



SUMMARY OF KEY FINDINGS

Out of the Ashes II: water pollution and NSW aging coal-fired power stations

Extensive investigations carried out by the Hunter Community Environment Centre, published today in the Out of the Ashes II report expose regulation failures enabling hundreds of tonnes of harmful heavy metals to pollute NSW waterways

Background

- Coal-ash waste is the by-product of coal-burning at power stations, and is Australia's third largest waste stream, accounting for 20% of our total domestic waste.
- All coal-ash dumps and power stations in NSW were built before key environmental laws came into effect.
- Coal-ash contains concentrated heavy metals that when in contact with water, can dissolve and pollute waterways with leachate.
- Some heavy metals are carcinogenic and are linked to global biodiversity decline in fish, frogs and bird populations.

Recommendations

If adopted by the NSW Government, the recommendations of Out of the Ashes II will:

- Slow harmful heavy metal pollution, impacting ecosystems in Lake Macquarie, the Central Hunter Valley and the Upper Cox's catchment
- See an expansion in the beneficial reuse of coal-ash and boost the sustainable manufacturing sector in regional NSW
- Make the full remediation and revegetation of these contaminated sites possible
- The findings of *Out of the Ashes II* are drawn from public, Government and industry data, as well as field investigations completed by the HCEC and concludes that coal-ash management and reuse practices are failing to prevent the contamination of ecosystems with leachate from seven dumps across NSW in Lake Macquarie, Lithgow and the Hunter Valley.

Key Findings

The key findings of Out of the Ashes II, as reported on ABC News are summarised here:

- An estimated **100 tonnes of harmful heavy metals leach into NSW waterways every year, from the 216 million tonnes of accumulated** coal ash waste in Lake Macquarie (101Mt) the Central Hunter Valley (84Mt), Central Tablelands (28Mt) and Wollongong (3Mt).
- If no additional coal-ash reuse occurs in NSW, a **further 45 million tonnes of waste will accumulate, from which 970 tonnes of harmful heavy metals** are expected to leach into waterways
- The **NSW Government is liable** for the bulk of the pollution stemming from coal-ash waste
- Contamination studies from 2014 commissioned by NSW Treasury to quantify pollution levels at coal-ash dumps before the privatisation of the NSW coal-fleet **show extensive groundwater, surface water and sediment contamination with heavy metals at all NSW coal-ash waste sites**. Our analysis suggested that these studies underestimate the contamination levels due to poorly selected and limited background wells.

- Analysis of published water quality monitoring data shows increasing trends for many heavy metals being emitted and **numerous exceedances of Australian Water Quality Guidelines** for species protection, recreational use and livestock and irrigation purposes
- Industry studies into coal-ash toxicity confirm that NSW ash poses environmental risks for **selenium, molybdenum, boron, vanadium, nickel, zinc, and copper**
- Coal-fired power stations are **under-reporting to the National Pollutant Inventory, and evading pollution fees**. Under the Load-Based Licencing Scheme, NSW power stations currently pay a mere \$150,000 a year in pollution fees for water pollution. In order to create an adequate incentive to address the problem we believe NSW power station operators should be paying a combined LBL fee of \$150 million a year for the metals leached from coal-ash waste dumps.

Lake Macquarie & Central Coast: Vales Point & Eraring

- Lake Macquarie has the largest concentration of ash waste in NSW where **101 million tonnes** is stored on its shores
- **45 tonnes** of harmful heavy metals are predicted to leach into Lake Macquarie each year from Eraring and Vales Point, to continue for decades to come
- In addition to annual **estimated 302 tonnes of metals will pollute between now and the retirement of the power stations**
- Limits on the consumption of seafood from Lake Macquarie are already in place due to the bio-accumulation of selenium in fish, and a recent Government study found that cadmium in mud-crab has also reached unsafe concentrations

Vales Point (Delta Electricity)

- Vales Point ash dump is the **largest in the state, containing an estimated 60 million tonnes** of ash waste
- Vales Point ash dump is estimated to have **leached 720 tonnes of heavy metals into Lake Macquarie** since it was commissioned
- If nothing is done to increase ash reuse at Vales Point, between now and its **retirement it will pollute Lake Macquarie with a further 96 tonnes** of harmful heavy metals
- The contamination studies completed for NSW Treasury at Vales Point show exceedances of maximum background concentrations for **zinc, selenium, cobalt, copper, lead, manganese and nickel**, and concluded that **the ash dump is a primary source of arsenic and selenium in groundwater**

- Vales Point have a **reuse rate of about 26% per year and use outdated methods of ash transport** (wetter, rather than dryer) which exacerbates heavy metal leachate pollution
- HCEC's water sampling of drainage from the Vales Point ash dump into Lake Macquarie (Mannering Bay) identified **water quality exceedances of species protection and recreational use limits for aluminum, arsenic, cobalt, iron, manganese, nickel and zinc**
- Vales Point groundwater monitoring shows consistent exceedances of Australian Water Quality Guidelines for **arsenic, copper, iron, lead, manganese, nickel, selenium, and zinc**, and surface water discharge monitoring shows occasional exceedances of **cadmium, copper, and lead**, and consistent exceedances of **selenium**. The trend for discharged **selenium** concentrations is increasing.
- Since Vales Point was commissioned in the 1960s, heavy metals levels in the adjacent Mannering Bay have spiked with cadmium concentrations in sediment increasing by a factor of 15, copper x12, zinc x10, selenium x10 and lead x4

Eraring (Origin Energy)

- With a **reuse rate of 35%**, Eraring has the highest reuse rate in NSW
- Origin Energy's Eraring ash dump is estimated to **contain 40 million tonnes of ash waste, predicted to have leached almost 685 tonnes of heavy metals** into Lake Macquarie since its commissioning
- Just under **205 tonnes of harmful heavy metals are predicted to leach from the Eraring dump** between now and its planned retirement in 2035
- HCEC's water sampling of drainage from the Eraring ash dump into Lake Macquarie (Myuna Bay) identified water quality **exceedances of species protection and recreational use limits for aluminum, boron, cobalt, copper, iron, manganese, nickel and zinc**
- Environmental Protection Licence (EPL) water monitoring data for Eraring shows **exceedances of species protection limits for cadmium, copper and zinc**, and consistently **iron** concentrations five times the recreational use guideline.
- Contamination studies completed for NSW Treasury at Eraring identified **arsenic, copper, lead, nickel, selenium and zinc in groundwater samples** at concentrations in excess of the adopted human health and/or ecological screening values
- Eraring's ash dump is reaching capacity, and in 2019 Origin applied for an ash dam expansion which will only accommodate additional ash until 2024
- The closure of the Myuna Bay Sport and Recreation Centre in 2019 was triggered by the risk of catastrophic collapse of the Eraring ash dam wall in the event of an earthquake

Central Hunter Valley: Liddell & Bayswater

- Around **84 million tonnes of accumulated ash waste is polluting waterways in the Central Hunter Valley** from AGL ash sites
- Each year, a **further 40 tonnes of heavy metal pollution is expected to leach** from the Bayswater and Liddell ash dumps

Bayswater (AGL)

- Bayswater burdens the region with **45 million tonnes** of accumulated ash, from which **860 tonnes** of heavy metals are expected to have leached since its commissioning
- AGL dump Bayswater ash into the unlined Pikes Gully ash dump and a former open-cut mine, now called the Ravensworth Rehabilitation area, both of which ultimately flow into the Hunter River
- Bayswater's **reuse rate is approximately 20%** and the Department of Planning are awaiting more information from AGL about a recently lodged application to increase its ash reuse rate
- Bayswater has the highest ash production of all NSW power stations, and is expected to produce **an additional 19 million tonnes of waste between now and its planned retirement** in 2049, from this additional ash a **further 410 tonnes harmful heavy metals are estimated to leach**
- There is **no requirement to publish groundwater pollution data** under Bayswater's Environmental Protection Licence (EPL)
- Bayswater water quality monitoring data shows an increasing trend and consistent **breaches of the concentration limits for boron and molybdenum** stipulated in the Environmental Protection Licence (EPL)
- HCEC's water sampling of drainage from the Ravensworth Rehabilitation Area and the Bayswater Ash Dam identified **exceedances of water quality guidelines for aluminum, copper, iron and zinc**
- The NSW Treasury contamination study at Bayswater identified **boron, cadmium, copper, lead, manganese, nickel, and zinc in excess of ecological limits in groundwater bores** at the ash dump boundary and perimeter
- AGL dispose of coal-ash in the former Ravensworth mine void, a **practice linked to increased concentrations of heavy metals in groundwater** and still partially utilize outdated wet ash transportation

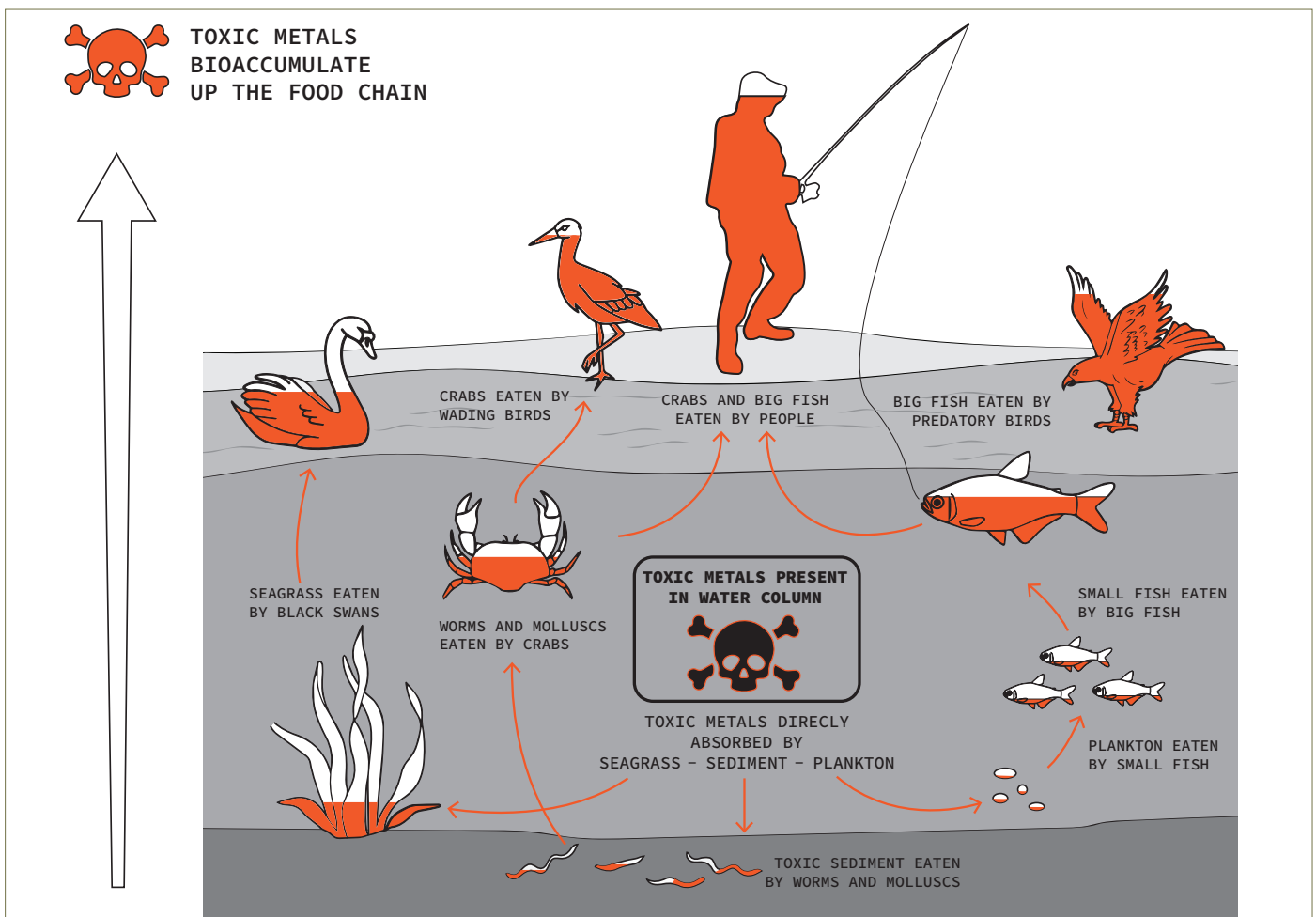
Liddell (AGL)

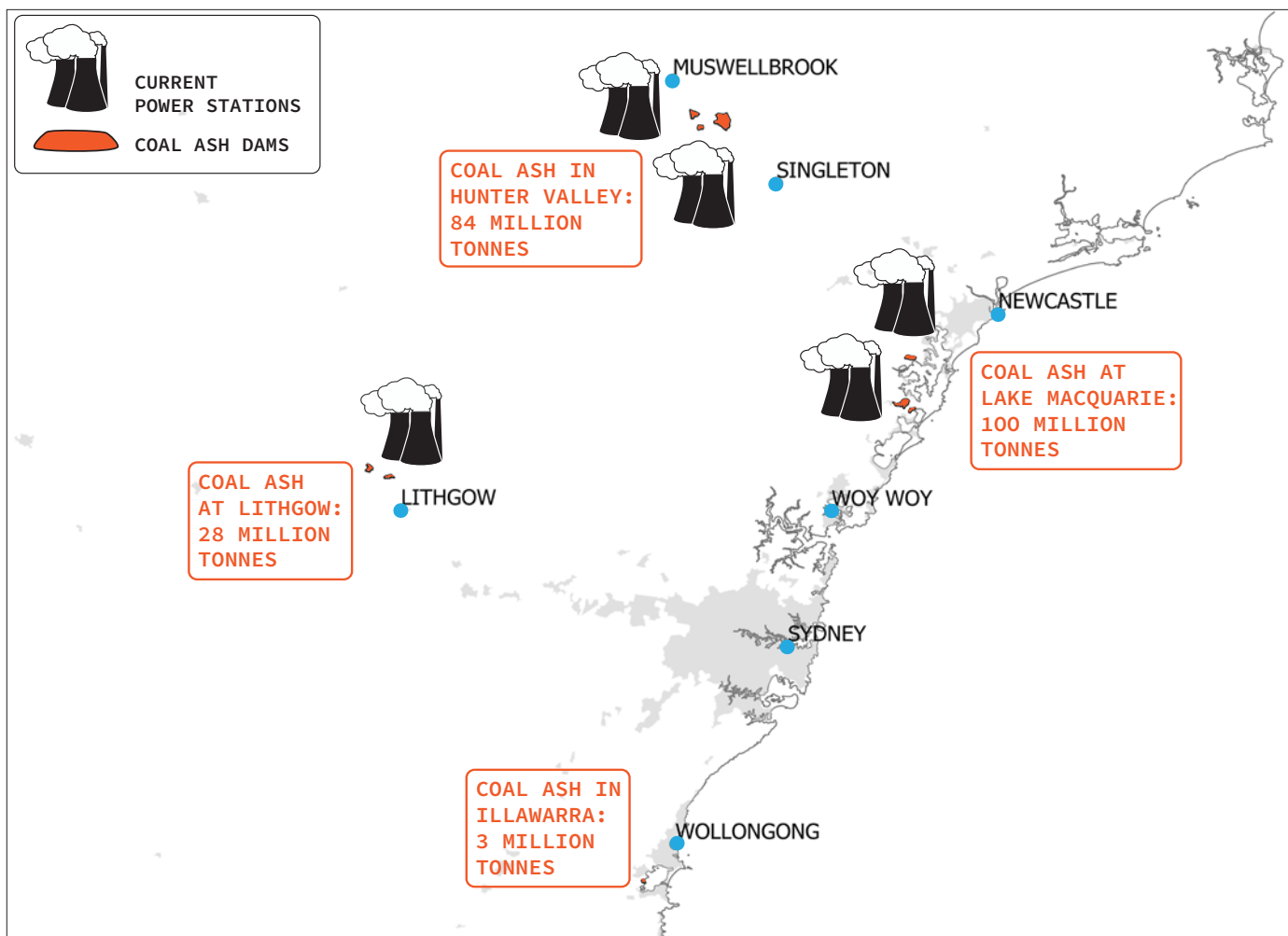
- **Liddell's coal-ash dump contains 39 million tonnes of waste, and is expected to have contributed 760 tonnes of heavy metal leachate to the regions waterways**
- **Liddell is the only power station in NSW that does not beneficially reuse any coal-ash**
- **Between now and its retirement in 2022, Liddell is expected to leach 51 tonnes of heavy metals**
- Environmental Protection Licence (EPL) water quality monitoring data for **Liddell shows increasing trends for cadmium and boron, exceedances of ecological protection limits for zinc, copper, cadmium and boron, as well as irrigation and livestock limits for selenium discharge.**
- Results of HCEC's water sampling of drainage from the Liddell ash dump into Tinkers Creek found **exceedances of species protection limits for aluminum, copper, boron, nickel and zinc; recreational use limits for aluminum and iron and; long-term irrigation limits for boron and iron**
- Sediment analysis from Tinkers Creek showed **very high copper, mercury and nickel deposition, above sediment quality guidelines**
- The NSW Treasury contamination study at Liddell found lead, selenium and nickel in exceeded the recreational
- Laboratory analysis of a black swan feather taken from the shore of Lake Liddell show bioaccumulation of **aluminium, copper, iron, manganese, selenium, and zinc**
- Despite its scheduled decommissioning in 2022, there are **no plans in place to rehabilitate the Liddell ash dump** and prevent continuing leachate from entering waterways

Upper Cox's River: Mt Piper & Wallerawang (Energy Australia)

- **28 million tonnes** of coal-ash is stored in Lithgow, at the top of Sydney's drinking water catchment
- **15 million tonnes** at Mt Piper and **13 million tonnes** at the decommissioned Wallerawang dump contribute **16 tonnes of harmful metals** per year to the Upper Cox's River
- The Mt Piper ash dump uses dry ash-placement, in contrast to the generally wet ash dams in NSW
- Between now and its planned retirement in 2049, **206 tonnes of harmful heavy metals will leach from Mt Piper** if nothing is done to increase reuse rates

- Until this year, **Energy Australia had no obligation to publish monitoring data** for heavy metal pollutants entering the Upper Cox's River, at the top of Sydney's drinking water catchment. Results for a range of metals emitted to surface and groundwater are now required to be published.
- This year, Energy Australia **admitted to the NSW EPA that the Mt Piper ash dump is contaminating groundwater**
- Results of HCEC's water surface water sampling of drainage from Mt Piper and Wallerawang ash sites and the Springvale mine discharge point found significant water quality guideline **exceedances of species protection limits for boron, manganese, nickel, cadmium, copper, zinc; recreational guideline limits for aluminum, boron, cadmium, cobalt, iron, manganese and nickel**
- Exceedances for **arsenic, cadmium, lead, nickel, and zinc** were identified in sediment samples taken by HCEC from four separate sites including Lake Wallace
- The Wallerawang EPL was recently transferred from Energy Australia to Generator Property Management and finally Greenspot. No monitoring for heavy metal pollutants is stipulated in the EPL.
- Lake Illawarra: Tallawara
- The former Tallawara power station ash dump holds **3 million tonnes of coal-ash** which is predicated to have leached **1 tonne** of heavy metals into Lake Illawarra in Wollongong





ACCUMULATED COAL ASH TO DATE
216 MILLION TONNES


CURRENT TOXIC METAL LEACHATE PER ANNUM
100 TONNES

PROJECTED ACCUMULATED COAL ASH AT NSW POWER STATION RETIREMENT
260 MILLION TONNES