



Australian Government



PROVIDING SCIENTIFIC WATER RESOURCE INFORMATION ASSOCIATED WITH COAL SEAM GAS AND LARGE COAL MINES

Coal resource development and water resources in the Sydney Basin bioregion

The Bioregional Assessment Program has improved our understanding of the potential impacts of coal seam gas and coal mining developments on water resources and water-dependent assets such as wetlands and groundwater bores.

At a glance

The Sydney Basin provides water for over five million people and coal for local and international markets. There is also coal seam gas extraction at Camden.

Where is the Sydney Basin bioregion?

The Sydney Basin bioregion covers an area of 24,625 square kilometres in New South Wales. It adjoins the Northern Sydney Basin bioregion and its westward boundary is defined by the geological Sydney Basin.



Nepean Gorge, Mulgoa, Sydney Basin bioregion, NSW
Credit: Esther Beaton (Department of the Environment and Energy)



Map of the Sydney Basin bioregion

What are the coal and coal seam gas resources?

The Illawarra Coal Measures in the Southern and Western coalfields are the main coal-bearing rocks in the bioregion. Coal has been mined from the Southern and Western coalfields for many decades. Coal production is mostly from underground mines in the Wollongong-Appin-Bulli area in the south and the Lithgow area in the west. There is also coal seam gas production at Camden.

What did the assessment find?

Surface water catchments in the Sydney Basin bioregion are protected under NSW State Government legislation, with multiple dams providing water supply to Sydney. The bioregion also has productive groundwater aquifers within the Hawkesbury Sandstone, and the Narrabeen Group. Alluvial deposits, typically comprised of clay, silt, sand or gravel deposited by running water, occur along the valleys, creeks and floodplains of the Nepean, Hawkesbury, Georges and Shoalhaven Rivers. These deposits are usually shallow, forming aquifers that are responsive to rainfall and streamflow.

The flow of water between the porous sandstone aquifers and the underlying coal measures is limited by low permeability claystones that overlie the coal measures throughout the Sydney Basin. The Bald Hill Claystone is particularly important as it occurs below the Hawkesbury Sandstone, the main productive aquifer of the Southern Coalfields. Its presence limits the exchange of groundwater between the Hawkesbury Sandstone and the underlying Bulgo Sandstone, possibly providing some protection against the potential impacts by underground coal mining activities.

How was the assessment done?

Scientists used the best available data to describe the coal and coal seam gas, surface water and groundwater resources in the region.

Local experts, including councils, natural resource management groups and community groups, provided information on local water-dependent assets, such as wetlands and bores, that rely on surface water or groundwater. A register of these assets is available for use in future assessments.

Bioregional assessments look at the cumulative impacts of potential new coal mines and coal seam gas developments on water resources across a region. However, current scientific methods are not well suited to bringing together uncertain local-scale information

about subsidence and water losses due to underground mining into a regional assessment. The importance of subsidence and water loss due to underground mining for modelling impacts in the Sydney Basin bioregion meant that the program could not model regional impacts on water resources. Other methods are better suited to local scale assessments of the impacts of individual projects. The program therefore decided not to proceed to detailed regional modelling.

How will information from the assessment be used?

The data and tools from this assessment are available to support natural resource management in the Sydney Basin bioregion. They can be used in future environmental studies, including contributing to assessments of any proposed coal mines.

Coal seam gas and large coal mining developments require federal assessment and approval if they are likely to have a significant impact on a water resource under Australia's national environment law, the *Environment Protection and Biodiversity Conservation Act* (the EPBC Act). Other matters protected by the EPBC Act which are likely to be impacted by coal seam gas and large coal mining developments include listed threatened species or endangered communities, especially those known to be water dependent.

Results from this assessment are provided in four reports, a water-dependent asset register and a data register at www.bioregionalassessments.gov.au/sydney-basin-bioregion. The website also provides open access to the methods and datasets used to develop the assessment.

Visit www.bioregionalassessments.gov.au to find out more about the Bioregional Assessment Program.