the water sharing rules within the plan. Historical records are also available for some discontinued gauges throughout the catchment.

Average annual flow in the Tuross River varies from 34,482 ML at Tuross Vale at the top of the catchment to 277,006 ML at Eurobodalla at the end of the catchment (Table 2). Annual streamflows were the lowest on record in 2009 with just 8,474 ML passing the gauge at Eurobodalla. The highest annual flows occurred in 1991 and 1992 with both years recording over 1,000,000 ML at the Eurobodalla gauge (Figure 3).

Table 2: Current river gauges in the Tuross River catchment

Gauge	Location	Catchment area (km^2)	Mean Annual Flow (ML)	Commenced
218001	Tuross River at Tuross Vale	93	34,482	1948
218005	Tuross River downstream of Wadbilliga River junction	920	237,293	1964
218007	Wadbilliga River at Wadbilliga	122	33,373	1974
218008	Tuross River at Eurobodalla	1,586	277,006	1977

Figure 3: Daily and annual stream flows in the Tuross River at Eurobodalla (1977-2016)



Significant flood events have occurred in the Tuross River catchment in 1978, 1991 and 1992 (with three large floods in this two year period), 2010 and 2011. In each of these events peak daily flows were in excess of 150,000 ML/d at Eurobodalla (Figure 3). The two most recent flood events were in December 2014 (130,000 ML) and January 2015 (120,000 ML).

Entitlement and water use

At the commencement of the water sharing plan, there were approximately 136 water licences in the Tuross River water sharing plan area, totalling 8522 ML/yr of entitlement (Table 3). This entitlement is divided between unregulated surface water (8,379 ML/yr) and alluvial groundwater (143 ML/yr). The total entitlement represents approximately 1.5% of the average annual discharge of the Tuross River.

There has been an embargo on granting new surface water licences on the south coast since 2007. Alluvial aquifers were embargoed in 2008.

The Tuross River water sharing plan assumes full development of all entitlement in setting the extraction limits that form part of the water sharing rules. For the Tuross catchment the sum of the peak demands for all water sources has been calculated as 59.8 ML/d.

These figures do not include extractions from the Tuross tidal pool that are currently not licensed under the *Water Act 1912*. Under the WMA 2000, which takes effect when a water sharing plan commences, all works located in the tidal pool will need to be licensed. DPI Water is currently identifying unlicensed works, determining the associated history of use and establishing whether licences should be granted in the Tuross River tidal pool.

Water extraction in the unregulated water sources

The Tuross River Water Source is the only water source in the plan area that was classified as being of high economic significance to local communities due to their dependence on commercial water extraction. Water users in the lower Tuross River catchment have had water sharing arrangements in place since 2005 negotiated through the South Coast Water Management Committee.

Table 3: Total entitlement* and number of licences for each water source at plan commencement

Extraction Management Unit	Water Source	Unregulated river entitlement^ (ML/yr)	Aquifer access entitlement (ML/yr)	No. of licences
Tuross River	Belimbla Creek	0	0	0
	Bumberry Creek	0	0	0
	Bumbo Creek	313	1	3
	Gulph Creek	0	0	2
	Little and Big Belimbla	0	0	0
	Mellion Creek	0	0	0
	Mid Tuross River	0	0	0
	Reedy Creek	8	0	2
	Swamp Creek	260	0	1
	Tuross Estuary Tributaries	21	10	10
	Tuross River	6450.8	120	50
	Upper Tuross River	40	0	1
	Wadbilliga River	100	0	1
	Wandella Creek	643	0	21
	Woila Creek	0	0	0
	Yowrie River	208	0	12
Total for EMU		**8043.8**	**131**	**103**
Tuross Coastal Streams	Brou Lake	0	0	0
	Coila Lake	80	0	9
	Corunna Lake	11.3	0	4
	Lake Mummuga	5	0	1
	Tilba Tilba Lake	117	0	12
	Wagonga Inlet Tributaries	122	12	9
Total for EMU		**335.3**	**12**	**35**
Total for Plan		8379.1	143	138

* Under the WMA 2000, licences are granted “share component” rather than “entitlement”. The term “entitlement” has been retained in this document due to its common usage. Share component is granted as unit shares for unregulated river access licences, and as ML/yr for local water utility and domestic & stock access licences. For ease of reporting, the total share component has been recorded as ML/yr.

^ Includes unregulated river access licences and domestic & stock access licences. Eurobodalla Shire Council’s local water utility access licence is included in the aquifer access licence total as all town water is extracted from the alluvial bores rather than from the river pump.

The majority of the unregulated surface water licences are located along the Tuross River between Gulph Creek and Bumbo Creek, and on Yowrie River between New England Creek and Cobblers Gully. The western part of the Tuross River catchment contains very few licences as much of the area is national park. Of the total surface water entitlement, 96% is for irrigation, less than 1% for town water supply, 1% for industrial purposes, and the rest for stock, domestic and farming purposes. Long-term records of water use are not available in the Tuross catchment as there is not yet broad scale metering in unregulated catchments on the south coast.

Water extraction in the alluvium

Most of the alluvial groundwater licences are located in the alluvium along the main trunk of the Tuross River in the Tuross River Water Source, and along the Tuross River in the Tuross Estuary Tributaries Water Source. Alluvial sediments can be categorised as “upriver alluvium” or “coastal floodplain alluvium”. Upriver alluvium nominally occurs upstream of the tidal limit and is sandier than coastal floodplain alluvium. The Tuross River water sharing plan does not differentiate between upriver and coastal floodplain alluvium; both types of alluvium are subject to the same rules.

A small number of alluvial licences occur on Gulph Creek and Coila Creek and a small cluster of licences occur near the coast in the Wagonga Inlet Tributaries water source. Of the total groundwater entitlement, 86% is for town water supply, 11% is for industrial purposes, 1% for irrigation and farming purposes and 1% for recreational purposes. No entitlement is issued for domestic and stock bores. Although domestic & stock bores need to be licensed, water access licences are not issued for groundwater extracted for domestic and stock purposes.

Detailed water use is not available in the alluvial groundwater sources because there is not yet broad scale metering in these water sources. The NSW government is exploring this issue through the Water Use Monitoring Program.

Local water utility requirements

Town water within most of the plan area is provided by Eurobodalla Shire Council while. Bega Valley Shire Council supplies a small number of households in the Wandella Creek catchment. Entitlement is held in three water sources: Tuross River (902 ML/yr), Wagonga Inlet tributaries (40 ML/yr) and Wandella Creek (79 ML/yr).

During the summer / high demand period, the Tuross River is the principal source of water (through the Southern Water Treatment Plant) for Eurobodalla Council’s southern water scheme covering Bodalla to Mystery Bay. Since 2012, Council’s extractions from the Tuross catchment have been predominantly from bores located in the alluvial sediments alongside the Tuross River at Eurobodalla (pers. comm. R. Overdyk, Eurobodalla Shire Council).

During the winter / low demand period, the entire Eurobodalla Shire is supplied from Deep Creek Dam through the Northern Water Treatment Plant. Deep Creek Dam is supplied from the Deua and Buckenbowra Rivers.

Bega Valley Shire Council diverts water from Illawambra Creek at the Illawambra Weir. Water is gravity fed through a 14km pipeline to the town reservoir at Cobargo which supplies around 220 households. The pipeline also supplies water to 10 rural properties along the route. In 2004 when the Wandella Creek water sharing plan commenced the sharing of water between Bega Valley Shire Council and landholders was one of the biggest issues addressed by the plan. Since then Council has begun supplying water to Wandella households from Brogo Dam (in the Bega catchment) which provides a more reliable and higher quality source of water than Illawambra Weir. This is expected to continue into the future, with Council reserving its use of the weir for emergency use only.

The process of developing the water sharing plan

DPI Water is responsible for implementing the WMA 2000, including developing water sharing plans for the state's water resources. DPI Water established several interagency panels to assist with the development of water planning policies and water sharing plans. The preparation of the Tuross River water sharing plan was guided by three panels:

- the State Interagency Panel;
- the South Coast Working Group; and
- the South Coast Interagency Regional Panel.

The role of each of these panels is discussed below.

The draft Tuross River water sharing plan was prepared based on:

- the indicative rules generated by a risk and values classification (explained later in this section);
- the deliberations of the Working Group and the Regional Panel; and
- feedback from stakeholders during targeted consultation.

The draft plan was publicly exhibited throughout the plan area. Comments and feedback received during the public exhibition period were considered by the Working Group and the Regional Panel in finalising the water sharing plan.

This section describes the panels and briefly discusses the process of developing the Tuross River water sharing plan including the risks and values classification, refining the indicative rules, and the specific outcomes of panel deliberations, targeted consultation and public exhibition.

Full details of the macro-planning approach and the classification method is available in the document *Macro water sharing plans – the approach for unregulated rivers. A report to assist community consultation*. This document is available on the DPI Water website www.water.nsw.gov.au.

The development of the Wandella Creek water sharing plan occurred prior to the adoption of the current approach to plan preparation. This plan was prepared under the guidance of the South Coast Water Management Committee which comprised agency and water user representatives similar to the current Regional Panel.

State Interagency Panel

The State Interagency Panel has overall responsibility for the strategic direction of water planning in NSW, to ensure that adequate resources are available from each agency and that the varying policy and statutory requirements of the relevant NSW Government agencies are met. The State Interagency Panel also has the role of making water sharing decisions in cases where regional panels cannot reach agreement or where the issue has statewide significance.

The State Interagency Panel is chaired by DPI Water and comprises representatives from the Department of Primary Industries (water, agriculture and fisheries specialists), Office of Environment and Heritage and Local Land Services. DPI Water is responsible for the overall project management.

South Coast Working Group

The South Coast Working Group (the Working Group) comprises a range of officers representing the various functions of DPI Water such as plan and policy development, licensing and compliance, hydrometrics and environmental protection. The Working Group was responsible for collating information and developing recommendations to be considered by the Regional Panel.

Interagency Regional Panel

The South Coast Interagency Regional Panel (the Regional Panel) comprises representatives from the Department of Primary Industries (water, agriculture and fisheries specialists), the Office of Environment and Heritage, and the South East LSS (formerly Southern Rivers Catchment Management Authority) as an observer. Appendix 4 lists the names of panel representatives and their areas of expertise, and also lists relevant colleagues who the panel had access to for specific technical and scientific information.

The key responsibilities of the Regional Panel were to:

- ensure water sharing rules are consistent with state policy;
- review the water management units provided by DPI Water;
- review economic, social and environmental values and undertake risk and value assessments to classify each unregulated water source;
- review existing and generic water sharing rules as to their applicability;
- make recommendations on water access and dealing rules for each water source;
- assist with consultation on the proposed rules; and
- review submissions from targeted consultation and public exhibition, and make changes where necessary to the water sharing rules.

The Regional Panel used local knowledge and expertise in developing and recommending the water sharing rules through a consensus decision-making approach.

Water source classification method

In developing water sharing plans for unregulated rivers, DPI Water classifies each water source based on the risks and values of water extraction.

Specifically the classification process involves assessing:

- instream values (such as threatened fish species) and the risk to these values posed by existing or increased extraction;
- hydrologic stress, based on the demands for licensed extraction relative to river flows;
- the risk to instream values posed by extractions;
- extraction value, a qualitative assessment of the economic value of the agriculture which relies on the water licensed for extraction;
- the economic dependence of the local community on activities requiring licensed water extraction; and
- the sensitivity of estuaries to the removal of freshwater inflows.

For the Tuross River water sharing plan, each water source was classified according to these values and risks. The Regional Panel then reviewed these classifications against a range of reference material and data including irrigation data, hydrologic data, aquatic ecology information, fisheries data, and threatened species data. Extraction patterns by local water utilities were also examined. A list of data and reference material that was used by the panel can be found in Appendix 5.

As part of this review, the Regional Panel revised the indicative classifications for several water sources:

- Coila Lake - Instream values were revised from high to medium due to the smaller number of threatened species relative to other water sources.
- Corunna Lake - Instream values were revised from high to medium due to the majority of this catchment being freehold land.

- Little and Big Belimbla Creeks - Instream values were revised from medium to high on the basis that a large proportion of the water source is national park.
- Tilba Tilba Lake - Instream values were revised from high to medium due to the smaller number of threatened species relative to other water sources. Community dependence on extraction was also revised from low to medium due to the considerable level of entitlement in this water source.
- Upper Tuross River - Instream values were revised from 'high' to 'medium' due to the smaller number of threatened species relative to other water sources.

The finalised water source classifications (Appendix 6) were used to generate indicative access and trade rules which provided the basis for deliberations and the development of draft water sharing rules.

Refining the indicative rules

Guided by the indicative access and trade rules, the Regional Panel used local knowledge and expertise to develop the access and trade rules for the draft water sharing plan. Indicative rules were revised based on site specific considerations such as:

- the availability of infrastructure, such as river gauges;
- the availability of management systems;
- any existing management rules; and
- whether flow regimes within different areas of a water source required differing management rules for those sub-areas.

For example, water users in the Lower Tuross River catchment have long recognised the need for a cease-to-pump and have willingly participated in water sharing arrangements since 2005. These existing water sharing arrangements, plus any licence restrictions in place as a result of Land Board hearings were examined by the Regional Panel to determine whether they achieved the required level of environmental protection and provided for BLR.

Consideration was also given to each of the estuaries in the plan area to see if any additional catchment-wide protection was required. The specific requirements of threatened species in relation to reproductive needs, migration or other particular ecological activities were considered where information was available.

Consultation

Consultation on the draft Tuross River water sharing plan

The draft rules formulated by the Regional Panel underwent targeted consultation with specific interest groups[3] and water users who had the opportunity to provide input to proposed water management rules before the plan was drafted.

Targeted consultation on the proposed rules for the Tuross River draft water sharing plan began in late 2005 and continued through the development of the water sharing plan until public exhibition in May 2013. The consultation process was facilitated by the former Southern Rivers Catchment Management Authority (CMA) whose role was to ensure that all stakeholders and interested parties had an opportunity to examine and comment on the proposed water sharing rules.

In particular, stakeholders were encouraged to provide:

[3] Targeted consultation refers to informal consultation held with key stakeholders to test the suitability of the proposed water sharing rules and provide feedback on the rules potential impacts.

- feedback on the potential economic and social impacts of proposed rules;
- local knowledge and expertise, for example, other natural or socio-economic values that have not yet been considered by the panel;
- feedback on the practical elements of the proposed water sharing rules to ensure they are easily implemented by the licence holders. This included the suitability of the proposed water sources and management zones, flow reference points and access and trading rules where significant changes were proposed from current management;
- confirmation that there were no unintended outcomes from the plan; and
- specific comments on the Minister's notes included in the draft water sharing plan.

The following organisations were consulted during the targeted consultation process:

- Eurobodalla Shire Council;
- Tuross River Water Users Association;
- NSW DPI;
- Southern Rivers CMA;
- Coast Watchers (environmental organisation); and
- Aboriginal community through Aboriginal Officers at the Southern Rivers CMA.

Consultation on replacement of the Wandella Creek water sharing plan

Public submissions regarding the replacement of the Wandella Creek water sharing plan were called for in early 2013. These submissions and additional information were collated and reviewed during 2013 and in May 2014 the Minister recommended that the plan be replaced.

Key stakeholders were informed of the proposed changes to the rules in this water source through a meeting at Wandella on 6 May 2014. Four local water users attended the meeting and were supportive of the proposed revisions to the access rules. DPI Water has continued to correspond with active licence holders in the Wandella Creek catchment as well as the South East Region Conservation Alliance (environment group) about the proposed revisions to the water sharing plan.

Public exhibition

Public exhibition is the formal exhibition of a draft water sharing plan where the Minister invites submissions on the draft plan and in particular seeks comment on a range of key issues. Public exhibition of the draft Tuross River water sharing plan was held from 6 May to 28 June 2013 with the plan documents available for viewing at five locations on the NSW South Coast (Nowra, Milton, Moruya, Narooma and Bega). Licence holders were sent letters advising of the public exhibition period. A public meeting was held at Bodalla on 23 May 2013. The objectives of this meeting were:

- to provide background to stakeholders as to why the water sharing plan was being developed, how it had been developed to date, what rules were proposed in the various areas and how stakeholders could provide feedback;
- to formally consult with a broad range of stakeholders to explain the proposed water sharing rules and how they would be implemented; and
- to seek feedback in writing from stakeholders and the general community about the proposed water sharing rules.

Six written submissions were received from stakeholders including landholders, water users, environmental groups and Eurobodalla Shire Council. The main issues raised in the submissions related to the cease-to-pump rules, environmental concerns, town water supply

and the suitability of flow reference points. The Regional Panel considered all of the issues raised in written submissions and those voiced at public consultation meetings. A summary of these issues and the resulting outcomes and decisions of the Panel are presented in Appendix 7.

No public exhibition was held prior to the merging of the Wandella Creek water sharing plan. This was because the plan had already been subject to public exhibition when it was first developed and major changes to the water sharing rules were not proposed. As indicated above, public consultation regarding the proposed changes occurred through a meeting with stakeholders in May 2014.

Water sharing rules

The Tuross River water sharing plan establishes a framework for water sharing that defines:

- planned environmental water to protect instream environmental values;
- water that is required to meet BLR;
- water that is required to meet licensed water extraction (including domestic and stock, local water utilities, unregulated river access licences and aquifer access licences);
- long-term extraction limits and available water determinations (AWDs) for each water source;
- rules for granting access licences;
- rules for water allocation account;
- flow classes and daily access rules for managing licensed extraction from unregulated rivers and alluvial aquifers;
- rules for water supply work approvals; and
- access licence dealing rules, which control the trade of water within or into other water sources.

The following section provides further background on each of these components, and outlines the information and methods used in developing the specific water sharing rules.

Planned environmental water

The water sharing plan identifies and protects water for environmental purposes in each water source. This is defined as ‘planned environmental water’ and consists of water that is remaining within the stream or aquifer after water has been taken for BLR and access licences in accordance with the rules of the plan.

In unregulated streams planned environmental water is generally delivered through two mechanisms:

- On a daily basis environmental water is protected through the implementation of cease-to-pump rules and total daily extraction limits which are applied to water access licences.
- On an annual basis environmental water is protected through the establishment of long term average annual extraction limits.

The Regional Panel set cease-to-pump rules for each water source in the Tuross River catchment which are discussed in the section on daily flow rules. For water sources where cease-to-pump rules could not be practically linked to a gauging station, the plan applies simple visual rules to protect environmental water such as a ‘no visible flow’ rule, and no pumping from instream or off-river pools when the pool is less than full capacity.

Requirements for water

The water sharing plan defines all of the licensed and unlicensed requirements for water within the Tuross River catchment.

Basic landholder rights (comprising domestic and stock, and native title rights) must be provided for and protected within a water sharing plan. The water sharing plan provides an estimate of the water requirements for domestic and stock rights within each water source. BLR requirements were estimated using the number of properties with river frontage in each water source, and estimated water usage based on property size, climatic region and land use.

At the start of the Tuross River water sharing plan:

- BLR were estimated at 287 ML per year;
- domestic and stock access licences accounted for 66 ML of entitlement per year;
- local water utility access licences accounted for 1,021 ML of entitlement per year;
- unregulated river access licences accounted for 7292.1 unit shares (a unit share is equivalent to 1 ML in years where 100% of entitlement is allowed to be extracted); and
- aquifer access licences accounted for 143 unit shares.

Managing extractions

The Tuross River water sharing plan establishes long term average annual extraction limits (LTAAELs) to manage extractions from surface water resources and alluvial groundwater in each of the two EMUs.

The LTAAEL for the Tuross River EMU comprises:

- the sum of the share components of all access licences in the Tuross River EMU at plan commencement (8174.8 ML/yr); plus
- an estimate of BLR in these water sources (248 ML/yr)

The LTAAEL for the Tuross Coastal Streams EMU comprises:

- the sum of the share components of all access licences in the Tuross Coastal Streams EMU at plan commencement (347.3 ML/yr); plus
- an estimate of BLR in these water sources (39 ML/yr).

To protect water for the environment and the supply to existing users, it is important to control any growth in water use that is above the LTAAEL. For both the Tuross River EMU and the Tuross Coastal Streams EMU, a reduction in allocated water may be triggered if the average annual usage over any three year period exceeds the LTAAEL by more than five per cent.

Reductions in allocation will be implemented by reducing the available water determination (AWD) which is the basis of crediting water into the water allocation account of each water access licence. The AWD for unregulated river access licences is set at 1 ML per unit share unless a reduction in allocation is required. If a reduction in allocation is required, the AWD for unregulated river access licences will be reduced to less than 1 ML per unit share in order to manage extractions.

Specific purpose access licences such as domestic and stock or local water utility access licences, will be permitted to extract 100% of their share component, except in years of exceptional drought. During periods of extremely low stream flow, daily access rules may limit extraction so that the full annual entitlement cannot be realised.

This approach to managing long term extractions in the Tuross River water sharing plan is the default position adopted for all unregulated rivers across the state.

Granting new access licences

Consistent with the WMA 2000, the Tuross River water sharing plan does not permit the granting of new unregulated river access licences. Any new commercial development must purchase entitlement from existing access licences consistent with the dealing rules defined in the water sharing plan. The water sharing plan does however permit the granting of several other categories of access licence: Aboriginal community development, Aboriginal cultural, domestic and stock licences (only from tidal pools) and high flow only access licences.

Aboriginal community development access licences

Many of the rivers in NSW already have a high number of irrigation licences and are generally judged to be stressed, particularly during dry times when river flows are low. This effectively prevents the issuing of any new irrigation licences. However in some coastal rivers, higher and more reliable flows are common and provide an opportunity for licences to be granted for Aboriginal community development activities, provided this additional extraction would not negatively impact on ecological values.

In coastal catchments, Aboriginal community development licences[4] (ACDLs) may be granted which allow water to be pumped from rivers during the high flows and stored in farm dams or tanks, to be used as needed. For the purpose of issuing these licences, high flows are defined as those that are exceeded 50% of the time (the top half of the flow regime).

The South Coast Regional Panel recommended that no new licences be granted in water sources with high conservation value, or in areas that could not support high flow licences. On this basis, the Tuross River water sharing plan has made provision for the granting of ACDLs in the following water sources:

- Gulph Creek;
- Mid Tuross River;
- Reedy Creek;
- Swamp Creek;
- Tuross River;
- Upper Tuross River;
- Wadbilliga River;
- Wandella Creek; and
- Yowrie River.

Since granting ACDLs would mean less water remains in the river at these higher flows to meet other users' and environmental needs, it is necessary to limit the total volume that can be extracted for Aboriginal community development purposes. The water sharing plan allows for a total of 500 ML/year to be granted across all water sources where ACDLs are permitted.

The restriction of ACDLs to high flows has been raised as a general issue across all water sharing plans. DPI Water is currently working with the Aboriginal community through the Aboriginal Water Initiative to address these concerns and look at options for allowing limited access to lower flows.

Aboriginal cultural access licences

Aboriginal cultural access licences of up to 10 ML/yr may be granted to Aboriginal persons or Aboriginal communities for any personal, domestic or communal purpose such as drinking, washing, gardening, making traditional artefacts, or for recreation or ceremonial purposes. The water sharing plan allows for the granting of these licences in any water source.

Domestic and stock access licences

Domestic and stock access licences may be granted where applicants can demonstrate a history of extraction within the tidal pool of the following water sources: Bumbo Creek; Tuross Estuary Tributaries; Tuross River; and Wagonga Inlet Tributaries.

[4] These are a sub-category of unregulated river and aquifer access licences called "Aboriginal community development." This new category of licences is not fully commercial. While they may be temporarily traded, they cannot be permanently traded and as such will remain in the Aboriginal community for the life of the licence. These arrangements are currently being reviewed by DPI Water.

This provision recognises that under the *Water Act 1912* no licence was required to extract water from a tidal pool and therefore there are a number of existing users that will need to obtain a licence under the WMA 2000.

High-flow-only access licences

Many of the coastal unregulated rivers within NSW have significant competition for water during dry periods. Therefore, there is merit in developing incentives that aim to move extraction out of the low flows and into the higher flows, to improve environmental conditions and reduce competition. To utilise higher flows, it is generally necessary to construct on-farm water storage. Water can then be pumped during periods of higher flow and stored for use at a later time, therefore enhancing security of supply.

The Tuross River water sharing plan includes an incentive to allow those licences that are converted to high-flow-only access to be granted additional volumes of water. The plan states that for every unit of unregulated river access licence entitlement surrendered, 2.5 units of unregulated river (high flow) access licence entitlement will be granted. The high flow access commences at the 50th percentile (i.e. the flow that is exceeded on 50% of days).

State-wide guidelines recommend that high flow conversions only be adopted in specified water sources if:

- the water source is classified as having important instream values at high risk from extraction or in water sources having high hydrological stress;
- there are adequate mechanisms in place to ensure the surrendered low flow is reserved for the environment;
- there is a no highly sensitive estuary or other identified high flow sensitive feature such as a wetland within the EMU;
- there is no significant extraction already occurring in high flow periods; and
- the conversion would not significantly impact on tidal pool users or town water supplies.

The Regional Panel considered these factors in relation to the Tuross River water sharing plan area and recommended that high flow conversions be made available in the following water sources:

- Gulph Creek;
- Reedy Creek;
- Swamp Creek;
- Tuross River;
- Upper Tuross River;
- Wadbilliga River;
- Yowrie River; and
- Wandella Creek.

Water allocation accounts

Water usage by individual licence holders is managed through water allocation accounts. Water is credited to the account when an AWD is made (at the start of the water year), and debited as water is extracted throughout the water year. A licence holder's account is not permitted to go into debit.

Unregulated rivers have enormous variation in annual flow volumes between years. It is important to allow this variability to be reflected in water accounting practices. Unused water allocation may be carried over from one water year to the next. The maximum amount that may be carried over in unregulated river access licence accounts is 100% of the share

component, where share component is expressed in megalitres; or 1 ML per unit share, where share component is expressed in unit shares.

Unregulated river access licence accounts are managed under three-year accounting rules, subject to compliance with the daily access rules. AWDs combined with any carryover allowance will enable licence holders to use up to twice their water allocation in a year provided that over a consecutive three year period they do not exceed the sum of their water allocations for those three years.

Flow classes and daily access rules

The water sharing rules for several water sources were revised from the indicative rules to reflect discussions with stakeholders and to incorporate feedback from the targeted consultation and public exhibition processes. Specific changes included:

- the inclusion of a dual cease-to-pump accreditation scheme;
- cease-to-pump levels for Tuross River, Gulph Creek, Reedy Creek and Swamp Creek Water Sources; and
- the flow reference point for Yowrie River Water Source.

Dual cease-to-pump accreditation scheme

The Tuross River water sharing plan introduces a dual cease-to-pump scheme that allows accredited water users to access flows at a lower level than non-accredited users. Water users can be accredited by South East Local Land Services if they meet certain criteria relating to the management of riparian lands. This accreditation scheme is based on policy advice adopted by DPI Water that recognises that in unregulated rivers flow management is not the only factor that contributes to river health. River conditions, including riparian vegetation, bed and bank stability, and water quality can also have a significant influence on river health. The former Southern Rivers CMA lobbied strongly for the adoption of an accreditation scheme that would help rural landholders adopt best practice riparian management. The State Interagency Panel determined that dual cease-to-pumps can be provided for in unregulated water sources that meet the following criteria:

- the Regional Panel agrees that there is local support for the dual cease-to-pump;
- river health is not driven predominantly by flow;
- poor land management practices are known or expected to be having an impact on the health of the river;
- adequate gauging is present; and
- dual cease-to-pumps and accreditation would contribute to catchment targets and priorities listed in the respective Catchment Action Plan.

The Regional Panel considered these factors and after discussions with Tuross River water users determined that a dual cease-to-pump scheme could be implemented within the catchment.

Tuross River, Gulph Creek, Reedy Creek and Swamp Creek Water Sources

The Regional Panel adopted the existing cease-to-pump on the lower Tuross River of 3 ML/d for the first five years of the water sharing plan, and agreed that a dual cease-to-pump be implemented from Year 6 of the Plan (3 ML/d for accredited water users, 5 ML/d for non-accredited water users).

The Regional Panel also agreed to the inclusion of a drought provision for Eurobodalla Shire Council which allows increased access (from 1 ML/d to 2 ML/d) in the very low flow class when the storage level in Deep Creek Dam is less than 40%. This provides Council with a greater level of reassurance with regards for managing critical human needs during severe drought. The likelihood of this provision being activated is low as the dam has never dropped

to less than 40% since its construction in 1984, and the augmented capacity of the adjacent Deua River town water supply has increased Council's ability to maintain storage levels.

Yowrie River Water Source

Water users on the Yowrie River expressed concerns about using the gauge on the Wadbilliga River as a flow reference point for the Yowrie River Water Source, on the grounds that flows between the two sub-catchments can vary significantly. Prior to the commencement of the water sharing plan, water users in Yowrie River Water Source were using Gauge 218005 to guide their water sharing activities. The Working Group and Regional Panel recommended that this gauge be written into the water sharing plan as the flow reference point for Yowrie River Water Source.

Final water access rules

Following public exhibition and consideration of the issues raised during public exhibition, the water sharing rules were finalised. The final water access rules including flow classes, cease-to-pump rules and the staged implementation approach adopted by the Regional Panel are summarised in Table 4.

For some water sources, the Regional Panel recommended that cease-to-pump rules be implemented incrementally to provide water users time to adapt to the new rules.

In water sources where the existing cease-to-pump rule under the *Water Act 1912* was more stringent than the proposed rule, the existing access rule was generally adopted. This was based on the premise that with no change to current operations there should be no adverse social or economic impact. In these circumstances the Regional Panel acknowledged that many of the existing cease-to-pump rules had been negotiated by water users or stipulated as outcomes of Rural Land Board hearings, had been in place for a period of time; and seemed to be adequately protecting values while providing certainty for water users.

This information may also be found on individual rule summary sheets for the Tuross catchment that are available on the DPI Water website www.water.nsw.gov.au. These rules were developed using the risk and value assessment, a wide range of resources, targeted consultation and public exhibition.

A full range of flow classes have been defined for the Tuross River, Gulph Creek, Reedy Creek and Swamp Creek Water Sources. This is due to the relatively high extraction pressure within these water sources, and the fact that they can be easily managed by a flow reference point (GS 218008).

Flow classes were previously defined for Wandella Creek as part of the Wandella Creek water sharing plan. These flow classes have been retained for inclusion in the current plan, although a new flow reference point is being used.

Access to very low flow

Those activities that are considered critical human needs or animal health requirements are permitted to access very low streamflows, that is, flows below the cease-to-pump. Licences with access to very low flows are listed in Schedule 2 of the plan. They include the taking of water for:

- domestic supply;
- town water supply, until major augmentation of the scheme infrastructure occurs;
- fruit washing;
- cleaning of dairy plant and processing equipment for the purpose of hygiene;
- poultry washing and misting; and
- cleaning of enclosures used for intensive animal production for the purposes of hygiene.

Table 4: Summary of access rules for the Tuross River water sharing plan

Water Source	Flow classes	Access rules	Flow reference point
Tuross River Reedy Creek Swamp Creek Gulph Creek	Very low flow ≤ 3 ML/d Low flow = 3-5 ML/d A1 Class = 5-20 ML/d A2 Class = 20-50 ML/d B Class = 50-200 ML/d C Class (high flow) >200 ML/d	Year 1-5: cease-to-pump at 3 ML/d Year 6-10 cease-to-pump at 3 ML/d (accredited water users) or 5 ML/d (non-accredited water users) TDELs will apply	218008
Mid Tuross River*	Very low flow ≤ 200 ML/d C Class (high flow) >200 ML/d	No access below 200 ML/d*	218008
Upper Tuross River	Very low flow ≤ 2 ML/d A Class = 2-24 ML/d C Class (high flow) >24 ML/d	Cease-to-pump at 2 ML/d High flow access above 24 ML/d	218001
Wadbilliga River	Very low flow ≤ 2 ML/d A Class = 2-25 ML/d C Class (high flow) >25 ML/d	Cease-to-pump at 2 ML/d High flow access above 25 ML/d	218007
Yowrie Creek**	Very low flow ≤ 5 ML/d A Class = 5-120 ML/d C Class >120 ML/d	Cease-to-pump at 5 ML/d High flow access above 120 ML/d	218005
Wandella Creek	Very low flow = no visible flow B Class ≤ 13 ML/d C Class = 13-32 ML/d D Class = >32 ML/d	Cease to pump when no visible flow at Wandella Road causeway	Wandella Road causeway and 218007
Bumberry Creek, Bumbo Creek Little & Big Belimbla Mellion Creek Belimbla Creek Tuross Estuary Tributaries Woila Creek Brou Lake Coila Lake Corunna Lake Lake Mummuga Tilba Tilba Lake Wagonga Inlet Tributaries	No flow classes defined	Licence holders are not permitted to take water when there is no visible flow at the pump site, or where water is being taken from a pool, when the volume of water in that pool is less than the full capacity of the pool.	Pump site or the outflow of the pool from which water is taken

* There are currently no water users in the Mid-Tuross Water Source and the plan does not permit the granting of access licences, except for unregulated river (high flow) access licences

** The flow reference point for Yowrie Creek was revised following public exhibition. Refer to Appendix 7

Total daily extraction limits

One of the plan's main objectives is to share water between users during low flows, particularly on the Tuross River where there are potentially competing demands for water from irrigators, the local water utility, the environment and other water users. This objective is achieved through the use of total daily extraction limits (TDELs). A TDEL is the total volume of water that may be extracted daily under access licences from an unregulated river in a particular flow class. TDELs are used where peak daily demands exceed supply and a cease-to-pump rule alone is not sufficient to ensure an adequate environmental share of the water within that flow class.

After considering peak daily demands in the lower Tuross River, the South Coast Regional Panel agreed that it was necessary to introduce TDELs in the Tuross River, Gulph Creek, Swamp Creek and Reedy Creek Water Sources (Table 5). The plan allows for TDELs to be established in other water sources at a later date, if required.

Daily extraction limits are calculated based on a policy method developed by DPI Water that assigns a proportion of extraction from the upper limit of each flow class. Full details of this policy can be found in the document *Advice to Water Management Committees. No. 6 Daily extraction management in unregulated rivers* which is available on the DPI Water website www.water.nsw.gov.au

Under this policy, daily extraction limits should generally be set at less than 30% of the flow threshold. However where demands for extraction are already very high and the economic impact of a significant reduction in access would be high, the volumes may be set at up to a maximum of 60 per cent of the upper limit of the flow class.

Table 5: Total daily extraction limits

Flow class	Stream flow (ML/d)	TDEL for local water utility access licences	TDEL for unregulated river and stock & domestic licences
Tuross River, Gulph Creek, Swamp Creek and Reedy Creek			
Very Low Flow Class	<3	1 ML/day*	No access
Low flow Class	3 – 5	50% of daily flows above 3 ML/day	50% of daily flows above 3 ML/day
A1 Class	5 – 20	1 ML/day + 50% of daily flows above 5 ML/day, up to a total maximum of 5 ML/day	1 ML/day + 50% of daily flows above 5 ML/day, up to a total maximum of 5 ML/day
A2 Class	20 – 50	5 ML/day + 20% of daily flows above 20 ML/day, up to a total maximum of 8 ML/day	5 ML/day + 80% of daily flows above 20 ML/day, up to a total maximum of 17 ML/day
B Class	50 – 200	8 ML/day + 50% of daily flows above 50 ML/day	17 ML/day + 50% of daily flows above 50 ML/day
C Class	> 200	No TDEL	No TDEL
Wandella Creek Downstream Management Zone			
B Class	≤ 13 ML/d	No TDEL**	2.1 ML/d
C Class	13-32 ML/d	No TDEL	2.6 ML/d
D Class	>32 ML/d	No TDEL	7.4 ML/d

* The panel agreed to allow 2 ML/d access for town water supply if Deep Creek Dam should fall below 40 per cent capacity

** Wandella Creek is not currently being used for supplying town water.

TDELs calculated as a percentage of the top of a flow class can be problematic as the amount of water theoretically available for extraction at the lower end of the flow class may

be greater than the volume of water in the river. During the targeted consultation process Tuross irrigators and Eurobodalla Shire Council expressed concerns about the calculation of TDELs calculated as a percentage of the top of the flow class.

Based on recommendations from DPI Water, the Regional Panel agreed to a means of calculating TDELs based on daily flows rather than the flow at the top of the flow class. The panel allocated a maximum of 50% of daily flow to be available for extraction (shared between water access licences and the local water utility).

Total daily extraction limits in Wandella Creek

Total daily extraction limits were previously defined in the *Water Sharing Plan for the Wandella Creek Water Sources 2004* on the basis that there is considerable entitlement in the catchment with the potential for significant competition and hydrologic stress. TDELS were defined for each flow class based on a staff gauge that is no longer operational. Advice from DPI Water's hydrology unit recommended that the gauge on the Wadbilliga River (218007) was the most appropriate for determining periods of B class, C Class and D Class flow in Wandella Creek. These classes are defined in Table 5 for the Downstream Management Zone. The Regional Panel determined that TDELs were not necessary for the Upstream Management Zone.

Alluvial licences

For management purposes, the Tuross River water sharing plan will establish a 40 metre wide buffer zone along the river from the high bank. This recognises the strong connectivity between groundwater and surface water at the boundary between the two. Existing bores located within the 40 metre buffer zone will be managed according to the same daily access rules that apply to surface water licences in the water source. The exceptions are access licences for stock and domestic, local water utility, food safety or essential dairy care purposes which are exempt from these constraints. These access rules will apply to alluvial water users from Year 6 of the plan to allow them to become familiar with the cease-to-pump concept and adjust their management practices.

In addition to the plan rules, alluvial bores may be subject to local impact rules, which are developed to address local groundwater issues, and are implemented through Ministerial Orders.

Water supply works approvals

Construction of dams

Consistent with state-wide policy, the Tuross River water sharing plan prohibits the construction of instream dams in the water sources which have been assessed to have high instream values: Brou Lake, Bumberry Creek, Bumbo Creek, Lake Mummuga, Little and Big Belimbla Creeks, Mid Tuross River, Tuross Estuary Tributaries, Tuross River, Wadbilliga River, Wagonga Inlet Tributaries, and Woila Creek.

Construction of bores in alluvial aquifers

The Tuross River water sharing plan sets the distances that new bores may be permitted to be constructed from streams, other bores, GDEs and cultural sites. These distance rules were set based on state-wide recommendations.

The plan prohibits new bores within 40 metres of a third order stream or higher, except for bores that:

- are the result of a conversion from an unregulated river access licence; or
- are drilled into the underlying non-alluvial material, and the slotted intervals of the production bore commence deeper than 30 metres; or

- the applicant can demonstrate that the bore will have minimal impact on base flows in the stream.

In relation to distances from other bores, new groundwater bores are not permitted within:

- 100 metres of an approved water supply bore nominated by another access licence;
- 100 metres of an approved water supply bore from which BLR is being extracted;
- 50 metres from the property boundary unless the owner of the adjacent property consents in writing;
- 500 metres from an approved water supply bore that is used by a local water utility or major water utility; and
- 100 metres from a Department observation or monitoring bore.

These restrictions do not apply if the new bore is solely for accessing BLR, or is replacing an existing groundwater bore or is for the purpose of monitoring or environmental management. The Regional Panel recommended that new bores may be permitted closer than the minimum distances if a hydrologic assessment is undertaken and can demonstrate that the impacts of extraction will be minimal.

The water sharing plan specifies rules for new bores located near high priority GDEs and culturally significant groundwater dependent sites. At the start of the plan there were no specified high priority GDEs or cultural sites. Should these be identified during the life of the plan, the plan rules state that no new works will be approved within 100 metres of either type of site for bores that supply BLR, and within 200 metres for any new water access licences.

Dealing rules

The objective of dealing rules (trading rules) is to allow the development of a water market whilst recognising and protecting the needs of the environment and third party interests. The NWI has established guidelines for water trading. Trading of water entitlement within the water sharing plan area needs to maximise the flexibility for users to be able to use water to its highest value without having an adverse impact on water sources or existing water users.

The water sharing plan prohibits trade into 13 water sources and permits trade into nine water sources up to a specified level of entitlement (Table 6).

Alluvial groundwater licences:

- are subject to the same dealing rules as surface water licences, i.e. not permitted to be traded into areas with high instream values or high hydrological stress;
- may be traded between alluvial aquifers, subject to assessment; and
- are not permitted to be converted to surface water licences.

Surface water licences are permitted to be converted to alluvial groundwater licences, subject to assessment.

Table 6: Summary of water dealing rules

Water Source	Dealing rule	Justification
Belimbla Creek	Trade into water source not permitted	High requirements for BLR
Brou Lake	Trade into water source not permitted	High instream values
Bumberry Creek	Trade into water source not permitted	High instream values
Bumbo Creek	Trade into water source not permitted	High instream values in headwaters and already considerable entitlement in this water source.
Coila Lake	Trade into water source permitted up to a total entitlement of 61 ML/yr	Medium instream values
Corunna Lake	Trade into water source permitted up to a total entitlement of 26 ML/yr	Medium instream values
Gulph Creek	Trade into water source permitted up to a total entitlement of 61 ML/yr	Medium instream values
Lake Mummuga	Trades into water source not permitted	High instream values; Australian Grayling present in the water source
Little and Big Belimbla Creeks	Trades into water source not permitted	High instream values
Mellion Creek	Trades into water source not permitted	High requirements for BLR
Mid Tuross River	Trades into water source not permitted	High instream values
Reedy Creek	Trade into water source permitted up to a total entitlement of 45 ML/yr	Medium instream values
Swamp Creek	Trade into water source permitted up to a total entitlement of 33 ML/yr	Medium instream values
Tilba Tilba Lake	Trade into water source permitted up to a total entitlement of 9 ML/yr	Medium instream values
Tuross Estuary Tributaries	Trades into water source not permitted	High instream values; Australian Grayling present
Tuross River	Trades into water source not permitted	High instream values; Australian Grayling present Significant volume of entitlement
Upper Tuross River	Trade into water source permitted up to a total entitlement of 76 ML/yr	Medium instream values
Wadbilliga River	Trades into water source not permitted	High instream values
Wagonga Inlet Tributaries	Trades into water source not permitted	High instream values; Australian Grayling present
Wandella Creek	Trade into water source permitted up to a total entitlement of 65 ML/yr	The previous plan did not allow for trade into the water source. However the Tuross plan permits trade into water sources with medium instream values, hence trade is permitted to maintain consistency.
Woila Creek	Trades into water source not permitted	High instream values
Yowrie River	Trade into water source permitted up to a total entitlement of 81 ML/yr	Medium instream values

Adaptive management

Adaptive management refers to the practice of change in response to new information such as monitoring or some other improvement in understanding. In the case of water sharing plans, such information could include socio-economic studies, hydrological modelling, ecological studies and information about Aboriginal cultural values.

Adaptive management is a requirement of both the WMA 2000 and the NWI, and has been allowed for during the life of the Tuross River water sharing plan through the inclusion of amendment provisions. These provisions allow some aspects of the water sharing plan to be changed within defined limits. Specific amendment provisions in the Tuross River water sharing plan are discussed below. Following this is a discussion about monitoring, evaluation and reporting which are key activities for the adaptive management of water sharing plans.

Amendment provisions

The Tuross River water sharing plan includes a number of specified amendments that may be made to the plan during its 10 year period of operation. Standard amendments that apply to all water sharing plans include:

- amending water sources, management zones or EMUs;
- establishing new or additional flow classes in any water source where management zones are added or amended;
- amending water sources for which dams on third order streams or higher will not be granted;
- amending requirements for metering or record keeping in relation to licensed access works; and
- updating information in Schedules or deleting them if no longer required.

The final Tuross River water sharing plan also includes the following amendments that are specific to the Tuross catchment.

Flow reference point for water sources along the lower Tuross

The flow reference point for the Gulph Creek, Reedy, Creek, Swamp Creek and Tuross River Water Sources is GS218008 (Tuross River at Eurobodalla). The future of this gauging station is unclear as the infrastructure to which it is attached is deteriorating. The water sharing plan contains an amendment provision which allows the flow reference point to be changed to GS218005 (Tuross River downstream of Wadbilliga Junction) should the Eurobodalla gauge (GS218008) be discontinued during the life of the plan.

Access to low flows

The plan allows for licence holders who become accredited under the Tuross River Health Agreement to gain access to the Low Flow Class. It also provides for extension or modification of the cease-to-pump exemption for stock watering beyond Year 3 of the plan (either extending the exemption or modifying the volume that may be taken for stock watering from low flows).

Town water supply drought provisions

An amendment clause has also been included in the plan which allows the revision of the drought provision (allowing Eurobodalla Shire Council to extract 2 ML/d in the very low flow class when Deep Creek Dam falls below 40% capacity) should future studies indicate that the rate of extraction is having an unacceptable impact on ecological values.

Weekly extraction limit for town water supply

During public exhibition of the draft plan, Eurobodalla Shire Council requested that extractions from its bores in the alluvial aquifer alongside the Tuross River be subject to a weekly extraction limit rather than a daily extraction limit. The extent to which groundwater extractions are buffered by the storage capacity of the aquifer is not clear and a desktop assessment by DPI Water on the impacts of groundwater extractions on stream flows in the Tuross River was inconclusive. An amendment clause has been included in the water sharing plan that allows Council's TDEL to be rewritten as a weekly extraction limit at a later date, pending the results of further investigation and consultation.

Eurobodalla Shire Council has established a code which defined measures to address water restriction and conservation. This code includes specified triggers for restrictions based on the capacity of Deep Creek Dam and available water from the Moruya and Tuross Rivers (ESC 2013). The code works in conjunction with the council's drought management strategy that details possible alternative water sources during times of drought. Any change to Council's water restriction policy may initiate a review of the dam storage level at which the drought provision is activated.

Monitoring, evaluation and reporting

DPI Water has developed a Monitoring, Evaluation and Reporting Framework in collaboration with key stakeholders. The framework conforms to NSW and Commonwealth government guidelines for monitoring, evaluation and reporting, and demonstrates an adaptive management approach to water planning required under the principles of the WMA 2000. The evaluation framework aims to inform the community of the outcomes of water sharing plans, and to collate the results of various legislatively required evaluations and relevant knowledge to inform the review of the water sharing plans. The framework will assess the inputs, outputs and outcomes of the water sharing plans and their operations. The assessment will consider:

- the process of plan development (appropriateness);
- the performance of the plan during operation (efficiency); and
- the socio-economic, environmental and cultural outcomes of the plan (effectiveness).

The main strategies in place to assist in evaluating water sharing plans include:

- assessment of performance indicators (using an Environmental Flows Monitoring and Modelling program);
- an audit of plans; and
- review of each plan at the end of its ten year term.

Performance indicators

Part 2 of the water sharing plan includes a number of standard performance indicators that will be monitored over the life of the water sharing plan. It is not practical to monitor all issues in all water sources. The performance indicators identify that monitoring will be undertaken for specific issues in key water sources. The actual procedure for monitoring each indicator may change over the period of the water sharing plan as improved methods are developed.

In order to assess performance indicators, DPI Water has established an Environmental Flows Monitoring and Modelling program which is designed to make the results of environmental flow studies more transferable between water sources and to develop more generic relationships between flow, hydraulics and ecological responses. This will enable a more efficient and effective evidence based approach to support monitoring and evaluation of water sharing plans in NSW.

Audit

The WMA 2000 requires that water sharing plans be audited regularly, at intervals of not more than five years, to determine whether the provisions of the plan are being implemented. Under section 44 of the Act the Minister for Primary Industries, Lands and Water must appoint an Audit Panel to undertake this review.

The Audit Panel reflects the membership of the State Interagency Panel for Water Sharing and comprises representatives from Department of Primary Industries, Office of Environment and Heritage, and Local Land Services. Representatives from the NSW Natural Resources Commission and NSW Fisheries are invited to participate in the audit process as observers.

Reflecting the requirements of the WMA 2000 the focus of the audit is on the extent to which the provisions in the plan have been implemented. The audit does not attempt to assess the outcomes or effectiveness of the plan in achieving its objectives (this is considered by DPI Water through its monitoring and evaluation process).

When conducting an audit the panel will review a range of analysis and material provided by DPI Water to:

- identify patterns of implementation activities across water source types, across plans and types of water sharing plan provisions;
- identify actions required to address instances of partial and non-implementation;
- develop broad recommendations for improving the implementation of existing plans and the robustness of new plans; and
- identify opportunities for linking the audit findings with other related processes, particularly the review of catchment action plan targets.

Plan review

At the end of the water sharing plan's 10 year life the Minister may, on recommendation by the NRC (under Section 43A of the WMA 2000), extend a water sharing plan for another 10 years or replace the plan. An extension does not allow for any changes to the water sharing plan. If any changes are proposed, then a replacement water sharing plan needs to be prepared.

The WMA 2000 requires that when deciding whether to extend or replace an existing plan, the Minister must consider:

- the most recent audit of water sharing plans conducted under section 44; and
- a report from the NRC prepared within the previous five years, on the extent to which the water sharing plan has contributed to relevant state-wide natural resource management standards and targets of the relevant LLS catchment action plan.

Under the WMA 2000 a water sharing plan may be extended for 12 months past the expiry date of the plan to allow for a replacement plan to be prepared.

Glossary

Many of the terms in this document are defined in the WMA 2000 and are therefore not redefined here. However, there are some terms not included in the legislation that are defined below to assist with understanding the water sharing plan.

Account water: The balance in an access licence water allocation account at a particular time. An access licence water allocation account records water allocations accrued under the licence as well as water allocations taken, assigned or re-credited. The operation of the account is also governed by rules for the carrying over of credits from one accounting period to the next and rules for the maximum credit that may be allowed to accumulate in the account as established in a water sharing plan.

Alluvial, alluvium: Sediment deposited by a stream of running water, in particular along riverbeds or floodplains.

Aquifer: An underground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, silt or clay) from which groundwater can be usefully extracted. The volume of water stored in an aquifer, the rate at which water can recharge, the volume of water extracted from it, and the rate at which water can move through the aquifer are all controlled by the geologic nature of the aquifer.

Conversion factor: The adjustment factor that is to be applied to share components when they are cancelled and reissued in a different water source and vice versa, or as a different category. It is designed to allow movement of water from one water source to another or from one licence category to another whilst minimising the impacts on third parties of such movements. These impacts result in that the value of a unit of share component (in terms of the average water allocations) that result from it may vary from one water source to another or from one licence category to another.

Critical habitat: Areas of habitat (land or water) that are crucial to the survival of particular threatened species, populations or communities.

Cumulative impact: The combined impact of all surface water extraction.

Ecological values: The intrinsic or core attributes associated with naturalness, diversity, rarity and special features, but excluding representativeness used to classify water sources for apportioning water management rules.

Endangered ecological communities: Ecological communities listed in Schedule 1 of the *Threatened Species Conservation Act 1995* or Schedule 4 of the *Fisheries Management Act 1994*.

Ephemeral: Temporary or intermittent; for instance, a creek or wetland which dries up periodically.

Extraction of water: Removal of water from a river for off-stream storage or consumptive use.

Extraction management unit: A group of water sources; defined for the purpose of managing long-term annual average extraction.

Flow classes: The range of daily flow rates in a river which provides the framework for sharing water on a daily basis.

Flow duration curve: A plot that shows the percentage of time that flow in a stream is likely to equal or exceed some specified value of interest.

Flow gauge: A device used to measure the height of a river, from which the flow in the river can be calculated.

Flow reference point: The site from which the flow data is calculated to determine the rates associated with a flow class and then to implement the daily access rules during the life of the plan.

Full capacity: The volume of water that is impounded in the pool, lagoon or lake when the level of water in the pool, lagoon or lake is at the highest water level where there is no visible flow out of that pool.

Groundwater: The water beneath the earth's surface that has filtered down to the zone where the earth or rocks are fully saturated.

Groundwater dependent ecosystems: Ecosystems that rely on groundwater for their species composition and their natural ecological processes.

Individual daily extraction limit (IDEL): The daily volume limit that may apply for a particular licence holder for each flow class. The IDEL will be specified as part of the extraction component on the access licence. It establishes a share of the TDEL for that flow class.

Instream refuge habitat: Stream habitat containing pools that retain water for longer periods of time during drought and low flow. Instream biota will migrate to these more permanent habitats to survive.

Long-term average annual extraction limit (LTAAEL): The target for total extractions (under all water access licences plus an estimate of BLR within an EMU) which is used to assess whether growth-in-use has occurred. The actual annual extractions (metered plus estimated) are averaged over a fixed period of time defined by the water sharing plan when comparing with the LTAAEL. If the fixed period of time is greater than one water year, then in any one water year, extractions can exceed the LTAAEL without triggering a growth-in-use response.

Macro water sharing plans: Plans which apply to a number of water sources across catchments or different types of aquifers. The macro planning process is designed to develop broader-scale plans covering most of the remaining water sources in NSW.

Management zone: An area within a water source used for defining the location of applicability of water sharing rules, but secondary to the water source. A management zone is more likely to be designated where local dealing restrictions are in place or where 'cease-to-pump' rules for works approvals apply.

Pools: Lentic water bodies (standing water), including anything falling within the definition of a "lake" found in the Dictionary of the WM Act, except for tidal pools and estuaries.

Riparian: Relating to or living or located on the bank of a natural watercourse, such as a river or stream.

Total daily extraction limit (TDEL): The total limit on the daily volume of water that access licence holders in a particular category can take from a flow class. It is the sum of all the IDELs in that flow class.

Visible flow: The continuous downstream movement of water that is perceptible to the eye.

Water sharing plan: A plan made under the WMA 2000, which sets out the rules for sharing water between the environment and water users within whole or part of a water management area or water source

Water year: The 12 months running from 1 July to 30 June.

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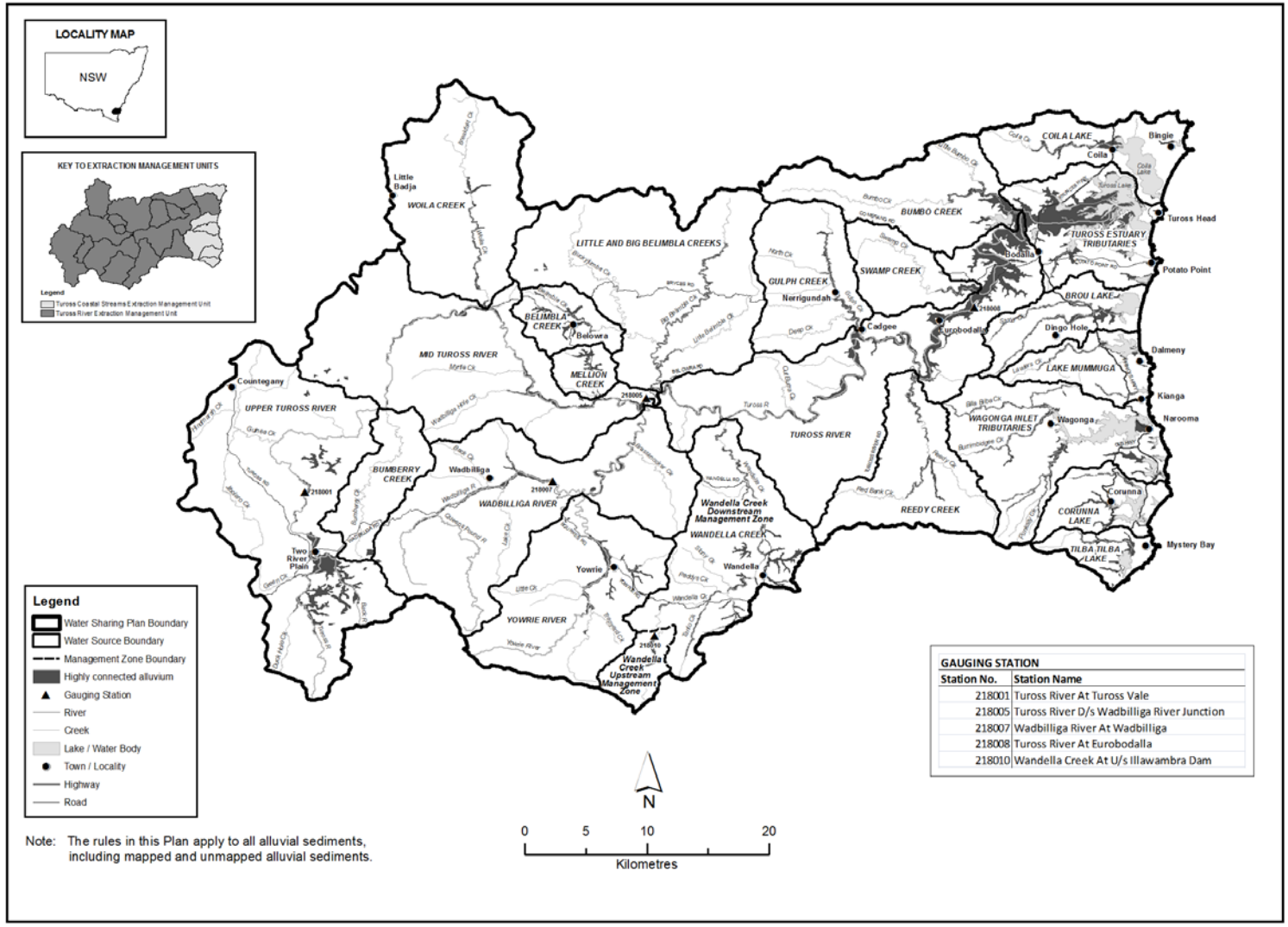
Appendix 1

Water sharing plan map



Appendix 2

Water management units established by the Tuross River water sharing plan

Extraction Management Unit)	Water Source	Management Zone
Tuross River	Belimba Creek	
	Bumberry Creek	
	Bumbo Creek	
	Gulph Creek	
	Little and Big Belimba Creeks	
	Mellion Creek	
	Mid Tuross River	
	Reedy Creek	
	Swamp Creek	
	Tuross Estuary Tributaries	
	Tuross River	
	Upper Tuross River	
	Wadbilliga River	
	Woila Creek	
	Yowrie River	
	Wandella Creek	Wandella Creek Upstream Wandella Creek Downstream
Tuross Coastal Streams	Brou Lake	
	Coila Lake	
	Corunna Lake	
	Lake Mummuga	
	Tilba Tilba Lake	
	Wagonga Inlet Tributaries	

Appendix 3

Identified threatened species

The macro water sharing plan process is concerned with protecting instream water values that relate to extraction. Therefore, only threatened species that are likely to be sensitive to extraction have been considered when assessing the water source values. It should also be noted that some threatened species are highly sensitive to low flow extraction, whilst other threatened species, such as plants that occur in the riparian zone, are less sensitive. Threatened species considered to be highly sensitive to low flows are given a higher priority for protection.

Table 7 shows threatened species that are known (K) or expected (E) to occur in each water source. Information relating to threatened fauna species in the Wandella Creek Water Source follows after the table.

Table 7: Threatened species and other environmental values known or expected to occur in the Tuross River water sources

	Belimbla Creek	Brou Lake	Bumberry Creek	Bumbo Creek	Coila Lake	Corunna Lake	Gulph Creek	Lake Mummuga	Little and Big Belimbla Creeks	Mellion Creek	Mid Tuross River	Reedy Creek	Swamp Creek	Tilba Tilba Lake	Tuross Estuary Tributaries	Tuross River	Upper Tuross River	Wadbilliga River	Wagonga Inlet	Woila Creek	Yowrie River
Threatened fish species																					
Australian Grayling	K		K	K			K		K	K	K	K	K		K	K	K	K	K	K	K
Threatened frog species																					
Alpine Tree Frog	E	E		E			E	E	E	E	E	E	E			E			E	E	E
Giant Burrowing Frog	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
Green and Golden Bell Frog	K	K		K	K	K	K	K	K	K	K	K	K	K	K	K		K	K	K	K
Littlejohn's Tree Frog	K	K	K	K	E	E	K	K	K	K	K	K	K	E	E	K	K	K	K	K	K
Southern Bell Frog			K								K						K	K		K	
Stuttering Barred Frog	K	K		E	E	E	K	E	K	K	K	K	E	E	E	E		K	K	K	K

	Belimbla Creek	Brou Lake	Bumberry Creek	Bumbo Creek	Coila Lake	Corunna Lake	Gulph Creek	Lake Mummuga	Little and Big Belimbla Creeks	Mellion Creek	Mid Tuross River	Reedy Creek	Swamp Creek	Tilba Tilba Lake	Tuross Estuary Tributaries	Tuross River	Upper Tuross River	Wadbilliga River	Wagonga Inlet	Woila Creek	Yowrie River
Threatened bird species																					
Australasian Bittern	K	K		K	K	K	K	K	K	K	K	K	K	K	K	K		K	K	K	K
Black Bittern	K	K		K	K	K	K	K	K	K	K	K	K	K	K	K		K	K	K	K
Black-tailed Godwit		K		K	K	K		K					K	K	K	K			K		
Little Tern		K		K	K	K		K					K	K	K	K			K		
Freckled Duck		K		K	K	K		K					K	K	K	K			K		
Great Knot		K		K	K	K		K					K	K	K	K			K		
Greater Sand-plover		K		K	K	K		K					K	K	K	K			K		
Lesser Sand-plover		K		K	K	K		K					K	K	K	K			K		
Osprey		K		K	K	K		K					K	K	K	K			K		
Regent Honeyeater	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
Sanderling		K		K	K	K		K					K	K	K	K			K		
Terek Sandpiper		K		K	K	K		K					K	K	K	K			K		
Threatened mammal species																					
Greater Broad-nosed Bat	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
Large-footed Myotis	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
Threatened wet flora																					
Waterwheel Plant		K		K		K		K					K	K	K	K			K		

	Belimbla Creek	Brou Lake	Bumberry Creek	Bumbo Creek	Coila Lake	Corunna Lake	Gulph Creek	Lake Mummuga	Little and Big Belimbla Creeks	Mellion Creek	Mid Tuross River	Reedy Creek	Swamp Creek	Tilba Tilba Lake	Tuross Estuary Tributaries	Tuross River	Upper Tuross River	Wadbilliga River	Wagonga Inlet	Woila Creek	Yowrie River
Threatened populations																					
South East Corner Bioregion		K		K	K	K		K					K	K	K	K			K		
Freshwater wetlands on coastal floodplains		K		K	K	K		K					K	K	K	K			K		
Declared locations																					
Declared wilderness areas			K					K			K						K	K		K	K
SEPP wetlands		K		K	K	K		K						K	K				K		
Nationally important wetlands					K										K						

Disclaimer:

The Office of Environment and Heritage (OEH) has provided assessments on the presence of threatened species and their sensitivity to extraction to inform the classification of water sources through the macro water sharing planning process. The assessments were undertaken for the specific purpose of developing an initial classification of water sources. They were based on the most accurate and relevant data/ information sourced and analysed at the time.

Initial classifications were a first step to inform panel deliberations. Regional Panels considered a range of information and used local knowledge in determining a final classification. The assessments are not absolute – for example the absence of threatened species for an assessment does not necessarily mean the threatened species are not present.

These assessments should not be used for any purpose other than classification of catchment management units as part of the macro water sharing planning process.

Threatened species in Wandella Creek

A list of threatened vertebrate species recorded from the Wandella Creek catchment was considered as part of the development of the 2004 water sharing plan for this water source.

Threatened fauna recorded within the Wandella Creek catchment

Common name	Habitat requirements	Status
Birds		
Glossy Black Cockatoo	Mountain forests, coastal woodlands, open forest and trees bordering watercourse, in areas with She-oaks (Allocasuarina spp)	Vulnerable
Powerful Owl	Habitats include forested hills and flats and eucalypt and riverine woodland in coastal areas	Vulnerable
Mammals		
Eastern False Pipstrelle	Roosts in stem holes of living eucalypts. Probably forages mainly above the forest canopy, in open woodland or over water	Vulnerable
Yellow-bellied Glider	Petaurus australis	Vulnerable
Koala	Phascolarctos cinereus	Vulnerable

NPWS advised that the proposed water sharing arrangements will not threaten any of these species. They also advised that there was no relevant Threatened Species Recovery Plans that were required to be addressed at the commencement of the water sharing plan.

DPI Fisheries provided a list of native fish species that were known or expected to occur in the Tuross River catchment. This included the following threatened species:

- Australian Grayling (likely to be present in the lower reaches of Wandella Creek); and
- Non-parasitic Lamprey (may be present).

DPI Fisheries advised that a precautionary approach needed to be taken in setting flow rules to meet the requirements of these species.

Appendix 4

Interagency Reference Panel and support staff

Table 8: South Coast Regional Panel-membership and expertise

Name	Agency	Role	Expertise
Tracey Brownbill	DPI Water	Agency representative	Water planning and policy, catchment management, consultation
Brett Miners	Local Land Services	Observer	Catchment management, river rehabilitation,
Anne Muir	DPI Agriculture	Agency representative	DPI regional input to water reforms, agriculture, catchment management and land use/strategic planning.
John O'Connor	DPI Agriculture	Agency representative	Catchment management, local knowledge of catchments, agricultural issues.
Allan Lugg	DPI Fisheries	Agency representative	Flow requirements of fish, local knowledge
John Patten	OEH	Agency representative	OEH regional input to water reforms, conservation issues.
Danny Wiecek	OEH	Agency representative	OEH regional input to water reforms, conservation issues.

Table 9: Support staff membership and expertise

Name	Agency	Role	Expertise
Bob Britten	DPI Water	Hydrogeological support	Groundwater analysis and hydrology.
Andrew Craig	DPI Water	Water sharing plan coordination	Local knowledge, facilitation and consultation.
Christine Hill	DPI Water	Socio-economic support	Economic and social policy
Kylee Wilton	DPI Water	Plan writing	Water planning and policy
Brendan Fletcher	DPI Water	Plan writing	Water planning and policy
Craig Jones	DPI Water	Compliance support	Water licensing and monitoring
Wayne Ryan	DPI Water	Licensing	Licensing support, local knowledge.
Simon Williams	DPI Water	Environmental support	Flow requirements for freshwater biota.
Kimberley Williamson	DPI Water	Planning support	Facilitation and consultation
Eva Ciecko	DPI Water	GIS support	Map production
Adam Wiggins	DPI Water	Hydrometrics support	Local hydrometrics knowledge
Simon Morton	DPI Water	Hydrological support	Hydrological modelling

Appendix 5

Reference information used by Interagency Reference Panel

DPI Water data sets

- Licensing Administrator System – DPI Water's statewide database holding the licence details including volume of entitlement, location details and stream orders
- Hydstra – Hydstra is a DPI Water statewide database that holds all flow data
- Regional Groundwater Monitoring Network – DPI Water is developing a regional groundwater monitoring network to be used to monitor alluvial groundwater levels and assess stream / surface water connectivity
- Volumetric Conversion Database – used to help determine the Peak Daily Demand for each water source
- Regional Geographic Information Systems – DPI Water land use and topographic information

Other data sets

- Stressed rivers reports – used as the basis for identifying where there are instream barriers.
- Threatened species (fish) – Data supplied by NSW DPI Fisheries
- Threatened species (other) – Data supplied by OEH
- Index of Social Disadvantage – Australian Bureau of Statistics
- Employment in Agriculture - Australian Bureau of Statistics

Other agency data

- Wildlife Atlas (OEH) – statewide flora and fauna database
- NSW DPI Fisheries modelled data sets (Fish Community Index, Fish Community Vulnerability)
- NSW DPI Fisheries freshwater and saltwater recreational fishing database

Appendix 6

Final classification summary

Table 10: Value matrix used to determine indicative dealing rules

	Low hydrologic stress or hydrologic risk	Medium hydrologic stress or hydrologic risk	High hydrologic stress or hydrologic risk
High Instream Values	**a** Brou Lake Bumberry Creek Lake Mummuga Little and Big Belimbla Creeks* Mid Tuross River Wadbilliga River Woila Creek	**b** Wagonga Inlet	**c** Bumbo Creek Tuross Estuary Tributaries Tuross River
Medium Instream Values	**d** Belimbla Creek Coila Lake* Corunna Lake* Gulph Creek Mellion Creek Reedy Creek Tilba Tilba Lake* Upper Tuross River*	**e** Yowrie River	**f** Swamp Creek
Low Instream Values	**g**	**h**	**i**

* Represents a change to the initial classification based on Regional Panel local knowledge

Table 11: Risk matrix used to determine indicative access rules

	Low dependence on extraction	Medium dependence on extraction	High dependence on extraction
High Risk to Instream Values	**A**	**B** Bumbo Creek Swamp Creek*	**C** Tuross River
Medium Risk to Instream Values	**D**	**E** Yowrie River	**F**
Low Risk to Instream Values	**G** Belimbla Creek Brou Lake Bumberry Creek Coila Lake Little and Big Belimbla Creeks Mid Tuross River Reedy Creek Tuross Estuary Tributaries Upper Tuross River Wadbilliga River Wagonga Inlet Corunna Lake Gulph Creek Lake Mummuga Mellion Creek	**H** Tilba Tilba Lake	**I**

* Represents a change to the initial classification based on Regional Panel local knowledge

Appendix 7

Summary of submissions received on the draft plan

Issue	Concerns raised	Outcomes and decisions
Environmental protection	Adequacy of CTP rules for protecting instream riffles and pools during times of low flow	No change to proposed CTP rules. The proposed CTP levels are based on long-term discussions with licence holders.
	Preservation of adequate environmental flows into the Tuross estuary (maintain objectives of Tuross Estuary and Coila Lake Estuary Management Plan 2005)	Environmental studies will be conducted along the Tuross River to improve our understanding of the importance of specific stream flows to the health of the river. This knowledge will be Incorporated into decisions regarding subsequent water sharing plans for the Tuross River.
Cease-to-pump rules	Impact of CTP rules on low-level water users (stock, domestic and farming)	As above, no change to proposed CTP rules.
Town water supply	Access to very low flow to provide for critical human needs during drought	Increased TDEL for local water utility from 1 ML/d to 2 ML/d when the storage level in Deep Creek Dam falls below 40%.
Flow reference points	Use of the Wadbilliga gauge to manage water access rules in the Yowrie River water source (current water users in Yowrie River use 218005)	Use 218005 as flow reference point for Yowrie River Water Source as this is the current arrangement for water users.
	Concern over use of gauge GS 218005 as a flow reference point on the Tuross River as it is upstream of the main irrigation areas	Retain the use of gauge GS 218005 as an alternative flow reference point if 218008 is discontinued in the future (due to concerns over instability of the site)
Water trading	Concern that allowing water trading would ultimately increase extraction within the Tuross catchment	No change to trading rules. Not allowing any trading within the catchment would conflict with National Competition Policy and National Water Initiative.
Other	Intermittent construction of the sand barrage to prevent upstream movement of brackish water	Operation of the barrage is outside the scope of the water sharing plan