Rivers SOS 10 Carra Ave Douglas Park NSW 2569
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www.riverssos.com
riverssos@riverssos

SUBMISSION FROM RIVERS SOS

Addressing BHP Billiton's Subsidence Management Plan for Appin 3

A proposal to mine on the Upper Cataract River, NSW

Rivers SOS is a coalition of environment/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 1km round all rivers, to protect them from ongoing damage. Groups supporting this campaign are:

The Wilderness Society
Central West Environment Council
Hunter Environment Lobby
Only One Planet Australia
Mountain Dragon Bushwalkers
Sutherland Environment Centre
Nature Conservation
Council of NSW
Nepean Action Group
Macarthur National Parks Association
Mountain Dragon Bushwalkers
Waterkeepers Australia
Mudgee District Environment Group
Illawarra
National Parks Association
Greens NSW
Colong Foundation for Wilderness
Total Environment Centre
Blue Mountains Conservation Society
Minewatch NSW Inc.
Georges River Environmental. Action Team
Mineral Policy Institute

Contents

Introduction

Rivers SOS was launched on October 1st 2005, with a fund-raising concert and art auction attended by over 200 at the Campbelltown Arts Centre. Our campaign for a safety zone around all rivers in the state was initiated as a result of the ongoing wrecking of rivers and their tributaries through poorly regulated mining operations.

Statements of support from well -known scientists and environmentalists were screened at the concert. Tim Flannery called for "a generous exclusion zone around all rivers." Jeff Angel said that "the dreadful impact of longwall mining is amongst the worst environmental damage I have ever seen … mandate through statute a one kilometre buffer zone." Other messages of support came from Keith Muir, Tom Uren, Professor Rob Close, UWS, Dr Tom Grant, UNSW and the ABC's senior science reporter Robin Williams (see Attachment A).

Damaged rivers and tributaries are numerous in the Southern Coalfield (twelve are on record), and in the Hunter Valley (five are on record), as listed in the NSW Scientific Committee's *Final Determination*, July, 2005. A number of others are under threat in the near future, including the Upper Cataract, the Upper Georges, the Upper Nepean and the Goulburn Rivers. People are finding this hard to believe.

The NSW government and its agencies must take steps to protect our rivers. The USA, for example, protects 172 of its rivers. Canada protects 40 of its rivers. But our rivers are in a state of increasing ecological crisis. Mine damage is a major cause, and unlike many other problems affecting river/catchment health, it could so easily be prevented by mandating a safety zone, as we are suggesting.

We have recently launched our www.riverssos.com web site. This contains the Rivers SOS manifesto, which details the research we have undertaken to arrive at the call for a safety zone of at least 1 km. (We also enclose a copy as Attachment B in this submission). We ask you to look at the photo galleries on our web site as these show, more forcefully than any words can do, the extent of damage and cracking of river beds that has already occurred, especially in the Lower Cataract, so relevant to this submission.

The geology of the Lower Cataract is, of course, identical to that of the Upper Cataract, the river which will be fractured by BHP Billiton's current mine plans, and the subject of this Subsidence Management Plan (SMP).

On our web site, you might also look at the second section on longwall mining, concerning damage from longwall mining to Pennsylvanian waterways and wetlands. Over 2500 miles of Pennsylvanian streams are degraded, and 52% of all miles of waterways were listed as "impaired" by 1998. The author says that this is because the Pennsylvanian State and the Federal agencies "which should be enforcing the environmental protections in existing laws and regulations … fail to do so – despite

regulations that look reassuring on paper … such lawless behaviour on the part of State government and the mining industry should not be tolerated any longer …" Rivers SOS finds much the same situation applying here in NSW.

Although many items in BHP Billiton's SMP call for comment, this submission is only intended to address the items specific to the common goal of the Rivers SOS coalition: to have a safety zone established around the Upper Cataract and all other rivers.

Mining operations going underneath, or too close to, river beds have caused cracking and fracturing of river beds, resulting in water loss and water pollution. Mines under, or close to, rivers can penetrate, breach and connect underground aquifers of different ages, sources and salinity, often damaging the rivers, which rely heavily on feed waters seeping from aquifers. This has been witnessed all too often in the past and this is the fate of rivers now under threat, through a mix of apathy, greed, irresponsibility and lack of public awareness.

The NSW government's Metropolitan Water Plan of 2004 recognises the need "to restore the health of the Hawkesbury-Nepean and other precious rivers surrounding our city." This government claims that it is implementing "the first stage of a long-term program to improve river health."[1][1] This claim is seriously compromised by the apparent willingness of this government to countenance ongoing permanent damage to our "precious" rivers through destructive mining operations. The construction of the first workings (access roads into the Appin 3 site on the Upper Cataract river) was unfortunately approved in June 2005. This SMP has been produced in order to win government approval for the second workings (the actual mining operations). Ian Macdonald, Minister for Primary Industries (this Department now includes Mineral Resources), is ultimately responsible for the decision.

1. 1. Why the Distance of 50m from the River Gorge is Unacceptable

BHP Billiton's three planned longwalls are only 50m from the gorge and cliffs of the Upper Cataract. Cracking of the river bed is inevitable at this close range in our opinion. The SMP in many of its sections seems to agree, in spite of qualifications.

All three longwalls end behind steep 70m cliffs along the river. Each longwall has a width of 260m which equates almost to the width of three football fields. As well, one longwall runs beside a reach of the river. The company's SMP states "Longwall 301 lies parallel to a reach of the river. It is likely that this reach will experience some mine-induced fracturing of the substratum."[2][2]

The unprecedented width of the longwalls is also completely unacceptable on this site. Subsidence effects are increased with wider longwalls. This stands to reason. The late Lax Holla, subsidence engineer with the DMR, wrote: "If panels are narrow … and pillars are large … then subsidence over both pillars and panel centres is small."[3][3] Much narrower longwalls should be insisted upon.

Holla detailed BHP Billiton's woeful experiments with longwall widths on the Lower Cataract River, throughout the '90s. Beginning at Broughtons Pass, the first five panels were relatively narrow at 110m. and "there was no reported water loss in the river." The company was emboldened to increase the panel width in the next four panels to 155m. Subsidence increased and "the gorge floor cracked at several locations."[4][4] In spite of this the company increased the width to 207m for longwall panels 10, 14 and 15, causing several rockfalls.[5][5] All the various shocking results of extensive cracking, gas releases of 20 litres per second, water loss, fish kills and contamination in this lower section of the

[1][1] DIPNR et al, *Meeting the Challenges: Securing Sydney's Water Future,* DIPNR, October 2004
[2][2] BHP Billiton, *Appin Colliery Longwalls 301A to 302: Subsidence Management Plan Application,* September 2005, s 9.1.2
[3][3] L. Holla & E. Barclay,*Mine Subsidence in the Southern Coalfield,NSW, Australia,* DMR, 2000, p. 12
[4][4] Ibid., p.92-3
[5][5] Ibid., p. 100

river are well documented. The company had been monitoring the site throughout this process and therefore must have been well aware of the outcome of widening the panels.

That the company could apply for a far greater panel width of 260 in this SMP, in spite of this woeful record, shows amazing chutzpah and a hope that decision makers will be ignorant of the above history. It certainly shows the company's contempt for the environment. As the NSW Scientific Committee write: "The general trend … toward increased panel widths (from 200 up to 300m), which allows greater economies in the overall costs of extraction, means that future impacts will tend to be greater than those in the past (ACARP 2001,2002)."[6][6]

This SMP does not deny the possibility of cracking the river at the Appin 3 site, e.g. in the following statement: " … predicted closure across the valley of the Cataract River and the creeks will result in an elevated level of compressive strain across the valley. This could lead to localised fracturing and buckling of the bedrock in the base of the river and creeks, and tensile cracks at the tops of the valley sides which may exceed 25mm in width." [7][7]

A research paper on BHP Billiton's previous longwall mines under the Lower Cataract and the Nepean sums up: "There is evidence of large scale, regional horizontal displacement of ground, at great distances from the active mining locations."[8][8] Yet in the SMP, BHP Billiton repeatedly claims that fracturing and rockfalls tend to happen mostly immediately beneath longwall goafs. (A goaf is the vacuum left as the longwall machine moves through, which collapses almost immediately). The impression is created that, because these planned longwalls are not going directly under the river, subsidence damage will be relatively minor.

There is no doubt that cracking would be more devastating if the longwalls went directly underneath. However we believe that serious cracking and fracturing will still occur at the planned distance.

One of BHP B's previous longwalls, Longwall 17, running under the Upper Nepean River near the mouth of the Cataract River, showed movement of over 60mm at a distance of 1.5 km from the mine workings. Another monitoring station 450mm from Longwall 17 showed movement of 70mm, while a station 680m from the adjacent Longwall 16 showed movement of 60mm.[9][9]

The dam wall of Broughtons Pass Weir was cracked by Longwall 401, at a distance of 415m.[10][10]

A number of fractures elsewhere have been observed far beyond the goaf edge of the longwalls: at a distance of 230m in Wongawilli Creek; and in the Bargo River, at a distance of 125m.[11][11]

Subsidence prediction is at best an inexact science. The efforts of BHP Billiton's consultants, Mine Subsidence Engineering Consultants, to outline their subsidence parameters for this SMP are peppered with qualifying phrases like "could occur", "may result in," "it is possible", etc. They tackle this problem head-on in a section entitled "The Likelihood of Irregular Profiles," which seems to mean, simply, the likelihood of mistakes in subsidence predictions.

They write: "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."[12][12] As in the steep gorge of the Upper Cataract site.

Holla wrote: "Monitoring has indicated that movements could extend well beyond the normally accepted limits in rugged terrains. It is therefore essential when mining under or in the vicinity of

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[6][6] NSW Scientific Committee, *Final Determination,* July 2005, p. 7
[7][7] BHP Billiton , *op. cit.,* s 11.2
[8][8] B. Hebblewhite, Research Director of University of NSW Mining Research Centre, *Regional Horizontal Movements Associated with Longwall Mining*, University of NSW,2000,p.14
[9][9] Ibid., p. 7
[10][10] BHP Billiton , op. cit., s3.3.1.8
[11][11] Ibid., s 3.3.8
[12][12] Ibid., s 3.17

sensitive structures located close to gorges … that a comprehensive assessment of ground movement be carried out … Adopting an angle of draw generally observed in the colliery for assessing the impact may lead to unsatisfactory results."[13][13] In other words, cracking and buckling may occur "well beyond" the 35 degree angle of draw (which is represented in the chart on p.4 by the black line around the Appin 3 site, extending a considerable distance across the other side of the river and incorporating all tributaries on both sides).

Holla quotes from a previous work on subsidence which concluded that subsidence predictions "should be received with ample reservations" and comments that this to some extent "is a fair comment even today."[14][14]

Attachment D in the SMP emphasises the problem of the "anomalies" which all too frequently occur. The definition of an anomaly, according to the MSEC consultants, is "a significant irregular or non-systematic ground movement, which was not expected to occur."

Anomalies, MSEC continues, may be caused by the "possible presence of an unknown fault, dyke or other geological structure."

Furthermore, "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."[15][15]

To underscore the element of chance which dogs even the best subsidence prediction work, the MSEC report tells us that "anomalies have been observed over a total of 12 of the 74 longwalls monitored. This represents a frequency of approximately 16%, or one in six longwalls." Four of these had "substantial impacts" on the surface. [16][16]

Therefore, it is inadvisable, even illegal, to gamble with a vital conduit of Sydney's water supply, which also happens to be a beautiful river. The mining operation should be delayed until the holy grail of mine subsidence knowledge, involving the accurate prediction of damage, is finally attained. Failing that, the longwall plans must be modified and withdrawn to a safe distance from the river bed. Clearly, 50m from the gorge is not a safe distance, as we have shown. Also 260m is not an acceptable panel width. If the plan is approved, some damage is inevitable and serious damage is likely.

2. Water Loss Through Cracks: Not "Water Smart"

The Upper Cataract, the site of the proposed longwalls, carries water from the Cataract Dam 2.5 km down to Broughtons Pass Weir, where it is blended with water coming from the Nepean Tunnel, and is then pumped a) to the nearby Macarthur Water Filtration Plant, which supplies the whole of the fast-growing Macarthur region with drinking water, and b) to Prospect Reservoir via the Upper Canal (itself cracked by previous longwall mining), where this input represents 20% of Sydney's drinking water supply.

Sydney's population is growing by over 40,000 people each year. For the last three years our water consumption has exceeded our supply by 30 billion litres, or 5%. [17][17]

Whether or not a desalination plant ameliorates this dire situation to some degree at some time in the future, it is short-sighted and irresponsible to risk significant water loss down cracks in this river.

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[13][13] L. Holla & E. Barclay, *op.cit.,* p. 10
[14][14] Ibid., p. 34
[15][15] Ibid.,MSEC Report, D 5.9.1
[16][16] BHP Billiton, *op.cit.,* MSEC Report, D 5.9.5
[17][17] DIPNR, DEC et al, *Meeting the Challenge: Securing Sydney's Water Future,* Oct. 2004, p.2

After the Lower Cataract River, downstream from Broughtons Pass Weir, was cracked in thousands of places, surface flow losses of 50% (3 – 3.5 ML/d) were recorded by the Department of Land and Water Conservation in 2001. At one site, a rock pool, localised loss of 4 ML/d has been recorded, indicating widespread bedrock fracturing (DIPNR, 2003).

The "environmental flow" averaging 1.7 ML/d now being put into the Lower Cataract from Broughtons Pass Weir is "not enough to keep the river flowing or to maintain acceptable water quality," according to a Hawkesbury Nepean Management Forum report written by a panel of independent experts.[18][18] They add that the river ceased to flow on at least 22 occasions in a monitoring period between June 1999 and October 2002.

The Lower Cataract River was once a major tributary of the Nepean, which supplies hundreds of irrigators and also drinking water for the City of Richmond, via the Richmond Water Filtration Plant. If water shortages in Sydney escalate as rapidly as predicted, we believe that the already inadequate environmental flow to the Lower Cataract will be cut back even more. People's needs will win out over river survival. A Healthy Rivers Commission report on the Hawkesbury Nepean catchment notes that "considerable tension between future water supplies and the provision of environmental flows has been brought to the fore … there will be considerable costs, both financial and social, to be faced in delivering environmental flows … this will require a strong commitment by Government …"[19][19] This Government halved environmental flows last June, due to water shortages.

The loss of flow in the Lower Cataract, plus loss through some cracks in the Bargo River, another Nepean tributary, plus future loss in wetlands and creeks around the Cordeaux River – another tributary – and the Cordeaux Dam, through BHP Billiton's newly opened Dendrobium Mine, shows that cumulative effects from mining in the Upper Nepean Catchment are escalating year by year. The Upper Nepean Catchment is being steadily degraded and desiccated. Damage to the Upper Cataract will be an unwelcome addition to an already sorry situation.

Not surprisingly, the Hawkesbury Nepean River Management Forum recommended 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."[20][20]

Rivers SOS would like to see this rule apply to all rivers and catchments in NSW.

We add that the proposed mines on the Upper Cataract are in an area designated a Special Area by the Sydney Catchment Authority. According to their Special Areas Strategic Plan of Management, any proposals for works in the SCA Special Areas must not contradict certain objectives such as protecting the integrity of the ecological systems, improving the environmental quality in the broader catchment, and conserving the natural, spiritual and cultural values of the Special Areas.[21][21]

As the McClellan Report noted, society requires the highest level of protection for Special Areas, and gambling with this mining operation on the basis of dubious predictions and experimental techniques is highly inappropriate.[22][22]

Thus we are confident that the SCA will be unable to approve BHP Billiton's plans as they are. It will be acting illegally if it does.

We add that there has also been significant water loss in the Upper Georges River, behind the town of Appin, which was undermined by BHP Billiton from 2000. There are similar stories in the Hunter concerning loss of flow in Bowmans Creek, Glennies Creek and Eui Creek.

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[18][18] Hawkesbury Nepean Management Forum, *Water and Sydney's Future,* DIPNR, March ,2000, p. 55
[19][19] Healthy Rivers Commission, *Hawkesbury Nepean and Shoalhaven River Systems,* June 2003, pp. 14-15
[20][20] Hawkesbury Nepean Management Forum, *op. cit.,* p. 55
[21][21] BHP Billiton, op.cit., s13.2.1
[22][22] P. McClellan, *Five Reports on the Water Crisis,* 1998

However we have concentrated on giving details of water loss in the Lower Cataract for the obvious reason that it concerns the same river and the same geological structures as the Upper Cataract. Details and photos of other wrecked rivers can be found on our web site.

BHP Billiton maintains that water lost down cracks will resurface downstream. Dr Brian Marshall, Adjunct Professor of Geology at the University of Technology, Sydney, with many years experience in geological surveying, mining and research , comments: "any loss of water from the river can have both local and potentially more far reaching consequences. The simple statement that the water rejoins the river downstream should only be made when substantiated by full and proper investigations". (See Dr Marshall's comments in full in Attachment C).

Angela Bush, PhD candidate in Earth Sciences at the University of Melbourne, says that the water going underground down cracks will be damaged by iron oxide and methane seepage "and even if it does rejoin the river downstream, it has the potential to degrade that water too." She asks "Has a detailed hydrogeological investigation been made in these areas ? If not, BHP cannot make such sweeping generalisations …"[23][23]

There is no such detailed study forming part of the SMP, which is another reason why a proper EIS must be demanded from the company.

3. Effects of Cracking on Water Quality

BHP Billiton's subsidence experts write in Attachment F of their SMP that "some of the deterioration in water quality in the Lower Cataract … can be attributed to low flow, and some to mining-induced increases in surface flow diversion through freshly fractured near-surface Hawkesbury sandstone."

John Bailey, Mining Warden, after hearing scientific evidence for both sides, in a case brought against BHP Billiton by residents on the Lower Cataract in 1998, attributed 80% of water loss to mining damage and 20% to drought.

Passage through fractured sandstone contaminates the water, causing " 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 during 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."[24][24] Residents and inspectors reported massive fish kills in the Lower Cataract. The river turned red from iron oxides at first, now several years after mining ceased it is a milky green colour in parts, with strange algal blooms previously unknown. (These may be associated with the high levels of methane gas emitted through cracks – at some sites in the 1990s at a rate of 20 litres per second. Aerobic bacteria feed on the methane, with their growth depleting the surrounding water of oxygen).

Cracking of the Upper Cataract must also impact on water quality. As the SMP states: "Groundwater ingress into the surface water system is possible …" and ingress of groundwater could "potentially impact on river water chemistry."[25][25]

A further possibility mentioned by BHP Billiton's consultants is that mining on the clifftops may cause subsidence-induced springs. "Creeks in the upland plateau (in the centre of Appin 3) are predicted to be subject to the maximum levels of subsidence … we estimate this could potentially generate a spring discharging into the gorge." The consultants go on to note "the spring in the Georges River, which was first located in late 2000 after it had contributed substantial ferruginous staining to the water and bed of the Upper Georges River, has shown little evidence of decline in the four and a half

[23][23] Angela Bush, email, a.bush@pgrad.unimelb.edu.au, 2004
[24][24] BHP Billiton, op. cit., p 186, s F.2.3.3
[25][25] Ibid., p. 647, s 2.1.2

years since it was first identified … such springs are likely to have a lifetime of at least ten years … and may in fact be relatively permanent once instigated."[26][26]

This perhaps explains why the once beautiful Marhnyes Hole in the Upper Georges River was the colour of pumpkin soup when photographed earlier this year, as can be seen in the Rivers SOS photo galleries on our web site.

Erosion from cracked streams and the possibility of rockfalls reaching the river are likely to be further sources of pollution. There were seven rockfalls along the Lower Cataract after the longwalls went through. On the Appin 3 site, the 70m cliffs closest to the planned longwalls go vertically down to the river, and on part of the site the river opens out into a tiny pristine lake. These cliffs will possibly collapse directly into the lake. This would both block and pollute a part of Sydney's water supply.

The overall likelihood of pollution of water supply is acknowledged in BHP B's SMP. Referring to the fact that the Cataract River is classified as a Class S (Specially Protected) river under the Protection of Environment Operations Act of 1997, and therefore development is subject to pollution limits, the SMP says that the "proposed mines are likely to result in discharges in exceedance (sic) of the Schedule 2 limits for pH, Filterable Fe and Filterable Mn for a Class S water. Sulfate and Zn are not expected to exceed the limits."[27][27]

This is not good enough. Under the State Environmental Planning Policy 58 of 1.2.99, and the draft Sydney Catchment Authority Regional Environmental Plan, any proposed development must demonstrate that it will have a "neutral or beneficial effect" on water quality.

This is unambiguous. No sophistry, no equivocation, no spin can rescue the Appin 3 plans from being precisely what they are: a threat to water quality; the exact opposite of a "neutral and beneficial" process of development.
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4. Threatened Species

In July 2005, the NSW Scientific Committee, consisting of eleven scientists from a variety of institutions, made a Final Determination to list alteration of habitat following subsidence due to longwall mining as a key threatening process, under Schedule 3 of the Threatened Species Conservation Act. Details of endangered and vulnerable species and endangered ecological communities can be found in their report.[28][28]

BHP Billiton's SMP lists three threatened fauna species in the Appin 3 area: the red-crowned toadlet, the spotted quail, and the painted honeyeater. Eighteen threatened flora species are also listed in the area.[29][29]

For the purposes of this submission, we are primarily concerned with fish and with aquatic ecosystems. As we know, subsidence induced fracturing of the Lower Cataract caused reduction of surface flow "accompanied by release of gas, fish kills, iron bacteria mats, and deterioration of water quality and instream habitat."[30][30]

These iron bacteria mats are described in BHP B's SMP as the "smothering of pool boulder and bed surfaces by the precipitated ferrous and manganese hydrous oxides."[31][31]

The SMP also mentions "possible ecotoxic effects from heavy metals released from the sandstone by acidity."[32][32]

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[26][26] BHP Billiton, *op.cit.,s 3.2.3*
[27][27] Ibid., s. 8.2.4
[28][28] NSW Scientific Committee, *Final Determination,* July, 2005 (PO Box 1967, Hurstville NSW 2220)
[29][29] BHP Billiton, *op.cit.,* s 6.6 & 6.8
[30][30] NSW Scientific Committee, *op.cit.,* p. 3
[31][31] BHP Billiton, *op. cit.,* s 8.3.1

A report prepared by Simon Williams of the South Coast Region Science Unit, on the impacts of longwall mining on aquatic ecosystems, sums up: "What is particularly concerning is the potential for irreversible long-term damage to these aquatic dependent ecosystems."[33][33]

He lists several damaging impacts, including loss of water quality with "increased iron oxides, manganese, electrical conductivity, and lower dissolved oxygen. In some cases (i.e. Native Dog Creek) reduced pH associated with elevated aluminium levels have been recorded."(Here the wetland vegetation died rapidly).

Again, 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 as unsuitable for biota and can lead to the loss of both native plants and animals directly via iron toxicity, or indirectly via smothering."[34][34]

We are especially concerned by the impact on the threatened fish species, Macquarie Perch, which BHP B's consultants have identified "at all locations" in the Cataract River. This threatened species, like too many other species, has seen a "marked decline in numbers during the last forty years,"[35][35] It now only exists in a limited number of places, including the Upper Nepean River, Colo River, and tributaries of Lake Burragorang. [36][36]

" … Australia has a relatively meagre freshwater fish fauna … there are very few species which can be said not to have suffered some decline in the last two hundred years."[37][37] We do need to protect those that are left.

We are concerned to find, in a letter sent by MP Diane Beamer to the NSW Minerals Council (which she signs, surprisingly, as Minister for the Environment), that the Department of Environment and Conservation has decided to take no action on the listing of longwall mining as a key threatening process by the NSW Scientific Committee. We had hoped that the DEC would respond to a serious finding by a panel of scientists by developing a Threat Abatement Plan, which could, amongst other things, recommend that mining operations not take place under, or near to, rivers and tributaries.

Ms Beamer claims that DEC representation on the interagency review committee, which reviews SMPs, is a process which can "adequately address the key threatening process declaration."[38][38] We do not think so. DEC has only two representatives on this large committee. Moreover the committee can only make recommendations or, at best, trigger a full and proper Environmental Impact Assessment, but whatever the outcome the Minister for Primary Industries makes the final decision on the mine plan. He can disregard any recommendations he receives.

This was the problem with the recommendations arising from a Commission of Inquiry in 2003 into BHP Billiton's Dendrobium Mine near the Cordeaux dam and river. Though the case concerning damage to the hydrologic regime in the area was clearly proven, the mine was approved anyway and mining has now commenced.

If the findings of two panels of independent scientists and experts – the NSW Scientific Committee and the Hawkesbury Nepean River Management Forum – which have categorised longwall mining as a threat to catchments/ rivers/ threatened species, are ignored by the NSW Government, this would represent a great waste of time, effort, expertise and taxpayers' money.

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[32][32] Ibid., s 8.3.1

[33][33] Simon Williams, *Summary of Environmental Impacts of Longwall Mining on Aquatic Ecosystems in the Southern Coalfield, South East NSW, DIPNR,* July 2003, p.3

[34][34] Ibid., p.4

[35][35] Ken Klippel, *Wildlife Data Search: Threatened Animal Species in NSW,* Total Environment Centre, Sydney, 1992, p. 71

[36][36] BHP Billiton, *op.cit.,* s 4.5.3

[37][37] Ken Klippel, *op. cit.,* p.69

[38][38] Diane Beamer ,*Letter to Dr Williams, CEO, NSW Minerals Council, MOF191189,* 30 August, 2005

BHP Billiton's SMP argues that the Macquarie Perch will not suffer as long as a flow of 5ML/day is maintained to mask the effects of the water disappearing down multiple fractures and cracks, and to dilute the ecotoxic pollutants (see Section 5 below). We strongly believe that a proper environmental study should be carried out, if possible by independent consultants, to give an independent assessment of this possible threat to the Macquarie Perch and the other threatened flora and fauna mentioned in the SMP.

5. BHP Billiton's Case

BHP Billiton, in an attempt to counter the objections we have outlined, uses two more arguments (added to the previous questionable argument that water down cracks will simply reappear downstream).

These two additional arguments are reiterated many times throughout the SMP.

First, the company says that an elevated flow rate of 5 ML/d, if agreed to by Sydney Catchment Authority, will solve a) the problem of water loss, by compensating for loss down cracks and fractures, and b) the problem of degraded water quality, by diluting the harmful contaminants outlined in Section 3 above.

The proposition that a 5ML/d flow of high quality drinking water released down river from Cataract Dam should be used to mask and compensate for water loss down subsidence induced cracks, and should itself be partially lost down cracks as in the Lower Cataract, is unconscionable – especially in a period of increasing drought and water shortages.

Though BHP Billiton's SMP asserts that current flow from the Cataract dam is as high as 6 ML/d[39[39]], the SCA web site reports that it is 1.3 ML/d. as per its Water Management Licence. BHP Billiton states that this huge discrepancy is due to a faulty valve, implying that the SCA is mistaken, but notes that "there are difficulties with accurate measurement of flow using the installed equipment."[40[40]]

We ask that before any approval process takes place, this discrepancy must be cleared up, and also that the very basic and fundamental need for an accurate flow measurement must be met. That this SMP should be presented without the means to measure and report flow rates accurately, if at all, further demonstrates the need for a full Environmental Impact Statement. It also demonstrates the careless haste with which this SMP has been drawn up and submitted.

Meanwhile the company's request for a leap from a flow regime of 1.3 ML/d to 5 ML/d seems absurd at a time when NSW government agencies are urgently producing plans to conserve every drop of water.

With the new Metropolitan Water Plan of 2004, we entered the era of "water smart living." We now have the "Water Wise on the Farm" plan. We have the "Every Drop Counts" programme for businesses. We will soon have the "Smart Water Mark" for household gardens. We have the draft "Sustaining the Catchments – the Regional Plan to Protect the Drinking Water Catchments." The NSW government is spending $82 million p.a. to repair leaks in water mains.[41[41]]

We have the "Water for Life Plan," in which the citizens of NSW are exhorted to reduce water use and to "respond to the call to action and secure the long-term sustainability of our water supplies … we're taking our current situation and turning it around – working together to secure our water for life."[42[42]]

[39[39]] BHP Billiton, *op.cit.,* s 6.3.2
[40[40]] Ibid.
[41[41]] DIPNR et al,*Meeting the Challenges:Securing Sydney's Water Future,* October 2004
[42[42]] On web site www.waterforlife.nsw.gov.au

We are asked by this government to think before flushing our toilets yet BHP Billiton wants an increased flow equating roughly to four Olympic swimming pools per day to alleviate and mask its environmental depredations.

Second, BHP Billiton argues that the greatly increased flow rate will also serve to dilute the predicted pollution. We concede that a flow of 5 ML/d would dilute localised pollution from Appin 3 fractures , however at this flow rate the water table will rise as surface water finds its way down cracks, and ecotoxic groundwater would then blend with the surface water causing further contamination.

Furthermore, we cannot be confident that this high flow can be released forever, in the attempt to hide the problems mine damage will cause. It will not be sustainable, even in the short term.

One question arising immediately involves the proposal put forward as "a matter of urgency" by the Hawkesbury Nepean Management Forum in 2004. This is the plan to construct a tunnel connecting the Upper Nepean Dams, including the Cataract Dam, with the Upper Canal and the Macarthur Water Filtration Plant.[43][43] If and when this is completed, the Upper Cataract will be bypassed. It will no longer be a conduit for the water supply from Cataract Dam. A flow of 5 ML/d would surely not be sustained down the river in this event. Pollution and water loss would no longer be masked in a low flow regime. The river may not survive.

Also water is becoming such a valuable resource that its price will inevitably keep rising – who will pay for BHP B's big ask ? The company, in its SMP, refers several times to a putative agreement with the Sydney Catchment Authority. The SCA has been very compliant with company demands in the past, as has the DMR, and we hope that finally government agencies will draw a line in the sand regarding our rivers, and our water supply.

As a submission on water from the Public Interest Advocacy Centre says: "Water is a variable resource and, above all, it is a public good. Given the history of exploitation of this resource we argue it is imperative that the public interest now be served in decisions about future entitlements to use water."[44][44]

We are aware that the NSW government receives royalties from longwall mining of over $600 million p.a.[45][45] But the long term fate of our rivers hangs in the balance. Both the principle of inter-generational equity and the precautionary principle (about to be enshrined in the Mining Act) should stand in the way of short term profit when decisions are made.

6. The Remediation Myth

BHP Billiton's SMP places emphasis on, and faith in, the possibility of remediation. Section 12 gives details of "Management Methods to Minimise Impacts." Remedial measures boil down to "injecting a cement grout into cracks and fractures."[46][46] The choice of grout substance depends on an analysis of any aquatic ecosytem toxicity – it could involve mixes of cement, bentonite (from which Kitty Litter is made), microfine cement and/or sodium silicon-based grouts.[47][47]

From past observations and reports, we reject the notion that grouting is effective enough to be touted as a viable and permanent solution. Grouting in the once-beautiful Marhnyes Hole in the Georges River is unsightly and the grout is crumbling in places after only a few years, and the cracks can be seen to be opening up again.

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[43][43] Hawkesbury Nepean Management Forum, *op.cit.,* pp. 76-7
[44][44] Public Interest Advocacy Centre, *Submission on the Water Property Rights Report,* 21.2.03
[45][45] Minister Kerry Hickey, *GPSC5 Mineral Resources Supplementary Hearing, Parliamentary proceedings,30.3.05, p. 9*
[46][46] BHP Billiton, *op. cit.,* s 12.2.3
[47][47] Ibid.

An attempt to place a grout curtain to stop water loss in the Lower Cataract was, like the effort at Marhnyes Hole, only partly effective even in the short term. As the NSW Scientific Committee say: "An attempt to rectify the cracking by grouting of the most severe crack in 1999 was only partially successful (AWT 2000). In 2002, water in the Cataract River was still highly coloured, flammable gas was still being
released and flow losses of about 50% (3 – 3.5 ML/day) still occurring (DLWC 2001)."[48][48]

They add, in general terms: "Mitigation measures to repair cracking creek beds have had only limited success and are still considered experimental (ACARP 2002)." Though noting some examples of relative success, they conclude that "The long-term success of mitigation measures such as grouting is not yet known. It is possible that any ongoing subsidence after grouting may reopen cracks or create new ones."[49][49]

According to Dr Gavin Mudd, from the Institute for Sustainable Water Resources at Monash University, the major issue "is the stress regime induced by mining in the first place – that is, the key driver of the cause of the cracks. If there is still ongoing subsidence due to mining (that is, if a new stress equilibrium has not yet established), even if the cracks are successfully infilled or grouted … new cracks could open up and cause leakage between the river and the underlying groundwater systems."[50][50]

Severely fractured rock is inherently unstable, and it is obvious that grouting could not permanently seal cracks if there is any subsequent movement. Moreover, in the Southern Coalfield, subsidence induced cracking "has varied from hairline cracks to openings up to several hundred millimetres in width."[51][51] Numerous hairline cracks would be well nigh impossible to grout, or even to observe, especially when hidden under boulders in the river (common in the Upper Cataract) or under sand/silt on the river bed. Yet leakage through thousands of such cracks could be considerable.

As well as questionable results for the only form of remediation on offer, it is also expensive and time-consuming. BHP Billiton grouted a few cracks on the Lower Cataract in 1999 but has not returned to do more – this seems to have been a token affair only. Much more effort was put into the remediation attempt at Marhnyes Hole, including the drilling of a stress-relieving slot which may have prevented some of the damage, however this too has not been 100% successful.

Moreover these remediation efforts have involved only very small sections of damaged rivers. This does not leave us with any confidence in either the company's willingness or ability to do what it advertises in its SMP: to have "creeks and catchments yielding similar water quantity and quality following mining," let alone to "repair the aesthetic values."[52][52] Cracks are not a pretty sight. Cracks grouted with grey-coloured cement are even less so.

And if cracks open up and cement crumbles and re-grouting is needed, who can guarantee that the company will be around in the long term to fulfil its current promises ? Corporations can leave, like James Hardie. In several years our one-time Big Australian may well have re-located its HQ to London. Companies do not last forever anyway. There are no iron-clad guarantees, given the uncertainties of all corporate futures.

As it is, the company has not repaired the Lower Cataract. It would demonstrate incompetence, or worse, if those involved in the approvals process take the promise of remediation given in the SMP at face value.

A letter dated 23 October 2000 from Axel Tennie, Regional Director of the South Coast unit of the then Department of Land and Water Conservation, to Ken Hollands, then Assistant Director Environment of the Department of Mineral Resources, is instructive in this regard. It is worth quoting at

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[48][48] NSW Scientific Committee,*op.cit.*,p.4
[49][49] Ibid., p.7
[50][50] Dr G. Mudd, email, 2004
[51][51] L. Holla & E. Barclay, *Mine Subsidence in the Southern Coalfield, NSW,* DMR, June 2000, p. 100
[52][52] BHP Billiton, *op.cit.,* s 12

some length. After observing that "the Upper Georges River catchment is suffering the same fate as the Cataract with cracking and water losses" he continues:

"The repeat nature of the problem is seriously disconcerting to DLWC. Clearly Mineral Resources has no control or solutions to prevent this environmental damage repeatedly occurring.

Nor is there any overt evidence available to me of Mineral Resources holding BHP accountable for all costs of remediation associated with environmental damage resulting from its mining activities. To date DLWC has been left holding the "can" to negotiate with BHP to fix their stuff ups, e.g. Cataract River bed sealing and replacement flow negotiations … For DLWC this problem seriously conflicts with achieving the goals of the Government's water reform and environmental flow enhancements in the State's river catchments. It also places our two agencies in direct conflict over a high profile Government reform initiative.

Your early response on how DMR can support DLWC in exacting from BHP its environmental/corporate citizen accountabilities would be appreciated."

We salute public servants of this calibre, prepared to make a stand. On this issue they are all too rare. We have no record of Ken Hollands's response, although as already mentioned the company has done no further remediation work on the Lower Cataract to this day. Cracks small and large, in photos taken this year, can be seen in the photo gallery on our web site.

7. Why BHP Billiton Must Produce an Environmental Impact Statement

The company decided to mine Appin 3 only after it had been requested not to mine directly underneath the Upper Nepean. Appin 3 was for compensation and to prevent loss of continuity – though some think this could have been better avoided by a 24-hour regime of tunnelling an access road under the Nepean to the other side,and commencing mining there sooner than planned, rather than threatening another river at Appin 3. Or by filling Illawarra Coal's contracts with similar high quality coking coal from BHP Billiton's two Queensland mines. Anyway, Appin 3 was planned in haste and the company's various consultants had only a few months in which to prepare reports for this SMP. The lack of research shows.

Questions that remain unanswered in this SMP would have to be answered in the EIS format. These include important questions of mine de-watering and pumpouts, source of water for mine operations, transport of coal, and coal washing.

The SMP gives almost no information on the above, which is necessary given that operating mines may use tens of megalitres of water per day.[53][53] Where will this come from ?

And as for pumpouts, dewatering a mine may involve pumping saline water into the nearest river. Through a Freedom of Information process in 2004, BHP Billiton were found to be pumping 2.8 tonnes of salt per day on average into the Upper Nepean via its Tower Colliery on Allens Creek. It still does so. The EPA declined to take action. It is necessary to know how and where BHP Billiton will dewater Appin 3.

This submission has already mentioned two other reasons why an EIS is necessary. First was the need for a proper and detailed hydrogeological study of the site and its surrounds. This was because of the need to better understand the hydrologic regime, and the interaction between groundwater and surface flow.

The SMP tells us in so many words that its own field investigations were inadequate. The "extent of natural flow diversions within the SMP area" could not be identified or quantified "because releases

[53][53] Dr Brian Marshall, *Groundwater:Lifeblood of the Environment,* Blue Mountains Conservation Society, April, 2005, p. 11

from the Cataract Dam were generally between 50ML/d and 250 ML/d."[54][54] (Surprising, when the average flow is said to be only 1.5 ML/d by SCA or up to 6ML/d by the company).

The SMP provides very little information on groundwater and subterranean flows in the Appin 3 vicinity. Ecoengineers, BHP Billiton's consultants on this important topic, are inclined toward "postulating" without much evidence of site-specific research. This can only be explained by the fact that they had to produce a report in the space of only a few months.

Thus, "considerable water storage is postulated within some sequences, particularly in the clay rich Wianamatta Shale" and "seepage water is postulated to migrate both laterally down the hydraulic gradient and vertically through the Hawkesbury sequence."[55][55] And "potential natural ground water flow paths can be inferred from observation and experience in other areas."

Also, "no classical aquifer zones of measurable thickness are either postulated or have been observed for the Hawkesbury (sic) in this area."

One statement mentions the "possibility" of groundwater ingress into the surface water system "if the separation intersects a water-bearing bedding plane system on the flanks of the gorge and the local hydraulic gradient is towards the gorge. This has the potential to increase the rate of flow of groundwater into the river surface water and therefore could potentially impact on river water chemistry" in, for instance, times of drought.[56][56]

Section 8.3.3 of the SMP proposes "detailed monitoring … prior to mining [which] will allow an assessment of potential mining induced changes to the groundwater system and identify any interaction with the surface flow within the river."

In other words, the necessary monitoring prior to mining has not yet been carried out. Approval must not be given until such vital information has been made available.

It should be obvious by now that information in this SMP is inadequate. much more preliminary research is needed. . Ingress of groundwater can impact in a major way on water quality, which will have its effect on Sydney's water supply and the standard of water set in the Bulk Water Agreement between Sydney Water Corporation and the Sydney Catchment Authority.

A further reason to call for an Environmental Impact Statement was also mentioned above in Section 5: that is, the lack of information on flow due to the lack of equipment to measure flow rates accurately. Without such basic information, monitoring and predictions are worthless. Some accurate measurements must be acquired before, not after or during, the commencement of mining operations. This is surely self-evident.

8. 8. Conclusion

Given the NSW Government's embrace, albeit hesitant, of laudable ideas such as the precautionary principle and inter-generational equity, and given the growing problem of water shortage and the need to make "every drop count," and given the commitment to reversing the shameful rate of extinction of threatened species, and given the need to protect water supply from pollution and the kind of scare witnessed previously over cryptosporidium and giardia, and given the fact that the Upper Cataract is a very beautiful stretch of river and should be preserved as such, and given the poor success rate of remediation techniques, and given the past record of the company's environmental performance here and in PNG, and given the short term nature of profit from the mining operation versus the responsibility of this generation to conserve what remains of our ravaged environment, the Rivers SOS coalition hereby requests all decision makers concerned with Appin 3 to shoulder their responsibilities, draw a line in the sand regarding ongoing damage in our major Catchment, and deny approval to the Appin 3 plan.

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[54][54] Ibid., s 3. 3.1.9
[55][55] Ibid., Ecoengineers Report, Attachment G, 8.3.4
[56][56] BHP Billiton, *op.cit.,* s8.5

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