

Submission
No 71

**INQUIRY INTO CURRENT AND POTENTIAL IMPACTS OF
GOLD, SILVER, LEAD AND ZINC MINING ON HUMAN
HEALTH, LAND, AIR AND WATER QUALITY IN NEW
SOUTH WALES**

Organisation: National Parks Association of NSW

Date Received: 5 September 2023



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Committee Chair
Portfolio Committee No.2 - Health
NSW Legislative Council

Upper House Inquiry - Current and potential impacts of gold, silver, lead and zinc mining on human health, land, air, and water quality in New South Wales

The National Parks Association of NSW (NPA) appreciates the opportunity to comment on the Upper House Inquiry into to above matter.

NPA's mission is to protect nature through community action. Our strengths include State-wide reach, deep local knowledge, evidence-based input to policy and planning, and over 65 years' commitment to advancing the NSW protected area network and its professional management. We also provide outstanding opportunities to experience and learn about nature through our unrivalled program of bushwalking, field surveys, bush regeneration, and other outdoor activities.

General Comments

Mining of minerals is associated with several environmental impacts in NSW. These impacts may be additive or interact with each other and they may also add or interact with the impacts of pre-existing developments giving rise to cumulative impacts. **Specific environmental impacts that may result from mining are:**

1. **Habitat Destruction:** The most immediate impact of mining is habitat destruction. Open-cut mining especially can remove large swaths of land and vegetation, leading to direct loss of habitat for numerous species (Mudd, G. M., & Weng, Z. 2012), Habitat loss results in biodiversity loss.
2. **Habitat Fragmentation:** Mining can split habitats into smaller patches, isolating populations and potentially leading to local extinctions (Currell, M., & Usher, B. H. 2015),
3. **Water Pollution:** Acid mine drainage, and the leaching of heavy metals and chemicals can contaminate water sources, impacting aquatic biodiversity and potentially moving up the food chain (Gray, D. J., & Delaney, G. M. 2007),
4. **Air Pollution:** Dust from mining operations can affect air quality, leading to respiratory problems in both animals and plants (Bell, M. L., & Davis, D. L. 2001),
5. **Noise and Vibrational Disturbances:** The machinery and explosions used in mining can lead to noise pollution which can disrupt animal behaviours, especially in species that rely on sound for communication and hunting.
6. **Introduction of Invasive Species:** The movement of machinery and materials can introduce invasive species to an area, which can out-compete and displace native species (Hobbs, R. J., & Humphries, S. E. 1995),
7. **Climate Change:** The greenhouse gases released from mining operations can contribute to global warming, which subsequently affects biodiversity indirectly (Mackey, B., Watson, J., & Hope, G. 2008), and
8. **Cumulative Impacts:** The combined effects of multiple mines, along with other anthropogenic stressors, can lead to cumulative impacts which are greater than the sum of individual



impacts (Zerger, A., Gibbons, P., & Davey, S. 2014). Single mines may have cumulative impacts due to the additive and interactive effects of different impacts which they generate.

NPA's submission addresses

1. air and water quality impacts that apply to humans equally apply to the broader environment and the animals and plants in it,
2. submission references to mining impacts include relevant issues associated with the impacts from coal mining.

Recommendations

1. that the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2023 be incorporated into NSW legislation to protect aquatic biodiversity,
2. that mine waste water is not discharged into the catchments of NPWS reserves or other areas of high conservation value,
3. That there be a minimum buffer of 5km between an NPWS reserve and any other area of high environmental conservation value which are downwind from a mine.
4. That it be condition of all mining development consents that the proponent have an EMP which is regularly updated
5. that NSW adopts the recommendations in the Independent Review of the Biodiversity Conservation Act 2016 as soon as possible, and
6. that the Biodiversity Conservation Act 2016 be amended to give it primacy over the Environmental Planning and Assessment Act 1979, as recommended by the Henry (2023) review.

Conclusion

The mining of gold and other precious/heavy metals unless properly regulated potentially will further increase the decline of biodiversity and ecosystem health in NSW. When approvals for gold, silver, lead, or zinc mining are issued in New South Wales it is imperative that both environmental and human health are protected from significant impacts from mining. There needs to be more detailed consideration of how far dust plumes from mines travel and better management of mine tailings to ensure water catchments and groundwater are not polluted.

Specific Comments

In relation to the Terms of Reference items (b) and (c):

- The Australian Bureau of Statistics report "Mining and the Environment" in the 2003 Yearbook stated: "The extractive nature of mining operations creates a variety of impacts on the environment before, during and after mining operations. The extent and nature of impacts can range from minimal to significant depending on a range of factors associated with each mine.",
- Depending on the extraction method and the mineralogy of the specific ore, gold, silver, and lead mining can produce a range of metals and compounds - such as mercury and cyanide – which can endanger the health of humans and ecosystems. The accelerated mobilisation of these elements and their elevated levels constitute a well acknowledged form of pollution that causes significant environmental degradation. The World Health Organisation has stated that metal (loid)s contamination is undoubtedly a threat to wildlife and humans (WHO 2017),
- In terms of impact on aquatic wildlife, freshwater aquatic ecosystems host at least 10% of the world's known fauna including 30% of all vertebrates. It is well known that anthropogenic activities such as mining and its waste products alter the natural dynamics of metals: increasing their availability in aquatic systems (Córdoba-Tovar et al. 2022). Once these chemicals enter the aquatic environment, they become accumulated mainly by fish. Fish and birds top the list of the

main recipient organisms of toxic substances, constituting a risk to human health as they may be consumed,

- Concentrations in animal tissues may differ between taxa (e.g., benthic versus pelagic), and the differences often relate more to substrate utilised than simply to water concentrations: implying that bioaccumulation can impact different parts of the food web in different ways - it is a simplistic view to emphasise only the cumulative impact up a food chain. There may be profound wider impacts as species having certain roles are more susceptible than others,
- The effects of these wastes on the environment and human health are related to toxicity, persistence, and ability to increase their toxic potential as they move from a lower to a higher trophic level (i.e., biomagnification). In wild organisms the effects include decreased reproductive capacity, reduced embryo viability, teratogenesis and reduced enzymatic processes. It has been shown that excessive levels can cause deformities in fish, birds, and mammals (Córdoba-Tovar et al. 2022).
- Heavy metal contamination of soils is one of the main factors contributing to soil quality decline and loss of biodiversity, which is also associated with plant contamination, as metals accumulate in the surface layer of soils and then enter the trophic chain (Li et al. 2022),
- Mining of coal and heavy metals adversely affects aquatic biodiversity by reducing surface water flows, drawdown of groundwater and discharge of contaminated wastewater into waterways (Price & Wright 2016), (Vareda et al. 2019), (Baguley 2023), (Serov 2023),
- The experience from coal mining in NSW is relevant for the consideration of the effects of gold, silver, lead, and zinc mining on aquatic biodiversity because these mines are subject to the same EPA licencing requirements for wastewater discharge as coal mines. For example, one study conducted in 2013/2014 reported that approximately 26 tonnes of heavy metals and other pollutants were discharged by coal mines into NSW waterways (LGA 2016). It is well established that heavy metals are toxic to aquatic organisms,
- Of particular concern to the NPA is that the NSW EPA has licenced discharges of mine wastewater containing heavy metals into national park waterways. For example, mine wastewater, containing heavy metals has been discharged into the Coxs River which flows through the Greater Blue Mountains World Heritage Area and the Wolgan River which flows through the Wollemi National Park (LGA 2016),
- The Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2023 (Water Quality Guidelines 2023a) state that for the protection of aquatic ecosystems in high conservation/ecological value systems from physical and chemical stressors (PC stressors) there should be no change from ambient conditions as outlined below,
- High conservation/ecological value systems should have no change from ambient conditions unless it can be demonstrated that such change will not compromise the maintenance of biological diversity in the system. Where comprehensive biological - effects data are not available, a monitoring program is required to show that values of PC stressors are not changing, using statistically conservative decision criteria as the basis for evaluation. (Water Quality Guidelines 2023a), and
- The ANZ Guidelines contain toxicant default values for water contaminants and these values appear to be much more protective of the environment and aquatic biodiversity than the current NSW EPA allowed values, see for example the default value for lead, (Water Quality Guidelines 2023b). The Water Quality Guidelines (2023a) are not mandatory in NSW; however, state jurisdictions can decide to adopt these Guidelines.

In relation to the Terms of Reference items (d):

- In many situations, by the time the regulatory authorities become involved, the 'horse has bolted'. Mines are often in regional areas where the indigenous nations and other local landholders have been caretakers of the land for generations. Dysfunctional community interaction will ultimately distract management from its focus of effectively and efficiently running the mine. Enlightened mining companies undertake various initiatives, including preferentially employing local people; training and providing skills in businesses or enterprises that will endure after the mine closes, and
- In many cases the mining organisation seeks planning approval which may involve "annually review the environmental performance of the project to the satisfaction of the Secretary of NSW Department of Planning & Environment" which may include the review including specific components. The conditions that certain mining operations might be required to have increased monitoring and managing of heavy metals prone to cause biomagnification or bioaccumulation hazards. The requirements could take a 'risk management approach' where, if the surrounding environment was particularly significant, or the risk more likely due to the nature of operations, more stringent requirements should be demanded.

In relation to the Terms of Reference items (e):

- Environmental Management System (EMS) are the critical component of the overall management system that helps a mining company comply with environmental regulations, identify technical and economic benefits, and ensure that environmental policies are adopted and followed. An EMS is an industrial tool that enables an organisation to systematically control its level of environmental performance and can be an effective tool in managing any impacts associated with biomagnification and bioaccumulation,
- ISO 14001:2015 Environmental Management Systems has importance when applied and can help a company address potential biomagnification or bioaccumulation hazards. Significant clauses include Clause 4.1, Clause 4.2, Clause 4.3 planning Sub clause 4.3.1, and Clause 4.4.3.,
- There are also guidelines that extent best practice beyond simply the ISO14001 process which could be adopted more widely to address biomagnification or bioaccumulation hazards. For example, the Commonwealth Governments Leading Practice Sustainable Development Program (LPSDP) for the Mining Industry program promotes sustainable mining practices suggest *that "because the environmental behaviour of a supplier, or indeed a customer, could well turn out to be not of the same level of responsibility exercised by the organisation. [it]. sense for an organisation to include such 'indirect' environmental aspects within its system, and*
- Biomagnification or bioaccumulation are processes where successive exposure increases concentrations in living organisms. The definition of 'cumulative environmental impacts' could be better defined in legislation to require companies to include these processes. The term is not mentioned at the Commonwealth level in the Environment Protection and Biodiversity Conversation Act (1999), and although in NSW it is mentioned in several places in the it is not defined anywhere. In environmental planning, cumulative impact is usually used to consider the interaction between the impacts of existing and new development. For mining of gold, silver lead etc, the addition and interaction of impacts from a single mine can give rise to cumulative impacts.

In relation to the Terms of Reference items (h):

- As mentioned above, biomagnification or bioaccumulation is not defined in legislation and poorly described in relevant guidelines. Therefore, they are not adequately regulated. For example, the relevant Commonwealth advisory guidelines state *"Tailings facilities can pose a threat to species and communities. The extent of the threat depends on their location, concentration of the hazardous materials (such as cyanide or caustic soda), the species present, and the design of the facility. If the likelihood of impacts is found to be high, the facility should be*

designed to make it 'unattractive' to wildlife" Simply making a hazard unattractive does not ensure that problems can be managed, should they arise - biomagnification and bioaccumulation are longer-term processes which are unlikely to be reversible.

- Similarly the [ANZECC/ARMCANZ \(2000\) Water Quality Guidelines](#) only constitute a 'possible' a water quality risk-management framework for management of aquatic ecosystems. The guidelines do not fully address the difficulties associated with the management of heavy metal accumulation in temporary water courses. Many of our regional water courses experience high variations in flows. Yet the trigger values contained in the guidelines are based on steady-state conditions; there are no toxicity-based trigger values provided for inland salt lakes; and the recommended biological water quality assessment strategies are untested for mining impacts in all but a few types of temporary water courses. This limits their use in the arid and semi-arid zones of Australia, where such water courses dominate, and where most mining occurs.
- Two acts, the *Environmental Protection and Biodiversity Act 1999 (EPBC Act)* and the *Biodiversity Conservation Act 2016 (BCA Act)* are the key statutes which underpin the regulatory framework for the protection of the natural environment. These acts have recently been reviewed. Both the Independent Review of the Biodiversity Conservation Act 2016 (Henry 2023) and The Independent Review of the Environment Protection and Biodiversity Conservation Act 1999 (Samuel 2021) clearly concluded that regulatory framework for the protection of the environment is inadequate. These reviews also found that biodiversity is declining in Australia and is under imminent threat of continuing decline (Samuel 2021), (Henry 2023),
- In addition to the inadequacies of the *EPBC Act* and the *BCA Act* identified in the reviews the NPA believes that the NSW system for planning approval, established by the *Environmental Planning and Assessment Act 1979 (EP&A Act)* is heavily weighted in favour of the proponent to the detriment of protecting biodiversity and high conservation value ecosystems. The *EP&A Act* applies to nearly all developments in NSW and is the key legislation regulating the approval of development applications for heavy metal and critical minerals mining,
- Arguably the planning system set up under the *EP&A Act* has failed to stem the decline in biodiversity in NSW. The *EP&A Act* needs to be changed to better protect the natural environment. In particular, the *EP&A Act* does not consider the cumulative effects of clearing native vegetation,
- Recently the Independent Planning Commission (IPC 2023) consented to the development of the Bowdens silver, lead, and zinc mine at Lue. We believe that this approval provides an example of the inadequacy of the offset system because the Bowdens silver, lead, and zinc mine was approved based on offsets, but these were not identified or purchased by the proponent at the time of consent. The offsets are required to replace, among other things, 381 ha of habitat currently utilised by koalas and Regent Honey Eaters.

In relation to specific impact themes on biodiversity that are adjacent to or within the catchment of mining actions, and which NPA believes relate to all mining operations:

2. **Habitat Destruction:** The most immediate impact of mining is habitat destruction. Open-cut mining especially can remove large swaths of land and vegetation, leading to direct loss of habitat for numerous species (Mudd, G. M., & Weng, Z. 2012),
3. **Habitat Fragmentation:** Mining can split habitats into smaller patches, isolating populations and potentially leading to local extinctions (Currell, M., & Usher, B. H. 2015),
4. **Water Pollution:** Acid mine drainage, and the leaching of heavy metals and chemicals can contaminate water sources, impacting aquatic biodiversity and potentially moving up the food chain (Gray, D. J., & Delaney, G. M. 2007),

5. **Air Pollution:** Dust from mining operations can affect air quality, leading to respiratory problems in both animals and plants (Bell, M. L., & Davis, D. L. 2001),
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7. **Introduction of Invasive Species:** The movement of machinery and materials can introduce invasive species to an area, which can out-compete and displace native species (Hobbs, R. J., & Humphries, S. E. 1995),
8. **Climate Change:** The greenhouse gases released from mining operations can contribute to global warming, which subsequently affects biodiversity indirectly (Mackey, B., Watson, J., & Hope, G. 2008), and
9. **Cumulative Impacts:** The combined effects of multiple mines, along with other anthropogenic stressors, can lead to cumulative impacts which are greater than the sum of individual impacts (Zerger, A., Gibbons, P., & Davey, S. 2014).

Summary

NPA contends that mining operations pose a significant and ongoing risk to the health of biodiversity and ecosystems across NSW. While NPA expects that mining operations will continue, we believe that that a properly resourced and enhanced regulatory framework is required as per our listed recommendations.

Yours sincerely,

Gary Dunnett
Chief Executive Officer
National Parks Association of NSW
protecting nature through community action

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