IMPACTS OF LONGWALL COAL MINING ON THE ENVIRONMENT IN NEW SOUTH WALES

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Cover Image: The now dry riverbed of Waratah Rivulet, cracked, uplifted and drained by longwall mining in 2006. The Rivulet comprises nearly 30% of the Woronora Dam catchment.

ABBREVIATIONS

ABC	Australian Broadcasting Corporation
ACARP	Australian Coal Association Research Program
AMCI	American Metals and Coal International
BHPB	Broken Hill Proprietary Billiton
CMA	Catchment Management Authority
CoI	Commission of Inquiry
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEC	Department of Environment and Conservation
DIPNR	Department of Infrastructure Planning and Natural Resources
DLWC	Department of Land and Water Conservation
DMR	Department of Mineral Resources
DPI	Department of Primary Industry
EDO	Environmental Defenders Office
EIS	Environmental Impact Statement
EP&A	Environmental Planning and Assessment
KTP	Key Threatening Process
LTCC	Longwall Top Coal Caving
NPA	National Parks Association
NSW	New South Wales
SMP	Subsidence Management Plan
TEC	Total Environment Centre

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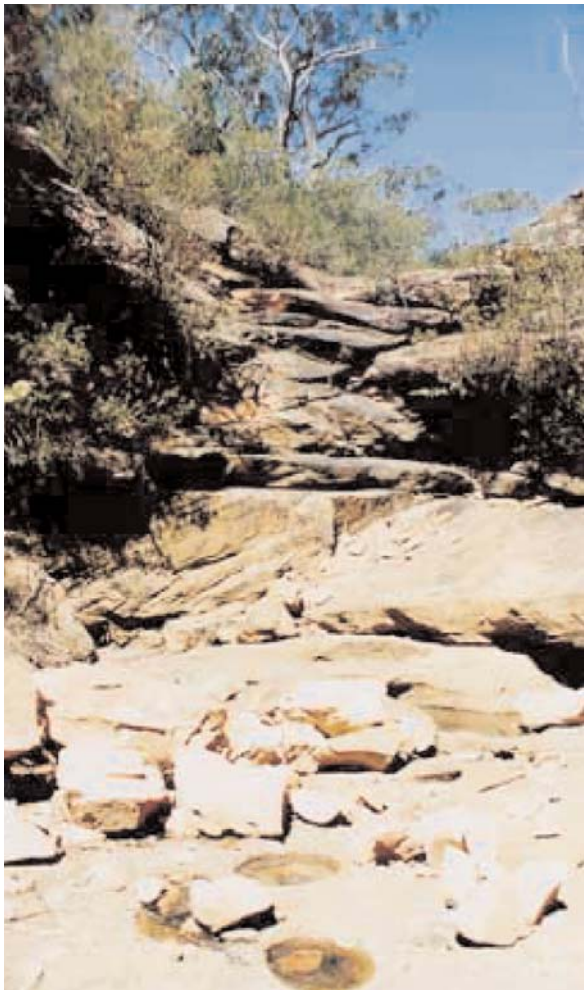
Longwall mining is a form of underground coal mining that was introduced to Australia and the United States from Europe in the early 1960s. It allows mining companies better access and vastly improved recovery rates than older methods of underground mining. It also results in far more dynamic land subsidence than the traditional methods. The effects of mine subsidence upon man-made infrastructure are well known. However, subsidence from longwall mining has had, and continues to have, a dramatic effect upon the natural environment.

The practice of longwall mining first came under the spotlight in 1974, when a dispute arose between the then Metropolitan Water Sewerage and Drainage Board and the Department of Mines over the proximity of longwall mining to the city's water supply dams south of Sydney. An inquiry was established under Justice Reynolds into 'Coal Mining Under or In the Vicinity of the Stored Waters of the Nepean, Avon, Cordeaux, Cataract and Woronora Reservoirs'. Justice Reynolds made several important findings, which were handed down in 1977, including restriction zones around dam walls and stored water. Reynold's findings also identified an "angle of draw" at which certain levels of subsidence are likely to occur (Reynolds 1977).

In the early 1980s environment groups were alerted to numerous cliff falls on the Newnes Plateau, north of Lithgow, that had occurred as a result of land subsidence due to longwall mining by nearby collieries. It later emerged that Centennial Coal were also pumping 14 megalitres per day (about 14 Olympic swimming pools) of mine effluent into the Wollangambe River, polluting it with a black muck that spread downstream.

By the 1990s, residents who lived along the Cataract River southwest of Sydney reported large cracks in the riverbed above longwall panels operated by BHP (now BHP Billiton). Along with the cracking, sections of the river downstream from the cracking started to dry up, iron oxide

Native Dog Creek: A large pool that would have been several metres deep and a drought refuge for wildlife, has now been drained by longwall mining. Note rock debris from destablisation of abutting cliff.



pollution stained parts of the river red, methane gas leaked to the surface, fish skeletons were discovered and cliff falls occurred along the steep gorges running alongside the river. A 1998 court judgement found in favour of seven parties who had sued BHP over the damage to the river – the court decided that 80% of the damage could be attributed to longwall coal mining.

Widespread cracking and draining of river and creek beds and underground aquifers, cliff falls, the draining of rare swamps, fish kills, methane gas bubbling to the surface, iron oxide pollution and the release of wastewater into river systems continue to occur across four coal mining regions of New South Wales as a result of longwall mining. A very significant number of operations take place in the Southern Coalfields in Sydney's water supply catchment and longwall mining is also proposed in the Central Coast's water supply catchment. Longwall mining poses a grave threat to the integrity of rivers and ecological communities in National Parks in the Western Coalfield, while BHP Billiton's Caroona project in the Gunnedah Basin, currently in the exploration stage, threatens multiple levels of aquifers under some of Australia's richest agricultural land.

It is not disputed by any authority that subsidence due to longwall mining can cause deformation of ground surfaces as well as cracking of valley floors and creeklines. This can affect natural water flow regimes and water quality, depending on such factors as the width of the crack, riverbed steepness, the riverbed material and the presence of organic matter. Subsidence is known to occur up to 3km from a longwall panel.

In turn, these impacts can lead to the alteration of species habitats and changes to the ecological function of communities (see Section 2.5, Longwall Mining as a Key threatening Process). Effects can be temporary or long-term. When water flows are altered, there can be permanent effects on the functioning of ecosystems in localised areas, which may be exacerbated in drought conditions.

Industry and government have responded to this situation with monitoring and rehabilitation programs. Although hailed by the industry as successful, past remediation efforts have failed. They have included concreting or grouting over cracks in riverbeds. However in many cases the cracks run hundreds of feet deep and have reopened. In other cases cracking has occurred under sandy riverbeds and cannot be detected. In some cases the mining companies have had to buy water from the water supply dams to provide an environmental flow back to the damaged stream – but this is not a sustainable solution (and wastes water in times of drought).

The damage that was occurring to rivers from longwall mining forced changes in NSW Government policy through a new approvals process that was introduced in 2004 (see 2.4, Policy Framework for Subsidence Management). This required mining companies to submit a Subsidence Management Plan (SMP) for new longwall panels they were intending to mine. However, there is widespread concern that the new approvals process is failing to protect the environment from subsidence damage.

SMP's are being approved largely without amendments that ensure avoidance of environmental impacts. While becoming more accurate in predicting the levels of subsidence, they offer no accurate assessment of the damage that may occur to rivers and creeks. Current government policy responses are to monitor the damage and try to fix it up later with unproven remediation techniques. In cases where a river or creek has suffered a loss of flow after mining, the mining company will often try to shift the blame to drought conditions, even though streams in adjacent valleys are still flowing.

There are no protection zones mandated for rivers being affected by longwall mining despite numerous reports by government agencies and independent bodies recommending such a policy. This could simply be implemented through a buffer zone around rivers and streams. The mining industry continues to resist the concept of a protection zone arguing that it is unnecessary and that the viability of their longwall mines would be under threat.

In November 2006 the Total Environment Centre (TEC) instructed The Environmental Defender's Office (EDO) to prepare drafting instructions for legislation in relation to longwall mining including the establishment of a 1km buffer zone around rivers and creeks (see Appendix).

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2.1 Definition

Longwall mining is a form of underground coal mining where 'panels' of coal are mined side by side separated by narrow 'pillars' of rock that act as supports. A long wall panel can be up to 4km long, 250-400m wide and 1-2m thick. Chocks are then placed lines of up to 400 m in length to support the roof. Coal is cut by a machine called a shearer that moves along the length of the face in front of the chocks, disintegrating the coal, which is then taken by a series of conveyors to the surface.

As coal is removed, the chocks are moved into the newly created cavity. As the longwall progresses through the seam, the cavity behind the longwall, known as the goaf, increases and eventually collapses under the weight of the overlying strata. This collapsing can cause considerable surface subsidence that may damage the environment and human infrastructure.

For the industry, the advantage of longwall mining lies in increased recovery rates of about 60 percent over the more traditional bord and pillar method. Subsidence is largely immediate, most of it occurring within two months. Theoretically, this allows for better planning and more accountability by the mining companies. (University of Wollongong)

2.2 The Longwall Mining Industry in New South Wales

Longwall mining in NSW began in 1962. In 1983/84 it accounted for 11% of the state's raw coal production. This had increased to 36% by 1993/94 and stood at 29% in 2003/04.

In 2003/04, there were 17 longwall coal mines operating in NSW with several others proposed or about to commence operating. Some mines combine a mixture of longwall and open cut methods. The NSW coal industry predicts that by 2013 about half of its production will come from new mines or extensions to existing mines.

The underground coal mining industry currently employs about 5 000 people in NSW. Longwall mining accounts for approximately 89% of raw coal obtained from underground mining operations. About 72% of all coal produced in NSW is exported with 23% being used for domestic power generation and the rest in steel making and other domestic industries such as - cement manufacturing.

Nearly all of the coal mined in NSW lies within the Sydney-Gunnedah Basin and in the five defined coalfields of Gunnedah, Hunter, Newcastle, Western (in the Lithgow / Mudgee area) and Southern (in the Campbelltown / Illawarra area). Virtually all coal mining in the Southern and Western coalfields is underground.

In recent times, mine ownership in the NSW coal industry has followed a global trend to become more concentrated. The three major longwall players in NSW are BHP Billiton, Centennial and Xstrata.

The NSW Government benefits from the coal industry through mining royalties. The revenue

raised by these royalties has risen sharply in the last few years as the international coal market has boomed. The current royalty rates for underground mining stand at 5% for mines deeper than 400m or 6% for mines at less than this depth (Mining Regulation 2003). The NSW Government raised $354 million from coal mining royalties in the 2004/05 financial year (DPI 2004/05). Royalties paid by mining companies to the NSW Government remain confidential, but on March 30th 2005 Minister for Mineral Resources, Kerry Hickey, told a parliamentary committee on 30/3/05 that "estimated royalties for longwall mines in 2002/3 were $602 million" (Rivers SOS).

2.3 Longwall Mines in New South Wales

17 longwall mines in New South Wales produced over 37 million tonnes of coal during the 2003/04 financial year.

Mine	Coalfield	Owner	LW Prod (t)
Angus Place	West	Centennial	956 367
Appin	South	BHBP	2 999 752
Baal Bone	West	Centennial	1 858 985
Beltana No 1	Hunter	Xstrata	5 446 703
Cumnock	Hunter	Xstrata	380 591
Dartbrook	Hunter	Anglo	3 248 326
Elouera	South	BHBP	1 814 579
Glennies Creek	Hunter	AMCI	2 195 725
Metropolitan	South	Excel	1 084 851
Newstan	Newcastle	Centennial	3 147 562
Southland	Newcastle	Southland	857 038
Springvale	West	Centennial	2 056 062
Tahmoor	South	Centennial	1 015 490
Ulan	West	Xstrata	3 090 627
United	Hunter	Xstrata	3 228 757
West Cliff	South	BHBP	1 414 087
West Wallsend	Newcastle	Xstrata	3 041 860
			37 837 362

N.B. Numerous mines have opened or changed ownership and a number of mines have closed in the two years since. (Source: Department of Primary Industries, *New South Wales Coal Industry Profile,* 2005)

2.4 Policy Framework for Subsidence Management

On March 1st 2004 the NSW Government enacted a new policy framework for the management of coal mining subsidence in response to concern in the community and from environmental regulators. This section is a summary of this process taken from the Department of Mineral Resources *New Approval Process for Management of Coal Mining Subsidence*, 2003.

The key element of the revised process is that an approved Subsidence Management Plan (SMP) is now required wherever underground mining is likely to lead to subsidence. The requirement for an SMP arises through a new condition attached to the mining leases of all new and existing underground coal mines. All subsidence assessment is controlled under this new approval. Preparation of an SMP and adherence to its terms is managed under the *Mining Act 1992,* including enforcement powers.

The Director-General of the Department of Mineral Resources (DMR) determines applications for approval of SMPs. Prior to this, an interagency review committee reviews all draft SMPs and advises the Director-General on approval conditions. The Committee also participates in the ongoing monitoring of subsidence management. However, it is the Director-General alone who makes the final decision as to whether an SMP is approved or not.

Public consultation processes apply to the preparation and lodgment of all draft SMPs.

Applicants must advertise their intention to develop a draft SMP, identify and consult with all directly affected landholders and local councils, and take their views into account. Applicants must readvertise when the draft SMP is finalised and submitted to DMR. Members of the community are free to make submissions to DMR in its consideration of the draft SMP.

Subsidence and its impacts must be addressed within the EIS as part of the development consent process. The preparation and approval of an SMP will is then required as a condition of consent. Environmental impact assessment for development consent and other approvals is taken into account in the SMP application process. The DMR will aim for the full integration of conditions imposed under the SMP, development consent and other approvals. Existing underground coal mines which already have development consent or operate under existing use rights will require the preparation and approval of an SMP before beginning new mining which causes subsidence.

The new approvals process applies to not just second workings but also first workings associated with secondary extraction panels such as longwalls. An SMP is required if first workings alone might lead to subsidence. SMPs are also required before pillar extraction programs.

Part of this report reviews the success of the new regime.

2.5 Longwall Mining as a Key Threatening Process

In July 2005 the 'Alteration of habitat following subsidence due to longwall mining' was listed by the independent NSW Scientific Committee as a key threatening process under Schedule 3 of the *Threatened Species Conservation Act 1995.* A key threatening process is defined as a process that threatens, or could threaten, the survival or evolutionary development of species, populations or ecological communities, in particular if it adversely affects two or more threatened species, populations or ecological communities; or could cause species, populations or ecological communities that are not currently threatened to become threatened.

The Scientific Committee recognised that subsidence due to longwall mining is the cause of habitat alteration, including cracks beneath a stream or other water bodies, and that subsidence may lead to "a temporary or permanent loss of water flows and could cause permanent changes to riparian community structure and composition".

The Committee also noted that, "Species and ecological communities that depend on aquatic and semi-aquatic habitats are particularly

Native Dog Creek, in Sydney's water catchment area. Numerous riverbed cracks are caused by subsidence from underground longwall mining, resulting in complete loss of water and habitat.

susceptible to the impacts of subsidence. Subsidence can cause a decrease in water quality such as reduced oxygen availability, encouraging bacterial growth, smothering native plants and animals. Subsidence can also increase the amount of iron oxides in the water which directly affects native plants and animals". (NSW Scientific Committee, *Alteration of habitat following subsidence due to longwall mining - key threatening process declaration,* 2005)

Five endangered species, twenty-three vulnerable species and four endangered ecological communities were listed as likely to be subjected to alteration of habitat as a result of longwall mining. A further eleven species not currently threatened were also listed as "may become threatened" as a result of subsidence impacts.

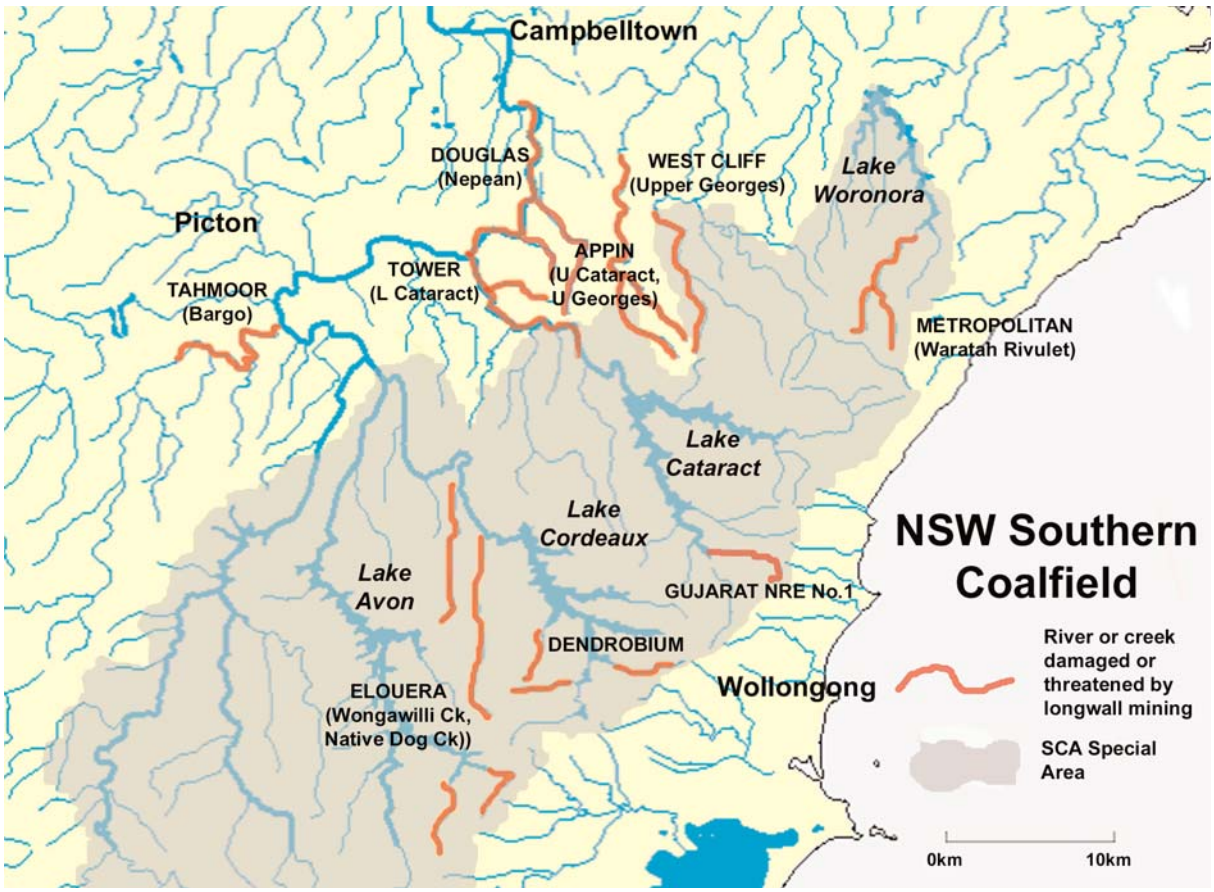
A total of 4 threat abatement strategies were identified to help tackle this key threatening process. These were:

1 Establish management agreements with public authorities CMAs and land managers/owners. Continue DEC commitment to inter-agency committee for the review of Subsidence Management Plans with Dept. of Primary Industries, Dept. of Lands, Dept of Planning & Dept of Natural Resources, to provide advice on the protection of biodiversity.

2 Prepare Statement of Intent. Prepare a statement of intent to establish links between existing regulation of clearing of native vegetation and identifying strategies for the protection of biodiversity.

3 Review and amend or adopt existing legislation and policies. Support the implementation of the Mining Act 1992 and associated subsidence management planing processes.

4 Review evidence of impacts. Determine impacts of longwall mining and subsidence on biodiversity with the aim to identifying priority threatened species, populations and endangered ecological communities impacted by this KTP.



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3.1 Damage to the Environment

The definition of successful [subsidence] prediction, therefore, depends upon the consequences of predicting incorrectly. When the possible cost of failure is small, the name of the game is accuracy of prediction, and skating close to the edge may be justified. When the cost is large, then there is no game; safety and conservatism is paramount. (Holla and Barclay, Mine Subsidence in the Southern Coalfield, NSW, Australia, page 34, Department of Mineral Resources, 2000).

In this report we ask, 'are current practices based on conservatism?' Chapters 3 and 4 are an outline of the damage to date.

3.1.1 Subsidence

The amount of subsidence that results from longwall mining depends upon the width of a longwall panel (150-400m), the depth at which mining takes place (in the Southern Coalfield about 500m), the height of the coal seam (2-4m), the width of the panels (20-50m) and a variety of geotechnical factors.

Following mining in an area, the gap left from the extraction of coal (approximately 3 metres when mining the Bulli seam), collapses, forming what is known as the 'goaf'. After most longwall operations in NSW this typically results in approximately 1-2m of displacement at surface level. As this collapse occurs, stress is placed on rock strata above, and uneven movement of the surface and rocks below the surface results in fracturing of the rock.

Areas of tensile and compressive strain occur naturally in the environment, resulting, for example, when mountains push down causing strain on river valleys. Given that the area of least resistance is upwards, into the air, a process referred to as 'upsidence' may occur which may compensate for some of the subsidence or may increase tensile strain at different points of the surface.

Mining subsidence accelerates and exacerbates a process that may occur over thousands of years into a few short weeks or months with about 80% of subsidence occurring within 2 months of longwall mining.

Impacts can manifest in the form of fracturing of rivers and rock benches, rock falls and slumping. Cracking may occur in other parts of the landscape but these are often hidden by soil and vegetation. It is generally accepted that steeper gorge type environments are more highly affected by subsidence than flatter areas due to greater variation in compressive and tensile strains. (Eco Logical Australia, 2004)

3.1.2 Cracking and Fracturing

In areas where fracturing of the riverbed occurs and the river is not connected to the natural watertable, a net loss of surface water to the underlying groundwater occurs. (Hawkesbury-Nepean River Management Forum, 2004)

The tensile and compressive strains that come about as a result of subsidence often result in the cracking or fracturing of surface rock. This has the greatest impact when occurring along watercourses or rock shelves. Fractures range in size from up to around 50cm. Such fracturing may result in water loss, gas release and rock falls, as well as impacting upon manmade infrastructure. Cracking may also take place when soil separates as a result of subsidence. Monitoring indicates this to be a fairly rare occurrence, however evidence of cracking is likely to be less notable

due to vegetation cover and filling of cracks through erosive processes. (Ecological Australia, 2004)

3.1.3 Rock and Cliff Falls

Rock benches and overhangs, common across areas of Hawkesbury Sandstone where much longwall mining takes place, are susceptible to fracturing in the same way as riverbeds. Cliff falls have occurred in such places as the Newnes Plateau, the Illawarra Escarpment and the Cataract River. These may have a dramatic impact upon cliff line ecology and sites of Aboriginal significance. (Eco Logical Australia, 2004)

3.1.4 Water Loss

Subsidence-induced cracks occurring beneath a stream or other surface water body may result in the loss of water to near-surface groundwater flows. If the water body is located in an area where the coal seam is less than approximately 100-120 m below the surface, longwall mining can cause the water body to lose flow permanently. If the coal seam is deeper than approximately 150 m, the water loss may be temporary unless the area is affected by severe geological disturbances such as strong faulting. It is claimed that in the majority of cases, surface waters lost to the sub-surface re-emerge downstream. The ability of the water body to recover is dependent on the width of the crack, the surface gradient, the substrate composition and the presence of organic matter. An already-reduced flow rate due to drought conditions or an upstream dam or weir will increase the impact of water loss through cracking.

The potential for closure of surface cracks is improved at sites with a low surface gradient although even temporary cracking, leading to loss of flow, may have long-term effects on ecological function in localised areas. The steeper the gradient, the more likely that any solids transported by water flow will be moved downstream allowing the void to remain open and the potential loss of flows to the subsurface to continue. A lack of thick alluvium in the streambed may also prolong stream dewatering (by at least 13 years in one case study in West Virginia). Impacts on the flows of ephemeral creeks are likely to be greater than those on permanent creeks. Cracking and subsequent water loss can result in permanent changes to riparian community structure and composition. (NSW Scientific Committee, *Alteration of habitat following subsidence due to longwall mining - key threatening process declaration,* 2005)

Upland swamps, particularly on the Newnes Plateau and in the Southern catchments, have also suffered damage from water losses and resulted in the Newnes Plateau Shrub Swamp being listed as an endangered ecological community.

Changes to drainage and moisture conditions in some swamps, including the largest example of the community, are caused by damming of swamp watercourses; roading across the swamps; sedimentation and erosion associated with roadways, quarries, mines and plantation harvesting within swamp catchments; and disposal of waste water from underground coal mines. These changes pose threats to the persistence and integrity of Newnes Plateau Shrub Swamp, given the crucial roles of water regimes in the composition, structure and function of the community. Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands is listed as a Key Threatening Process under the Threatened Species Conservation Act (1995) – NSW Scientific Committee, Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion - endangered ecological community listing – final determination, NSW Scientific Committee, 2005)

3.1.5 Water Quality

When water is redirected as a result of fracturing or cracking, it interacts with the various subsurface strata that it comes in contact with. Within such strata there is an array of compounds and sediments that may be dissolved by the water, eventually 'leaching' back into the drainage lines. Iron oxides are a typical material in many New South Wales creeks undermined by longwall mining. These have an impact on water chemistry and aesthetics as well as increasing the level of suspended solids resulting in a significant reduction in the quality of water and aquatic habitat. (Eco Logical Australia, 2004)

3.1.6 Gas

Fracturing of rock strata may result in gas release. Such gas is associated with near surface geology, not the coal seam being mined. The gases are predominantly carbon based (C4 and C6) and methane. Impacts may include localised alterations to water chemistry, soil heating and dieback of riparian vegetation, as occurred in the nearby Cataract River during the 1990s. (Eco Logical Australia, 2004)

Cataract River: crack caused by longwall mining.

3.1.7 Wastewater

Large amounts of water are used in both underground and above ground longwall mining operations. In addition, runoff from the colliery and washery sites can include coal dust, oils etc. The coal washery is designed to recycle the bulk of the water in use. However, the water in use has an inherent level of salinity that is gradually increased as a result of evaporation.

When required, water is discharged from a number of collieries to maintain environmental flows in the rivers and creeks to offset water loss through fracturing of the riverbed. The water utilised for mining operations has chemical characteristics that do not meet minimum requirements for discharge into the river system. In order to meet licence standards and maintain environmental flows, mines mix this water with potable town water or water from storage dams, which, (given the current drought conditions and associated water restrictions), can be seen as a poor use of a valuable resource.

In the case of the Lower Cataract River, where it was cracked below the Broughtons Pass Weir, the current environmental flow releases (purchased by BHP from the Sydney Catchment Authority (SCA) and released from Broughtons Pass Weir) are not enough to keep the river flowing or to maintain acceptable water quality. (Ecological Australia, 2004)

3.1.8 Slumping

Slumping generally occurs on steeper slopes when unconsolidated surface material moves down slope. This increases localised soil erosion and can result in higher levels of sedimentation, loss of vegetation and reduction of water quality. (Eco Logical Australia, 2004)

3.2 Southern Coalfield Impacts

3.2.1 Lower Cataract River – Tower Colliery now absorbed by Douglas Colliery (BHP Billiton)

Nine longwall panels were mined directly under the Lower Cataract from 1988 to 2000. Local residents began to report damage to the river in 1994. Water had drained away, hundreds of cracks in the riverbed were revealed, as were the skeletons of fish up to 1m in length. From 1996 onwards, large amounts of methane gas began venting in spots in the riverbed. At its height, sections of the river appeared to be boiling and the gas could be set alight.

The dam wall of Broughtons Pass Weir, controlling 20% of Sydney's water supply, was also cracked in four places and leaked across its face. A pump house adjoining the weir was also damaged. The Nepean Tunnel and the Upper Canal were cracked and the extent of water loss was unknown. (TEC & Colong Foundation, 2001)

In its submission to the Dendrobium Commission of Inquiry in 2001, the NSW Department of Land and Water Conservation estimated that the Cataract River had lost 50% of its flow down cracks (DLWC).

According to a report by DIPNR's Hawkesbury-Nepean River Management Forum, "Investigations confirmed that the loss of water was primarily attributable to long-wall mining. BHP undertook rehabilitation by grouting the cracked streambed at key sites to reduce the loss of water" (Hawkesbury-Nepean River Management Forum, 2004). The current environmental flow releases of 1.7 ML/day in the Cataract River released from Broughtons Pass Weir are not enough to keep the river flowing or to maintain acceptable water quality.

In August 2006, Primary Industry Minister Ian Macdonald approved the Appin 3 proposal by BHP

Billiton. This will see three longwall panels come within 60m of the Cataract River. Minutes of the SMP Interagency Review Committee meeting held on August 2nd 2006 show that an independent consultant recommended that mining come no closer than 350m to the Cataract River.

3.2.2 Upper Georges River – Appin Colliery & West Cliff Colliery (BHP Billiton)

Surface cracking of the riverbed in the upper reaches of the Georges River, near Appin, has occurred due to the subsidence that has resulted from the longwall coal mining. This surface cracking has caused loss of river water and consequently the loss of instream habitats, instream biota and degraded water quality. Changes to the local groundwater movement have occurred, as has damage to the surrounding landscape – The Hon Ian Macdonald, Minister for Natural Resources, 1st July 2003

The Upper Georges River catchment is affected by mining at both the Appin and West Cliff Collieries. In 2000 Jutt's Crossing on the Georges River at Appin cracked and water in rock pools disappeared. Further cracking to the River was reported in 2001. In 2002 Marhnyes Hole, a popular swimming hole near Appin, cracked and water disappeared. Rock fall collapses forced the temporary closure of the swimming hole to the public on safety grounds.

Through licences issued by DEC, BHPB is permitted to discharge polluted water, high in pH and salinity from the mines, primarily over the Brennans Creek Dam Spillway. Part of Brennans Creek was redirected to allow for modified drainage resulting from coal waste emplacement areas for Appin, West Cliff and Dendrobium mines. Discharges from the Appin town water supply are also be used to maintain environmental flow. BHPB pumps 1.5 - 2 megalitres of water per day back into the river system. The water comes from the Appin town water supply, supplied by the Cataract Dam, and includes 1% recycled water from the Appin mine.

3.2.3 Stokes Creek – Appin Colliery and West Cliff Colliery (BHP Billiton)

Stokes Creek was undermined between 1990 and 1999. Surveys in 2004 identified substantial areas where water levels had dropped considerably as well as ongoing problems with the leaching of oxides. No such drops in water level were observed in areas that had not been undermined (Eco Logical Australia, 2004).

BHPB indicated that remediation work would be carried out but it appears that this has not yet taken place (NPA Macarthur Branch 2005).

3.2.4 Bargo River – Tahmoor Colliery (Centennial Coal)

Longwall damage to the Bargo River in 1994 was among the first to be reported in the Southern Coalfields. In 2002 a 2km section of the Bargo River near Tahmoor was reported as being completely dry and large cracks were found in the riverbed. The Tahmoor Colliery is pumping an average of 5 tonnes of salt per day from its workings into the river. Longwalls proposed in 2006 would come within 230m of cliff lines along the Bargo River. Wollondilly Council has indicated its intention to petition the NSW Government against longwall mining near the Bargo Gorge. The section of the River affected by longwall mining is listed as an Indicative Place on the Register of the National Estate.

The Bargo River catchment is one of the Macarthur Region's most significant natural and cultural features, and one of the few substantial bushland areas around Sydney that is not protected in a National Park or Metropolitan Catchment Area (National Parks Association, 1999).

3.2.5 Upper Nepean River – Appin Colliery (BHP Billiton)

Minister Macdonald approved four new longwalls forming part of BHPB's Douglas Area 7 Project without modification in November 2006. These will come within 180m of the Nepean River. In the year 2000 the bridge where the F5 Freeway crosses the Nepean at Douglas Park had to be strengthened and repaired when mining came within 600m as the hinge joints on the bridge were opening up. Mining was halted at that point. With a sandy riverbed, it will be more difficult to detect fracturing and implement remediation efforts.

3.2.6 Flying Fox Creek, Wongawilli Creek & Native Dog Creek – Dendrobium Mine & Elouera Mines (BHP Billiton)

The NSW Scientific Committee's key threatening process declaration states that these creeks have all suffered from subsidence-induced cracking within the streambed, followed by significant dewatering of permanent pools and in some cases complete absence of surface flow. In the case of Wongawilli Creek, upland swamps have been drained and pollution has also occurred

downstream. All are located in the Southern Catchments feeding the Avon and Cordeaux Dams. (NSW Scientific Committee, 2005)

3.2.7 Waratah Rivulet – Metropolitan Colliery (recently acquired by Peabody Energy from Excel Coal)

Waratah Rivulet is located just to the west of Helensburgh and flows into the Woronora Dam from the south. Along with its tributaries, it makes up about 29% of the Dam catchment. In 1999 the Healthy Rivers Commission described the condition of the Woronora catchment upstream of the dam, as largely pristine. The Dam provides both the Sutherland Shire and Helensburgh with drinking water. Metropolitan Colliery operates under the Woronora Special Area. Recent underground operations have taken place and still are taking place directly below the Waratah Rivulet and its catchment area.

In September 2006, the TEC and Colong Foundation were informed that serious damage to the Waratah Rivulet had taken place. An inspection was organised through the SCA that covered the length of the Rivulet that flows over the longwall panels. The Rivulet had ceased to flow for much of its length. The sandstone streambed is cracked in a way typical of that caused by longwall mining in the Southern Coalfield. SCA officers indicated that at one series of pools, water levels had dropped about 3m. Anecdotal evidence suggests the Rivulet has ceased to pass over places never previously known to have stopped flowing.

The watercourse has also tilted to the east as a result of the subsidence and upsidence. Iron oxide pollution has also occurred. Attempts at remediation have failed with a distinctly different coloured sand having washed out of cracks and now sitting on the dry riverbed or in pools. Also undermined was Flat Rock Swamp at the southernmost extremity of the longwall panels. It is believed to be the main source of water recharge for the Waratah Rivulet. It is highly likely that the swamp has been drained and tilted.

The SMP for the next series of longwall panels surprisingly states that there has been no significant impact upon net flow or water quality. Peabody intends to extract a further 27 longwall panels that will run under the Rivulet and finish under the Woronora Dam storage area itself. The panels responsible for the current damage are relatively small longwalls with a width of 158m.

3.3 Western Coalfield Impacts

3.3.1 Goulburn River & Moolarben Creek – Moolarben Coal Project (Felix Resources), Ulan Mine (Xstrata Coal)

The Moolarben Coal Project is a proposal that constitutes three open cut mines and 24 longwall panels at the top of the Goulburn River catchment. The longwall panels are proposed to come within 50-200m of the Goulburn River. The site is bounded by the Goulburn River to the north and west, and Goulburn River National Park to the east. Mining will threaten the fragile sandstone cliffs and gorges along the Goulburn River, including the well-known Great Dripping Wall, and the groundwater system with numerous underground springs feeding the river. The area features important aboriginal cultural sites (including cave paintings). The company are also proposing three open cut mines in the Moolarben Valley.

The Wilpinjong Open Cut Mine (Peabody Coal Limited) was recently granted a DA to open cut mine 28 square kilometres of the valley, while Ulan Coal Mines (Xstrata) has been granted development permission to expand its open cut and longwall operations, including a 400m wide longwall – the largest in Australia. Ulan Coal Mine currently produces over 11 million litres of excess mine water per day and discharges up to 5ML/day of salt-affected water into Ulan Creek. Mine subsidence and dewatering of the underground mine creates a regional 'draw down' affect causing interference to surrounding aquifers and the base flow of the Goulburn River.

3.3.2 Wollangambe River & Farmers Creek – Clarence Colliery (Centennial Coal)

Farmers Creek suffers from cracking and had to be paved with cement where it runs through Lithgow. Pumpouts of 14 megalitres a day from Centennial mine into Farmers Creek and the Wollangambe River have badly polluted the water with iron and manganese being deposited on the creekbed. Farmers Creek supplies the town of Lithgow with its drinking water and the Wollangambe River forms part of the Sydney catchment and runs through the Blue Mountains World Heritage Area.

In 1999, Centennial Coal stated that to do nothing about Clarence Colliery's pollution of the Wollangambe River "is not an option that is acceptable to Centennial, Department of Land and Water Conservation, Lithgow City Council, or the

Cataract River: clean pool in 1975

Same pool in 2005. Lost water sometimes re-emerges polluted (turbidity and oxides) from flowing through underground strata.

Environment Protection Authority". The Environmental Impact Statement for a greatly expanded Clarence Colliery that followed, however, did not propose any solutions to the Wollangambe pollution problem. (Colong Foundation for Wilderness)

Longwall mining under the Newnes Plateau and the draining of swamps and aquifers as a result played a significant role in the listing of Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion as an endangered ecological community in 2005. Hundreds of cliff collapses have occurred on the Plateau as a result of longwall mining:

The Newnes plateau is underlain by extractable coal seams at varying depths, with underground longwall mining occurring, or proposed to occur, beneath the majority of the swamps. Subsidence of the land surface, and associated fracturing of bedrock between the coal seam and the surface, occurs after longwall mining, and this may change the hydrology of catchments and swamps they contain. Specifically, the conversion of perched water table flows into subsurface flows through mine-related voids may significantly alter the water balance of upland swamps (Young and Wray 2000). Changes to surface morphology within or near the swamps as a result of mine subsidence may also create nick points which become the focus of severe and rapid erosion (Young 1982). These changes pose threats to the persistence and integrity of, the community. Alteration of habitat following subsidence due to longwall mining is listed as a Key Threatening Process under the Threatened Species Conservation Act (1995) – NSW Scientific Committee, Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion - endangered ecological community listing – final determination, NSW Scientific Committee, 2005)

3.3.3 Cox's River – Angus Place, Springvale & Clarence Collieries (Centennial Coal)

The Cox's River catchment is affected by numerous longwall mines operating in the top of its catchment. Hanging swamps have been damaged and decreasing environmental flows have been recorded. There is also rising salinity and alkalinity due to mine dewatering. Long Swamp, at the source of Cox's River, is drying, probably as a result of longwall mining.

In 2002 the CSIRO reported that:

Although there have been some efforts at remediation, there is considerable contamination of streams within the Cox's River catchment from coal stockpiles, coal mining wastes and acid draining from operating and derelict mines. Two operating collieries within the vicinity, Angus Place and Clarence, are discharging good-quality mine water into other catchments at the same time that Delta Electricity is extracting potable water from the Cox's catchment and 8,000 megalitres per annum from the Fish River Reservoir. Some rationalisation of this water management would ensure an adequate supply for Delta Electricity and environmental flows in the Cox's River. (CSIRO, 2002)

3.3.4 Kangaroo Creek – Angus Place (Centennial Coal)

The puncturing of two underground aquifers has resulted in significant amounts of saline groundwater flowing into the mine. Centennial Coal currently pumps 12 megalitres of groundwater per day from the mine. Up until recently, this water has been discharged (under DEC licence) into Kangaroo Creek, which lies within Sydney's drinking water catchment. A recently implemented water transfer system to

the nearby Delta Electricity power stations has reduced discharges to the Kangaroo Creek and Wolgan River catchments down to 3.5-4 megalitres per day. There are 5 main aquifers in the rock strata above the mining area and it is the lower 2 of these that have been punctured.

Studies by the company have concluded that the lower two aquifers are not hydraulically connected to those above them, "do not directly contribute to surface environmental flows, and do not significantly contribute to Sydney's drinking water catchment". The upper aquifers are a vital source of water for the ecologically endangered Newnes Plateau Shrub Swamps (NSW Department of Planning, 2006) that are located above longwalls that are currently being mined and a number of which have been badly damaged by mines across the coalfield.

3.4 Hunter Coalfield Impacts

3.4.1 Hunter River

While not undermined by longwall panels or threatened by future longwall proposals, the Hunter River suffers from the combined effects of a number of mining operations (open cut and longwall) in the catchment including pollution, salinity, river diversions and losses of environment flows. The Goulburn River in the Western Coalfield (see Section 3.3.1) is the Hunter's largest and most westerly tributary.

3.5.2 Bowman's Creek

In the 1980s Bowman's Creek, near Singleton, had its bed cracked from underground mining, causing a total loss of water in some areas and an increase in salinity where it started flowing again downstream. Anecdotal evidence (Hunter Valley Minewatch, Stateline, ABC, 30/7/04) describes the owner of a property in Ravensworth going to look at his cattle and seeing that that the water that had been flowing the day before had stopped. After walking up the creek, into the next-door property, the owner found that the creek bed had cracked and dropped, and flow has not returned to this day.

3.4.3 South Wambo Creek – Hunter Coal (Wollemi UGM)

Also impacted by open cut coal mining, South Wambo creek was cracked and drained causing surface water to enter underground workings (NSW Department Of Planning, 2002).

3.4.4 Glennies Creek, Eui Creek, Fishery Creek, Black Creek & Foy Brook

All listed as being damaged, cracked and polluted (NSW Scientific Committee, *Alteration of habitat following subsidence due to longwall mining - key threatening process declaration,* 2005; and Rivers SOS, *NSW Rivers of Shame,* 2006)

3.5 Newcastle Coalfield Impacts

3.5.1 Wyong River & Jilliby Creek – Wyong Proposal (Kores)

In terms of longwall mining and the threats it poses to water supply catchments, the proposal to establish a longwall mine under the Dooralong and Yarramalong Valleys on the Central Coast is the most contentious issue outside of the Sydney Metropolitan catchments. Both Wyong and Gosford Councils have stated their opposition to mining in the catchment.

3.5.2 Diega Creek – West Wallsend Colliery (Xstrata Coal)

Diega Creek is now the subject of a rehabilitation project involving Xstrata, various government agencies and the local community. Cracks of up to 10cm wide formed after longwall mining under the creek between 1999 and 2005. Despite a significant loss of water suffered by the creek, Xstrata stated that they only became aware of the problem midway through 2006. The company also claimed that grazing could have been a contributing factor to the loss of water. (ABC News, Newcastle, 7/7/06)

Environmental Impacts of Longwall Mines in NSW

Mine	Region	Owner	Cracking/Draining	Pollution/Salinity	Cliff/Rock Falls	Major River	Creek or Stream	Supply Catchment	National Park/SCA
Tower	Southern	BHPB	Y	Y	Y	lower Cataract		Metropolitan	
West Cliff	Southern	BHPB	Y	Y	Y	upper Georges			
Appin	Southern	BHPB	commenced	commenced	commenced	upper Cataract			
Appin	Southern	BHPB	Y	Y		upper Georges	Stokes Creek		
Tahmoor	Southern	Centennial	Y	Y		Bargo			
Dendrobium / Delta (former Elouera)	Southern	BHPB	Y	Y	Y		Wongawilli Creek	Metropolitan	
Delta (former Elouera)	Southern	BHPB	Y		Y		Native Dog Creek	Metropolitan	
Metropolitan	Southern	Peabody	Y	Y	Y		Waratah Rivulet	Metropolitan	
Metropolitan	Southern	Peabody		Y		Hacking	Camp Gully Creek		Royal
Moolarben	Western	Felix	proposal	proposal	proposal	Goulburn			Goulburn River
Ulan	Western	Xstrata	Y	Y		Goulburn	Ulan Creek		Goulburn River
Clarence	Western	Centennial		Y		Wollangambe	Farmers Creek	Metropolitan	Blue Mountains
Angus Place / Springvale	Western	Centennial	Y	Y		Wolgan & Cox's	numerous	Metropolitan	Wollemi/Gardens of Stone
Baal Bone	Western	Xstrata		Y			Jew's Creek	Metropolitan	Wollemi
numerous	Hunter			Y		Hunter			numerous
Wollemi UGM	Hunter	Hunter Coal	Y			Hunter	South Wambo Creek		
	Hunter		Y	Y		Hunter	Bowmans Creek		
Wyong Proposal	Newcastle	Kores Australia	proposal	proposal	proposal	Wyong	Jilliby Creek	Central Coast	Jilliby SCA
West Wallsend	Newcastle	Xstrata	Y	Y			Diega Creek		
Caroona Proposal	Gunnedah	BHPB	exploration	exploration		Namoi (& major aquifers)			

04 LONGWALL MINING IN WATER CATCHMENTS

04

A number of operating longwall coal mines in the Southern Coalfield and the Western Coalfield occur within the Sydney water catchment. These pristine catchments are also home to 30 threatened animals and 26 threatened plants, including the Spotted-tail Quoll and contain the only viable koala populations near Sydney. The catchments cradle significant rainforest and tall old growth forests remnants, as well as upland swamps of very high conservation significance. These catchments were recommended for World Heritage listing values in 1994 by the Royal Botanic Gardens as part of the Blue Mountains and surrounding plateaux nomination. (Colong Foundation)

There is also a proposal for longwall mining to take place in the Wyong catchment on the Central Coast. Other towns, such us Lithgow and Richmond, also take their drinking water from rivers subject to the effects of longwall mining upstream.

Mining in catchment areas poses one of the biggest threats to the environment and water supplies due to the potential for water quality and quantity to be compromised.

Five dams are located within the Southern Coalfield supplying water to the Sydney region. The Nepean, Cordeaux and Cataract Dams supply Sydney with about 20% of its drinking water via Prospect Reservoir. This water is taken from the Upper Nepean River via the Nepean Tunnel to Broughtons Pass Weir. From there it travels via the Cataract Tunnel and Upper Canal to Prospect Reservoir. The Avon Dam and also the Nepean Dam supply the Illawarra region, while the Woronora Dam provides water to the Sutherland Shire and the town of Helensburgh. The Macarthur region takes its water from a filtration plant at Broughtons Pass Weir. (Sydney Catchment Authority)

The past decade has seen an intensification of mining in the immediate vicinity of the major rivers in the Sydney catchment. Mining companies, mainly BHP, had avoided mining under the rivers until the late 1980s and it was the damage to the Cataract River that brought the issue to public attention in the mid 1990s.

The Cataract Tunnel had longwall panels from BHP's Appin Mine extracted underneath it between 1997 and 1999. Greater shear stress fractures and cracks in the wall and roof of the tunnel were reported. An SMP for Longwall 409 of the Appin mine was submitted in 2006. The proposed longwall panel passes underneath the Upper Canal and below a wrought iron viaduct. In the 2003-04 financial year the SCA spent $5.58 million on the Upper Canal; $2.13 million of this was for "extensive mining-related preventive work". (Sydney Morning Herald 28/1/05)

In the case of the BHP Elouera Mine, which undermined two creeks in the water supply catchments, the longwalls were 185m wide at a depth of 340m. The damage to the creeks included extensive and intense cracking of their rock beds and draining of all rock pools (small and large) in mined areas, where under normal unmined circumstances the affected streams would be flowing (as was the case with similar creeks in the vicinity not subject to mining). The Elouera Mine reported increased water inflow (225 megalitres a month) into the mine itself. The loss of water is most serious in terms of the catchments' capacity to supply water, particularly in drought years and the loss of catchment integrity and biota. (Colong Foundation 2001)

The issue of water loss and damage to the catchment was highlighted at the 2001 Commission of Inquiry into the proposed Dendrobium Mine – which commenced operating in 2004. In its submission, Sydney Catchment Authority said, " There is evidence of pools being drained, reduce flows and a reduction in water quality….a potential for cracking beneath swamps to drain a significant amount of water contained in the swamps. This could lead to drying of swamps – adversely affecting their ecological integrity but also reducing water flows downstream. Practical means of remediation are generally not available." (30 July 2001)

The TEC and Colong Foundation also noted that, "in the shale geology of the metropolitan catchment and environs, the groundwater is eco-toxic, containing dissolved salts, dissolved hydrogen sulphide which is toxic to aquatic life, low oxygen levels and elevated soluble iron levels." (TEC and Colong Foundation, 2001)

In 2001 the CSIRO conducted an audit for the Sydney Catchment Authority. In regard to the damage being inflicted upon the catchment areas by longwall mining, the audit claimed it would be some years before definitive trends are recognised and benchmark data was absent.

The study also raised concerns over the environmental wellbeing of hanging swamps in the Special Areas:

Another concern is that subsidence will result in the loss of water and aquatic ecosystems from hanging swamps in the Special Areas. A survey by Biosis (Selga Harrington 2001) has revealed some holes and cracks in Swamp 18 above the Elouera mine with accompanying desiccation and fallen vegetation. A subsequent inspection by staff of BHP Billiton, SCA, Biosis and MSB was unable to find unequivocal reasons for these features. As with Wongawilli Creek, there are no baseline data and monitoring of this and other hanging swamps is to commence. (CSIRO, 2002)

It is apparent that the current management response in the sensitive and important catchment lands is to monitor even though damage is obvious and continuing. This is a fundamental failure of the precautionary principle, with the protection regime taking second place to coal extraction.

The CSIRO Audit also noted that in 1999 there existed less than optimal relations between the SCA and the relevant State Government department (Department of Mineral Resources – DMR).

Without strong and effective protection measures, water supplies critical to Sydney and Wollongong will suffer further longwall damage and become more polluted. The catchment is managed by the Sydney Catchment Authority, which was created in 1998 after a series of water contamination incidents. The Catchment Authority has a legislative duty to preserve the ecological integrity of the area, but does not have any power to prevent mining. The new approvals process did give the SCA a greater say in the regulation of mines within the Special Areas but only advisory powers, as the Director-General of the DPI is the sole authority who approves SMP applications.

The damage that took place in the Waratah Rivulet (see 3.2.7) in 2006 was the result of longwall panels that pre-date the current approvals regime. In light of this, the further granting of an approval of an SMP for four more longwall panels under the Waratah Rivulet, without modification, is both a serious indictment on the SCA's power to influence the Department of Mineral Resources and the integrity of the current approvals regime.

Other government rules and policies, such as Sydney Catchment Regional Environmental Plan and the Sydney Water Catchment Management Act 1998 state that development in catchments should have only a "neutral or beneficial effect" on water quality and are being overridden by the *Mining Act 1992*. The SCA appears powerless to halt the damage to Sydney's water supply.

05

5.1 Longwall Mining near National Parks

Longwall mining has taken and is taking place up to the boundaries of several National Parks, particularly in the Western and Southern Coalfields. This has caused damage to natural features such as the cliffs and rock formations in the Gardens of Stone National Park and poses a threat to places such as the Great Dripping Wall in the Goulburn River National Park.

As part of the 1998 NSW Forest Agreements, the new tenure of State Conservation Area (SCA) was created specifically to allow mining in areas where logging was prohibited. This has already had adverse effects in Barrington Tops near Polblue Swamp, where ruby mining is taking place in the headwaters of the Manning River.

Proposed longwall panels at the Tahmoor Colliery also threaten the proposed Bargo National Park.

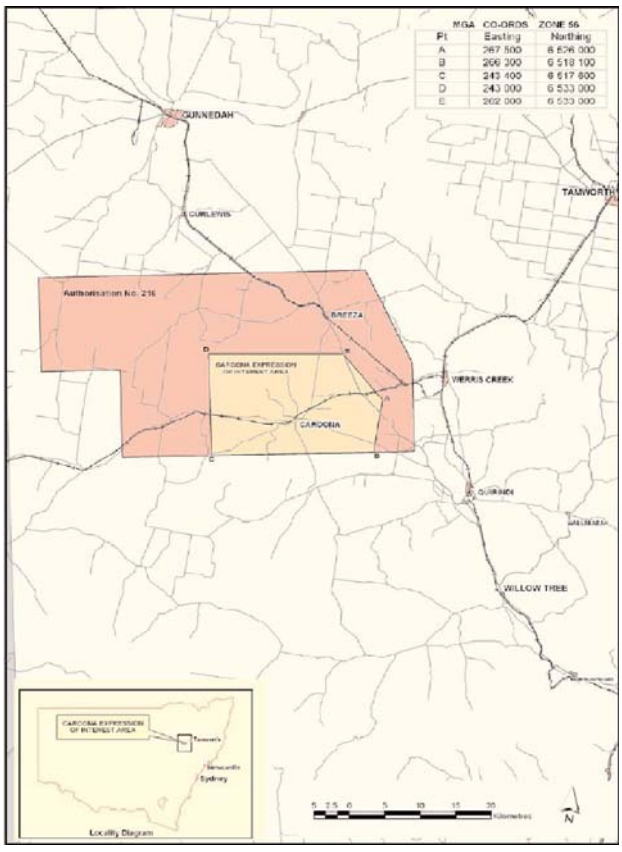
5.2 Longwall Mining under the Liverpool Plains

In June 2006 the NSW Government granted coal exploration rights to a 350-square-kilometre area of the Liverpool Plains in the Gunnedah Basin. BHP Billiton paid more than $100 million for this. Near Quirindi in northwest NSW, the exploration site is in the centre of the Liverpool Plains well known for their rich alluvial soils and vast underground water resources.

The coal seam under the Liverpool Plains lies at a depth of 400m below the surface meaning that longwall mining would be the most likely method of extraction. There are concerns among farmers groups that subsidence on the Liverpool Plains will dramatically alter drainage patterns and compromise the farming land. The NSW Government recently made dramatic cuts to farmers' groundwater entitlements.

Longwall mining has never taken place under such deep alluvial soils, which are up to 80m in places. Along with the farmers, towns along the Namoi River rely upon the underground basin for their water.

The Prime Minister John Howard has written to the Independent Member for New England Tony Windsor giving an assurance that the Government is considering an 'independent' study into coal mining on the Liverpool Plains.



Map Source: BHP Billiton

5.3 Longwall Top Coal Caving

Longwall Top Coal Caving (LTCC) is a form of longwall mining previously practised only in China. However, the method is currently being used on a trial basis in two longwall panels at the Austar Colliery (formerly Southland Colliery) near Cessnock in the Newcastle Coalfield. Southland Colliery was closed following a fire in 2003. It was purchased a year later for $32m by the Yanzhou Coal Mining Company of China, and renamed Austar Coal Mine. Yanzhou is among the four largest Chinese coal miners in eastern China, with six underground mines in Shandong Province producing more than 40Mtpa of coal, 90% of which is extracted using LTCC.

The development of LTCC took place in France more than 20 years ago but has been further refined in China for dealing with thick seams and where the Chinese government has decreed that at least 85% of a seam must be extracted.

The front of a LTCC machine functions like a standard longwall system but with a second armoured face conveyer – an articulated chain conveyor that transports the coal along the longwall face after it has been cut by the coal shearer – that runs behind the base of the supports to clear coal that subsequently falls from the roof once the chocks have moved forward.

In 2000 the CSIRO signed an agreement to work with the Chinese Yankuang Mining Group to study the potential for LTCC in Australia. The CSIRO concluded that the method was suitable for seams of 4.5-12m thickness. This would not be applicable in the Southern Coalfields of NSW but would be in some of the seams in the Hunter, Newcastle and Gunnedah Basin coalfields.

According to the CSIRO, "Longwall top coal caving offers significant reductions in cost and improved capital utilization. The method could potentially double longwall recoverable tonnes mined per metre of gateroad development. Less development metres, less frequent longwall moves and the potential for a more even coal flow are major advantages". (CSIRO, Longwall Top Coal Caving, Fact Sheet, 2003)

The CSIRO also noted that "additional research is required particularly in the area of geotechnical feasibility", and acknowledged that the geotechnical elements of LTCC are not well understood. Austar Mine's Statement of Environmental Effects predicts subsidence between 3.9 to 4.2 metres and maximum crack widths of up to 90mm, although local residents claim to have been told that subsidence of up to 6m may occur (Media Release by local resident John Harvey, 10/7/06).

06

There is no long-term evidence that grouting, mortaring and a number of other remediation measures are capable of returning river systems back to health following longwall mining. Environmental flows may not return without the continuing practice of replenishing flow with water from the mine or purchased from town supplies or water catchments. Changes in the chemical composition of rivers and creeks from iron oxide leaching may not support the return of aquatic species to an area.

There is also the substantial problem that damage between the mine operations and the surface is often undetectable. Some cracking occurs beneath alluvial, sandy deposits and simply cannot be seen. According to the Environmental Impact Statement for BHPB's Douglas Area 7 Project, "It is … not possible to visually identify the location and extent of additional fractures that may have occurred as a result of mining previous longwalls".

Sometimes proposed measures are not always practical. Following the fish kills that occurred in the Cataract River, BHP offered to restock the river. This was unable to be done due to the lack of flow and water quality of the river, which continues to the present day.

In 2004 the TEC commissioned Eco Logical Australia to produce a report into *The Impacts of Longwall Mining on the Upper Georges River Catchment*. The report found that there were three measures or considerations that must be taken in regard to the impacts of longwall mining. These were:

- Avoidance
- Amelioration
- Rehabilitation.

This section draws largely on Eco Logical Australia's report to assess these issues in a state-wide context.

6.1 Avoidance

Avoiding significant impacts is the key to ecologically sustainable development and is fundamental for effective land use planning. In the case of longwall mining identifying values vulnerable to impacts and being able to accurately predict where unacceptable impacts will occur forms the basis for sound strategic planning. This is best exemplified by not mining under or too close to rivers, creeks and underground aquifers that are likely to be impacted.

The coal mining industry has a poor record on avoidance. The introduction of SMPs in 2004 made some advances towards predicting subsidence impacts. However unacceptable levels of damage to water resources and natural features are still taking place across NSW. Mining companies' SMPs are routinely approved with little or no additional conditions imposed by the DPI to avoid subsidence impacts and with a focus on amelioration and rehabilitation, along with ongoing monitoring programs.

6.2 Amelioration

Where impacts are not avoided, ameliorating the intensity and longevity of the impacts is the next objective. Amelioration techniques include water treatment, environmental flows, stress-relieving slots and grouting.

6.2.1 Water Treatment

Water from surface and underground operations in longwall mines undergoes a number of treatments before being released back into the river systems.

These include settling ponds to facilitate removal of particles and chemical treatment to improve water quality. DEC specifies minimum water quality parameters for water being released into river systems. As well as the above treatments, mines use potable town water mixed with the mine water to ensure that maximum salinity levels are not exceeded.

6.2.2 Environmental Flows

To offset water loss and drops in water level as a result of fracturing and extended periods of low rainfall, numerous longwall coal mines release substantial amounts water of into river systems as environmental flows. This assists in maintaining minimum water levels in ponds and channels and is intended as a temporary measure to be used in the time between impact and when rehabilitation can be implemented. Given Sydney's water supply problems and environmental problems associated with low flow in dammed rivers, the release of large amounts of potable water to compensate for environmentally poor mine planning is considered to be an unnecessary waste of a precious natural resource.

6.2.3 Stress Relieving Slots

In an attempt to prevent fracturing of the rock bar upstream from Marhnyes Hole, which was fractured as a result of longwall mining in the Upper Georges River Catchment, a stress relieving slot was drilled for a distance of approximately 28.5 metres. Whilst some fracturing still occurred it was small in nature and on the margin of the slots' effective area.

While this technique may prove effective, it was invasive and a number of factors prevent it from being carried out in all but the most extreme (and most publicised) of cases. Due to the mechanics involved it may not be possible to drill these types of slots in steep environments or areas without vehicular access. For example, amelioration equipment and materials being used in the Waratah Rivulet in the upper Woronora catchment are being transported into the area by helicopter.

6.2.4 Grouting

Grouting is sometimes carried out as mining progresses under an area. Difficulties faced by grouting when used as an ameliorative measure include washouts and ongoing subsidence. Grouting as an effective measure to reduce the impacts of longwall mining subsidence on river systems is a contentious topic and is discussed further in Section 6.3.3.

6.3 Rehabilitation

The final option is to rehabilitate or remediate degraded environments. Mining companies spend millions of dollars each year on remediation works. Whilst some short-term results have been successful, the long-term effectiveness of rehabilitation techniques is currently unknown. The dominant forms of rehabilitation include:

Environmental flows, Mortaring, Grouting and the Natural sealing of rock fractures.

6.3.1 Environmental Flows

When used to maintain water flows over a longer period of time, environmental flows can be suggested to be a rehabilitation measure. Whilst there are benefits to maintaining environmental flows, they can lead to changes in water chemistry and ecology and, given the need to mix water with town water, may put pressure on potable water supplies, particularly during drought periods. The long-term viability of maintaining environmental flows from potable water supplies is low.

6.3.2 Mortaring

Site inspections of the mortaring that took place as part of remediation work carried out at Marhnyes Hole identified cracking and flaking of the mortaring. This is believed to be a result of further subsidence related movement and raises doubts about the effectiveness of this technique.

6.3.3 Grouting

The aim of grouting is to fill the fractures below the surface through which water has been flowing. This reduces the redirection of water from the surface and reduces the amount of dissolved oxidants that are brought up when the water resurfaces.

Negative impacts from grouting include disturbance of vegetation and other surface features through access, drilling and the like, and damage from source material extraction/supply There is also the serious problem of practicality – grouting cannot be applied to the thousands of cracks, nor can all the works be effectively monitored.

The Minister for Primary Industry Ian Macdonald and mining companies regularly claim that grouting has 'repaired' damaged rivers such as the Cataract and the upper Georges.

6.3.4 Natural Sealing

Natural sealing on its own appears to be a slow if not ineffectual technique. Examples (based on rock staining and vegetation) show water levels dropping in a number of river systems following longwall mining and possible natural sealing. No such drops in water level were observed in areas that had not been undermined suggesting caution should be exercised in relying on natural sealing as the sole rehabilitation technique.

6.4 Monitoring

As discussed in Section 4, monitoring is a key government and industry response and benchmark data is absent.

Since the damage occurred to the Cataract River and through the conditions enacted by the new approvals process, extensive monitoring of water quality and quantity takes place before and with every longwall mining operation. Most monitoring programs are conducted by mining companies themselves and sometimes by various government agencies, such as the SCA if mining is taking place within a supply catchment.

Cracking of the Waratah Rivulet bed, in Sydney catchment area

While programs that provide more information and data about the effects of longwall mining on river systems are no doubt beneficial in the long term, mining companies are using data taken from monitoring programs to justify continued mining near rivers. Highly generalised statements in mine plans, such as 'flow observations indicate that the underflow [the water that has disappeared down cracks] reappears as surface flow further downstream' (Helensburgh Coal, 2006) are made routinely without acknowledging the absence of baseline data as described by the CSIRO.

In the case of the Waratah Rivulet, the recent SMP referred to studies done in 2004 and 2005 to justify more longwall panels, when the longwall panel that had caused catastrophic damage to the riverbed was mined in 2006.

It is a routine practice of the miners and its regulator to assume the most optimistic situation and to undervalue the extent of risk.

07

Despite the careless attitudes of industry and the Mines department, government has received sufficient warning about the situation from a wide range of community groups and also key government agencies. For instance the *Water and Sydney's Future* report (Hawkesbury-Nepean River Management Forum, DPINR, 2004) to the Minister for Planning, Minister for Natural Resources and Minister for the Environment found that longwall mining in the Hawkesbury-Nepean catchment had the potential "to cause irreversible long-term damage to aquatic and groundwater dependent ecosystems".

The report made one recommendation regarding underground coal mining in the catchment:

That all underground coal mining be required to eliminate existing impacts and to avoid future impacts upon the water supply system, rivers, streams and wetlands within the Hawkesbury-Nepean, Shoalhaven and Woronora catchments. (Hawkesbury-Nepean River Management Forum, 2004, Recommendation PEF19)

The operation of coal mining under section 138 of The Mining Act 1992, and indeed under the new approvals regime and SMP process, is the antithesis of the precautionary principle. Too many risks are being taken with natural resources, including a large volume of the Sydney catchment, and key items of infrastructure. Unlike damage to man-made structures, damage to natural resources, ecosystems and places of recreation do not attract financial compensation. This reflects a lack of legal recognition for the damage being caused and the absence of an enforcement regime to protect environmental services and pristine environments that should be retained for the benefit of future generations. Unlike man-made infrastructure, financial compensation for damage to aquatic ecosystems is neither possible nor advisable.

7.1 The Approvals Process

Although established to address environmental impact issues, Environmental Impact Statements and Subsidence Management Plans submitted as part of the new approvals process invariably state that subsidence can be managed, yet offer no assured results from past monitoring and rehabilitation. New mines are approved with little or no focus on avoidance, but instead on speculative amelioration and rehabilitation and endless monitoring that simply records the damage and does not inform the future.

The Department of Mineral Resources is a law unto itself when it comes to final approvals for new longwall mines. There are also significant questions over the DMR fulfilling their obligations to the public and the integrity of their desire to achieve good environmental outcomes.

In their annual report of 2003/04, the SCA reported that the Southern Coalfield River Remediation Committee, an interagency committee established to address the not insignificant issue of rehabilitation 'continued to encourage and oversee the remediation of watercourses that have suffered subsidence damage as a result of underground coalmining'.

However the Committee has not met for over three years and after making a number of inquiries into the Committee's status, Rivers SOS were informed that it had been disbanded after the DMR moved to Newcastle.

The penultimate role in the new approvals process, before the DMR makes a final

determination, is held by the SMP Interagency Review Committee. The role of this Committee is to "advise on conditions for their approval and to participate in ongoing monitoring of subsidence management". Given the number of SMPs that are approved by the DMR without modification, the ability of the Review Committee to influence environmental outcomes for the better must be brought into serious question.

An example of the problems faced by the Interagency Review Committee can be found in the recent approval of the Appin 3 mine. Minutes of the Committee's August 2006 meeting (obtained through FOI by Rivers SOS) noted that:

- the SMP was deficient in the provision of management plans;
- Illawarra Coal (BHPB) had been hard to obtain information from and when information was received it was "minimal with no backup information";
- there was pressure to approve prior to the completion of management plans;
- the SCA had commissioned an independent consultant to determine a "suitable barrier" to protect the Cataract River from cracking and that a distance of 350m had been determined, and also that substantial discussion would need to take place on this before approval;
- that it would be very difficult to grout and ensure success and that the SCA was not confident with the grouting management program; and
- that the SCA was going to produce a document recommending changes to approval conditions

Less than a month after the meeting Appin 3 was approved without any significant conditions and allowed mining to come to within 80m of the Cataract River.

The rapid approval for Appin 3 following the problems noted by the Interagency Review Committee raises major concerns and proves that recommendations and concerns about protecting rivers, remediation and access to information from mining companies are ignored by the DMR when granting new approvals.

Under the new approvals policy, SMPs are required to be publicly available and applications for and determinations made on SMPs are required to be exhibited publicly on the DMR's website. However, the list exhibited is incomplete with the SMPs for several major longwall mines not included. The DMR has also failed to respond to the TEC's request for information on this problem.

The intention of government policy should be to preserve the ecological integrity of water supply catchments, including maintenance of water quality and flow as paramount to the production of coal. This requires a much improved protection and an independent regulatory system for mining in these areas. It is necessary to prohibit high impact coal mining in drinking water catchments and other environmentally sensitive areas.

Recommendations: The Department of Mineral Resources (DMR) has a conflict of interest in regulating mining, as they are a strong promoter and advocate of mining. The DMR should be immediately removed as the approval body for longwall mines.

An independent regulator with the power to prevent longwall mining in sensitive sites is required, in addition to much greater involvement of Planning NSW, the Department of Environment and Conservation (DEC) and the Sydney Catchment Authority (SCA).

Additionally provide monthly public internet reporting of mine subsidence damage monitoring and advice from an independent expert ecological committee.

7.2 Buffer Zone

Fifteen rivers in New South Wales have been damaged since the 1990's as a result of longwall mining with a further seven under threat from current plans (Rivers SOS 2006).

As noted at the beginning of this section, in 2004 DIPNR's Hawkesbury-Nepean River Management Forum made a recommendation to "eliminate" all existing impacts by longwall mining on Sydney's water supply catchment.

In an assessment of coal mining potential in the Upper Hunter Valley, the NSW Department of Planning (NSW Department of Planning, 2005) made the recommendation 'That formal policy to avoid or minimise the potential impacts of coal mining on major streams or aquifers and guidelines for assessment under Part 3A EP&A Act of such potential impacts by major coal mines be developed by DoP in consultation with DNR and DPI'. In his media release following the assessment, Planning Minister Frank Sartor noted that the recommendations included protecting the Pages River, 'from any significant impact from coal mining' (NSW Minister for Planning, 20/12/2005).

In their key threatening process declaration, the NSW Scientific Committee *(NSW Scientific Committee, Alteration of habitat following subsidence due to longwall mining - key threatening process declaration, 2005)* notes that:

The surface area affected by ground movement is greater than the area worked in the seam (Bell et al. 2000). In the NSW Southern Coalfield, horizontal displacements can extend for more than one kilometre from mine workings (and in extreme cases in excess of three km) (ACARP 2002, 2003)

In their report, Mine Subsidence in the Southern Coalfield, Holla and Barclay state that "horizontal movements of up to 25 mm near Cataract Dam even when underground mining was about 1500m from survey stations."

Protection and buffer zones are already enforced in regard to protecting man-made infrastructure from the impacts of longwall mining. Dam walls, railway lines and bridges all have set conditions to prevent longwall panels from coming too close. The necessity of protecting railway lines stems from the 1970s when underground coal mining caused significant damage to the Stanwell Park Railway Viaduct and the creek beneath. Sections of the viaduct had to be replaced, and trains are still obliged to slow down at this point. This cracking was caused by mines that were approximately 130m from the viaduct.

This concept can easily be extended to incorporate key natural areas such as supply catchments, river systems, alluvial aquifers cliffs and other important landmarks.

TEC believes that special legislation should be passed to ensure protection, along with strong penalty provisions – the Appendix contains legal drafting instructions to achieve this.

Recommendations: To enact in the first parliamentary session after the 2007 State Election, legislation for a 1km protection zone around rivers and streams underlain by proposed longwall mining; development of additional protection measures from other mining impacts and compliance measures.

A 1km mining exclusion zone around rivers and groundwater aquifers immediately be made mandatory in all mining licences for all current longwalls that have not proceeded to second workings.

7.3 Southern Coalfields Inquiry

On December 6th 2006 NSW Planning Minister Frank Sartor announced an Independent Inquiry into the NSW Southern Coalfields. The Terms of Reference are:

1. Undertake a strategic review of the impacts of underground mining in the Southern Coalfield on significant natural features (i.e. rivers and significant streams, swamps and cliff lines), with particular emphasis on risks to water flows, water quality and aquatic ecosystems; and
2. Provide advice on best practice in regard to:
   a) assessment of subsidence impacts;
   b) avoiding and/or minimising adverse impacts on significant natural features; and
   c) management, monitoring and remediation of subsidence and subsidence-related impacts; and
3. Report on the social and economic significance to the region and the State of the coal resources in the Southern Coalfield.

The Inquiry comes in the wake of damage to numerous rivers and creeks in the region and is a delaying tactic that will allow more damaging mining. New longwall mines may still be planned and approved in the Southern coalfields while the Inquiry proceeds. The Minister has announced that he will impose a new approval process after 2010, by which time many more longwalls will have been granted consent under the current failed regime, extending operations beyond 2010.

Damage caused by longwall mining is a statewide problem and the Inquiry should expand its scope beyond the Southern Coalfield.

Recommendations: The NSW Government should institute a new protection regime in 2007.

A moratorium on new longwall mines should be established until the Inquiry has handed down its findings.

It should also investigate longwall mining in supply catchments and the Special Areas as a separate term of reference.

Finally, the scope of the Inquiry should be expanded to acknowledge the primacy of the precautionary principle and address the damage done to river systems and water resources across NSW by coal mining.

08

Our Ref: 2006150

28 November 2006

Dave Burgess
Total Environment Centre
Level 4, 78 Liverpool Street
Sydney NSW

Dear Dave,

Longwall Mining

The Environmental Defender's Office (EDO) has been instructed by the Total Environment Centre (TEC) to prepare drafting instructions for legislation in relation to longwall mining. In particular, the instruction relate to establishing:

- a total prohibition on mining within 1km of waterways (including rivers and wetlands) in NSW,
- appropriate penalties for breach of this buffer zone, and
- making Subsidence Management Plans (SMPs) more robust.

To achieve these ends, any legislation would need to contain adequate provisions relating to:

- environmental protection object clause
- prohibition of mining
- offence provisions
- open standing
- any exemptions clearly delineated
- concurrence of the Department of Environment and Conservation
- public participation

These are two options that are available to achieve the desired outcome:

1) A new, stand alone piece of legislation, or
2) Amending existing legislation.

These will be considered separately below. Within each option two alternatives will be considered: an absolute prohibition of mining within the buffer zone, and a conditional prohibition subject to consent.

1. Stand alone legislation

Title

Example: *Protection of Waterways (Longwall Mining) Act 2007.*

Objects clause

A new separate Act would require appropriate objectives. The overriding objective is to prohibit longwall mining within 1km of waterways to ensure protection of water ways and avoidance of subsidence. The objects clause should also state that the Act is to operate in accordance with the principles of ecologically sustainable development. Since it is well shown that longwall mining does cause subsidence with significant environmental impacts on river structure and rehabilitation techniques are doubtful in their effectiveness, such an objective would be consistent with the precautionary principle.

Prohibition

A clear provision is required stating that mining is prohibited within 1km of waterways.

"Mining" activities and "waterway" should be clearly defined.

Exemptions

Provisions should be drafted to clarify how the legislation applies to existing mining approvals and activities currently within the 1km buffer zone.

Offence provisions

The new Act would have to establish an appropriate enforcement mechanism for breaches of the Act, such as carrying out a prohibited activity in the buffer zone (without an existing licence); breach of a relevant condition; or providing false and misleading information. The accepted view is that stipulated in the High Court case of He Kaw Teh. It recommends a 3-tiered structure for offences.

- Tier 1 offences are the most serious offences and involve willful or negligent activities that breach the buffer zone. That is, an appropriate state of mind must be proven in addition to the breach. Such breaches may lead to imprisonment in addition to a monetary penalty.
- Tier 2 offences are 'strict liability offences'. This means that to prove the offence, the prosecutor does not need to show that the defendant intended to breach the buffer zone or was negligent. The prosecutor only has to prove that the defendant conducted mining activities within the prohibited zone, or conducted such activities without a licence. The appropriate penalty is a monetary fine.
- A Tier 3 offence is the least serious of the three categories of offences. A Tier 3 offence is a Tier 2 offence for which a penalty notice can be issued. These may be appropriate for breaches of ancillary provisions of the Act.

Open standing

The new Act should include provision for the public to enforce breaches of the Act under open standing provisions. The standing clause should provide that any person may bring proceedings to challenge a Minister's decision to award or refuse a permit (merits appeals), or to take civil proceedings to enforce breaches of the Act or legal errors by the Minister in granting consents (judicial review).

2. Amendment to existing legislation

We refer to our previous advice (June 2004) regarding the current institutional, planning and regulatory framework for mining which included reference to the following Acts:

Coal Acquisition Act 1981

Coal Acquisition Act 1981

Coal and Oil Shale Mine Workers (Superannuation) Act 1941

Coal Industry (Industrial Matters) Act 1941

Coal Industry Act 2001

Coal Mines (Health and Safety) Act 2002
Coal Mines Regulation Act 1982
Coal Mining Act 1973
Coal Ownership (Restitution) Act 1990
Environment Protection and Biodiversity Conservation Act 1999 (C'th)
Environmental Planning and Assessment act 1979
Environmental Planning and Assessment Regulation 2000
Fisheries Management act 1994
Mine Subsidence Compensation Act 1961
Mines Inspection (Amendment) Act 1998
Mines Inspection Act 1909
Mining Act 1909
Mining act 1973
Mining Act 1992
Mining Legislation (Health and Safety) Act 2002
Mining Regulation 2003
Mining Statute 1865
National Parks and Wildlife Act 1974
Protection of the Environment Operations Act 1997
Sydney Water Catchment Management Act 1998
Rivers and Foreshores Improvement Act 1948
Threatened Species Conservation Act 1995
Water Act 1912
Water Management Act 2000

As is apparent, there are many Acts that are potentially relevant to regulating longwall mining. If amendment of existing legislation is preferred to the option of stand alone legislation as discussed above, it would be necessary to ensure consistency between all existing instruments. This could be done by including key amendments on one Act, for example, the *Mining Act 1992* or *Rivers and Foreshores Improvement Act 1948*, and ensuring that the amendments cannot be overridden by loopholes in existing legislation.

Objects clauses

Existing legislation may need to be amended to insert an appropriate waterways protection objective including reference to a prohibition on certain activities within 1km of waterways.

Prohibition

Existing legislation would need to be amended to include provisions stating that mining is prohibited within 1km of waterways.

If the key offence prohibition is contained in one Act, for example in the *Mining Act 1992*, it is important to also state that other legislation cannot override the prohibition.

Exemptions

Any new Act would require provisions exempting certain activities from the prohibition of mining such as existing uses.

Existing provisions that may allow exemptions to the prohibition should be omitted by the amending legislation. (It is important to note that the removal of certain rights may give rise to compensation).

Offence provisions

A similar enforcement regimen would be required as for a stand alone Act, as discussed above.

Open standing

As noted above, amendments should state 'any person' may bring proceedings to enforce a breach of the prohibition or challenge a decision. It is important to note that the *Mining Act 1992* and *RFI Act 1948* do not provide such standing currently.

Example: Potential amendments to the Rivers and Foreshores Improvement Act 1948, and the Mining Act 1992

The *RFI Act 1948* currently applies to 'protected waters'. These are defined as a river, lake into or from which a river flows, coastal lake or lagoon (including any permanent or temporary channel between a coastal lake or lagoon and the sea).

The Act regulates certain activities within 'protected land'. Such land is defined as:

(a) land that is the bank, shore or bed of protected waters, or

(b) land that is not more than 40 metres from the top of the bank or shore of protected waters (measured horizontally from the top of the bank or shore), or

(c) material at any time deposited, naturally or otherwise and whether or not in layers, on or under land referred to in paragraph (a) or (b).

Section 22B of the *RFI Act 1948* currently prohibits excavation on or under protected land unless a permit has been issued by the Minister of Public Works. Further, a person must not do anything which obstructs or detrimentally affects the flow of protected waters without a similar permit. Prima facie, this section would mean that longwall mining activities cannot proceed unless a relevant permit has been given. However, this is not the case due to section 22H. It states that the above section does not apply to any lease, licence or permit relating to mining. Hence, as long as a relevant mining lease has been issued, the *RFI Act 1948* does not apply. In order to achieve a 1km buffer around and under rivers, this exclusion would have to be removed. Furthermore, the definition of 'protected land' would have to be amended to increase the protected area from 40m to 1km for the purposes of longwall mining. It may also be appropriate to make the Department of Environment and Conservation a concurring authority.

The *Mining Act 1992* will also need to be amended to ensure that no mining lease is issued where the proposed mining is to take place within 1km of protected waters, or no lease is approved without obtaining a relevant permit under the RFI Act. Part 5, Division 2 of the Act contains restrictions on the grant on mining leases so that would be the appropriate section of the Act to include such a restriction.

3. Subsidence Management Plans

Legislative amendments may have implications for Subsidence Management Plans and Departmental policies and guidelines.

If the aim of the new/amended legislation is to prohibit mining within a 1km buffer, but to allow such mining to proceed with a relevant consent, licence or permit; then appropriate criteria will need to be drafted which the consent authority must consider before granting or refusing an application. The existing Subsidence Management Plan (SMP) regime may form a logical part of that process, either as one of the criterion to be considered or as a condition of consent. To be robust and effective, SMPs should encapsulate five elements:

1) community participation
2) legislative force
3) appropriate criteria for the making of SMPs
4) processes to challenge the granting or refusal of consent to a SMP.
5) effective monitoring of the plan.

Community Participation

The community already has a right to participate in the SMP process. All applicants must advertise their intention to develop a draft SMP in a local and a State-wide newspaper; identify and consult with all directly affected landholders and local councils and take their views into account. Applicants must readvertise when the draft SMP is finalised and submitted to the Department of Primary Industries. The advertisements must contain details of where the SMP can be accessed by the public. All members of the community are free to make submissions on the draft SMP which must be considered by the Department of Primary Industries.

Legislative force

Under the existing system, SMPs must be prepared as part of the application process. The requirement to prepare SMPs is attached as a condition of mining leases. The plans assist in assessing the subsidence potential of new underground mines and extensions to existing mines. However, since SMPs are required as conditions of mining leases, they do not have the same statutory protection as express provisions in an Act would. SMPs could therefore be strengthened through amendments to the *Mining Act 1992* making SMPs compulsory for all applications. Currently, there is nothing preventing the lease conditions from being altered for particular mining applications. There would be no statutory recourse in such an event. An appropriate provision in the Act would be one stating that SMPs are compulsory for all mining activities that are likely to cause subsidence, and a requirement for SMPs to be approved before the consent to mine is given.

Appropriate criteria for making of plans

Criteria already exist for the making of SMPs. These are founds in the Department's Guideline for Applications for Subsidence Management Approvals. Criteria include an assessment of the economic and social benefits of the mine, proposals for rehabilitation of subsidence impacts and proposals for ground and surface water management. As part of their application, applicants must also report on the views of the public and how these views will be taken into account. However, the practice has been to allow longwall mining and subsidence with a commitment to monitoring and rehabilitation, if possible. The primary criteria on proceeding to a SMP should be whether there can be an absolute assurance that waterways will not be damaged.

Processes to challenge the granting or refusal of consent to a SMP.

There are currently no processes that allow the public to enforce a breach of a SMP, nor challenge the granting of one. Merits review and judicial review should be available.

Effective monitoring of the plan

There is currently a Subsidence Management Plan Review Committee established under the Department of Primary Industries. Its task includes an annual review of SMPs and assessing the results of monitoring data supplied by the mining companies.

Commentary

The NSW Government seems to lend support to a buffer zone around waterways. In December 2005, the Department of Planning released Coal Mining Potential in the Upper Hunter Valley - Strategic Assessment. In reviewing the potential subsidence effects of coal mining in the Hunter Region, the report states that such effects "can be avoided by adopting a policy to restrict where appropriate coal mine development within or beneath the alluvium or alluvial aquifers of major streams and rivers throughout the Hunter Valley". Furthermore, the (then) Department of Infrastructure, Planning and Natural Resources, released a set of stream/aquifer guidelines in April 2005. These guidelines propose that barriers should be maintained (up to 150 metres) between mining operations and water sources. However, the Department of Natural Resources has stated that these guidelines only apply to the Hunter Region and do not form part of government policy. Nevertheless, it is acknowledgment by government of the need to protect waterways from subsidence effects caused by longwall mining.

For further information, please contact robert.ghanem@edo.org.au or 9262 6989.

Yours sincerely

Environmental Defender's Office Ltd

Rachel Walmsley

Policy Director

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