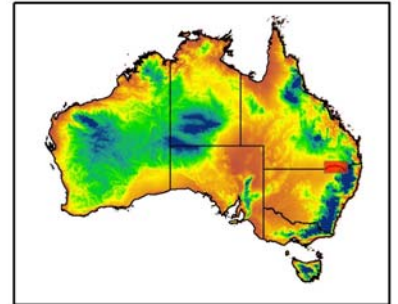


Border Rivers Trial Catchment

Location

The Border Rivers catchment lies in the Murray-Darling Basin, and spans across Queensland and New South Wales. The two major rivers in the catchment, the Dumaresq River and the MacIntyre River, define the border between the two States. The main towns in the study area —Goondiwindi, Mungindi and Texas — exist primarily to serve the region's agricultural industries, which underpin the regional economy.



Topography

The Border Rivers catchment extends from the rugged mountains of the Great Dividing Range in the east to a broad, flat alluvial plain in the west. The topography is largely determined by the geology of the region. The alluvial valley of the Dumaresq River is relatively narrow in the east. Moving west, the elevation decreases and the topography is characterised by gently undulating hills underlain by Mesozoic rocks and the alluvial valley begins to open.



Climate

The climate is characterised by dry stable winters with sporadic, unreliable rainfall and warm to hot summers with moderate to heavy rainfall. Annual median rainfall is >800 mm in the east to 500 mm in the west. The annual evaporation potential (as determined by pan evaporation) exceeds annual precipitation. The maximum and minimum temperatures of the higher altitude eastern region (upstream of Keetah) contrast with the maximum and minimum temperatures of the lower altitude of the western region.

Soils

In the Dumaresq river valley the soils are shallow to deep alluvial and colluvial of mixed lithology. In the MacIntyre River valley the soils are dark or grey cracking clay with coarse structured surface, clay alluvium substrate, hard setting, periodic cracking, imperfectly drained with medium to low salinity subsoil.



Land use

Agriculture is the dominant economic activity and the main source of income in the Border Rivers region. In the area upstream of Keetah, along the Dumaresq River, irrigated crops include potatoes, corn, peanuts, tobacco, lucerne and other fodder crops for livestock. In the area downstream of Keetah, along the MacIntyre River valley and alluvial plain, irrigated cotton is the dominant crop with some wheat and barley.



Geology and hydrogeology

Alluvial sediments of Quaternary and Tertiary age fill the base of the valley. Alluvial sediments of the Dumaresq and MacIntyre River system have been subdivided into 2 regions (upstream of Keetah and downstream of Keetah) based on hydrogeology. In the area upstream of Keetah the alluvial deposits are confined to a narrow valley, but east of the Dumaresq/MacIntyre confluence the deposits become more extensive, characteristic of an alluvial plain.

The main aquifers in the alluvial sediments are referred to as Units A, B and C, based on age, rock type and morphology. The groundwater upstream of Keetah contains two Cainozoic alluvial formations. The upper unit, Unit C, is 10-30 m thick and consists of unconsolidated sands and gravels with silt in some areas. Unit B is below Unit C, can be up to 50 m thick and occurs at depths greater than 30 m. Downstream of Keetah, Unit C consists of a shallow sand/gravel layer (8-16 m depth) that forms a continuous, extensive unconfined aquifer that is not high-yielding.

Socio-economic profile

The Queensland part of the catchment comprises the Statistical Local Areas (SLA) of Stanthorpe, Inglewood, Waggamba and Goondiwindi. Current population is 20,135 (2001 Census) with minimal population growth projected for 2011. Around 24% of the work force was employed in the agriculture, forestry and fisheries industries. The NSW part of the catchment comprises the Statistical Local Areas (SLA) of Inverell, Yallaroi, Severn, Tenterfield and Moree Plains. Since 1991, the catchment population has declined at an annual average rate of 1.5%. Around two-thirds of the work force was employed in the agriculture, forestry and fisheries industries.

Water use and management issues

Irrigation is the largest consumer of water in the Border Rivers catchment, followed by residential, stock and industry, which are relatively minor users. The volume of water used for irrigation varies from year to year, depending on seasonal conditions, rainfall, surface water allocation and crops grown. Some groundwater is also extracted from shallow alluvial aquifers for stock, domestic and industrial purposes and a limited amount of irrigation. Cotton is the main irrigated crop, accounting for around 85% of the total area irrigated in recent years in the catchment.

Water management is covered under the two jurisdictions of NSW and Queensland. The Border Rivers Commission has been established to facilitate coordination and development of a common management plan. This includes the design of monitoring and progressing consistency in management rules. In the area upstream of Keetah, the main water issue is the potential for groundwater development to increase transmission losses from the river. Groundwater is mainly used to irrigate fodder crops, with initial



development limited to the shallow aquifer (6-7m) and there are localised areas of bore interference and groundwater level declines.

In the downstream reach from Keetah to Mungindi, where the alluvial plain widens, the floodplain is underlain by shallow (10-25 m), highly saline groundwater (14,000-45,000 $\mu\text{S}/\text{cm}$) that is rising in part. The river in this area is generally a losing system. Surface water is used to irrigate large cotton holdings. The main issue is the potential for accessions from irrigation development on the floodplain to reverse the hydraulic gradient and induce inflows of saline groundwater into the river.



Conjunctive water management approach

In Border Rivers catchment there is a high degree of connectivity between surface water features such as streams, wetlands and drains and the underlying groundwater systems. It has been shown that the Dumaresq River and the shallow aquifers are intimately related. Any groundwater extraction will ultimately affect the flow in the river and consequently existing irrigation use from surface water supplies.

The concept of conjunctive use of surface water and groundwater was introduced for the Border Rivers region in 1990. The conjunctive system enables the users of the surface water to access groundwater when the allocations from dams decreases. Groundwater-surface water interactions are also critical from a water quality perspective. In highly saline groundwater environments (downstream of Keetah), the role of fluctuating watertables and discharge of shallow saline groundwater into rivers is central to the generation and export of salts. This highlights the need to take a conjunctive approach to water management in the catchment.



Relevant Links

[Border Rivers Water Resource Planning](#)

[Border Rivers Catchment Management Association](#)

[Border Rivers \(NSW\) Water Quality and River Flow Interim Environmental Objectives](#)