



Alcoa of Australia

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Committee Secretary
Senate Standing Committees on Environment and Communications
PO Box 6100 Parliament House
Canberra ACT 2600
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Dear Secretary

Inquiry into the rehabilitation of mining and resources projects as it relates to Commonwealth responsibilities.

Alcoa welcomes the opportunity to provide supplementary information in response to matters raised during the Committee's public hearing in Perth on Wednesday, 7 March 2018 and during Senators Rice, Lines and Reynolds visit to our Huntly operations the day prior. The information outlined below (and attached) is supplementary to Alcoa's original submission to the Inquiry on the 17 April 2017. Specifically, we have included requested information about threatened species conservation, rehabilitation density, groundwater use in rehabilitated areas and rehabilitation costs.

Conservation of threatened black cockatoo species habitat

Alcoa has pro-actively pursued a threatened species management plan for the past decade to mitigate the effects of its mining operations on all listed rare and threatened species known to occur in the northern jarrah forest. Management plans include the retention of critical habitat associated with aged ecosystems such as tree hollows. Alcoa conducts surveys annually to identify and protect trees with nesting hollows in all operational areas. Importantly for bauxite mining in the jarrah forest, operations are spatially distributed which allows flexibility to avoid these features. In areas of particularly high cockatoo conservation significance such as near the community of Yamba, Alcoa has relinquished ore and worked with the Western Australian Parks and Wildlife Service to proclaim in 2016 a formal Fauna Habitat Zone. This example continues a track record since the 1990's of Alcoa's involvement in the identification and addition of new reserves to the conservation estate within its lease area (see Gardner and Stoneman, 2003, Attachment 1).

Alcoa has for many years supported ecological research aimed at conserving threatened species in the jarrah forest (see as one example, Craig *et al.*, 2017, Attachment 2) including the three species of black cockatoos that occur in the northern jarrah forest, and continues to do so. Moreover, Alcoa has well established internal mechanisms to incorporate new knowledge into improved practices on the ground.

Densely stocked rehabilitation

The density of jarrah and marri trees established in Alcoa's rehabilitation has been adjusted downward over time from an average of approximately 3,000 seedlings/ha in the early 1990's to the current target of 1,000 trees/ha which reflects levels in unmined forest. These changes are based on research and monitoring in an adaptive management approach, and have been made in consultation with and approval of government stakeholders. The changes have been incorporated into rehabilitation standards, or Completion Criteria, which were first developed in the mid-1990s and are reviewed on a five-yearly basis

in consultation with multiple government agencies including the Department of Biodiversity, Conservation and Attractions (DBCA) and Department of Water and Environmental Regulation (DWER). Alcoa has also undertaken and has shared a range of research to inform strategies for silvicultural treatment of regrowth stands, and is working collaboratively with relevant agencies such as the Forest Products Commission to manage rehabilitation forest trajectories into the future. Investigations have canvassed tree thinning treatments and their effects on a range of wood production and ecosystem values including both above- and below-ground biota and catchment-scale hydrology.

Rehabilitation and groundwater in the jarrah forest

A recent peer-reviewed study jointly authored by Alcoa and the CSIRO (see Macfarlane *et al.*, 2018, Attachment 3) found that jarrah forest is conservative in its water use and that trees in either mature forest or post-mining rehabilitation forest are not dependent on access to groundwater for their survival. Groundwater decline is evident throughout the jarrah forest driven in large part by a drying climate (see Hughes *et al.*, 2012, Attachment 4) with no evidence of large-scale mortality of mature forest as a consequence. Rather, where it has occurred, mortality has been mostly in areas of shallow soils in elevated positions such as around granite outcrops and only in years of extreme drought.

Alcoa collects a range of environmental data that are shared with government agencies, universities and with other interested parties, usually on a project basis or in response to specific requests. In particular, groundwater data have been shared with research organisations (see Hughes *et al. ibid* as an example), Western Australian water authorities (Water Corporation, DWER) and forest managers (DBCA) to assist these organisations in their planning processes.

Incorporating changing community expectations into rehabilitation

Alcoa has been at the forefront of mine rehabilitation science and improving practices, recognised in both national and international awards. As indicated above and in our original submission to this Inquiry, our Completion Criteria are reviewed and updated every five years and includes public consultation. This provides a key workable and transparent mechanism for the incorporation of evolving knowledge and community expectations into rehabilitation practice. An overview with examples are succinctly provided in Grant and Koch (2007, Attachment 5).

Cost of rehabilitation

It was unfortunate that up to date costs of bauxite mine rehabilitation were unavailable during the Committee's inspection of Alcoa's mining operations. Alcoa is happy to share this information. Current costs fall in the range of approximately \$35,000 to \$55,000 per hectare, dependent on the degree of earthworks required, the type of machinery used and other operational factors.

We stress however, that these costs are specific to Alcoa's bauxite mine operations in Western Australia and are not necessarily indicative of mine rehabilitation costs in other parts of Australia. Alcoa has completed more than 19,000 hectares of rehabilitation (of a total mining footprint of approximately 24,000 ha) since bauxite mining operations commenced in 1963.

If you require any further information or clarification on the above matters please do not hesitate to contact me

Yours sincerely,

Brett McIntosh
Director, EHS and Sustainability
Alcoa Mining

Attachments:

1. Gardner, J.H. and Stoneman, G. (2003). *Bauxite mining and conservation of the jarrah forest in south-west Australia*. Presented at IUCN and ICMM Workshop on Mining Protected Areas and Biodiversity Conservation: Searching and Pursuing Best Practice and Reporting in the Mining Industry, Gland, Switzerland, July 7-9, 2003.
2. Craig, M.D., White, D.A., Stokes, V.L. and Prince, J. (2017). Can postmining revegetation create habitat for a threatened mammal? *Ecological Management & Restoration* 18: 149-155.
3. Macfarlane, C., Grigg, A., McGregor, R., Ogden, G. and Silberstein, R. (2018). Overstorey evapotranspiration in a seasonally dry Mediterranean eucalypt forest: response to groundwater and mining. *Ecohydrology* DOI:10.1002/eco.1971.
4. Hughes, J.D., Petrone, K.C. and Silberstein, R. (2012). Drought, groundwater storage and stream flow decline in southwestern Australia. *Geophysical Research Letters* 39, L03408.
5. Grant, C. D. and Koch, J. M. (2007). Decommissioning Western Australia's first bauxite mine: co-evolving vegetation restoration techniques and targets. *Ecological Management & Restoration* 8: 92-105.

