What is the National Parks Association of NSW?
National Parks Association NSW (NPA) is a non-government conservation group that seeks to protect, connect and restore the integrity and diversity of natural systems in NSW and beyond, through national parks, marine sanctuaries and other means.
We have over 3000 members, 800 active volunteers. Southern Sydney Branch (NPA SSB) is one of 19 branches statewide. In recent decades NPA has increasingly argued for conservation of off-park natural areas both to guarantee sustainability of adjoining national parks and reserves and to connect areas of land which have significant biodiversity.

The Inquiry
We applaud the government's initiative in setting up this inquiry. As a reserve declared under the NSW National Parks Act and as part of the Greater Blue Mountains World Heritage Area, the significance of the Thirlmere Lakes precinct is already recognised and proclaimed. Professor Pells (retired) has stated that Lake Baraba is of immense scientific interest since it is one of only 33 sites in the Australian, South-East Asian and Pacific region in which a record of vegetation types since the last Ice Age can be found. The recent drying of the lakes is therefore a matter of concern for the NPA and a matter of responsibility for the NSW government. NPA SSB believes the status of the Thirlmere Lakes and the rapid growth of longwall mining in NSW justifies the broadest possible interpretation of the terms of reference.

Terms of Reference
We welcome the emphasis of the Inquiry's Terms of Reference on the scientific factors relating rainfall, lake levels and factors impacting on the hydrology of the lakes area. We note the comments of Dr Brian Marshall, retired professor of structural and engineering geology, and a past president and current committee member of the Blue Mountains Conservation Society. Dr Marshall's assessment follows:
“The lakes are sourced from surface water and register the local water table. They should have recharged by now, as was the case after previous severe droughts, but instead the water levels continue to drop. Something other than drought is causing the loss: mining has possibly caused fracturing of the local aquiclude (rock barrier) beneath the lakes, facilitating hydraulic connectivity between the lakes and the deeper aquifers affected by mine impacts. Water may now be migrating through a fracture network (permeability paths) extending both vertically and laterally (vertilaterally) down to the level of the mine workings.

Over time the rate of flow along the fractures increases along with the vertilateral connectivity, while mine workings form a low pressure “sump.” The role of the low pressure “sump” is increased by the pumping out of water from the mine workings at a rate of 4 megalitres per day from Xstrata’s Tahmoor Colliery into the nearby Bargo River. This ongoing dewatering of the mines could be a significant factor in the water loss from the Thirlmere Lakes.”

We also note that the Department of Environment conceded in its management plan that the hydrology of the Lake system is poorly understood. It is therefore a high priority for the Inquiry to include investigation of impacts from subsidence of longwall coal mines in the nearby Bulli seam. Couridjah Lake is 699m and Weri Berri Lake 955m from longwalls. Given the known extent of damage from subsidence in other locations such as Waratah Rivulet, Cataract River and Nepean River it is a matter of some urgency that the Inquiry reviews the relationship of loss of water from the lakes to rainfall, mining subsidence and the volume of water pumped out of Tahmoor Colliery. Appendix 1 draws on the Rivers SOS website to provide numerous examples of subsidence impacts over distances greater than those of the Thirlmere Lakes to adjacent mines.

In his modelling of the lake levels, Professor Pells has claimed in unpublished research that

- The water levels in the lakes are currently 1.5 to 2.5 metres lower than predicted by his model
- The groundwater regime in the area has been significantly affected. Some bores have completely dried; others have reduced flow.
- These impacts on the ground and surface waters correspond closely with the advent of longwall mining in the vicinity (within 700 metres).
Management and Research
Given the limited geological and hydrological information available, the provision for the Inquiry to identify areas of research and recommendations for management are welcome.
It is reasonable to assume that the adjacent Tahmoor Colliery would have some relevant information for example on the local geological structure, the location of faults in strata above the coal seam and the movement of groundwater. Any applications of modern technology to underground imaging of aquifers or other hydraulic connections between lakes and mine subsidence should be sought by the inquiry from the mining companies. Research into the hydrology of the lakes is likely to be long term but NPA would like to see evidence accumulated by the Inquiry forming the basis of more immediate and strongly precautionary recommendations to protect underlying aquifers, reduce further drying of the lakes, and inform measures for protecting significant features.

Yours faithfully,

Gary Schoer
Secretary
17 Jan 2012
Rivers SOS arrived at the call for a safety zone of at least one kilometre after careful research. ... The major sources of expert opinion ... are as follows:

“… Horizontal displacements can extend for more than one kilometre from mine workings.” [Preliminary Determination of the NSW Scientific Committee, 22.11.04]

“Reid (1998) reports horizontal movements of up to 25mm near Cataract Dam even when underground mining was about 1500m from survey stations.” [L.Holla & E.Barclay, “Mine Subsidence in the Southern Coalfield”, DMR, 2000 (Lax Holla was the DMR’s principal subsidence engineer; Peter Reid researches subsidence for the Dam Safety Committee)]

An example is one of BHP Billiton’s longwall mines - Longwall 17 which runs under the Nepean River at Douglas Park. Monitoring showed movement of over 60mm at a distance of 1.5 km from mine workings. Another monitoring station 450m from Longwall 17 showed movement of 70mm, while a station 680m from the adjacent Longwall 16 showed movement of 60mm. [B.K.Hebblewhite, “Regional Horizontal Movements Associated with Longwall Mining”, 2000 (B.K.Hebblewhite is the Research Director of the University of NSW’s Mining Research Centre)]

Hebblewhite sums up the above research on mines under the Cataract River and the Nepean River as follows: “There is evidence of large scale, regional horizontal displacement of ground, at great distances away from the active mining locations.”

Recent research carried out by the Australian Coal Association indicates that horizontal movements can be measured as far as 3 kilometres from mine workings, though movements detected at this distance were small. [ACARP 2002,C9067; ACARP 2003,C10023]

Sections of the Stanwell Park Railway Viaduct had to be replaced due to mining in the 1970s, and trains still must slow down at this point. The bed of the creek beneath has been cracked in several places. This was caused by mine workings only 130m from the viaduct, but Hebblewhite comments that the “severe damage” happened “well outside the conventional ‘angle of draw’ subsidence influence.”

[Rivers SOS state] “This and other examples have convinced us that protection zones predicated on an ‘angle of draw’ are not sufficiently reliable, which is why we campaign for a 1 kilometre safety zone rather than using ‘angle of draw’ measurements.

All subsidence researchers agree that the degree of subsidence damage cannot be accurately predicted. They also agree that effects will be more severe and unpredictable in hilly or rugged sites such as river gorges. For example, Holla & Barclay write: “Where mining occurs in rugged terrains, large strains are likely to occur. The large strains may crack creek beds and cause changes in or even loss of water flow.”

Hebblewhite writes “Previous experience had indicated that severe surface topographic changes …could result in significant ‘anomalous’ subsidence behaviour.”
The State Rail Authority has a railway protection zone based on the 35 degree angle of draw in areas of low to medium topographic relief, but in areas of high relief the SRA calls for intensive on-site investigation.

Subsidence consultants predicted that mining would not seriously damage the Georges River. However the river is now badly cracked and polluted. As Holla says: “While conservative designs (mine plans) may unnecessarily sterilise coal reserves, the cost of conservative designs may be justified when balanced against the consequences of wrong predictions.” [Rivers SOS adds] that cumulative damage to rivers, creeks and wetlands from destructive mining operations is a threat to all forms of wild life. In July 2005 the NSW Scientific Committee listed “alteration of habitat following subsidence due to longwall mining as a key threatening process in Schedule 3 of the Threatened Species Conservation Act.” The Committee lists a number of threatened plant and animal species, and ... commented that remediation efforts have had only “limited success and are still considered experimental”.
