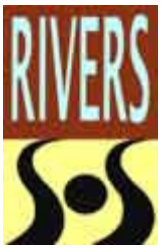

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30 JULY 2007: SUBMISSION FROM RIVERS SOS

TO PANEL OF INQUIRY INTO NSW SOUTHERN COALFIELD

Contents

Introduction

The Rivers SOS Alliance welcomes this opportunity to present this submission to the Panel of Experts of the Southern Coalfield Inquiry of 2007.

The terms of reference for the Inquiry involve a "strategic review of the impacts of underground mining in the Southern Coalfield on significant natural features ... with particular emphasis on risks to water flow, water quality and aquatic ecosystems."

As our name implies, our concern is with the impacts of mining on rivers. However since tributary creeks and streams, aquifers and wetlands feed our rivers these are also of concern where they are, or may be, damaged by mining operations.

With this submission, we include a box of numbered documents. Some are complete copies of reports/ articles/previous submissions; others are extracts. They will give the Panel some idea of the range of research which we have relied on.

Most will be referred to by number in footnotes in this submission. Others are included in the box for general information only. Some books and articles referred to in our footnotes are not included in the box for a variety of reasons.

Five detailed submissions sent in 2005-6 by Rivers SOS to the Director Environment, Department of Primary Industries – Mineral Resources, addressing our objections to five recently submitted mine plans affecting four major rivers in the Southern Coalfield, are included in the box of documents. All contain specific maps and bibliographies, and some contain photos. As these can easily be referred to we felt there was no need to include another set of illustrations or a bibliography in this current submission.

In discussing specific mining impacts on our rivers, this submission is in essence, though not entirely, a compendium of these previous submissions; together with information gleaned from the five subsidence management plans (SMPs) that were addressed.

These SMPs are typically 1000 pages long and Rivers SOS cannot supply hard copies. We refer to their contents in our footnotes on the assumption that the Panel has been provided with copies.

To sum up, in this submission we focus on the Cataract, the Georges, the Nepean and the Bargo River systems. Other rivers and creeks in the Southern Coalfield which have not been the subjects of recent SMP applications will be addressed in other submissions to you from the National Parks Association (Dendrobium area and Waratah Rivulet) and the Total Environment Centre (Waratah Rivulet). Mine damage to wetlands will be addressed by the expert Dr Ann Young, while the potential breaching of the Kangaloon aquifer, feeding the headwaters of the Nepean system, will be addressed by the Robertson Environment Protection Society and the Save Water Alliance.

With some degree of co-ordination amongst concerned groups we hope to avoid too much overlap.

More photos of damaged rivers, and further information, can be found on the Rivers SOS web site: www.riverssos.com.

The Rivers SOS Alliance

By 2005, irreparable damage had been done by longwall mining to three major rivers in the Southern Coalfield: the Lower Cataract River, the Upper Georges River and the Waratah Rivulet. Numerous creeks had also been cracked and damaged, e.g. Wongawilli, Native Dog, Stokes, Lily Ponds, Flying Fox, Ousedale, Simpsons, Myrtle and Elladale Creeks, and many smaller unnamed creeks and streams.

Two other major rivers had been cracked rather less severely by mining: the Bargo River and the Upper Nepean River. More mines going too close to rivers were/are in the pipeline.

Three local groups – the Nepean Action Group, the Georges River Environmental Action Team, and the Macarthur branch of the National Parks Association joined to form the Rivers SOS Alliance to campaign for a safety zone to be mandated around our rivers in future.

Rivers SOS was also joined by individuals: some of whom are well-informed community members of local colliery community consultative committees (CCCs) and some who had been active in the Cataract River Action Party (CRAP), which won a court case against BHP Billiton in 1998 for damage done to the Lower Cataract River.

We soon realized that we were not alone: we found that a total of fourteen rivers around NSW had been damaged by mining and seven were under further threat, due to the failure of the NSW Government to mandate adequate safety zones.[1] Affected community groups from the four other coal fields in NSW joined Rivers SOS, as well as some of the major environmental groups like the Nature Conservation Council of NSW, the Wilderness Society and the Total Environment Centre. Political parties like the Greens and the Australian Democrats also joined. (Rivers SOS is strictly non-political, but we welcome any political party or group which supports our call for the protection of rivers from mining).

The Rivers SOS Alliance was launched with 13 member groups in October 2005, with a concert and art auction attended by over 200 at the Campbelltown Arts Centre. We had statements of support from Robyn Williams, Jeff Angel, Tim Flannery, Professor Rob Close (UWS), Dr Tom Grant (UNSW), Tom Uren , Keith Muir and others.

Today the Alliance has 36 member groups (the list is provided on the final page of this submission). We have gone on to organize numerous events, petitions, presentations and delegations to politicians. We have written 7 submissions for the DPI, answering the call for public input when mine plans are under consideration. All our submissions are vetted and edited by all groups in the Alliance.

Thanks mostly to donations from artists and musicians, we raised enough money to make the documentary film "Rivers of Shame," which we have forwarded to you previously. This was launched last year at Parliament House by Arthur Chesterfield-Evans (Australian Democrats MLC) and Lee Rhiannon (NSW Greens MLC). We are now raising money for a second documentary.

As well as campaigning to protect rivers, we have also become concerned that two major aquifers in NSW feeding vital river systems are under threat from future mining operations: the Kangaloon Aquifer near Robertson, which feeds the Upper Nepean River

[1] Document 1: Rivers SOS, *Rivers of Shame,* October 2006

and catchment, and which is threatened by Gujerat (recently re-named India) Coal's future mine plans, and further afield the aquifer under the Liverpool Plains, which feeds the Mooki and the Namoi Rivers, part of the Murray-Darling River system, is under threat from BHP Billiton's mine plans.

In 2006 Rivers SOS had the honour of winning the Nature Conservation Council of NSW's annual Marie Byles Award for the Most Outstanding New Environmental Campaign.

Rivers SOS queries the moral basis of a society in which decision-makers - politicians, bureaucrats, scientists, consultants and mining corporations - continue to acquiesce in the approval of mine plans which inflict major and irreparable damage on our rivers, in spite of efforts by the public in general, and local communities in particular, to urge the NSW Government to protect the rivers.

Further, in an era of water shortages and restrictions, with more severe droughts predicted by climatologists, we can only wonder at the mindset of those who approve mine plans which can be guaranteed to cause water loss and pollution in rivers in the drinking water catchments – as in the Southern Coalfield.

Rivers have been loved, worshipped, prayed to, written and sung about since the beginning of time. It should go without saying that our rivers and their health mean a great deal to us, whether they form part of Sydney's water supply, or are providing for irrigators, oyster farmers and fishermen. Bushwalkers, canoeists, artists, tourists, children – in fact most of us - love our rivers for their intrinsic beauty. Native flora and fauna depend on them. The cumulative mine damage now occurring in NSW, and particularly in the Southern Coalfield's major rivers, is both a tragedy and a scandal in our eyes.

How have we as a society consented to a situation where, according to environmental lawyer Claire Allen, "the water resources and their dependent ecosystems in NSW and across Australia are severely degraded from decades of mismanagement" and where "freshwater rivers in NSW may be the most degraded ecosystems?"[2]

The question of inter-generational equity looms large – how can we be so irresponsible as to leave a legacy of wrecked rivers for future generations ?

All groups in the Rivers SOS Alliance earnestly hope that this Inquiry will make history by taking a responsible stand and calling a halt to destructive mining operations where they contribute to the degradation of rivers in the Southern Coalfield.

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[2] Document 2: Claire Allen, LLM, *Heritage Rivers,* Environmental and Planning Law Journal, Vol. 21, No. 5, October 2004, p. 329

Why We Call for a 1 km. Safety Zone

Rivers SOS from its inception has had only one simple aim: to campaign for the NSW Government to mandate a safety zone of at least one kilometre around all rivers in the state, to protect them from further permanent damage through the effects of mining under, or too close to, river beds.

The call for a one kilometre safety zone, or buffer zone, around rivers is not a radical ambit claim hit upon by a bunch of amateurs. We researched carefully and relied on expert advice to arrive at this goal, which serves to unite our 36 groups.

Rivers SOS prepared a manifesto to this effect when we were first formed. This, as you can see, cites some of the research which helped us to arrive at this specific distance (see Document 3).

Though the so-called 35 degree angle of draw (from mine workings to surface) is traditionally used in order to predict a zone of possible surface damage, we opted for a specific distance instead, partly because damage is even less predictable than usual in rugged terrain such as river gorges. [3]

We note that Austral Coal, former owners of Tahmoor Colliery, kept mines "around 1 km from the Mermaid Pool and at this distance no impacts to flows are expected."[4]

We note, as another example, that the NSW State Rail Authority, when assessing potential mine impacts on rail tracks, uses the 35 degree angle of draw predictor of damage in flat terrain but in "areas of high relief" it requires "special consideration" and site-specific studies.[5]

We also considered calling for site-specific studies, however we believe that the resultant lack of precision could leave too much "wriggle room." Any such studies would most likely be carried out by consultants paid by the mining companies, in accordance with the current practice in assembling the SMPs, and we would not have enough confidence in any such process.

Our fear of the disproportionate influence of the mining companies on government decision-makers and policy is more than borne out by the whistle-blower Guy Pearse, in his book *High and Dry* (Penguin, 2007).

Environmental scientist Ray Mjadwesch, told a public meeting, organized by the Nepean Action Group in Douglas Park on 15 December 2005, that he had been sacked by a mining company for refusing to re-write his environmental assessments according to their wishes.

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[3] Document 3: Rivers SOS Manifesto, p. 4
[4] Document 3: Rivers SOS Manifesto, p. 5
[5] L. Holla & E. Barclay, *Mine Subsidence in the Southern Coalfield, NSW,Australia, NSW DMR, 2000,* p.11

Our "one size fits all" approach in calling for a uniform safety zone may not be ideal but it has the advantage of avoiding the problem of undue influence being exerted by powerful interests in numerous individual cases.

Moreover site-specific studies would not anyway give certainty. The likelihood of "anomalies" dogs every prediction. As Professor Hebblewhite wrote, after researching subsidence effects in the Southern Coalfield: "Previous experience had indicated that severe surface topographic changes … could result in significant "anomalous" behaviour."[6]

Inability to pinpoint the existence of underground faults and dykes calls out for a reasonably ample safety zone. BHP Billiton's own subsidence consultants in the Southern Coalfield, MSEC, also take pains to emphasise what they call the "Likelihood of Irregular Profiles." They write that "By far the greatest number of irregularities in subsidence profiles … can be explained by the presence of surface incisions such as gorges, river valleys and creeks."

They refer to the frequent occurrence of anomalies, caused by the "possible presence of an unknown fault, dyke or other geological structure" and "**while the causes of anomalies are not yet fully understood, it is hoped that they will be better understood as the development of mine subsidence knowledge progresses .This may then allow these movements to be predicted, so that surface features can better be protected in the future**."[7] This honesty from the horse's mouth !

These experts, formerly known as Waddington Kay and Associates, had previously assured all concerned that the Georges River would not be as badly affected by mining as the Cataract had been. For example, the Healthy Rivers Commission reported that "the Commission was advised that the particular geological characteristics of the Cataract River gorge meant that the incidence of riverbed cracking was unlikely to be repeated elsewhere. This has not proven to be the case, and it is now evident that the impacts of longwall mining are significantly broader than was advised."[8]

Yet, as Jim Galvin has written, "Of all the consulting groups, they [MSEC] have the most experience with upsidence and valley closure." It is helpful that they now stress the fact that their predictions are unreliable. Their "incremental method" may be state of the art but as they admit, accurate predictions are just not possible.

This situation calls for the **precautionary principle** to be observed. This requires that a lack of scientific certainty about the potential impacts of an action does not justify in itself a decision that the action is not likely to have a significant impact.

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[6] B.K. Hebblewhite, *Regional Horizontal Movements Associated with Longwall Mining,* UNSW, 2000, p. 7
[7] BHP Billiton, *SMP for Appin 3 Application*, Sept. 2005, MSEC report, D 5.9.5.
[8] Healthy Rivers Commission, *Independent Inquiry into the Georges River-Botany Bay System,* Final Report, September 2001, p. 51

Quite the reverse of this principle occurs in approving mine plans in NSW. **In providing assessments for current mine plans going too close to the Upper Cataract, Upper Georges, Upper Nepean and Bargo Rivers, MSEC consultants predict damage in every case, as reported in the SMPs.** However they typically round off a litany of potential impacts and damage with the comment that the impact will not be significant, in spite of all the uncertainties and "known unknowns" surrounding such judgments, and in spite of a disastrous track record of past damage.

If the Panel can examine the relevant sections and attachments in the SMPs and the EIS in question, this problem will be clearly evident in all cases.

We add that as stretches of all four major rivers fall well within the 35 degree angle of draw "damage zone" in the mine plans (see maps in Documents 4 - 7), significant damage would seem, even to the layperson, to be unavoidable.

There is some debate as to whether ground movement caused by mining conflates with surface damage. Our Rivers SOS manifesto makes it clear that we arrived at our 1 km call on the basis of distances of movements from workings, but because we realize that severe damage is not likely to be caused by far-field movements we did not attempt to avoid all movement by opting for, say, a 3 km safety zone. However we do believe, at this stage, that a level of intensity in movement within our 1 k margin will put gorges and river valleys under stress, and crack river beds.

Taking just one case: Professor Hebblewhite, in the above paper, noted that a monitoring station 1.5 k from BHP Billiton's Longwall 17 (near the Hume Highway Twin Bridges over the Upper Nepean River at Douglas Park) recorded 60mm movement. However he adds that this movement is of a "rigid body" nature, implying ground movement but no surface damage.

We note that Dr Ann Young, in her submission to this Panel, discusses the theory that horizontal movement has no significant surface impacts and comments that "this may be wishful thinking."

We add that two members of Rivers SOS witnessed core drills taken from the Nepean's river bed around 60m west of the Twin Bridges, near the Douglas Park Causeway, only last week. We saw lengths of pulverized and shattered sandstone, apparently from a depth of 20m, which in the opinion of those present could only have been caused by mining.[9]

This damage squares with the testimony of ex-miner Ray Smith, Douglas Park resident and one of the Friends of the Nepean. He swears that he saw numerous methane vents bubbling out of the river beside the Nepean Causeway when Longwall 17 was extracted in 2000.

[9] A report on these core drills is now being compiled for the RTA. We hope it will soon be available.

Whether horizontal movement within a 1 km zone always equates with such damage may well be debatable but damage there certainly is in this instance, and irreparable damage at that; all the more serious if this fracturing is widespread.

We estimate the distance from the previously mined Longwall 17 to be around 700m at this point. This is another reason why we think the call for a 1 k safety zone is far from excessive. Of course we would like drill samples to be taken even further from the longwall here, at our 1 k distance, to help prove or disprove our point.

If this extent of damage is happening beneath the surface, although not visible on the surface, the impacts of rigid body movement are perhaps far more destructive than commonly thought.

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The mining companies and the NSW Government are greedy for immediate profits and royalties. We urge patience instead and we say that where river health is threatened mining should be delayed, until the holy grail of accurate prediction of damage is finally attained. At this point the mining companies could go back and take the coal if it is then considered safe. New or modified mining methods may also make future mining in sensitive areas more acceptable in future. The coal will not run away meanwhile.

As we have already argued, we urge acceptance of the **precautionary principle** where our rivers are concerned. We believe that it is immoral to gamble with the health of any river for short term economic gain. We also believe it may be illegal to gamble with those rivers in the Southern Coalfield which are vital conduits for Sydney's water supply.

Altogether, the one kilometre call is by way of a compromise for us, rather than a radical ambit claim. This safety zone has the added advantage of lending some protection to tributary creeks and streams near their confluence with the rivers.

We were pleased to read the Department of Planning's 2005 Report on mining in the Hunter Valley, which called in general fashion for "appropriate buffer zones between open cut or underground mines and streams or alluvial aquifers," adding that "A formal policy should be developed to avoid or minimize potential impacts of coal mining on major streams in the Hunter Valley **and elsewhere in the state**."[10]

There has been no response to this suggestion as yet, and certainly no response to submissions from Rivers SOS.calling for the 1 k safety zone.

On the contrary, three mine plans on rivers in the Southern Coalfield have very recently been approved in which the company, which happens to be BHP Billiton in all cases, was given everything it asked for. No concessions whatsoever were made to the notion of a safety zone, and the approvals did not come even half-way to meet our 1 km call.

- The mines on the Upper Georges River are going right up to the river bank.

[10] NSW Dept. of Planning, *Coal Mining Potential in the Upper Hunter Valley – Strategic Assessment,* Dec. 2005, pp. 4 & 31

- Plans on the Upper Cataract River going only around 50m from the river bed were approved and mining has already cracked the river. We have witnessed nine methane gas vents bubbling in the river near Jordans Crossing as well as iron oxide staining and bacterial mats in some pools. Large cracks and some shattered rocks have also been photographed.

- Plans going only 180m from the Upper Nepean River have been approved and mining will commence in a few weeks. BHP Billiton did alter its previous plans to put four longwall mines directly under the Nepean, and of course this was a very welcome change, however the current plans still go far too close. Surface impacts within the 35 degree angle of draw are likely to be just as severe as impacts caused by mining directly underneath.

The decision-makers: the Minister Ian Macdonald, the Interagency Review Committee which makes recommendations on mine plans, the consultants who are paid by the company and downplay damage "significance", and the company itself have not even come part of the way towards the call for a safety zone in these three instances.

The Impacts of Mining on Rivers

While there may be debate over the exact nature of stresses and movements causing subsidence, upsidence, cracking and fracturing and pollution of rivers impacted by mining, we trust we do not need to argue the broad question of whether mining **does** cause such impacts. As the Healthy Rivers Commission wrote back in 2001, "There is a growing awareness and understanding of the impacts of longwall mining."

Dr John Williams reported as far back as 1999 that subsidence due to longwall coal mining in the SCA Catchment - overlapping with the Southern Coalfield – leads to "potential erosion, diversion of water flow, reduction in water quality, impacts on ecosystems and cultural heritage, massive land slips and damage to infrastructure."[11]

The physical impacts on our four rivers have been addressed at some length in Rivers SOS submissions (Documents 4 - 7) and therefore we will just reiterate the main concerns briefly here.

River beds which are cracked and fractured through mining impacts experience water loss and pollution. The worst affected river in the Southern Coalfield was the Lower Cataract. Impacts on this river are widely known but we include extracts from two of the most detailed reports (see Documents 9 & 10). An excellent summary is also contained in the NSW Scientific Committee's Final Determination of July 2005 (Document 11).

[11] Dr John Williams, *Audit of the Sydney Drinking Water Supply Catchments Final Report,* Nov. 2002, p. 109

Mining companies and their consultants will argue that all water lost down cracks will re-emerge further downstream, therefore there is no absolute loss. To counter this argument we submit one response to this question written for the Nepean Action Group by mining expert Professor Brian Marshall (Document 12), who sums up: "The simple statement that the water rejoins the river downstream should only be made when substantiated by full and proper investigations."[12]

Even where water does re-appear downstream, there will be dry stretches left involving loss of aquatic or instream habitats and loss of connectivity between pools.

Water re-appearing downstream will be polluted by chemicals leached from fractured sandstone and probably also by the emergence of saline and acidic groundwater. There will be increased iron oxides, manganese, electrical conductivity and lower dissolved oxygen.

As BHP Billiton's consultants write, passage through fractured sandstone causes "an increase in acidity and turbidity, and increased concentrations of iron, manganese, nickel, zinc and sulphate. A drop in dissolved oxygen is also commonly observed in times of low flow. It is also further observed that increased groundwater inflows occur after mining due to an increase in horizontal permeability along the strata interface. Groundwater is generally more saline than river water, is more acidic and contains less dissolved oxygen."[13]

BHP Billiton's consultants also observe that mining caused "subsidence-induced" ferruginous springs above both the Lower Cataract and the Upper Georges Rivers, which discharge iron staining into the water and which "may in fact be relatively permanent once instigated." They predict that this may also occur on the Upper Cataract River, carrying Sydney water supply.[14]

Eruptions of methane gas occur, causing trees and vegetation to die in the riparian zone, as in places in the Lower Cataract gorge. Methane vents will last for some years (around 9 years in the Lower Cataract) and represent a fire hazard. The stench of hydrogen sulphide gas pervaded the gorge for some years, but no hydrogen sulphide analyses of gas samples were made, in spite of complaints about health effects by some residents on the gorge, to Wollondilly Council.

Fish and aquatic ecosystems may be destroyed. To quote scientist Simon Williams from his 2003 report on the impacts of longwall mining on aquatic ecosystems in the Southern Coalfield (Document 13): "The occurrence of iron precipitate and iron-oxidising bacteria are particularly evident in rivers where surface cracking has occurred. This renders the waters and associated habitats unsuitable for biota and can lead to the loss of both native

[12] Brian Marshall, *Response to Nepean Action Group queries,* September, 2005
[13] BHP Billiton, *SMP Application for Appin 3,* September 2005, p. 186, sF.2.3.3
[14] Ibid., s3.2.3

plants and animals directly via iron toxicity or indirectly by smothering." [15] This, writes Williams, may lead to localized extinctions.

Of course there are aesthetic and possible health problems caused by loss of water quality and quantity. Residents of Appin complained that water in their swimming hole turned a pumpkin soup colour after mines went through. Years later, it is still discoloured (see photos in Document 5). In the Lower Cataract, the river turned red at one early stage and is now a milky green colour.

.Loss of flow and pollution renders our rivers unattractive: less pleasant and suitable for canoeists, swimmers, fishermen, children and all others who value them.

Rivers SOS would like to comprehensively address further problems concerning mine de-watering, and contamination of streams and rivers from coal stockpiles, waste emplacements and acid draining from operating and derelict mines. But we do not have sufficient information to hand.

We are concerned that the SMP guidelines do not oblige mining companies to report on plans for water usage and sourcing in new mines, or on mine pump-outs, or on mine waste disposal.

Dr John Williams, in his Catchment audits, addresses some of these problems as they affect the Southern Coalfield river systems and hanging swamps.

A whistle-blower formerly working for the Environmental Protection Agency alerted the Nepean Action Group, in 2005, to the extent of saline pumpouts into the Upper Nepean from BHP Billiton's Tower Colliery, and into the Bargo River (a major tributary of the Nepean) from Centennial Coal's Tahmoor Colliery.

Documents subsequently obtained through the FoI process showed NAG that Tower Colliery was putting 2.8 tonnes of salt per day into the Nepean (via Allens Creek) and Tahmoor Colliery was putting 5 tonnes of salt per day into the Bargo River.

Headlines in a local newspaper about the problem concerning the Tower Colliery may have helped to pressure BHP Billiton into installing a de-salination plant there, which was operational by 2007. However Centennial Coal, the worst offender in this regard, has made no similar move.

Since BHP Billiton dammed up Brennans Creek, the major tributary of the Georges River near its source, water from this creek and its catchment is mixed with waste water from West Cliff Colliery, and the mix is sent into the Georges River at intervals. Waste water from Appin Colliery also goes into the Upper Georges nearby, so all flow in the Upper Georges River now consists largely of contaminated mine water.

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[15] Document 13: Simon Williams, *Summary of environmental impacts of longwall mining on aquatic ecosystems in the Southern Coalfields,* NSW DIPNR, July 2003, pp 4-5

Finally, we need more comparative research on all mining impacts, both at local and international levels. This is a serious problem for rivers and streams around the whole planet, wherever coal seams are mined, and we plan to invite experts from overseas to highlight our common problems.

We are in touch with Stephen Kunz, a consulting ecologist with over 20 years experience in assessing environmental impacts of development (Document 14). He writes that in Pennsylvania, where he has completed a three year study of the environmental impacts of longwall mining, streams have been dried up or turned into a series of pools, springs and wells have been polluted and/or have permanently dried up, wetlands have been destroyed, groundwater is contaminated by methane or radon, and aquifers have been disrupted by cracks and fissures. Moreover, "some 3,200 miles of Pennsylvania streams currently are degraded by acid mine drainage."[16]

In NSW, we need urgent action before too many more of our own rivers and streams are impacted.

The Impact on Drinking Water Catchments

The need for effective protection of water sources is especially relevant to the Southern Coalfield, as so many coal seams lie directly under Sydney's,Wollongong's and the Macarthur region's drinking water supply catchments.

Also the badly damaged Waratah Rivulet supplied around 30% of the water stored in the Woronora Dam, supplying Sutherland Shire.

The recently damaged Upper Cataract River supplied around 7% of Sydney's drinking water, via Broughtons Pass Weir and the Upper Canal to Prospect Reservoir. The Macarthur Water Filtration Plant draws from Broughtons Pass Weir and supplies the towns of the Macarthur region.

The Nepean river, about to suffer further mine damage, supplies the City of Richmond from the Richmond Water Filtration Plant.

Streams and creeks undermined further south, by the Dendrobium mine (affecting the Cordeaux Dam catchment) and by earlier operations, add to the problem.

The Sydney Catchment Authority was formed in 2000 in response to Sydney's drinking water scare, involving water contamination by cryptosporidium and giardia organisms. It is supposed to protect the catchments, and any development therein is supposed to have only a "neutral or benefical" effect on vital water resources.

As the McClellan Report on the Water Crisis (1998) noted, society requires the highest level of protection for the Special Areas of the catchments. Yet cumulative effects from

[16] Document 14 : Stephen Kunz, *Effects of Longwall Mining,* Feb. 2006, Sierra Club web site

mining in the Upper Nepean Catchment are escalating year by year, making a mockery of the NSW Government's "Water for Life Plan" or the draft "Sustaining the Catchments – the Regional Plan to Protect the Drinking Water Catchments."

With increasingly severe droughts expected, and with Sydney's population growing by over 40,000 people per year[17], water loss from rivers and streams in the catchment is unacceptable. Acquiescence in the continuation and escalation of any such loss is almost unbelievable, especially when ordinary citizens can be served with substantial fines for watering a pot plant at restricted times.

The Sydney Catchment Authority must be better equipped by the NSW Government, both in terms of legislation and staffing, to carry out its mission of protecting our water resources and river systems from mining, as well as from other development impacts.

Document 15, a Rivers SOS submission to the SCA of October 2006, details some of our concerns and expresses the frustration shared by many, including some SCA staff.

Do rivers recover ?

We are not aware of any definitive research on this question, regarding longwall mining, perhaps because this technology was relatively recently introduced to Australia. Nor have we located much overseas research on the likelihood or otherwise of recovery.

However in our document box we include one detailed report from the USA by Dr Ben Stout, entitled "*Do Headwater Streams Recover from Longwall Mining Impacts in northern West Virginia?"* (Document 16). His report encompasses two years of field research. Headwater streams are similar to the creeks and streams in the Southern Coalfield that are often referred to as "ephemeral," and as he writes "Loss of headwater streams from the landscape could have significant ecosystem-level consequences for large rivers …[18]

We assume that, in spite of geological and biological differences, the damage he found applies to our streams to a significant extent, and also to some extent to our rivers, especially in reference to changed chemical characteristics. He found, for instance, that "oxygen levels decrease over time rather than improving …" This has been our observation regarding the appearance of the Lower Cataract River, some seven years after mining ceased. This river is still badly discoloured, a murky shade where it meets with the clearer water of the Nepean. We are told that this may be due to de-oxygenation.

Stout wrote that "Longwall mining resulted in a net loss of approximately one-half of all headwater streams in Marshall County, West Virginia … neither the diversity or longevity of the macroinvertebrate community recovered along the stream gradient.

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[17] DIPNR et al, *Meeting the Challenges: Securing Sydney's Water Future,* October 2004

[18] Document 16 : Dr Ben Stout, *Do Headwater Streams recover ...,* Wheeling Jesuit University, August, 2004, p. 4

There was no indication that the physical, chemical or biological impacts of longwall mined streams recover over time."[19]

He concluded that "there was no evidence of stream recovery over the twelve year period of time that had elapsed since longwall mining occurred in Marshall County streams. **Lack of temporal recovery appears to be the case in other regions of the world." (**Here he cites "our" Holla and Barclay, 2000.).

Regarding cracks in river beds, mining company representatives often tell us that rivers will "heal themselves." We have seen only one case in the Southern Coalfield of a section of a river which has "healed itself" after being cracked by mining. At the "Potholes" stretch in the Bargo River, beside the Rockford Road bridge, in a fairly flat stretch formerly badly cracked by mining, the cracks have filled up to a large extent with sediments. As the NSW Scientific Committee observed: "the potential for closure of surface cracks is improved at sites with a low surface gradient."[20]

However this has not happened in steeper rivers such as the Lower Cataract, while efforts to fill cracks in the Waratah Rivulet with sand seem to have resulted mostly in sand being washed downstream

Furthermore while cracks filled with sediment will slow down water loss, the sediment is permeable nevertheless. Sand filling cracks could even have the effect of holding the cracks open.,as mining geologist Mike Atkinson told a public meeting in Douglas Park in 2005.

To conclude this section, we have no faith in any "recovery" theory. We are sure that the Panel will agree that more research needs to be carried out on this issue.

The Remediation Myth

We have addressed remediation problems in some detail in two previous Rivers SOS submissions (Document 4, re Appin 3 p. 15; Document 5, re West Cliff p. 16).

In the Subsidence Management Plans for mining on rivers in the Southern Coalfield, the mining companies are invariably upbeat about the prospect of remediation.

In practice remediation typically involves injecting a cement grout into cracks and fractures. The cement may contain additives such as bentonite or microfine cement.

Also – and we have only observed this technique used at Marhnyes Hole on the Georges River – a deep stress-relieving slot may be cut into the rock bed, in the hope of absorbing the pressures caused by mine subsidence.

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[19] Ibid., p. 30

[20] Document 11 : NSW Scientific Committee, *Final Determination,* July 2005, p.2

In practice, remediation is not taking place in a sustained or determined manner in the rivers which have been damaged in the Southern Coalfield. The mining companies are not holding to their promises. Obviously further mine plans should not be approved until basic requirements have been met.

The only exception is the remediation work at Marhnyes Hole, where BHP Billiton has spent time and effort in an attempt to rehabilitate a popular swimming hole for the people of Appin. The company had previously promised the Healthy Rivers Commission that "it would maintain water in Marhnyes Hole even if it had to undertake multiple efforts of restoration."[21]

Even so the work has had a poor effect on the look of the former beauty spot though it may have been successful in sealing some of the cracks. They have injected cement into fractures below the ground and they have grouted surface cracks. In contrast to rock pools in the Lower Cataract and elsewhere, Marhnyes Hole no longer leaks like a sieve at present.

The stress-relieving slot which was drilled, over 1m long and 12 cm wide, looks unattractive but may have lessened cracking and fracturing. It certainly did not prevent it. (See our photos of Marhnyes Hole in the Rivers SOS submission concerning BHP Billiton's West Cliff 5 mine plan).

Meanwhile, after a few years, cement grout in the surface cracks at Marhnyes Hole started to crumble. We have a photograph of this, taken in 2005 (see Document 5: p. 19a).

We in Rivers SOS often ask company representatives how long is cement grouting expected to last. We have had no reply; because in our view this remediation technique is only of temporary value. The slightest earth tremor would re-open grouted cracks, for example.

More remediation work has been undertaken near Marhnyes Hole, e.g. at Jutts Crossing. Further downstream the company had to rush a cement mixer to plug up a post-mining hole known as the "Plughole" when a resident trying to water stock found that the river downstream had completely dried up, with all flow disappearing down the Plughole. The fact that the resident's dismay, complete with photo of the dry river bed, hit the front page of a local newspaper help to speed the response.

In contrast, almost no remediation work has been attempted on the Lower Cataract River. It is less accessible and in a worse state. Work was carried out via a helicopter for only a few days in 1999, when "an attempt to rectify the cracking by grouting of the most severe crack … was only partially successful."[22]

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[21] Healthy Rivers Commission, *op.cit.,* p. 52 fn
[22] Document 11 : NSW Scientific Committee, *Final Determination,* July 2005, p.4

BHP Billiton's representatives tell us that no further work is planned to grout the thousands of cracks along this river. (See recent photos in Document 5).

Nor of course can they rectify the eleven rockfalls, some small, some up to 100 tonnes, [23] which occurred after the mines went through and which make the gorge a dangerous place. (In previous submissions we followed BHP Billiton's consultants in saying that there were seven rockfalls. However an environmental officer at Wollondilly Council, who lives on the Lower Cataract, told us that there were four more from the cliffs in front of her home).

One large fall was on a path used by locals and children holidaying at the nearby Cataract River Ranch. Now that these 80m high cliffs have been seriously destabilized, bushwalks in the area would be inadvisable and perhaps even fatal.

Unfortunately there was also a substantial rockfall into Marhnyes Hole, at the spot from which generations of local kids once dived into the water. BHP Billiton had to employ a security guard at the pool for several months after this disaster, to warn children away.

BHP Billton's Environment Officer reported two further rockfalls accompanying the mining of the first new longwall on the Upper Cataract this year. With the second and third longwalls in train, more falls can be expected here as well. Cliffs here rise vertically from the river and any rockfalls into the river will further pollute Sydney's water supply.

Another suggestion for remediation involves the use of Sydney's water supply to dilute pollution and mask water loss. BHP Billiton has advised that, if there is future water loss down cracks in the Upper Cataract or the Upper Georges Rivers, this could be compensated for by increasing the amounts of Sydney's drinking water put into both rivers (in the Cataract, from Cataract Dam; in the Georges, from Appin Colliery).[24] This is unacceptable and unsustainable. The Cataract Dam is already seriously depleted in the current drought conditions, and is likely to remain so.

In practice, except in the case of Marhnyes Hole, both BHP Billiton and the NSW Government's agencies appear to have washed their hands of responsibility for remediation. The much-vaunted Southern Coalfield River Remediation Committee, formed by the DPI –MR. has not even met since March 2004.

Perhaps this neglect reflects the fact that remediation is unsightly and impermanent and just does not work very well, on the few occasions when it is seriously attempted. The large-scale failure at South Wambo Creek near Singleton is another case in point. This was filmed in our documentary "Rivers of Shame".

Rivers SOS members who walked into Waratah Rivulet with SCA officers recently photographed unsuccessful attempts to fill some cracks with white sand.

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[23] Letter from BHP B to Campbelltown Council General Manager, 18.10.2000
[24] See relevant sections of BHP Billiton's SMPs for Appin 3 and West Cliff 5

As the NSW Scientific Committee summed up: "Mitigation measures to repair cracking creek beds have had only limited success and are still considered experimental (ACARP 2002)." (Document 11).

Questions for the Panel:

What grouting mix can last forever ?
Will mining companies be around forever to keep repairing the damage?
Can promises of remediation be taken seriously, in light of the record of inaction ?
Isn't fractured rock inherently unstable ? Won't the slightest earth tremor open up the cracks again ?
Can multiple hairline cracks, and cracks hidden under rocks or sediment, and extensive fracturing below the surface be located, let alone grouted up ?

We conclude that remediation is no answer. The only answer is to forbid damage to our rivers in the first place, by mandating an adequate safety zone.

Threatened Species

The threat from longwall mining to threatened species has been examined by the NSW Scientific Committee, which concluded in July 2005 that alteration of habitat due to longwall mining adversely affects a number of threatened species and could cause other species to become threatened.

The new SMP procedure is useful in that consultants to the mining companies are required by the SMP guidelines to research and document flora and fauna surviving in riparian zones which may be affected by mine impacts.

In this section we summarise research on threatened species cited in the four recent SMPs for longwall mine areas on four of the Southern Coalfield's major rivers: the Cataract, Georges, Bargo and Nepean Rivers.

Mine plans on other rivers, or previous stretches of the above rivers, in the Southern Coalfield were approved before the SMP procedure was introduced in 2004, so detailed research of this kind was not carried out. However we know that members of the National Parks Association, the Total Environment Centre and others will be submitting their own research on other rivers - especially the Waratah Rivulet- and also creeks and hanging swamps, which we will not be covering in this submission.

First, in the case of the Upper Cataract River, BHP Billiton's consultants list three threatened fauna species in the Appin 3 mine area, and eighteen threatened flora species.

Of special concern is the threatened fish species, the Macquarie Perch, which BHP Billiton's consultants have identified "at all locations" in the Upper Cataract River.[25] It

[25] BHP Billiton, *SMP Application for Appin 3,* Sept. 2005, s 4.5.3

exists in only very few other places: the Upper Nepean River, the Colo River and some tributaries of Lake Burragorang. The Appin 3 SMP contains a striking photo of one of these very rare fish for which we must be grateful.

The consultants mention "possible ecotoxic effects from heavy metals released from the sandstone by acidity."[26] Unfortunately the mine plan was approved anyway.

Large fish kills downstream in the Lower Cataract River when mines went through in the 1990s does not bode well for the fate of the Macquarie Perch.. Extensive fish kills, including a skeleton 1m long, were noted by an inspector[27], and by local residents who were shocked to see fish gasping to death on sand bars etc.

BHP Billiton argues that its request for a flow regime of 5ML/d will dilute the pollutants released by mine impacts. This would not prevent the release of saline and acidic groundwater, even if this flow rate was sustainable. Last year the Illawarra Mercury informed locals that the Cataract Dam was less than 40% full, and we doubt if a 5ML/d flow could be maintained in all future periods of severe drought.

The SMP for BHP Billiton's West Cliff Area 5 longwalls on the Upper Georges River lists two endangered ecological communities here as being threatened: Cumberland Plain Woodland and Shale Sandstone Transition Forest. The consultants also found a large population of the vulnerable Grevillea Parviflora bedside the threatened stretch of the river, and they note that a koala has been recorded here.[28]

Mine plans going right up to the river bank were nevertheless approved, with more on the drawing board for the future.

In the case of the mine plans on the Upper Nepean River, BHP Billiton's Environmental Impact Statement mentions four threatened animal and fish species which could be in danger; also an endangered ecological community and three threatened flora species. However the consultants opine, contrary to the NSW Scientific Committee, that "significant impacts on the community and the species are unlikely."

Plans were approved which go only 180m from the middle of the Nepean River.

In the case of the mine plans on the Bargo river, Centennial Coal's consultants discovered that the area is potential habitat for five threatened flora species, nineteen threatened fauna species and two frog species.[29]

These plans, going only 290m from the river, still await approval.

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[26] Ibid., s 8.3.1
[27] M. Everett et al, *Interim Report of the Cataract River Task Force,* Hawkesbury Nepean Trust, 1997
[28] BHP Billiton, *SMP for West Cliff Area 5 Application,* Nov. 2005, s1.0 & Attachment G
[29] Centennial Coal, *SMP for Tahmoor Colliery Application,* s8.4.1

We note that in all these SMPs, a great deal hinges on the exact interpretation of key words like "significant" and "unlikely." Who decides what is significant ? How unlikely is unlikely? Lack of precision does not encourage confidence in these findings.

Meanwhile the shameful rate of extinction of our native flora and fauna looks set to continue apace, by incremental means but with cumulative results.

Expert Advice Ignored

For years now experts have advised the NSW Government to mitigate or to halt the damage done by mining operations to rivers. In many cases these experts are respected and moderate government employees or officially sanctioned advisers.

Governments obviously feel able to ignore calls from environmental organizations, "greenies" and/or affected local communities and Councils. But it is surely more difficult to turn a deaf ear to their own advisers.

Here we will quote from just a few:

In 2002, Dr John Williams (CSIRO and Wentworth Group scientist), in auditing the Sydney Catchment and addressing mining impacts, wrote that mining proposals **"should be approved only if they can reasonably demonstrate that subsequent subsidence is unlikely to affect watercourses or hanging swamps."**

In 2003, the Healthy Rivers Commission welcomed the imminent introduction of the new SMP approval procedure in the hope that this would prevent serious mine impacts such as riverbed cracking, adding that "**… the Commission considers this to be an absolutely critical future outcome … a matter which is fundamental to maintaining the integrity of river systems."**[30] They conclude that **" the objective of maximizing extraction of the coal resources should not be pursued at the expense of riverine resources."**[31]

In 2004, the panel of experts comprising the Hawkesbury-Nepean River Management Forum produced a report for the NSW Government entitled *Water and Sydney's Future.* One recommendation reads as follows:

"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."[32]

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[30] Healthy Rivers Commission, *op. cit.,*pp. 20-21
[31] *Ibid.,* p. 52
[32] Hawkesbury-Nepean River Management Forum, *Water & Sydney's Future,* DIPNR, 2004, p. 55

In 2005, as already mentioned, a Department of Planning report looked at mining impact on rivers in the Hunter and concluded that " **Such impacts can be avoided by adopting a policy to restrict where appropriate coal mine development … the policy should include appropriate buffer zones between open cut or underground coal mines and streams or alluvial aquifers …"**[33]

We could include any number of statements from environmentalists, such as this one from Jeff Angel of the Total Environment Centre, Sydney: **"The dreadful impact of longwall mining is amongst the worst environmental damage I have ever seen. Mandate through statute a one kilometer buffer zone."**[34]

But the fact that the NSW Government and its agencies has turned a collective back on advice proferred by their own chosen experts and employees, given in detailed reports and audits paid for by the taxpayer, is a very major concern.

Community Consultation

The new (2004) SMP process requires the mining companies to show some proof of efforts to consult with and communicate with local communities.

Rivers SOS members have been or are members of the three so-called Community Consultative Committees in the Southern Coalfield. These are the Tahmoor Colliery CCC (Centennial Coal), the Dendrobium Colliery CCC (BHP Billiton) and the Appin Area Community Working Group covering Appin Colliery, West Cliff Colliery and Douglas (formerly Tower) Colliery (BHP Billiton/Illawarra Coal).

Members of the Tahmoor CCC, which is chaired by Margaret Macdonald-Hill, have positive reports about their proceedings. They were even able to take a decision to use surplus funds to pay for an independent opinion on offset distance from the Bargo River. The Dendrobium CCC members have no complaints, but the Appin Area Community Working Group has had problems, as follows:-

1) Community members met separately in January 2006, and unanimously signed a petition addressed to the DPI- Mineral Resources, asking for mine plans to be set back to a safer distance from the Georges River. This had no effect on the final decision, which is allowing longwall extraction right up to the river bank.

The much-vaunted rhetoric concerning community consultation was put to the test in this instance. The fate of this petition – signed by some members who usually back the mining company or at least are not often complainants – shows the futility of participation when it comes down to the crunch. A second petition signed by several members asking for a safety zone for the Upper Nepean was likewise ignored.

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[33] NSW Dept. of Planning, *op.cit.,* pp.4, 31
[34] Jeff Angel, videotaped statement filmed for launch of Rivers SOS, October 2005

2) Another incident occurred on this CCC in 2007 when a member let a Daily Telegraph journalist know that BHP Billiton's officer had reported to a CCC meeting that their mining operation on the Upper Cataract had cracked the river bed, causing methane eruptions, and iron oxide staining, as well as two small rockfalls. This was duly reported on p. 17 of the Telegraph. The impact on Sydney's water supply made it important to let the wider public know what was/is happening.

   The terms of reference for this committee emphasizes that its role is, inter alia, "to obtain and disseminate information on Illawarra Coal and its activities," "to ensure effective flow of information between the community and Illawarra Coal," "to improve the community and river for all," "to address future mining impact issues in a proactive way" and so on (Document 17).

   There is no mention of confidentiality or the so-called Chatham House rules in the guidelines, and any such constraints would certainly contradict the stated role of the CCC as a communication channel.

   Management nevertheless attempted to insert a clause which would prevent adverse publicity about the company gleaned from operational reports given at CCC meetings. This motion failed to pass, however the "guilty" member resigned. Three other members also resigned in 2007, leaving only a rump consisting partly of the company's "trusties" who, among other activities, preside over the company's million dollar so-called Community Partnership Programme, doling out large sums of money to deserving groups in the area. This money helps to divide the community in subtle and not-so-subtle ways. For just one example, Rivers SOS found it hard to hire one particular local hall where we were previously welcome, and were told that this had something to do with the fact the BHP Billiton had donated a large sum for repairs.

BHP Billiton in 2004 published a leaflet about their implementation of their "Integrated Mine Planning Process", promising more stakeholder participation and consultation and more consideration of environmental impacts, so enabling "future mine plans to be developed on the balanced consideration of all relevant factors including stakeholder expectations and environmental impact…"[35] (Document 18).

However the reverse has happened in practice.

Significantly, no open public meetings have been held by any of the mining companies in the Southern Coalfield. At Appin, one tightly managed meeting was held for those locals who applied beforehand (only two or three from any group, no journalists). These people were strategically seated at round tables, making it difficult to speak to each other or make eye contact. They were presented with a selection of alternative mine plans for the Upper Nepean to discuss, but were told in the end that their preferred plan was not feasible. No further consultation of this kind has since been attempted.

[35] Document 18: BHP Billiton, *Integrated Mine Planning Process,* Community Information Sheet No. 2, November 2004

We have to conclude that community consultation is a farce. Community members attend meetings in the expectation that reasoned and informed discussion will lead to some concessions being made by the companies to community wishes to preserve their rivers and natural environment, especially when these wishes are unanimous.

No unreasonable demands have been made and, for example, no-one on these CCCs to our knowledge has suggested anything as radical or unrealistic as cessation of coal mining altogether. (This is not Rivers SOS's position). All community members are aware of the economic importance of mining to the Southern Coalfield, though Rivers SOS must add that some of our supporters and informants are miners or ex-miners, who know more than most about subsidence impacts.

But in spite of community participation, objections, petititons and submissions, and the express wishes of CCC members, the companies pay no heed to the community and leave us feeling that we are pawns, lending credibility to the companies by attending CCC meetings, and being used in a cynical exercise which allows the companies to jump through one of the hoops in the SMP guidelines.

Although it is true that knowledge about mining operations and impacts is obtained in CCC meetings, knowledge for its own sake or knowledge that cannot be widely shared is of little if any benefit towards efforts to protect the environment.

Rivers SOS Recommendations

- Longwall mines in the Southern Coalfield must be set back at least 1 km from rivers
- If not, then at least longwall panels must be much narrower to lessen impact, or preferably bord and pillar mining should be used near to rivers, and goafs should be filled.
- Remediation, resulting in unsightly, impermanent or botched efforts at best, must be jettisoned in favour of avoidance of impacts in the first place
- The Precautionary Principle must be enshrined in legislation
- Impacts on aquifers and wetlands feeding into river catchments must be avoided altogether, and impacts on tributary creeks and streams should be avoided.
- Independent experts must be employed by the NSW Government to prepare SMPs, rather than experts employed by the mining companies[36]

[36] There are two cases in the Southern Coalfield where independent experts have been employed to recommend a safe offset distance from two rivers. Professor Philip Pells was employed by the Tahmoor Colliery CCC to give an expert opinion on a safe offset from the Bargo River. In his report of April 2006 he recommended a distance of 500m whereas the company is asking to go as close as 290m. An unknown (to Rivers SOS) expert was also employed by the SCA to recommend a safe offset distance for the Upper Cataract mine plans. According to the Minutes of the Interagency Review Committee meeting of 2nd August 2006 obtained under FoI, 350m was recommended. However mine plans going only around 70m from the river bed were approved nevertheless.

- There must be independent monitoring of longwall positioning underground as extraction proceeds
- Community representatives and independent experts should sit on the Interagency Committee which makes recommendations to the Minister on mine plans.
- The proceedings and deliberations of the Interagency Committee should be open and transparent, not secret as at present. The public should be able to attend meetings as observers. Minutes should be available to the public.
- The SMPs must include information on mine de-watering, water intake and waste emplacement plans, which at present is not available.
- The SMPs and the government decision-makers must address the problem of cumulative effects. At present only two or three longwalls are approved and examined at a time, and no attention is paid to overall impacts when mining is planned to continue much further along the rivers in future, as in the case of the Nepean, the Waratah and the Georges Rivers plans.
- The new SMP process is a step forward in requiring much detailed environmental impact information, but this welcome dissemination of knowledge has not proved able to halt environmental destruction. We recommend that due consideration must be taken of findings concerning environmental damage, which at present are completely ignored. The proof of the SMP pudding is in the eating, and when mining companies have destructive plans approved with no alteration whatsoever required of them, any notion of balance between profits and the environment goes out the window.
- We would also request that knowledgeable environmentalists or informed local community members should be included in future Panels of Inquiry
- We ask the Panel to recommend that the precautionary principle should be enshrined in legislation and formally observed by decision-makers
- We ask for legislation and extra resources and staffing to enable the SCA to carry out its duty to protect the catchments
- In the long run, many of the costs related to mining will be borne not by the mining industry, but by the residents of the Southern Coalfield, by the taxpayers and by all citizens whose environment and rivers are being sacrificed in the absence of proper regulatory safeguards. Therefore we hope that the Panel will take this into account when mining companies make the absurd claim that they cannot afford to lose a relatively small amount of coal in order to protect our rivers. The huge profits now being made by these companies would easily fund any requirement, however irksome, to modify plans or to "sterilize" coal seams in sensitive areas. The threat to lay off miners, coming from BHP Billiton in their Appin 3 SMP, does not sit well when the company made $14 billion profit last year – the company could well afford to put all staff on half pay while plans are being modified. This form of blackmail is resented. Therefore the Panel should encourage the NSW Government and its agencies to request delays in approving plans until safer technologies have been invented/introduced.
- On a minor note, groups which take the trouble to send detailed submissions on mine plans to the Director Environment, DPI – Mineral Resources should be

accorded the courtesy of an acknowledgement at the very least and, if possible, some indication of how and where their input has been considered.

Rivers SOS is an alliance of environmental/community groups formed as a result of the wrecking of rivers in NSW by mining operations. We campaign for a safety zone of at least 1 km around all rivers to protect them from ongoing damage. Groups supporting this campaign are: • The Wilderness Society• Nature Conservation Council of NSW• Total Environment Centre• Colong Foundation for Wilderness• Blue Mountains Conservation Society• Mineral Policy Institute • Minewatch NSW• Sutherland Shire Environment Centre• Macarthur and Illawarra National Park Associations• Gloucester Environment Group• Nepean Action Group• Georges River Environmental Action Team• Hunter Environment Lobby• Greens NSW• Waterkeepers Australia• Central West Environment Council• Only One Planet Australia• Mudgee District Environment Group• Mountain Dragon Bushwalkers• Lithgow Environment Group• Pages River and Tributaries Water Users' Association• Clarence Residents Association• Johnsons Creek Conservation Committee• Save Barrington Tops Committee• NSW Canoeists Inc.• River Canoe Club• Caroona Coal Action Group• Australian Coal Alliance•Upper Hunter Waterkeepers Alliance• Wollondilly Bass Club• Robertson Environment Protection Society• Save Water Alliance• Inland Rivers Network• Australian Democrats• Water First