

Environmental Impacts of the South of Embley Project

A submission by The Wilderness Society into Rio Tinto's proposed South of Embley Bauxite Mine Project Environmental Impact Statement.

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Environmentally sustainable? - Forest clearing and burning at Weipa for bauxite mining

Summary

Rio Tinto's South of Embley bauxite mine will have enormous environmental impacts, from total forest destruction, to fundamental disruption of hydrology, to threatening rare species such as the newly discovered freshwater crab in Winda Winda Creek. Given the form of extraction of the bauxite – via strip mining an entire landscape – and the associated extensive industrial infrastructure, there is simply no way that this mine can proceed on an ecologically sustainable basis. For this reason The Wilderness Society categorically opposes this mine. We call for the rejection of any approval under the EPBC Act based on the highly significant environmental threats the mine poses.

This short submission summarises our major concerns with the proposed mine in the areas of: forests and land, hydro-ecology, marine, climate, cultural heritage, and specific EPBC matters. The consistent theme throughout is that the environmental impacts are extremely high and therefore completely unacceptable, and that the surveying techniques and analysis used to reach many important conclusions in the EIS studies are very dubious.

Overview of the major environmental impacts of proposed mine

- 28,970 hectares of forest wiped out, with rehabilitation extremely unlikely
- Natural integrity and wilderness values of Pera Head destroyed
- Dredging for port and barge facilities, including clearing of seagrass habitat and mangroves
- High risk of invasive species from land disturbance
- Destruction of Norman Creek system via a new dam
- Significant risk to Ward River and downstream wetlands from water extraction
- Significant changes to surface and groundwater hydrology due to removal of bauxite layer
- New species of freshwater crab, likely to be critically endangered, directly threatened
- Through all mine activities, a number of EPBC listed species threatened

Forests and Land

The ecosystem most affected by bauxite mining is Regional Ecosystem 3.5.2, tall *Eucalyptus tetradonta* woodland on bauxite plateau, which accounts for 86% of vegetation within the project area. Its distribution is closely correlated with the bauxite plateau, and 28,970 hectares will be completely destroyed through this mine. The tall woodland that occurs on the Weipa bauxite plateau is a unique regional ecosystem. It is floristically distinct from Eucalyptus formations in the Northern Territory and Western Australia. It is also structurally distinct.

The distribution of Regional Ecosystem 3.5.2 is determined by soil moisture which is primarily controlled by drainage conditions and the physiology of *Eucalyptus tetradonta*. Essentially it is access to soil water that allows the development of an open forest structure.

Given the removal of the deep permeable bauxite layer on which the *E. tetradonta* tall woodland grows, and the altered drainage conditions caused by mining, restoration of vegetation similar in composition and structure to the pre-mining vegetation is not technically or economically feasible. Loss of the original ecosystem in the mined area will therefore be permanent.

Nor can this be addressed by rehabilitation programs. Post-mining rehabilitation at Weipa found that establishment rates of the four local native tree species that dominate the pre-mining vegetation are very low and that the composition of the plant community in post-mining rehabilitation areas is significantly different from pre-mining native forests, and the structure of the pre-mining native forest will never be restored (see Gould 2010).

In addition, whereas the original vegetation is stable in response to frequent fire, the vegetation in post-mining rehabilitation is unlikely to withstand fire. Replacement of fire stable vegetation with vegetation that is unstable in response to fire is a serious concern in a landscape in which there are frequent fires. The proposed actions to mitigate the impacts of altered fire regimes do not provide an ecological basis for future burning practices, nor address monitoring of the impacts of fire. This will exacerbate the effects of unstable vegetation cover with long term consequence for fauna and hydrological conditions.

The proposed mining, and the associated infrastructure, especially tracks and drill lines will create many opportunities for the establishment of weedy species which adversely affects the natural integrity of these areas and degrades habitat values.

A large number of highly invasive species is well established in the Weipa and Aurukun area and this proposed project will exacerbate the problems of invasion of undisturbed areas, impacts on wetlands and, particularly in the Aurukun area, important areas for wetland birds. Some weeds such as Gamba Grass are considered to be dangerous to human safety as well as to ecosystems because of their impacts on fire intensity.

The EIS acknowledges that vertebrate pests have caused damage to virtually all vegetation types within the project area. This is indicative of the fact that that Rio Tinto has not been a responsible land manager of the bauxite mine lease area.



Cleared forests and scarred land around Weipa from existing Rio Tinto bauxite mine. Photo: Glenn Walker

Hydro-ecology

The proposed dam on Norman Creek will likely have devastating impacts on this river system, which are grossly understated in the EIS. The periodic flushing of the river system, and the deposition of woody debris and other vital food and habitat, will be severely hampered by the impoundment. The very high changes in flow – up to 50% – downstream of the impoundment will also affect the timing and duration of water available to downstream ecosystems and aquatic species.

In addition, the dam footprint itself will flood eight hectares of evergreen notophyll vine forest – the largest patch in the project area, where numerous species of conservation significance were recorded. This patch is likely linked to other vine patches with species moving between the areas (akin to stepping stones). This vital ecological function in the landscape is ignored in the EIS.

The water extraction plan from Ward Creek is another area of major concern. The delivery of freshwater to downstream ecosystems, including wetlands, will be severed by the proposed direct extraction of water from this stream.

Removal of the bauxite layer will permanently alter surface topography and therefore hydrology. The EIS falsely claims that the storage volume of rainfall will be unaffected by removal of the bauxite layer (Section 8.14.1.1), however this assumes that the post mining surface will have identical permeability and storage capacity to the pre-mining surface. This is a fundamentally flawed assumption, with no supporting evidence, particularly given the variability of permeability in the landscape, and the inability of Rio Tinto to effectively re-establish original vegetation cover and structure.

The likely scenario is instead greater run-off rates during peak flow events and reduced dry season capacity for water recharge to downstream aquatic ecosystems (including stream baseflows and other groundwater dependent ecosystems). These significant risks are poorly understood and are not adequately addressed in the EIS.

Marine

Extensive dredging of sediment around Boyd Point and Pera Head is proposed: several million cubic metres (m³) in the first year, with an additional 3 million m³ as production capacity is increased and maintenance dredging of more than 1 million m³ annually (p. ES-10).

These massive volumes of sediment will be shipped to an offshore sediment dumping ground. The EIS (Section 6e) acknowledges that “various impacts on marine habitats are likely to occur during construction and operational phases of the Project” with “key habitats potentially impacted” including: 1) reef assemblages in the vicinity of the proposed port; 2) soft sediment habitat in the vicinity of the proposed new spoil ground; and 3) marine plant (seagrass and mangrove) habitat.

Direct and indirect impacts on feeding habitat, nesting habitat (turtles) and potential boat strike of dugongs, dolphins and several threatened species of marine turtles should not be underestimated. The EIS acknowledges that “Urquhart Point Mineral Sands Project may impact on beaches that contain marine turtle nesting habitat to the north of the SoE Project” (p. 20-7). We find it unacceptable to state that “The nature and significance of such impacts cannot yet be assessed due to lack of available information on proposed infrastructure and activities associated with the Urquhart Point Mineral Sands Project”. We strongly recommend that the details of infrastructure are supplied before an assessment is made.



An entire landscape lowered from bauxite mining near Weipa, affecting hydrology. Photo: Sue Gould



Scar on an otherwise intact coastline - the bauxite port at Weipa. Photo: Glenn Walker

Climate

The calculations of projected greenhouse gas (GHG) emissions (Section 9.6.1) are misleading and appear not to be based on empirical data, which should be readily available to the proponent who has operated mines in the region for 40 years: 1) the biomass carbon estimate presented for pre-mining vegetation appears to be low; 2) an average growth rate of 1.07t carbon/ha/year was assumed for Weipa eucalypt tall open forest revegetation using default values from the National Carbon Accounting Toolbox and likely overstates the amount of carbon captured in rehabilitation vegetation; 3) shipping has not been included although it would be a major source of emissions; and 4) downstream processing (refining and smelting) of the ore produced by this operation has not been included, although refining and smelting produces large GHG emissions.

Therefore, the calculated annual GHG emissions for three mining production scenarios (Table 9-9) grossly underestimate the GHG implications of the proposed project. Furthermore, land management should be included in the calculations and reporting and be part of the overall strategy for reducing GHG emissions.

We strongly recommend that accurate estimates of biomass carbon are calculated using empirical vegetation data for both pre-mining forest and post-mining rehabilitation. Gould (2010) found significant differences in plant species composition and structure in a comparison of pre-mining native forest and post-mining rehabilitation vegetation. Such differences are expected to be persistent and have long term implications for the amount of carbon sequestration in the post-mining landscape.

Cultural Heritage

The proposed mine site is an area that is in the homelands of the Wik Peoples and contains a number of Traditional Owner clan estates. The Country is replete with Indigenous cultural values, which are intimately woven through the ecological processes of the area, including cultural sites, important living connections across the entire 'cultural landscape' (dependent on the intactness of the country), and the abundance and distribution of natural resources used in economic, social and cultural life.

The impacts of this proposed project, as with other bauxite mining in the region, will be comprehensively destructive of the Indigenous cultural heritage of the area. The cultural heritage it is dependent on the health and integrity of the landscape, and given its permanent alteration under mining, this cannot be restored.



Forest clearing and burning near Weipa for existing Rio Tinto bauxite mine. Photo: Glenn Walker



Trees on horizon set aside for "cultural heritage" at Rio Tinto bauxite mine in Weipa. Photo: Glenn Walker

Specific EPBC Matters

Threatened Flora Listed Under the EPBC Act

The EIS reports floristic data from 134 secondary (0.1 ha quadrats), 6 tertiary and 847 quaternary (rapid on-ground) surveys conducted in 2008 and 2009 (Appendix 7a). Despite a seemingly impressive number of surveys, Table 7-3 (Section 7a) shows extensive clustering of vegetation survey sites, leaving vast areas of the proposed mining operations and the overall project area unsurveyed. Therefore, lack of confirmation of several species of threatened flora must be interpreted with caution.

Six threatened plant species listed as Vulnerable under the EPBC Act may occur in the project area (Table 7-7). Of these, two epiphytic orchids, *Dendrobium bigibbum* and *D. johannis*, were confirmed during surveys (Figure 7-7). However, while the EIS states that neither of these two orchid species are thought likely to occur in the mining area (Table 7-7) it also states that the *D. johannis* “occurs within the infrastructure corridor downstream of Dam C, and in the vicinity of proposed Mine Access Road crossings of Winda Winda Creek and an upper Norman Creek tributary.” In other words, impacts are likely on this Vulnerable species.

Threatened Fauna Listed Under the EPBC Act

Fauna surveys presented in this EIS are grossly inadequate, comprising only nine “comprehensive” survey sites in 2008, three different sites in 2007 (Section 7c and Appendix 7e), and scattered targeted surveys (Table 7E-4). Also of concern is that surveys at the 12 sites were only conducted in the month of May (Table 7E-3), further limiting confidence in the results reported. Critically, only three of the sites were within the proposed mining areas (Figure 7-10). Therefore, lack of confirmation of several species of terrestrial threatened fauna must be interpreted with extreme caution. Specifically, the EIS states that “There are currently no survey guidelines for the Northern Quoll” (Appendix 7e). However, guidelines for surveying this Endangered species are available via the SPRAT search tool on the DSEWPac website, and these techniques should be deployed extensively in the project area.

In reference to Table 7-15, the EIS states that eight threatened fauna species have either been “previously recorded”, “found during surveys for the EIS”, or “could potentially occur” in the project area (p. 7-80). However, details of where EPBC listed threatened species were “found during surveys” are not provided in this table, and appear to be lacking elsewhere in the report. Figure 7-11 “Threatened and Migratory Fauna Records” shows only the sighting locations of seven species, none of which are listed as threatened under the EPBC Act: two are listed Migratory and two as Marine. Curiously, as for Figure 7-7 (confirmed listed EPBC plants), Figure 7-11 indicates that these records only occurred outside of the proposed mining areas.

Although nineteen (of a potential forty-four) listed Migratory bird species were recorded during surveys within the Project area (Table 7-16), they are not mapped in the report. Again, survey effort appears to have been grossly inadequate: only two surveys were conducted during the appropriate period for migratory birds in December 2007 and 2008 (p. 7E-10). We strongly recommend that the list of Migratory species confirmed in the project area is not considered comprehensive.

Overall, the range and scope of inconsistencies in the EIS raise serious questions about the integrity and accuracy of the data supplied, and likely downplay the potential impacts on a number of species listed under the EPBC Act.

Discovery of a new species: the Winda Winda Crab (*Austrothelphusa* sp.)

An entirely new species of freshwater crab found during surveys for the EIS is only known from Winda Winda Creek catchment. The species is currently being assessed by international experts and we strongly recommend that mining activities are not allowed in the Winda Winda Creek catchment, as changes in hydrology and vegetation could potentially cause the extinction of this species before it has even been appropriately described by science and assessed for conservation listing.



A common sight on “rehabilitation” plots at Weipa - failure due to fire sensitivity. Photo: Sue Gould



Invasive Gamba Grass let loose at Weipa bauxite mine. Photo: Sue Gould

References

Gould, S.F. 2010. Comparison of post-mining rehabilitation with reference ecosystems in monsoonal eucalypt woodlands, northern Australia. *Restoration Ecology*. doi: 10.1111/j.1526-100X.2010.00757.x.

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