- Local Water Resource Protection and the Bickham Coal Proposal -

Introduction

- In January 2004, Bickham Coal Company Pty Ltd (BCC) was granted approval under the Mining Act 1992 to extract a 25,000 tonne bulk coal sample from a site in South Bickham. BCC now propose to establish an open cut mining operation at the site to extract an estimated 47Mt of coal over the next 22 years (DOP, 2005).
- There is now conjecture that the volume of coal to be extracted may be much larger.
- This document was prepared by Gilbert & Sutherland for the Bickham Coal-mine Action Group (BCAG) and local landholders.

Hydrology

- The study area lies within the catchment of the Hunter River. The major tributaries to the Hunter in this region are the Kingdon Ponds, Dartbrook, Pages and Isis Rivers.
- The Pages River, Dartbrook, Wybong Creek, Hunter River and associated aquifers are currently over-allocated to uses such as stock watering, crop irrigation and domestic supply.
- BCC intends to apply for a licence to extract an estimated 300ML/year from these already over-used water sources.

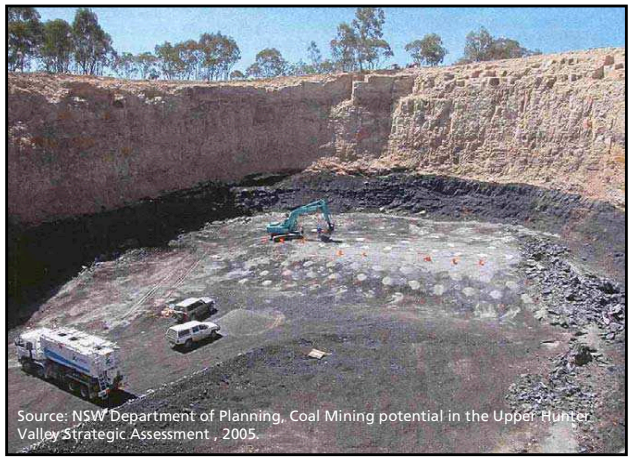
Groundwater

- The Kingdon Ponds/Dartbrook alluvial aquifer is the major fresh groundwater resource in the area. Communities in the area are also highly dependant on the Pages River, Wybong Creek and Hunter River aquifers.
- Hard rock aquifers which underlay the alluvial aquifers in the region usually contain saline waters. Underground mining may lead to fracturing of the hard rock layers which could contaminate the alluvial aquifers with saline waters. This could render these major groundwater sources useless for crop irrigation, stock watering and domestic supply.

Surface Water

- Some water resources in the region (including the Pages River System) are already classified as "highly stressed" streams due to low flows resulting from their over-use. The Bickham project poses a major threat to the health of these systems.

"Coal mining may result in the loss of surface flows, the loss of aquatic habitats, complete drying of river pools and loss of connectivity as surface flows are lost to subsurface flows" (DOP, 2005)



Source: NSW Department of Planning, Coal Mining potential in the Upper Hunter Valley Strategic Assessment , 2005.

"Mining development in the area would cut off significant quantities of high quality agricultural lands, threaten existing irrigation opportunities and create additional land use conflicts" (DOP, 2005)

Receiving Environment

Source: NSW Department of Planning, Coal Mining potential in the Upper Hunter Valley Strategic Assessment , 2005.

Groundwater Hydrogeology

- Alluvial aquifers have a major hydrological connection with the streams and ponds above them. During dry periods, the aquifers may be recharged by waters from the streams or ponds above. When the aquifer is fully recharged it can provide base flow to the stream.
- Extraction of groundwater from bores and wells accelerates water table decline. A lower water table results in greater volumes of water required to recharge the aquifer. This in turn reduces the amount of water available to receiving waters in the streams and ponds above.

"Coal mining results in the temporary drainage of surrounding aquifers, declining water tables and the possible reversal of groundwater flows, springs and base flows" (DOP, 2005)

Geology

- Hunter Development Brokerage (2003:27) states

"The project area is structurally complex. The dominant structural features are NW-SE tending regional folds. The folds have variable plunges and limbs dipping at high angles, dips of over 70 degrees have been recorded during exploration. Large-scale faults are also thought to exist within the project area. In the proposed bulk sample area, the Koogah Formation seams dip to the west at 15 - 25 degrees".

Agricultural Land Uses

- The upper hunter region boasts highly productive soils with good topography for sustainable agricultural use.
- Major agricultural land uses in the area include horse breeding, lucerne production and beef cattle grazing. The equine industry in the region has world-class standing and provides a substantial economic contribution through employment, capital investment and specialised products.
- The Department of Primary Industries - Agriculture estimates the total value of agriculture in the surrounds to be greater than $400million/year.
- The most valuable agricultural lands in the area are those associated with the alluvial aquifers between Murrurundi and the coal mine site at Bickham (DOP, 2005).

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"There is clearly a potential for long term damage to major streams, aquifers and dependant ecosystems by nearby coal mining" (NSW Department of Planning, Coal Mining potential in the Upper Hunter Valley Strategic Assessment , 2005.)

Groundwater Studies

- Investigations into groundwater quality and movement were undertaken by Hunter Development Brokerage Pty Ltd as part of a Review of Environmental Factors for the Bulk Sample pit (October 2002).
- A Strategic Assessment of the 'Coal Mining Potential in the Upper Hunter Valley' was undertaken by the NSW Department of Planning in December 2003.
- Bickham Coal Company (BCC) is currently undertaking a Water Resources Assessment (WRA) to determine whether surface and groundwater impacts associated with the mine can be managed.

Limitations of Groundwater Studies

- To date, no groundwater study has adequately addressed the issue of connectivity between Pages River or the Kingdon Ponds Catchment and the associated aquifers below.
- BCC's WRA proposes to incorporate only minimal sampling and analysis of the surrounding landholders' bores and dams. This is insufficient to address community concerns about protection of these resources.
- Studies to date have not adequately addressed groundwater flow, salinity and the possible impacts if saline waters are released into the receiving environment as a result of mining activities.

The Precautionary Principle

- Where the possibility exists of serious or irreversible environmental harm, lack of scientific certainty should not prevent cautious action to avoid such harm. Decision makers need to anticipate the possibility of ecological damage, rather than react to it as it occurs.
- Under this approach it is the responsibility of BCC to ensure that the proposed mining activities will not result in environmental harm. If this cannot be proven, the precautionary principle applies.
- Considering the sensitivity of the surrounding surface and groundwater environments and the dependence of local and regional communities on the health of these resources, it is imperative that this principle be applied.

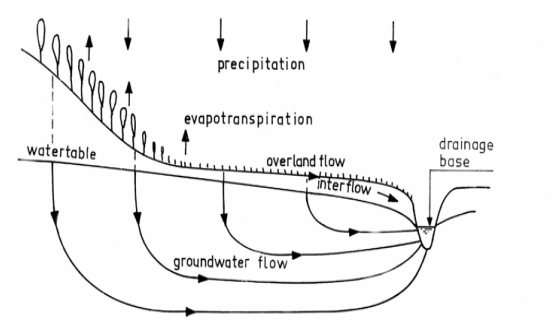

Figure 1: The hydrological cycle. Demonstrates the connection between ground and surface waters. **Source:** Land Drainage—Planning and design of agricultural drainage systems.

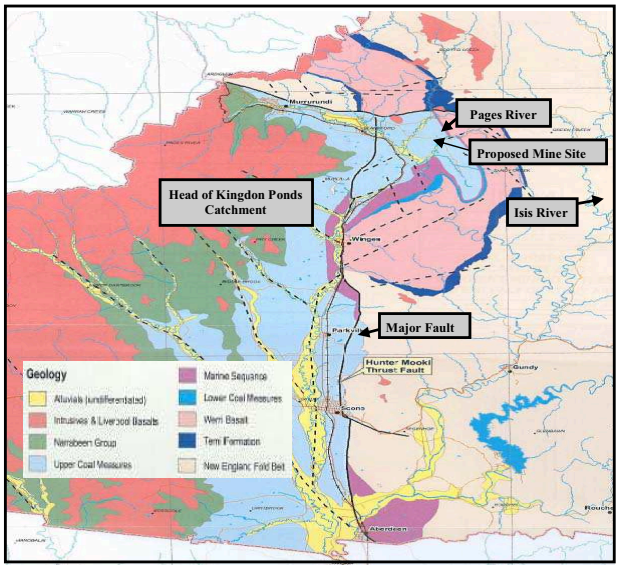

Figure 2: Location of major features and geology of the region. **Source:** Adapted from Map 3 of the NSW Department of Planning, Coal Mining potential in the Upper Hunter Valley Strategic Assessment , 2005.

Risk Management

Significant risks associated with the Bickham project include :

- The depletion of already over-allocated surface and groundwater resources
- Contamination of water resources
- Irreversible damage to major streams and aquatic habitats
- Destruction of the burning coal seam
- Economic losses to surrounding land holders.

Each identified environmental risk requires detailed investigation in order to allow adequate management.

To anticipate all risks associated with a large scale coal mining operation such as the Bickham proposal is very challenging with limited scientific data available.

The Approval Process

According to Parsons Brinkerhoff (2006) under the NSW Environmental Planning and Assessment Act 1979, the environmental assessment process for the Bickham Project can be summarised as follows:

1. Preparation of Water Resources Assessment studies (current stage)
2. Assessment of studies by an Independent Assessment Panel
3. Preparation of an Environmental Assessment
4. Assessment and decision by the Minister for Planning (PB, 2006).

What Needs To Happen

Surface and groundwater resources need to be protected to ensure the continued prosperity of existing industries in the region. All environmental, economical and social impacts of the Bickham project need to be fully addressed.

- A detailed independent investigation into the connectivity between the Pages River and all associated aquifers should be undertaken even in the adjacent catchments.
- Salinity of groundwater in the hard rock aquifers requires extensive investigation.
- Thorough testing of neighbouring land holders bores and wells should be conducted.
- A detailed and comprehensive plan for the management of all potential impacts associated with the Bickham project and workable compensation arrangements if they fail is required.
- Policies and legislation relating to the protection of high quality agricultural land, the protection of the Burning Mountain Coal Seam and the protection of surface and groundwater resources should not be disregarded.

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Information sourced from NSW Department of Planning, Coal Mining potential in the Upper Hunter Valley Strategic Assessment , 2005 (DOP, 2005).
Bickham Coal-mine Action Group Response to Review of Environmental Factors for Proposed Removal of Bulk Sample, 2003 (BCAG, 2003).
Bickham Coal Project, Water Resources Assessment and Community Consultation Briefing Paper. Parsons Brinckerhoff, 2006. (PB, 2006).