

Position Paper by Concerned Scientists

Deficiencies in the scientific assessment of the Carmichael Mine impacts to the Doongmabulla Springs

Key points:

- (1) *Adani appears likely to have significantly under-estimated future impacts to the Doongmabulla Springs Complex (DSC) arising from the Carmichael Mine.*
- (2) *Should the Carmichael Mine cause springs within the DSC to cease flowing, this impact may be irreversible.*
- (3) *The safeguard against DSC impacts proposed by Adani, namely Adaptive Management, is unsuitable and unlikely to protect the DSC from severe degradation or cessation of flow.*
- (4) *Possible cumulative impacts to the DSC from other mining activities in the Galilee Basin have not been adequately considered.*

We conclude that the DSC face a legitimate threat of extinction due to the Carmichael Mine project.

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Justification (see also Appendix A):

Key point 1:

Adani appears likely to have significantly under-estimated future impacts to the Doongmabulla Springs Complex (DSC) arising from the Carmichael Mine.

Justification Summary:

(1) *The Carmichael Mine will cause considerable drawdown (groundwater level drop) in the coal-rich sediments (Permian aquifers) that lie beneath the DSC.*

Source: GHD and Adani (2013), Hydrosimulations (2015), AECOM (2019)

(2) *Adani presumes that the source aquifer for the DSC is the shallow Triassic aquifer and that the Rewan Formation effectively isolates the DSC from significant drawdown in the Permian aquifers.*

Source: GHD and Adani (2013), Land Court of Queensland (2015), Adani (2019)

(3) *However, the source aquifer for the springs is still uncertain, because the existing data indicate that the Rewan Formation may not be regionally impermeable or near-impermeable, as Adani have presumed.*

Source: IESC (2013), Webb (2015), Currell et al. (2017), Lewis et al. (2018), CSIRO and Geoscience Australia (2019)

(4) *It follows that if the DSC relies on water from the Permian aquifers to maintain discharge rates, the impact to the DSC (e.g., reduction in spring discharge and wetland areas) from drawdown caused by the proposed Carmichael Mine is highly uncertain.*

Source: IESC (2013), Currell et al. (2017), CSIRO and Geoscience Australia (2019)

(5) *Even if the DSC is predominantly dependent on groundwater flow from above the Rewan Formation, unrealistic model assumptions mean that drawdown is still likely to be greater than currently predicted.*

Source: Werner (2015), CSIRO and Geoscience Australia (2019)

Key point 2:

Should the Carmichael Mine cause springs within the DSC to cease flowing, this impact may be irreversible.

Justification Summary:

(1) *Significant drawdown will remain at the end of the Carmichael Mine's life.*

Source: GHD and Adani (2013), AECOM (2019)

- (2) *The mine will impact groundwater flow pathways permanently by modifying landforms and the properties of the geological strata, e.g., by fracturing strata near longwall operations.*

Source: GHD and Adani (2013), Hydrosimulations (2014), CSIRO and Geoscience Australia (2019)

- (3) *Previous cases of mining- and pumping-induced spring extinction demonstrate that permanent cessation of spring flow due to human interference is a strong possibility.*

Source: Younger and Wolkersdorfer (2004), Wu et al. (2011), Brunetti et al. (2013), Fan et al. (2018).

Key point 3:

The safeguard against DSC impacts proposed by Adani, namely Adaptive Management, is unsuitable and unlikely to protect the DSC from extinction.

Justification Summary:

- (1) *The Queensland Land Court decision and EPBC approval decision relied heavily on the capacity for Adaptive Management, proposed by Adani, to protect the springs from future unknown impacts.*

Source: Land Court of Queensland (2015), Department of the Environment (2015)

- (2) *However, Adaptive Management is unsuitable for projects potentially causing irreversible impacts or where rehabilitation is impractical.*

Source: Williams et al. (2009)

- (3) *Adaptive Management requires that methods for addressing impacts should be detailed and assessed at the project outset. However, Adani has not provided information on exactly how the DSC would be remediated from impacts.*

Source: Williams et al. (2009), GHD and Adani (2013), AECOM (2019)

- (4) *Lag times between mining operations and identifiable impacts to the DSC are potentially considerable. This likely precludes effective responses to DSC decline.*

Source: Williams et al. (2009), GHD and Adani (2013), Currell (2016)

Key point 4:

Possible cumulative impacts to the DSC from other mining activities in the Galilee Basin have not been adequately considered.

Justification Summary:

- (1) *The cumulative impacts to the DSC from other current and proposed mining activities in the region (such as the possible China Stone Coal mine, North Alpha mine, etc.;*

amongst other likely project proposals) are additive and significant, and yet have not been adequately assessed by Adani.

Source: IESC (2013), Werner (2015), Lewis et al (2019), CSIRO and Geoscience Australia (2019)

(2) *An assessment of cumulative impacts is industry best practice.*

Source: National Water Commission (2009)

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