

# Review of the environmental aspects of Alcoa's Myara-Huntly Mining & Management Program

8th August 2024



*(Image source: Alcoa) Huntly Mine\_2013.12.12 Excavator loading haul truck*

## Executive Summary

In response to a request from Alcoa, Mandurah Environment and Heritage Group (MEHG) engaged with Alcoa with regard to Alcoa's proposed updates to the Myara-Huntly Draft 2025 – 2029 Mining and Management Program (MMP) ahead of Alcoa submitting the MMP to the State Government for review and approval.

MEHG agreed to provide

1. feedback on whether Alcoa's MMP clearly and adequately sets out how Alcoa will identify, minimise and manage potential environmental and social impacts; and
2. insights into how Alcoa can refine and improve their operations to meet evolving expectations.

For this review MEHG considered:

1. the literature published by Alcoa with regard to the environmental research and strategies under their current MMP,
2. relevant legislative requirements, and
3. the in-situ practices currently being implemented by Alcoa.

From these investigations MEHG concluded, that although Alcoa has recently undertaken a number of environmental improvements and pledged to make further improvements, these improvements are not being adopted quickly enough and there are a number of areas where Alcoa could, and should, make additional urgent changes.

The following environmental areas require Alcoa's urgent attention:

- Management and protection of flora and fauna (incorporating management of pests)
- Revegetation methodology and diversity, including topsoil improvement
- Animal habitat re-creation in revegetation areas
- Animal and environmental ethics (form an Ethics Committee to guide operations)
- Management of climate change impacts on rehabilitation schedules
- Carbon calculations and offsetting
- Protection and enhancement of rehabilitated areas
- Protecting drinking water
- Reducing impact on forests
- Operating in line with EPA assessment and approval process and best practice methodology (modernising approvals)
- Refinery infrastructure improvements to protect the Swan Coastal Plain (Binjareb region)

*Citation details: Roennfeldt R-L and R Ackroyd.*

*'Review of the environmental aspects of Alcoa's Myara-Huntly Mining & Management Program'. Mandurah Environment and Heritage Group. 8th August 2024. Pp 20.*

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## PART A: Brief & Appointment of Representatives

Mandurah Environment and Heritage Group (MEHG) was approached by Alcoa to undertake meaningful engagement with regard to the proposed updates to the Myara-Huntly Draft 2025 – 2029 Mining and Management Program (MMP) ahead of Alcoa submitting the MMP to the State Government for review and approval.

The 2025-2029 MMP includes where Alcoa plans to mine during those five years, as well as a 10-year outlook.

We agreed to engage with Alcoa and provide:

1. feedback on whether Alcoa's MMP clearly and adequately sets out how Alcoa will identify, minimise and manage potential environmental and social impacts; and
2. insights into how Alcoa can refine and improve their operations to meet evolving expectations.

(collectively, “the **Brief**”)

The MEHG Committee appointed members Dr Ben Roennfeldt and Robyn Ackroyd to undertake the research, consultation and reporting process required by the Brief.

## PART B: Preliminary Readings and Investigations

Between May to June 2024, MEHG undertook comprehensive study of the relevant materials published on Alcoa website and supplementary material provided from Alcoa by email.

On 14 June 2024, MEHG met with Alcoa representatives Georgia Haines (Community Relations & Communications Advisor | Huntly Bauxite Mine) and Beth Butler (Community Relations Officer | WA) to seek additional information and data on various discussion topics. *[Refer to Minutes from the meeting at Attachment 1]*

On 11 July 2024, MEHG attended an extensive site visit to Alcoa's operation localities. The morning was spent at the Huntly/Myara area with Andrew Richardson (Environmental Superintendent), Mitch Brown (Rehabilitation Supervisor) and Georgia Haines (Community Relations & Communications Advisor). The afternoon was spent at the Pinjarra Refinery area with Ben Miles (Environmental Manager Pinjarra Refinery)

## PART C: Map of Alcoa Lease and Mining Areas



(Image source: Alcoa.)

## PART D: Relevant Legislative Requirements

In December 2023, the WA Environmental Protection Authority (EPA) notified Alcoa that it would be conducting an [Environmental Impact Assessment](#) into Alcoa's existing and future bauxite mining operations on the Darling Range. (Refer to map on previous page)

State and Commonwealth assessments would run in parallel led by the EPA.

(collectively the “**Environmental Assessment**”)

MEHG welcomes the Environmental Assessment and fully supports measures to ensure Alcoa:

- operates in line with EPA assessment and approval process,
- modernises its three WA State Agreements; and
- keeps abreast of national and world best practice methodology.

As part of the Environmental Assessment:

- a. Alcoa is preparing an Environmental Review Document to submit to the regulators; and
- b. Alcoa's future Huntly mining and Pinjarra refining activities are to be assessed through a Public Environmental Review.

[Refer to [Factsheet - Pinjarra Huntly Environmental Assessment](#)]

MEHG's contribution to the Environmental Assessment is as a key stakeholder providing feedback to Alcoa about its mine management operations for Alcoa's Draft 2025 – 2029 MMP and Environmental Review Document.

During the Environmental Assessment, Alcoa is operating under [Section 6 Ministerial Approval Conditions for 2023-2027 MMP](#) (“**Section 6 Approval Conditions**”).

MEHG endorses the Section 6 Approval Conditions and commends Alcoa on the following initial improvements made with regard to transparency and community input:

- Publishing Mine Management Plans and collating and sharing expanded monitoring data on its [website](#)
- Keeping the public informed through factsheets eg [Alcoa Approvals Fact Sheet](#)
- Encouraging public feedback eg [Pinjarra-huntly-environmental-assessment/have-your-say](#)
- Commissioning a peer review of Alcoa's current and proposed rehabilitation methods and Alcoa's success to date of rehabilitation in the Pinjarra-Huntly mining areas.

The Peer Review was prepared in November 2023 and MEHG fully endorses the recommendations made in the document. [Refer to [Peer Review on Rehabilitation of Alcoa Jarrah Forest](#)]

In addition to the above endorsements, MEHG makes its own specific comments and recommendations in the following pages.

## PART E: Review & Recommendations

### 1. Alcoa's Forest Research Centre

We commend Alcoa on establishing the [Forest Research Centre](#). In addition, it is recommended that an **Alcoa Conservation Foundation** be established, to offset the destructive environmental practices required during bauxite mining and aluminium production, both onsite and offsite (Figure 1). This will account for the large carbon and environmental footprint of the operation, which extends far beyond the current mining area and includes operational farms, the Pinjarra Refinery and on-site power plants (Figure 1).



Figure 1 Land clearing and mining areas of Myara-Huntly sites in the Darling Range, WA. (Google Maps, accessed 12/07/2024)

### 2. Future timber production versus conservation areas.

There is concern that the revegetation areas are being considered for future logging onsite. Ideally areas would be set aside as conservation areas, post mining.

### 3. Habitat mounds

- 1 habitat mound per hectare is not enough.
- Habitat mounds need to consider predators and prey, and be complex in design to accommodate a large range of creatures.
- Recommend scientific studies into the optimum structure of a habitat mound.
- Recommend a chain of large and small habitat mounds (per ha) linked by dense undergrowth bushes and shrubs, including ground cover species.
- Habitat mounds should be built just before replanting or redistributing topsoil containing provenance seed (this is not occurring in current replanted areas).
- Connectivity for animals with denser undergrowth is needed between habitat mounds, to avoid predation on small mammals and reptiles.
- Notably quendas don't move further than 5 meters from dense undergrowth, or risk predation.

#### 4. Rate of re-growth

- Recovery not as quick as expected in most long-replanted areas (likely due to nutrient availability).
- Aerated/organic topsoil is clearly missing and is only starting to establish with organic matter building up in farrow gutters in the 20+ year old re-growth areas.
- Experiment to see if additional organic matter will add to better re-growth, is a good initiative. Need to assume a good outcome and proceed to add organic matter in other sites, as previous 21 year old regrowth and other 8-10 year old regrowth is slow in most locations (all Jarrah-Marri dominated).
- Mycorrhizal fungi are clearly not established in the revegetated areas and are necessary to aerate the soil and improve water permeability. The forest community cannot function properly without the decomposers, which provide food and water to tree roots. Further additional organic matter is required to condition the topsoil to establish mycorrhizal fungi.
- The current methods of regeneration rely on the survival and growth from the natural seed bank within relocated topsoil. This is only partially successful and requires the planting of established native plants from nurseries, which will then provide shade throughout the warmer months, for the developing seedlings. This has been a very successful method for planting throughout the Gondwana link in SW WA.
- Deep leaf litter was found important to reptile recolonization, taking up to 10 years to re-establish (Append 12). *Can leaf litter be diverted to rehabilitation sites to increase habitat regeneration on the forest floor?*

#### 5. Density of re-growth

- 21 year old re-growth area understory is not established and still needs additional planting to better establish the understory.
- Recommend adding wood chips manually into areas to provide additional soil conditioning and carbon/moisture retention in farrowed old regrowth areas.
- Planting requires an understanding of the species using the plants. We recommend clumping of Sheoak species to improve natural wind pollination, and other species (such as Acacias) to provide safety and nest sites for small birds. Prickly plants (i.e. *Acacia pulchella*, *Hakea spp.*) protect from foxes and cats and are important roosting and nesting sites when in dense stands.
- The plant species, plant densities and soil profiles/condition at re-growth areas should be matched to, and replicate from, the old growth unaltered reference sites (prior to logging) nearby.
- We highly recommend that old growth (marri-jarrah forest) unaltered reference sites should be retained in areas of mining to improve re-establishment of plants and animals and to provide a comparative a reference points and important established zones within wildlife corridors within each 1ha. These will be particularly important for expansive mining areas.

#### 6. Plant species arrangement with regard to significant plant species

- The re-vegetation does not include manual translocation of orchids and other significant species. These are not re-establishing during topsoil relocation (Andrew Richardson, Alcoa). It is recommended that these be located within the flowering season from areas earmarked for clearing, then prior to earth commencing works, manually relocate these plants to old re-growth areas with sufficient soil and organic matter and matching the aspect and level of shade/cover.



- Translocation of sundews into old re-growth areas where afternoon shade and moisture are available. Bulbs can be greater than 30-40cm below the soil, joined to the plant by a thin thread.

## 7. Reptile Mounds

- Dirt and small rocky mounds are recommended for reptiles to borrow into. They should be placed in shaded and semi-exposed and full sun for breeding and hibernation site selection.
- There is a lack of coarse woody debris in re-established areas for reptiles to live and shelter beneath. This needs further attention.

## 8. Mining and clearing methods

- Strip mining is likely to be much better for ecological rehabilitation than expansive mining in a region (as per Figure 2).
- New regulations to increase the vegetation strip between mining operations and the water's edge at Serpentine Reservoir and North Dandalup Dam, by 1 km, are an improvement. Figure 2 indicates mining operations were getting closer to the impoundments thereby increasing the risk to aquatic life and the aluminium concentration in water. Aluminium concentrations in water impoundments are naturally high due to the surrounding geology, however, run-off from mining areas increases the threat of high Al concentrations in potable water supplies, and to drinking water for wildlife.
- Aluminium as a soluble heavy metal is particularly dangerous and usually lethal to aquatic life at lower pH levels (< 6), even in very low Al concentrations, with toxicity increased as water temperature increases (Gensemer & Playle 1999; Reference [link](#)). To add, neurotoxic effects also impact humans and animals who consume Al enriched water, therefore soluble aluminium additions into reservoirs, with runoff and operational airborne dust movement, should be avoided when mining nearby, and buffer zones and water diversion and pre-treatment by diverting water through constructed wetlands. Vast amounts of literature are available from around the world.

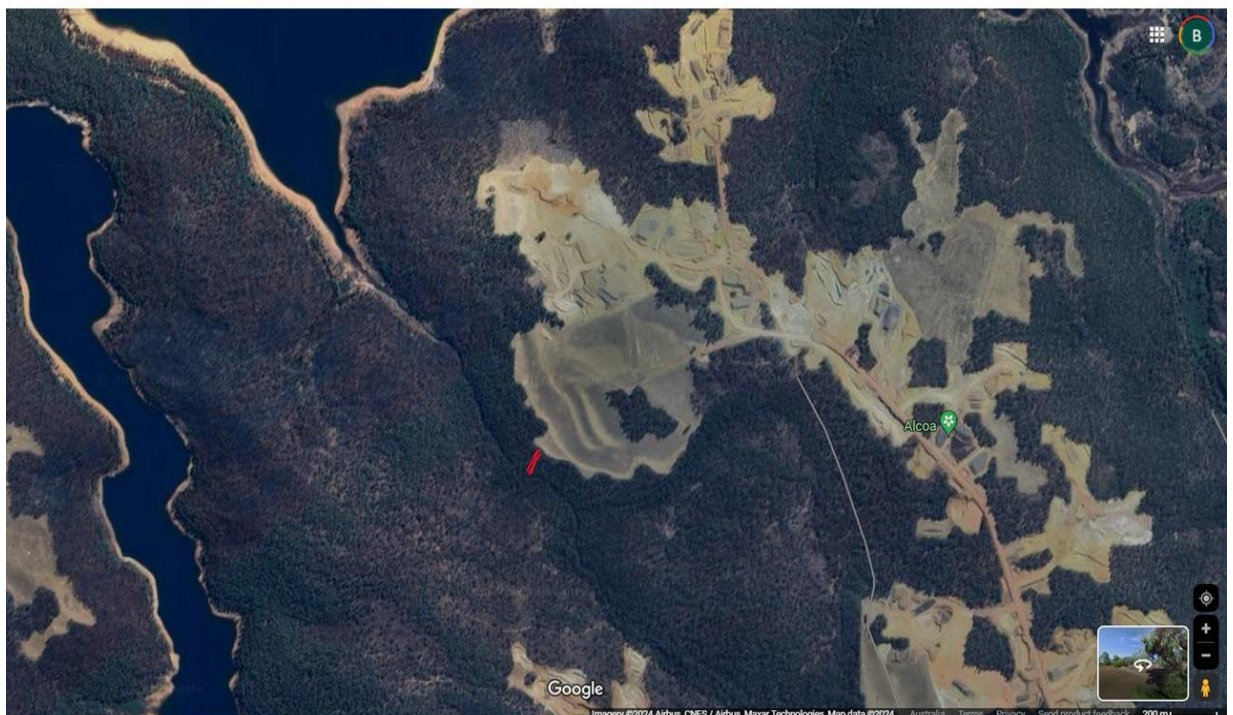


Figure 2 Serpentine Dam and nearby mining operations within 100m (red line) of feeder tributaries (Google Maps, accessed 12/07/2024).

## **9. Carbon Calculations and Offsetting (Alcoa's Global Responsibility)**

Global responsibility with carbon emission and reduction and greenhouse gas reduction, should be a priority calculation. Calculations should be made to report the true impacts at a local and global level, caused by mining and refinery operations at Myara-Huntly/Pinjarra.

Carbon emission calculations should be region specific, and include:

- Natural carbon sequestration and storage losses, due to deforestation
- Operating three power stations (incl. gas fired) at the Pinjarra refinery (15% of SW WA's Power use)
- Trains
- Trucks
- Company vehicles
- Contractors and equipment working on site
- Prescribed burns and natural bushfires
- Conveyor operation

Carbon sequestration and reduction calculations, should include:

- Revegetation zones within mine sites
- Growth rates within plant species
- Predicted growth rates with climate change
- Regrowth following prescribed burns and natural bushfires
- Offsetting using revegetation sites (highly recommended/needed)
- Conveyor use and energy production

Other Alcoa greenhouse gas emissions, include:

- Farm management and cattle production (methane) in refinery and mining buffer zones

Carbon offsetting using additional Alcoa managed properties away from the mining site are recommended. Considering Alcoa's Pinjarra Refinery is located on the Swan Coastal plain (SCP), and farmland on the SCP is being used for beef cattle production, there is justification for establishing conservation areas on the SCP, where community groups can access and aid in re-generation rewilding.

## **10. Introduced and native animal management**

- With such a large area under Alcoa management, feral pigs, deer, foxes, cats, and other introduced species need better management plans and action. Employing licenced shooters or trappers might be needed. The current pest management plan is not effective and re-vegetation sites are being impacted. Baiting should be used cautiously due to the presence of quendas and quolls.
- The lack of established understory habitat in revegetation sites will be increasing small animal predation efficiency by foxes and cats.
- Native animals, such as emu's and kangaroos, are impacting re-vegetation sites by following provenance seeding and seedling development respectively. This is having an impact to the overall potential recovery of re-vegetation sites, therefore additional methods, such as fencing, needs to be implemented to exclude native animals where possible. Additional manual seeding and planting will also be needing upscaling to re-establish vegetation to obtain adequate density and a natural profile.

- Disease monitoring and reporting in native animals is essential throughout the extensive mine site area. [Scarpotic mange](#) spreading through the southwestern Brown bandicoot (Quenda) populations residing in the Darling Scarpe is a current concern, requiring monitoring and potential management.

## 11. Ethical Caustic Lake and Pinjarra Refinery Management

- The caustic lake has a pH of 10-13, which is a death sentence for any animal or bird being exposed to the caustic water.
- Kangaroos and birds only occasionally are exposed to the caustic water.
- It was reported that only a single bird landed in the lake in the past 12 months. However, because the caustic lake is unable to be protected from birds and animals, we recommend cameras be installed to monitor and enable early detection as they enter the lake. The outcome of monitoring can then be used to make an informed assessment of the impact on birdlife.
- Proper reporting on mortalities, and best practice guide rapid removal and euthanasia are required.
- We recommend investigating and employing bird scaring technologies and fencing the area to remove access by small mammals, macropods and emus to the caustic lake.
- In addition, there is concern that the bauxite tailings dams have bank instability risks, increased due to the added requirement to accept more tailings resulting from the current need to extract alumina from lower grade bauxite (Figure 3).

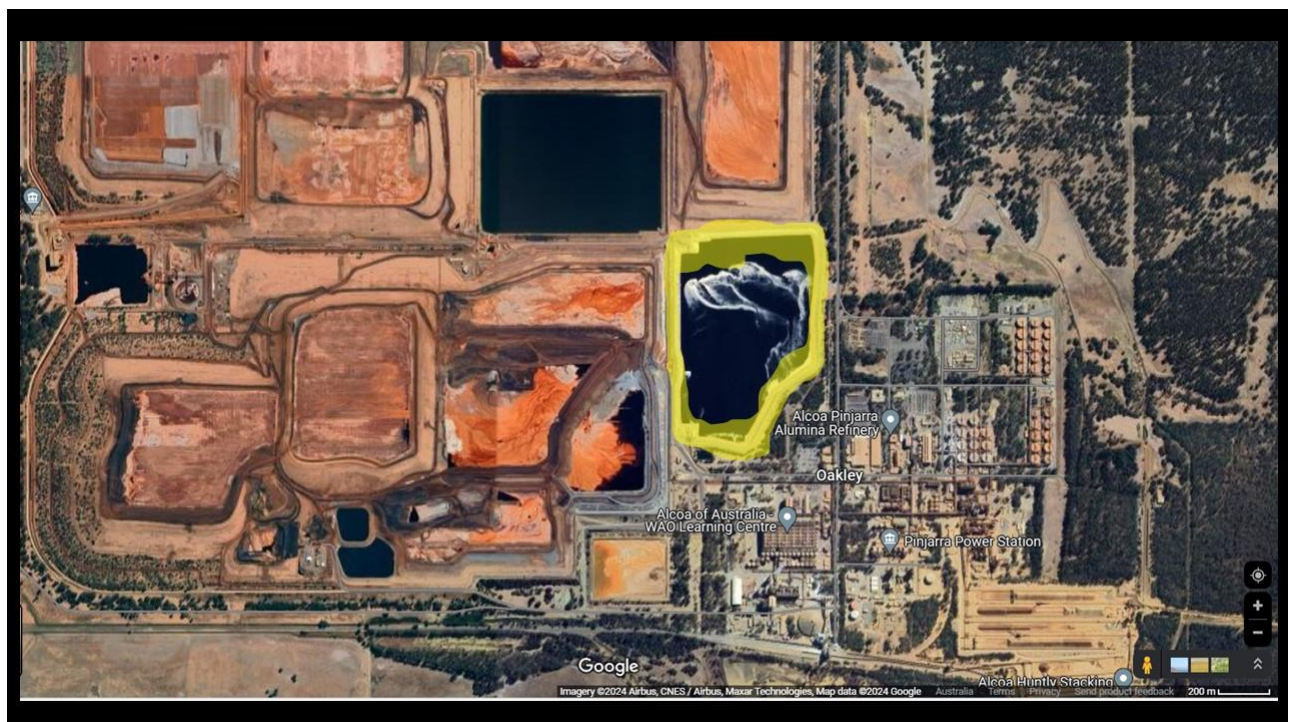


Figure 3 Location of the caustic lake (yellow outline) which forms a critical part of the Pinjarra Refinery and poses a threat to wildlife.

- Investigation of current technologies to sure-up pond walls further, is considered important for the safety of the Swan Coastal Plain and its waterways, and Alcoa are requested to proactively employ new engineering technologies to avoid potential disaster. Monitoring wall movement is not considered a preventative measure. Risk mitigation measures need to be in place should a disaster occur.

- Further, PFAS use in the region is discouraged, as the effects of these chemicals used in fire retardants, have long lasting environmental impacts to ecosystems, people and fauna. There is also high concern among senior members of the science community about the impacts of PFAS in the region (e.g. Link: [ABC 2023](#)).

## 12. Threats to regenerative and natural areas

- Threats within the mining area include:
  - Polyphagus shot hole borer in native plant species
  - *Phytophthora cinnomomi* in susceptible trees and shrubs
  - Native and introduced animals
  - Wildfire/bushfire, premature prescribed burns (areas under 10 years post re-establishment)
  - Dry hot summers and low survival of plants in regeneration sites, and impacts of water diversion and landscape alteration resulting from mining operations to natural and revegetated areas.
- Tree mortality due to climate effects
  - Hot and dry summers are likely to continue and tree losses in the darling scarp are likely to increase over time.
  - *What strategies are in place to protect revegetation sites regarding planting methods and timing?*
  - *What strategies are in place to replace dead vegetation in re-vegetation sites?*

## 13. Identifying and managing Animals and plants of National Significance

- A list of Nationally Significant Plants and Animals which might be found in the area, is provided as Table 4.1 and Table 4.2 respectively in Alcoa’s [Environmental Referral Supporting Document \(June 2020\)](#).
- *What Significant animals and plants from these tables have been identified on the current and proposed mine sites, and are there any new additions to the list?*

**Table 1-3: Site specific environmental values and potential impacts**

Region specific terrestrial fauna values	Impacts to region specific environmental values
<ul style="list-style-type: none"> <li>• Three species of black cockatoo and associated habitat</li> <li>• Chuditch and associated habitat</li> <li>• Quokka and associated habitat</li> <li>• Woylie and associated habitat</li> <li>• Carters’ freshwater mussel and associated habitat</li> <li>• Priority listed and other conservation significant fauna and associated habitat</li> </ul>	<ul style="list-style-type: none"> <li>• Direct loss of conservation significant fauna individuals</li> <li>• Direct loss of habitat</li> <li>• Behavioural changes in individuals to avoid areas previously used for foraging or breeding.</li> <li>• Decline in health and/or change in habitat composition</li> <li>• Habitat fragmentation</li> <li>• Disruption to breeding cycles</li> </ul>

CF- Fauna Management Plan Huntley and Willowdale Mines (Appendix 12, Alcoa)

- *What aquatic fauna surveys have been completed, and what water quality monitoring has been implemented, with aquatic fauna in mind?*

#### 14. Mining operations and water quality, including sedimentation, pH, heavy metals, dissolved oxygen levels and salinity.

##### Serpentine Reservoir plus catchment.

Prevent impacts to *W. carteri* pop'n.

- Small native fishes required for *W. carteri* breeding cycle
- *Aquatic species present?*

##### Nth Dandelup Dam plus catchment

- *Aquatic species present?*
- Rate of habitat re-establishment and methods for fast tracking works.

#### 15. More in-depth risk analysis is required.

Currently Risk Analysis has only been completed in a general manner. Risk Analysis should be undertaken for all Significant species **individually** that are identified within the current and prospective mining sites and impacted waterways, including:

Three Black Cockatoo species:

- Baudin's Cockatoo (*Zanda baudinii*) – Endangered
- Carnaby's Cockatoo (*Zanda latirostris*) – Endangered
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) – Vulnerable

Other species:

- Woylie (*Bettongia penicillata ogilbyi*) – Endangered
- Carters Freshwater Mussel (*Westralunio carteri*) – Vulnerable
- Quokka (*Setonix brachyurus*) – Vulnerable
- Chuditch (*Dasyurus geoffroii*) – Vulnerable
- Brush Tailed Phascogale (*Phascogale tapoatafa*) – Vulnerable
- Masked Owl (southwest) (*Tyto novaehollandiae novaehollandiae*) – Priority 3
- Southern Death Adder (*Acanthophis antarcticus*) – Priority 3
- Western False Pipistrelle (*Falsistrellus mackenziei*) – Priority 4
- Rakali, Water-rat (*Hydromys chrysogaster*) – Priority 4
- Quenda (Southern Brown Bandicoot) (*Isodon fusciventer*) – Priority 4
- Western Brush Wallaby (*Notamacropus Irma*) – Priority 4
- Dell's Skink (*Ctenotus delli*) – Priority 4
- Peregrine Falcon (*Falco peregrinus*) – Other Specially Protected
- Carters Mussel (*Westralunio carteri*) - Threatened (Vulnerable) (Serpentine Reservoir)
- Western Ring-Tail Possum (*Pseudocheirus occidentalis*) - Critically Endangered (found in in Jarrah-Marri Forest- present?)

Areas to include in individual species risk analysis (in addition to current risks identified):

- feeding habitat (including understory/or tree canopy density)
- breeding habitat (animals and plants)

- safe migration and habitat connectivity (including understory/or tree canopy density)
- water availability and quality
- revegetation and habitat maturity timeframes
- territories and range
- relocation (manual or by displacement due to works; appropriate new territories and range)

There is a lack of information around ecological relationships available in Appendix 12, including food webs and ecosystem functions. This information is considered essential for mine site revegetation and habitat re-establishment.

*What is the extent of surveys?* Diurnal and nocturnal, aquatic and terrestrial (invertebrates, fishes, mammals, birds), each terrestrial habitat type (given in Table 1-5; Appendix 12), *and timeframes between scheduled fauna surveys?*

**Table 1-5: Extent of fauna habitat within the Huntly and Willowdale Mines**

Description	Extent within Huntly Mine (ha)	Proportion of Extent within Huntly Mine (%)	Extent within Willowdale Mine (ha)	Proportion of Extent within Willowdale Mine (%)
<p><b>Blackbutt Forest</b> Blackbutt open forest with occasional Bullich, and Marri over sparse <i>Banksia littoralis</i> over <i>Trymalium</i>, <i>Macrozamia</i>, <i>Xanthorrhoea preissii</i>, over <i>Lepidosperma tetraquetrum</i>, <i>Astartea scoparia</i> and areas of dense Swamp peppermint (<i>Taxandria linearifolia</i>). This habitat is limited to localised patches often associated with creeks and drainage lines. Disturbance factors include frequent fire, feral pigs, dieback, trail bike and 4WD.</p> <p><b>Habitat for conservation significant species:</b> Core habitat for Western Brush Wallaby, Quenda, Quokka, Woylie, Chuditch and Western False Pipistrelle. Breeding and roosting habitat for all three Black Cockatoo species with moderate foraging to Forest Red-tailed Black Cockatoo.</p>	2,790.6	2.8%	923.6	1.6%
<p><b>Bullich forest</b> Valleys and drainage areas dominated by Bullich (<i>Eucalyptus megacarpa</i>) and with some Blackbutt (<i>E. patens</i>), occasional Marri (<i>Corymbia calophylla</i>), over Sheoak (<i>Allocasuarina fraseriana</i>), <i>Banksia littoralis</i> over Grass trees (<i>Xanthorrhoea preissii</i>), Bracken fern, patches of dense <i>Gahnia trifida</i> shrubland over <i>Lasiopetalum floribundum</i>, sedges and herbs. Substrate is dark clayloam soil. These areas are associated with seasonal creeks and drainage areas. Disturbance factors include frequent fire, feral pigs, dieback.</p> <p><b>Habitat for conservation significant species:</b> Core habitat for Black Cockatoos (all three, breeding and roosting with limited foraging), Chuditch, Quokka, Woylie, Quenda, Western Brush Wallaby, Masked Owl, Brush-tailed Phascogale and Western False Pipistrelle.</p>	3,317.2	3.4%	1,249.7	2.2%
<p><b>Flooded Gum woodland</b> Flooded Gum (<i>E. rudis</i>) open woodland with occasional Blackbutt, over open to open to sparse <i>Banksia littoralis</i> over Prickly Moses (<i>Acacia pulchella</i>), myrtaceous species such as Swamp peppermint (<i>Taxandria linearifolia</i>), <i>Astartea scoparia</i> <i>Trymalium odoratissimum</i>, low shrub/sedgeland. Substrate varies from dark grey to grey brown sandy clays. Associated with</p>	2,969.9	3.0%	446.3	0.8%

Description	Extent within Huntly Mine (ha)	Proportion of Extent within Huntly Mine (%)	Extent within Willowdale Mine (ha)	Proportion of Extent within Willowdale Mine (%)
poorly drained broad valleys forming seasonal swamps and occasionally tall open forest along drainage lines. Disturbance factors include frequent fire, feral pigs.  <b>Habitat for conservation significant species:</b> Core habitat for Chuditch, Western Brush Wallaby, Quokka, Woylie and Quenda for which it will also provide refuge and movement corridors. Foraging and roosting habitat for all Black Cockatoos. Breeding habitat for Carnaby's Cockatoo limited for others.				
<b>Granite outcrop</b> Granite outcrops with associated lithic vegetation complexes and adjacent associated fringing open Jarrah and Marri areas with scattered Sheoak, Melaleuca, <i>Banksia ilicifolia</i> over occasional Grass trees over mixed open heath communities of Myrtaceous and Proteaceous low shrubs. Soils are pale grey to yellowish fine sand or sandy clay. Granite outcrops often associated with seasonal watercourse and seasonally damp areas. This habitat found as localised patches throughout the Survey Area. Disturbance factors include frequent fire, feral pigs, dieback, damage caused by rock removal, trail bike and 4WD on granite.  <b>Habitat for conservation significant species:</b> Foraging and denning habitat for Chuditch. Habitat for Western Brush Wallaby, Southern Death Adder, and Dell's Ctenotus. Fringing open forest provides foraging and potential breeding habitat for Black Cockatoo species.	1,513.5	1.5%	87.0	0.2%
<b>Jarrah – Marri forest</b> <i>E. marginata</i> and <i>C. lasiophylla</i> open forest over Grass trees ( <i>Xanthorrhoea preissi</i> ), <i>Lasiopetalum floribundum</i> , <i>Macrozamia</i> mid shrubland. Patches have dominance of understory <i>Allocasuarina fraseriana</i> and <i>Banksia grandis</i> . Often with complex mosaic of low shrubs such as Fabaceae, <i>Hibbertia</i> , <i>Leucopogon</i> , <i>Adenanthos</i> , and <i>Pteridium</i> . This is the most extensive habitat identified and comprises a number of vegetation types dominated by Jarrah on upper, mid and low slopes and broad valleys. Soils range from well drained gravely sand to sandy clay loam. Historical logging is a significant disturbance factor: extensive areas of forest are at varying ages of regeneration. Other disturbances include frequent fire (significant), feral pigs, dieback, trail bike, 4WD and dumped rubbish including weed plants.	52,974.1	53.6%	11,926.0	20.9%

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	(ha)	(%)		
<b>Habitat for conservation significant species:</b> Core habitat for Chuditch, Brush-tailed Phascogale, Western Brush Wallaby, Peregrine Falcon, Masked Owl, Western False Pipistrelle, Dell's Skink, Southern Death Adder. Foraging and potential roosting habitat for all three locally occurring Black Cockatoo ( <i>Calyptorhynchus</i> ) species. Breeding habitat for all three Black Cockatoo species. Quokka may use dense area of Jarrah Marri Forest for foraging and dispersal.				
<b>Melaleuca dampland</b> Paperbark ( <i>Melaleuca preissiana</i> ) over sparse isolated <i>Banksia littoralis</i> over open <i>Hakea</i> , occasional Woody Pear ( <i>Xylomelum</i> ), Grass trees and over mixed shrub layer of Cyperaceae, Restionaceae, <i>Babingtonia</i> , <i>Jacksonia</i> and <i>Acacia</i> , over low shrubs, sedges and herbs. There are areas of sparse to occasional stunted Jarrah and Marri however these are limited to lowland transitional zones adjacent to slightly higher elevation and drainage open forest areas. Generally limited to areas of poor drainage and subject to winter inundation such as broad valleys and swamps. Substrate is grey gravely clay and clay loam. Disturbance factors include frequent fire and feral pigs.  <b>Habitat for conservation significant species:</b> Western Brush Wallaby, Western False Pipistrelle. Foraging habitat for all three locally occurring Black Cockatoo ( <i>Calyptorhynchus</i> ) species although Jarrah and Marri are generally stunted and sub-optimal for potential breeding habitat. Where creek lines or dense vegetation is present Quokka and Quenda reside.	931.8	0.9%	41.8	0.1%
<b>Mine rehabilitation</b> Mine rehabilitation of the Huntly and Willowdale Mines of varying ages. Areas of age greater than 8 years provide foraging habitat for Black Cockatoo species but lack trees of suitable age (trunk diameter) to have developed hollows of sufficient diameter and depth to be considered potentially suitable breeding trees for Black Cockatoos. These areas also provide continuity of forest or woodland connectivity allowing fauna movement and foraging habitat for a range of species ground such as terrestrial reptiles, birds, small mammals.  <b>Habitat for conservation significant species</b>	13,767.3	13.9%	5,082.9	8.9%

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Description	Extent within Huntly Mine (ha)	Proportion of Extent within Huntly Mine (%)	Extent within Willowdale Mine (ha)	Proportion of Extent within Willowdale Mine (%)
Research indicates use of mine rehabilitation within 2 years of establishment for Chuditch and Quenda, 4-5 years for Western Brush Wallaby, by Quokka (varying ages) and within 4-7 years for foraging by Black Cockatoos				
<b>Cleared areas</b>	329.0	0.3%	-	0.0%
<b>Sub-Total</b>	<b>4,784.7</b>	<b>4.8%</b>	<b>1,657.2</b>	<b>2.9%</b>
<b>Unsurveyed</b>	<b>83,378.3</b>	<b>84.4%</b>	<b>21,414.5</b>	<b>37.6%</b>
<b>Total Area</b>	<b>15,400.7</b>	<b>15.6%</b>	<b>35,597.6</b>	<b>62.4%</b>

CF- Fauna Management Plan Huntley and Willowdale Mines (Appendix 12, Alcoa)



## PART F: Conclusions & Taking Action

### 1. Conclusions

In line with Section 6 Approval Conditions set by the State Government, Alcoa has undertaken the following environmental improvements / commitments:

- PROTECTING DRINKING WATER
  - \$100 million guarantee that operations will not impair drinking water supplies
  - Ceased clearing for mining and mining within 1km of public drinking water reservoirs within the mine plan area
  - No new clearing at more than 16% average mine pit slope within 2km of public drinking water reservoirs
  - Enhancing water monitoring and drainage controls and contributing to catchment-wide risk management
- REDUCING IMPACTS ON FORESTS
  - Capped clearing at 800 hectares per annum across their two mines
  - Relinquished more than 1,200 hectares in previous clearing approvals
  - Doubling current rehabilitation rates by 2027 to more than 1,000 hectares per annum, exceeding the rate of new clearing
  - Prioritising rehabilitation in areas considered vulnerable
  - Changing mining practices to accelerate rehabilitation of mined pits
  - Working with stakeholders on new Rehabilitation Completion Criteria
  - Working with the State Government to return rehabilitated areas
- MODERNISING APPROVALS
  - Referring all new mining regions to the Environmental Protection Authority's contemporary approvals process
  - Collaborating with the State to modernise their three State Agreements
- PROTECTING PEOPLE & CULTURAL HERITAGE
  - Forgoing mining around the forest towns of Dwellingup and Jarrahdale to provide better protection for lifestyle and recreational values
  - Co-developing a Cultural Heritage Management Plan with Traditional Owners

While MEHG considers these are good first steps for Alcoa to transition to operating in line with EPA assessment and approval process and best practice methodology, as outlined in PART E above, Alcoa also need to make improvements in:

- a) Management and protection of flora and fauna (incorporating management of pests)
- b) Revegetation methodology and diversity, including topsoil improvement
- c) Animal habitat re-creation in revegetation areas
- d) Animal and environmental ethics (form an Ethics Committee to provide leadership)
- e) Management of climate change impacts on rehabilitation schedules
- f) Carbon calculations and offsetting
- g) Protection and enhancement of rehabilitated areas

- h) The aspects of rehabilitation referred to in the 2023 [Peer Review on Rehabilitation of Alcoa Jarrah Forest](#)

## 2. Taking Action

### a) Meeting Evolving Expectations

The public no longer view it as acceptable that mining companies are complacent about, or seek exemptions from, legislative or best practice requirements. Rather, there is an evolving expectation that mining companies not only meet the legislative requirements but are also proactive in seeking to operate under best practice methodology to:

- minimise impacts on the natural environment;
- eliminate or mitigate risk to people, flora and fauna;
- maximise the efficient use of the resources that are mined or become waste products;
- play a role in the education of, and adoption by the public in recycling / reusing / reducing the consumer product produced from the resource being mined.

While the public acknowledge that mining bauxite is necessary to produce resources essential for everyday use and future green products and technology, there is an increased public concern that Alcoa is not meeting these evolving expectations.

Alcoa needs to take urgent action for the implementation of the improvements they have pledged to make above and to those set out in the 2023 [Peer Review on Rehabilitation of Alcoa Jarrah Forest](#). Currently these improvements are not being adopted quickly enough.

### b) Adoption of MEHG's Recommendations

All recommendations made in PART E are critical for reducing environmental impact and require attention in as quick a timeframe as possible. It is expected that all the recommendations are incorporated into Alcoa's 2025 – 2029 MMP.

Many of the recommendations do not require further research or large capital investment to be implemented. Simple modification to current practices is all that is required so it is expected that Alcoa takes immediate action to implement those items.

In conclusion, MEHG considers that Alcoa has an opportunity to change public perception and build trust in Alcoa's mining practices by becoming a leader in best practice methodology. Establishing an Alcoa Conservation Foundation and an Animal and Environmental Ethics Committee, and adopting the recommendations endorsed or provided in this review would spearhead this transition.

## Acknowledgements

The Mandurah Environment and Heritage Group wishes to thank Alcoa for the opportunity to provide feedback on their operations and practices, in the hope we can together better protect the animals, birds and vegetation in these sensitive aquatic and terrestrial environments prior to, during, and after, mining operations.

We are grateful to Georgia, Beth, Andrew, Mitch and Ben from Alcoa for their efforts and transparency with the complexities of mine site and refinery operation, and to Robyn Ackroyd and Dr Ben Roennfeldt from the Mandurah Environment and Heritage Group committee for leading this review requested by Alcoa.

For more information on MEHG please visit <https://mehg.org.au/>

# **Review of Alcoa Myara-Huntly MMP**

**8th August 2024**

## **Attachment 1**

**(MINUTES from MEHG Meeting with Alcoa held on 14th June 2024)**