



**UNSW**  
A U S T R A L I A



# **Submission on the Lake Disappointment Potash Project**

**Centre for Ecosystem Science,  
UNSW, Sydney**

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## 1. Executive Summary

The Lake Disappointment Potash Project will have major and unacceptable environmental impacts on the nationally important Lake Disappointment. This lake is a significant national site for the breeding of banded stilts *Cladorhynchus leucocephalus*, and both extent and frequency of breeding events will be affected by the proposed Lake Disappointment Potash Project. This Project will also impact two unique reptile species; the Lake Disappointment Dragon *Ctenophorus nuyarna* and the Lake Disappointment Ground Gecko *Diplodactylus fulleri*, the endangered Night parrot *Pezoporus occidentalis*. Finally, it will have many other unknown effects on the broad ecology of this nationally important wetland, a wetland described as having both high conservation and anthropological value in your own documents. The Centre for Ecosystem Science therefore does not support this proposal.

## 2. Centre for Ecosystem Science, UNSW Sydney

The Centre for Ecosystem Science (CES), UNSW Sydney, supports instruments of government, including strategies that improve effectiveness of biodiversity conservation, founded on a strong evidence base. Current rates of biodiversity loss around the world and in Australia are unprecedented. Researchers in CES have established track records in the research and management of Australia's biodiversity, both within and outside protected areas. In particular, researchers focus on the three main realms of biodiversity (freshwater, terrestrial, marine) in the natural world (<https://www.ecosystem.unsw.edu.au/>) and welcomes the opportunity to provide a submission on the Lake Disappointment Potash Project. The Centre for Ecosystem Science have considerable expertise in wetland and waterbird management and conservation.

## 3. The Lake Disappointment Potash Project

The relevant assessment documents on the Lake Disappointment Potash Project suggest that this project will have major and unacceptable impact on the functioning of this wetland system and the significant biota that it supports. Despite the short 20 year mine life, this project will have permanent effects on the hydrology and ecological functioning of Lake Disappointment. The following sections highlight these impacts and the flaws in Reward Minerals' Environmental Review and risk assessment.

### a. Banded Stilts

#### *Ecology of the Banded Stilt*

- Banded stilts are a highly eruptive species of waterbird, occurring in large numbers sometimes in coastal areas (e.g. Coorong) but breeding in relatively few inland parts of Australia. Banded Stilts are often found near the coast but almost never nest there. They only breed in large colonies of thousands at inland salt lakes and do so very infrequently, on the rare occasions that these lakes fill, triggering brine shrimp (*Parartemia spp*) to hatch in their millions. Banded Stilts nesting has been recorded just ~50 times in history a sites.

- Lake Disappointment is one of the more important breeding sites in Australia. For example, over the last 20 years (1999-2019) there have been just 8 nesting attempts by Banded Stilt in Australia, deemed successful in hatching chicks. Just 2-3 of these events are thought to have allowed banded stilts chicks to fledge in any numbers.
- A review of Banded Stilt ecology and breeding indicates that Lake Disappointment is a very significant breeding site for the species, critical for the species population function and survival.
- The most successful breeding event in these eight nesting attempts was at Lake Disappointment and nearby sites such as Lake Mackay (Pedler et al. 2018), both of which are proposed sites for modification from potash harvesting.
- Lake Disappointment is significant because of its more regular filling frequency compared to other Banded Stilt breeding sites and its remoteness from threats that the species faces at other inland breeding sites (Pedler et al. 2018).
- Banded Stilt nesting ecology is geared towards the most ephemeral salt lakes as potential nesting sites, most likely because their Brine Shrimp *Parartemia* prey (with high endemism to different salt lake systems/regions) usually undergo just one lifecycle during a salt lake flood event, laying eggs that will hatch during the next flood cycle.
- Banded Stilts do not appear to nest at sites where water levels or food resources are relatively abundant yet static (e.g. man-made salt harvesting ponds with introduced Northern Hemisphere Brine Shrimp, *Artemia sp.* or Australian endemic *Parartemia spp.*).
- Although not listed as a threatened species, Banded Stilts face different threats across their range, through failure of breeding attempts from Silver Gull predation (thought to be exacerbated by anthropogenic-induced increases in gull populations (Pedler 2018, Minton, Jessop and Collins 2000), changes to refuge wetlands that sustain their populations during dry times, and changes to wetlands across the continent as a result of human induced change.

#### ***Impact of the Lake Disappointment project through the Reward Minerals Potash Project***

- The proposal to construct over 130 km of drainage channels (up to 6 m deep) that will draw brine water away from areas of the wetland where it naturally ponds after rainfall and flooding will permanently change the depth, duration and distribution of wetting and irreversibly change the availability and suitability of nesting habitat for banded stilts. Reward Minerals' analysis shows reductions in the area and longevity of ephemerally flooded areas, reducing the time window for Brine Shrimp (*Parartemia sp.*) production and thus opportunities for banded stilts to nest following flood events.
- The impact assessment for Banded Stilts by Reward Minerals suggests that the project will have a 'HIGH' impact on the species, but that implemented controls through under-causeway pipes etc will reduce this to 'MEDIUM'. However, the modelling and assessment on pg 23-28 of the Environmental Review Document is simplistic and lacks the necessary detail to determine the true impacts. The analysis focusses on the importance of duration of ponding but fails to recognise that this is a proxy for the more critical aspect - the persistence of food resources (*Parartemia spp.*) in that ponded water.
- Banded Stilts can't survive or breed by drinking salty water, they need high abundance of brine shrimp to lay eggs that represent 30-50 of their own body weight and for their chicks to rapidly grow and fledge (Pedler et al. 2016). Despite Reward Minerals having

documented 4-5 breeding events by Banded Stilts over the course of its work at Lake Disappointment since 2012, there is no mention in the Environmental Review document on what freshwater invertebrates banded stilt are feeding on in the salt lake, or their persistence at increasing salinities (although this food is anecdotally referred to as 'brine shrimp' in the documents).

- Despite the modelling and assurances given in the document that salty water will persist near banded stilt breeding islands for the minimum banded stilt breeding timeframe of 80 days, there is no information or modelling of whether the extent of the ponded water and its chemistry will be sufficient to allow banded stilt food resources to persist long enough to allow successful breeding. Thus the very limited modelling that is presented is not sufficient to make the conclusion that the impact on Banded Stilt from hydrological changes will be 'MEDIUM'. It is likely that the true impact will be much more significant.
- Increased access by mammalian predators along causeways formed from side cast material. Predation by dingoes, cats and foxes is a major documented impact on the success of banded stilt nesting attempts (Pedler et al. 2018).
- The piling of side cast material from the excavation of drainage channels (to a depth of 6 m) will create walkways for mammalian predators to access banded stilt nesting islands, making them unsuitable sites. Moreover, it is proposed that these side cast areas will be developed into roadways to allow vehicles to access the entire length of the drainage channels.
- Although Reward Minerals has sought to avoid islands with such structures, they will undoubtedly still allow predators easy access to within 200 m of nesting islands, then requiring just a short walk across shallow (1-10 cm deep) water to access nesting colonies.
- Through our work on Banded Stilt nesting on salt lakes in South Australia, we witnessed several instances in which foxes and dingoes walked across much greater spans of partially flooded salt lake, traversing 1-3 km across soft mud or shallow brine water wreak carnage on banded stilt nesting colonies of thousands of pairs. Thus despite assurances in the Environmental Review Document, these causeways and side cast material areas are likely to have a major impact on Banded Stilt nesting success.
- Anthropogenic activity and waste that may attract Silver Gulls to the area. Silver Gulls present a serious threat to successful Banded Stilt nesting and have deleterious impact on the species at southern inland breeding sites

## **b. Night Parrots**

### ***Ecology of the Night Parrot***

The Night Parrot is referred to as one of the most elusive and mysterious birds in the world, and for over 100 years was considered to be extinct. Australian scientists have now formed a recovery team to guide research on this nocturnal, ground dwelling parrot, and take advantage of this second chance to protect it from extinction.

The Night Parrot is a nationally endangered species known from just a handful of sites, one of which is Lake Disappointment. This proposal states that it will impact known Night Parrot

feeding/roosting sites - this is clearly unacceptable for such a species.

#### ***Impact of the Lake Disappointment project on the Night Parrot***

- This project appears to have an unacceptable impact on the Night Parrot – a nationally endangered species known from just less than 10 sites. This proposal states that it will impact known Night Parrot feeding/roosting sites but this is clearly unacceptable for such a species.
- The Environmental Review Document does not adequately address one of the potentially key habitat areas for Night Parrots on Lake Disappointment – the small islands in the lake that support huge clumps of Spinifex *Triodia* that are remote from wildfire events that affect *Triodia* roost sites on the shoreline.
- These potential island roost sites are currently remote from feral predators such as cats and foxes, with this at threat from the proposed causeways and access network across the lake surface. A buffer of 200 m around island sites which potentially form roost areas for Night Parrots will increase accessibility by cats and foxes, affecting survival of Night Parrots.
- A further threat comes from the risk of invasion by Buffel Grass (*Cenchrus ciliaris*) – a threat to the Night Parrot due to its propensity to invade spinifex-dominated habitats, increasing the fire frequency (Murphy et al. 2018). A further threat comes from the risk of invasion by Buffel Grass (*Cenchrus ciliaris*) – a threat to the Night Parrot due to its propensity to invade spinifex-dominated habitats, increasing the fire frequency (Murphy et al. 2018).

### **c. Endemic Reptiles**

#### ***Importance of Lake Disappointment for endemic reptiles***

Lake Disappointment is the only place in the world that the unique Lake Disappointment Dragon and Lake Disappointment Gecko occur.

#### ***Impact of the Lake Disappointment project on endemic reptiles***

- The risk to the Lake Disappointment Dragon from changes in the abundance of aerial predators such as Silver Gulls and Gull-billed Terns does not appear to have been discussed in the Environmental Review Document. These bird species are thought to be important predators of dragons on inland wetlands and are listed threats to the only other salt-lake dwelling dragon in Australia, the Lake Eyre Dragon (Pedler and Neilly 2010).

### **d. Wetland Degradation**

The relevant assessment documents on the Lake Disappointment Potash Project suggest that this project will have major and unacceptable impact on the functioning of this wetland system and the significant biota that it supports. Despite the short 20 year mine life, this project will have permanent effects on the hydrology and ecological functioning of Lake

Disappointment. Reward Minerals' own documents attest that Lake Disappointment is listed as a Nationally Important Wetland with high conservation and anthropological value, its main tributary watercourse the Savoury Creek is listed as a Wild River, having previously experienced no modification by modern human activities. Importantly, due to its location and climate, Lake Disappointment has a much higher frequency of flooding than others sites in inland Australia where Banded Stilts are known to breed.

#### **4. Conclusions**

The Lake Disappointment Potash Project has many foreseen and unforeseen effects on the endemic endangered wildlife of the region. These effects will be long lasting – out living the 20 year project span. Lake Disappointment is a particularly important wetland to the region based on its size and flooding frequency, meaning it plays an irreplaceable role for desert wildlife, particularly birds and reptiles. We therefore cannot support this project due to its deleterious effect on Australian biodiversity.

#### **References**

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