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Viewpoint

Environmental protection and management: A water pollution case study within the Greater Blue Mountains World Heritage Area, Australia

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ABSTRACT

The Grose River is contained almost entirely within a World Heritage Area. While sewage pollution in the area has been addressed, pollution at damaging levels continues from a disused coal mine, closed in 1997. Despite some surface rehabilitation, no action has occurred to remediate zinc polluted waters emanating from the mine. We examine the historical regulation and management of the Australian Commonwealth and New South Wales governments and highlight gaps in both regulatory systems. We conclude that there is an urgent need to improve regulation of water pollution, mining and management of the environment in highly valued world heritage areas.

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Introduction

The encroachment of human activities has modified most ecosystems of the globe (e.g., Botkin and Keller, 2009). Due to human activities it is becoming increasingly difficult to identify any natural environment that has not been altered to some extent. One approach to limiting the adverse impacts generated by humans has been to identify particularly 'valuable' or 'unique' environments and to manage them as protected areas. This approach regulates threats of human disturbance for selected 'protected areas' (Pimm et al., 2001). The form of protection varies internationally and there are a wide range of reserve classifications, including nature reserves, national parks, national monuments, and wilderness areas. Protected areas may be terrestrial, marine and/or freshwater (WDPA, 2009). Protection of large terrestrial reserves also often offers some protection for waterways within their boundaries (Fitzsimons and Robertson, 2005), although reserve boundaries rarely enclose the entire catchment watershed (Linke et al., 2008). This is one of the issues in the ongoing debate over the most appropriate approach to protecting aquatic ecosystems compared with terrestrial reserves (Moulton, 2009).

The Blue Mountains region is environmentally one of the most highly valued and comprehensively protected areas in Australia. The region has unique geology and biodiversity, and was considered of sufficient international significance to be declared a United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Estate because of the area's natural values (UNESCO, 2009; Commonwealth Government, 2009a). In the 50 years since the initial creation of the Blue Mountains National Park, the area has continued to expand (NPWS, 2001). Several adjoining National Parks are now collectively regarded as part of the Greater Blue Mountains area. The majority, but not all areas are naturally vegetated and most of the area is considered to be in good ecological condition (Commonwealth Government, 1998).

The Blue Mountains region has historically witnessed considerable conflict between development and conservation (Mosely, 1999). Issues such as increased urban development, tourism, forestry, infrastructure development, and mining have frequently created strongly divergent views. The source of the environmental conflict has often originated from a 50 km string of settlements, stretching from Penrith in the east to Mt Victoria and Lithgow in the west. This ridge-top development bisects the National Park and houses a population of more than 80,000 residents (BMCC, 2002). It also caters for a large number of tourism visitors (Commonwealth Government, 1998; BMCC, 2002). Water pollution is one of many threats to the National Park that generates environmental conflict in the management of the area (Berman et al., 1987).

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Historically, a major source of water pollution in the Blue Mountains area has been sewage effluent. In July 1980 there were 12 sewage treatment plants (STPs) servicing a population of 46,000 in the Blue Mountains (MWS&DB, 1987). In the 1980s and early 1990s six STPs disposed of their wastewater into streams that flowed into the National Park estate lands (Berman et al., 1987).

Another source of water pollution throughout Australia, and in the Blue Mountains, has been water contamination from mining. The Blue Mountains region has had coal and other mining activity for more than a century (Macqueen, 2007). Although many of the mines have been closed, there are several active coal mines in the Western Blue Mountains, particularly in the Lithgow and upper Coxs Valley area (Lithgow Tourism, 2009).

One part of the Blue Mountains National Park that has been adversely affected by pollution by a combination of sewage effluent and mining pollution is the upper reaches of the Grose River, an otherwise pristine environment that is protected as a declared Wilderness Area within the National Park lands, and is also part of the Greater Blue Mountains World Heritage Area. The upper Grose River catchment (Fig. 1) is used as a case study for this paper. Regulation and management of water pollution in this area reflects a number of the strengths and weakness of regulation of coal mining, water pollution, and management of waterways within Australia's protected areas. Recommendations are made for future management to minimise the chance of similar environmental contamination issues arising in other protected areas.

Environmental protection of the Blue Mountains

The Blue Mountains became a popular holiday destination for Sydney residents, particularly since the construction of the first railway link between Sydney and mountains in the late 1800s. Over time, the impressive scenery of the area has become increasingly widely appreciated. The bushland has also become a popular destination for bush walking and camping along walking trails (Macqueen, 2007).

Over the 20th century there was a gradual increase in the recognition of the environmental values of the Blue Mountains. Conservation of large tracts of the area was advocated by the Sydney Bushwalking and Mountains Trails Club from early in the 20th

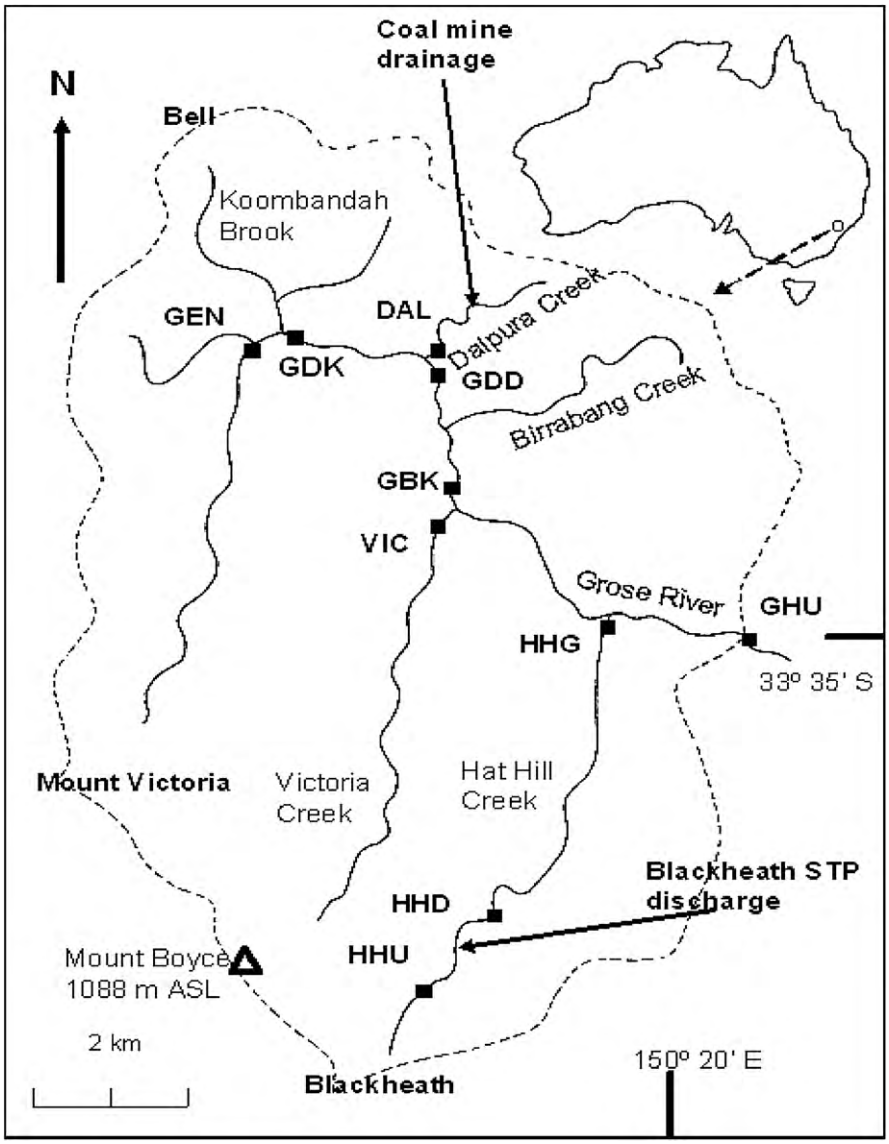

Fig. 1. Map of survey sites (square symbols), waterways and waste discharge points in the upper Grose River study area (sampled by Wright and Burgin, 2009a). Approximate catchment boundary of study area is indicated by dashed line. Inset shows location of study area in south-eastern Australia.

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