Australian Government
BIOREGIONAL ASSESSMENTS
PROVIDING SCIENTIFIC WATER RESOURCE INFORMATION ASSOCIATED WITH COAL SEAM GAS AND LARGE COAL MINES

Coal resource development and water resources in the Gloucester subregion

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

Additional coal resource development is predicted to cause minor hydrological change in the Gloucester subregion. No impacts on ecological assets are predicted in the south, given the limited additional coal resource development. In the north, potential impacts on ecological assets are expected to be minor and localised because predicted hydrological changes are small.

Where is the Gloucester subregion?

The Gloucester subregion covers an area of about 348 square kilometres, including Stroud and Gloucester, north of the Hunter Valley, New South Wales. It is part of the Northern Sydney Basin bioregion.

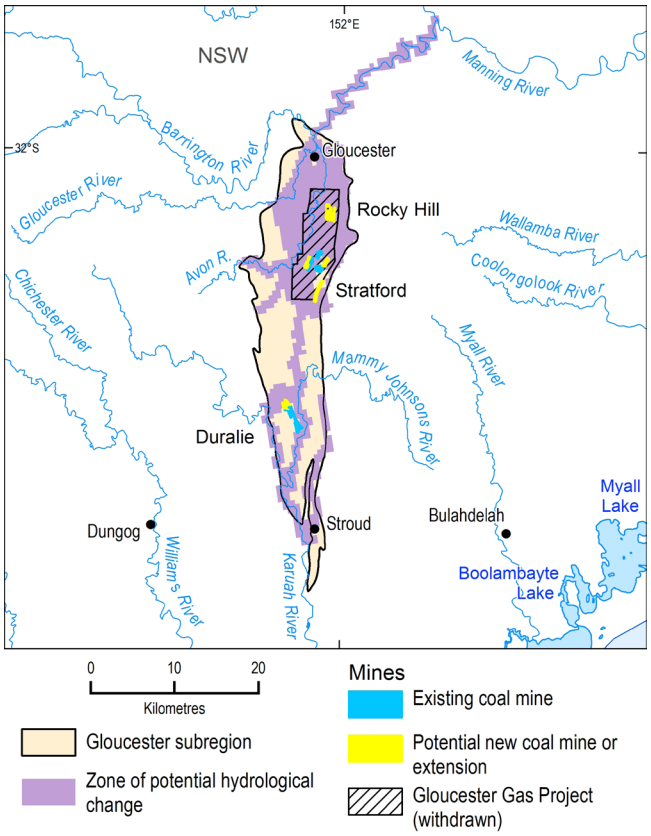
What are the coal resource developments?

As of October 2015, there were two existing, or baseline, mines (Duralie and Stratford) in the subregion and four additional coal resource developments: proposed expansions of the two baseline mines; a proposed open-cut coal mine at Rocky Hill, which the NSW Planning Assessment Commission refused approval for on 14 December 2017; and the Gloucester Gas Project Stage 1 coal seam gas development proposal, which has been withdrawn.

What are the potential changes in water?

The total area where additional coal resource development causes potential changes in groundwater or surface water is *very likely* (more than 95% chance) to be less than 250 square kilometres, including 242 kilometres of streams. This area is known as the zone of potential hydrological change. One hundred square kilometres of this area is affected by potential groundwater drawdown.

In the Avon and Upper Gloucester rivers, additional coal resource development is *very likely* (more than 95% chance) to reduce water availability by less than 1.6 gigalitres a year. This is 1-2 percent of the water available in the absence of additional coal resource development.



Additional coal resource development is *very unlikely* (less than 5% chance) to affect the reliability of water supply in the Upper Gloucester River and Karuah River (upper management zone). It is *very unlikely* (less than 5% chance) to cause more than three additional low-flow days per year in the Avon River.

Further details can be found in *Assessing impacts of coal resource development on water resources in the Gloucester subregion: key findings (Outcome Synthesis)*, *Surface water numerical modelling for the Gloucester subregion* (product 2.6.1), and *Groundwater numerical modelling for the Gloucester subregion* (product 2.6.2).

What might that mean for ecosystems and water-dependent assets?

Potential impacts due to additional coal resource development are ruled out for all estuarine ecosystems, and approximately 70% of groundwater-dependent ecosystems are *very unlikely* (less than 5% chance) to be impacted.

There are 242 kilometres of streams and 3.3 square kilometres of groundwater-dependent ecosystems in the zone of potential hydrological change. Modelled hydrological changes are likely to lead to minor ecological impacts on the streams. The ecology of the groundwater-dependent ecosystems is not as well understood. However it is *very unlikely* (less than 5% chance) that any of these ecosystems will experience drawdown of more than two metres due to additional coal resource development.

No detectable impacts are likely for ecological assets in the southern part of the subregion, given the limited additional coal resource development in this area. In the northern part of the subregion, potential impacts on ecological assets are expected to be minor and localised because modelled hydrological changes are small.

Fifty-eight surface water extraction points in the Gloucester subregion are outside the zone of potential hydrological change and very unlikely to be impacted. One hundred and twenty-nine bores are either monitoring bores or tap groundwater where drawdown is *very unlikely* (less than 5% chance) to exceed 0.2 metres. No change in cease-to-pump days is seen in the Upper Gloucester River and Karuah River (upper management zone) water sources. It is *very unlikely* (less than 5% chance) that there will be an increase in the number of cease-to-pump days in the Avon River.

The Washpool in the Karuah River, north of the town of Washpool, is the only identified sociocultural asset in the zone of potential hydrological change. However, due to the very small hydrological changes at this location, additional coal resource development is unlikely to affect it.

Further details on the results can be found in *Assessing impacts of coal resource development on water resources in the Gloucester subregion: key findings (Outcome Synthesis)*. More specific information on the impacts, including the sensitivity of different landscape classes to hydrological change, can be found in the impact and risk analysis (product 3-4).

How was the assessment done?

Scientists used the best available data to describe coal and coal seam gas resources, and to assess potential changes to surface water and groundwater due to proposed new coal resource developments.

They developed regional groundwater and surface water models for this assessment. The natural and human-modified ecosystems in the subregion were classified into 20 landscape classes to enable a systematic analysis of potential impacts on, and risks to, the water-dependent assets nominated by the community. The landscape classification was based on the subregion's geology, geomorphology, hydrogeology, land use and ecology. These landscape classes were aggregated into five landscape groups, based on their likely response to hydrological changes. Potential impacts were identified by overlaying landscape classes and assets on the modelled changes in hydrology and, in some cases, by ecological modelling.

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

How will information from the assessment be used?

The data and tools from this assessment are available to support natural resource management in the Gloucester subregion. They can be used in future assessments and environmental studies.

Results from this assessment are provided in 12 reports, a water-dependent asset register and a data register at www.bioregionalassessments.gov.au/assessments/gloucester-subregion. The website provides open access to the methods and datasets used to develop the assessment. Explore the subregion in more detail on BA Explorer, at www.bioregionalassessments.gov.au/explorer/GLO. Data from a range of disciplines are provided under a Creative Commons Attribution license where possible on the Australian Government's public data information service www.data.gov.au.

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