



Government of Western Australia
Office of the **Appeals Convenor**
Environmental Protection Act 1986

Appeals Convenor's Report to the Minister for Environment

Appeals against grant of clearing permit CPS 8761/1,
Lots 9882 and 9883 on Plan 203117, Boorara Brook,
Shire of Manjimup



Appellants	Dr Beth Schultz; Mr John Perlinski
Permit holder	Mr Peter Robert Beebe
Authority	Department of Water and Environmental Regulation (DWER)
Appeal number	007 of 2021
Report date	November 2021

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Cover image supplied by applicant – mixed karri forest of the application area.

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Acknowledgement of Country

The Office of the Appeals Convenor acknowledges the traditional custodians throughout Western Australia and their continuing connection to the land, waters and community.

We pay our respects to all members of the Aboriginal communities and their cultures, and to Elders past, present and emerging.

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1 Executive summary

1.1 Decision under appeal

Clearing permit CPS 8761/1 was granted to Mr Peter Robert Beebe (the applicant) to clear 33.8 hectares (ha) of native vegetation at Boorara Brook, approximately 47 km south of Manjimup.

The permit is for a timber harvest and silvicultural activities within Lots 9882 and Lot 9883 on Plan 203117, Boorara Brook (Figure 1).

The applicant's¹ proposed silvicultural activities include:

- harvesting mature karri, marri and blackbutt trees, known as 'thinning from above';
- a tree retention rate of 10 to 15m² for a future harvest in 20 years' time;
- a post-harvest cool burn during autumn or winter; and
- regular cool burns after a minimum of 5 years as the applicant considers this will reduce the risk from bushfires.

Two appeals were received against the grant of clearing permit CPS 8761/1.

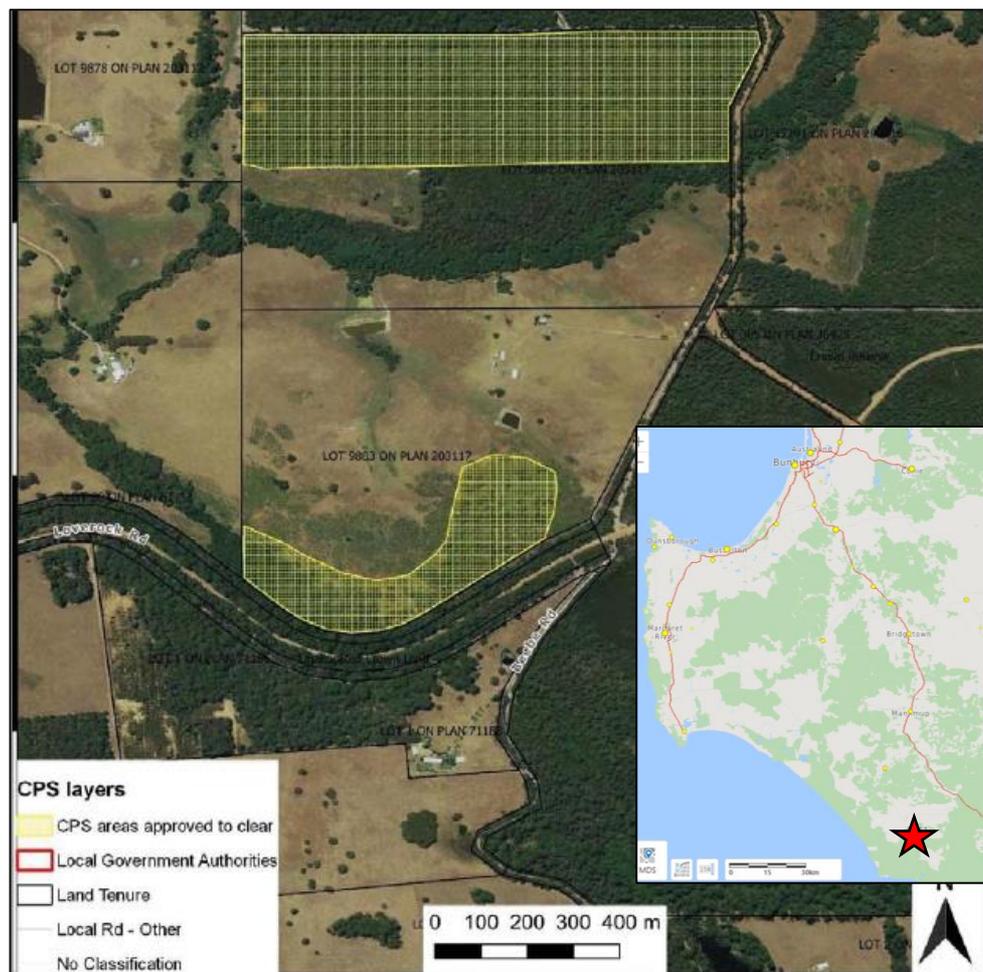


Figure 1 Areas approved to clear (yellow hatched = 33.8 ha)

¹ [Applicant's timber harvest management plan](#) 9 December 2019 prepared by John Clarke

1.2 Grounds of appeal and appellants' concerns

In March 2021, appeals were lodged by Dr Beth Schultz and Mr John Perlinski against the decision to grant the permit and conditions to which it is subject.

The appellants opposed the grant of the permit with key concerns relating to the cumulative loss of karri forest, impacts to fauna and forest health, and increased flammability. The appeal grounds are summarised below.

Table 1 Grounds of appeal

Ground	Main concerns of appellants
Cumulative loss	<p>Habitat fragmentation was not adequately considered in DWER's assessment. Karri forest is endemic to the south western forest of Western Australia and the clearing contributes to continued fragmentation and loss. This constitutes a breach of the principle of intergenerational equity, the precautionary principle, and the principle of the conservation of biological diversity and ecological integrity.</p> <p>The proposed timber harvest would release carbon and reduce carbon capture and storage.</p>
Forest fauna	<p>Impacts to fauna were not adequately considered in DWER's assessment.</p> <p>The timber harvest would have adverse impacts on forest biodiversity.</p> <p>Retaining two habitat trees per hectare is inadequate to meet the requirements of a single fauna species. The area provides habitat for multiple species of conservation significance.</p>
Forest health	<p>The proposed harvest will have adverse impacts on forest health including soil compaction and associated erosion; and spread of forest diseases. Additionally, there would be impacts to fungi habitat.</p>
Forest flammability	<p>The proposed harvest and silvicultural activities are likely to increase the risk of wildfires through increasing the flammability of the remnant. The opening up of the forest and allowing more sunlight to reach the ground will dry out debris and increase flammability. The clearing will promote the growth of flammable species (including weeds) and greatly increase the fuel load and flammability of the remnant. This also has negative implications for soil nutrients.</p>

1.3 Conclusions

This report relates to appeals against the grant of the permit. The main question for the appeal investigation is should the permit have been granted, and if so, are the conditions adequate and appropriate to mitigate against impacts to the environment.

We summarise our conclusions to the appellants' grounds of appeal below and Section 2 of the report details our reasoning for the recommendations. Section 3 provides supporting

information including vegetation descriptions of the application area and a list of similar clearing permits.

Did DWER consider the cumulative loss of karri forests?

Given the mapped vegetation complex within the application area is adequately represented, protected, and managed in conservation estate, we consider DWER's assessment of the cumulative loss of karri forest was appropriate.

Cumulative loss was considered primarily under clearing principle (e) which states that:

...Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

The application area is mapped predominately as a mixed karri-marri forest (Crowea vegetation complex²) which retains approximately 86% of its pre-European extent. Of this, 81% is secure within conservation estate. Furthermore, the application areas does not form part of an ecological linkage, nor provide significant³ habitat for conservation significant flora or fauna species.

DWER⁴ advised that given the application area is not clear felling, the clearing may reduce competition and promote growth of retained trees. DWER considers that this may enable opportunities for more carbon to be captured by the trees in the future. While this may eventuate, DWER's claim was unsubstantiated.

Regarding the loss of carbon and capacity to store carbon post-harvest, we consider that the release of carbon and subsequent loss of carbon storage is likely to be minor. This is due to the relatively small scale of timber harvest (in a landscape context), the requirement for retention of habitat for fauna, future regeneration of the forest, and the anticipated persistence of substantial areas of contiguous vegetation in conservation estate under the Forest Management Plan 2024-2033⁵.

Given the above, this ground of appeal should be dismissed.

Did DWER adequately consider the impacts to forest fauna?

We consider that DWER's assessment adequately considered the impacts to fauna at the species-level. However, as the application area contains habitat for a range of terrestrial and arboreal fauna of conservation significance, the potential local impacts can be reduced further, through strengthened permit conditions.

The application area contains habitats for all three black cockatoo species, western ringtail possum (WRP), quokka, south-western brush-tailed phascogale, short-nosed snake and quenda. However, we consider that the habitat is not significant for these species given the availability of substantial areas of contiguous and secure fauna habitat outside the application area for all species, except WRP. The application area is outside the key management zones for WRP and given this, DWER considered the habitat is not significant for WRP.

Consistent with DWER's assessment, we consider that the timber harvest is unlikely to change the conservation status of fauna species. However, we consider that the local

² Vegetation Complexes - South West forest region of Western Australia ([DBCA-047](#))

³ Habitat required for the persistence of the species

⁴ DWER (2021) Appeal response, 19 August 2021.

⁵ [WA State Government media statement 8 September 2021](#)

impacts to fauna can be reduced by amending the permit to require ‘thinning from below’, which removes immature trees and retains older trees of highest conservation value.

Furthermore, additional habitat elements should be retained including more habitat trees, patches of healthy representative understorey and habitat logs. Retention rates should be consistent with DBCA forestry practices for karri forests⁶. We also note that the incorrect height was used in the definition of ‘habitat tree’ in the permit. The permit should be amended to specify the correct height of 1.3 metres above ground level.

Given the above, this ground of appeal should be upheld to the extent that the permit is amended as noted.

Did DWER consider the impacts of the harvest on forest health?

We conclude that DWER’s consideration of the impacts of the timber harvest and associated activities on forest health requires improvement. We consider that additional mitigation measures are required to reduce the impacts of soil compaction, to facilitate regeneration, and to reduce the impacts on fungi habitat. DWER’s consideration of forest diseases was appropriate and conditioned have been applied to the permit to manage this aspect.

Soil compaction from timber harvesting is more prevalent in karri forest when undertaken in moist soil conditions⁷. To mitigate against this and subsequent erosion, we consider that further conditions are required including restricting machinery operation to dry conditions and scarifying extraction tracks and log landings to reduce soil compaction and facilitate natural regeneration. Furthermore, the applicant responded that the log landings authorised on the permit were excessive and should be reduced to 500m² in total.

To reduce the impacts to fungi habitat we consider that the retention of one ground habitat log per hectare be required and the removal of all woody fuels one metre away from habitat logs to prevent combustion. Fungi habitat will also be provided from the retained habitat elements required for fauna.

Did DWER consider the impacts of the harvest on forest flammability?

DWER’s consideration of how the harvest might change forest flammability was generally appropriate. However, the conditions require strengthening to ensure the proposed post-harvest burn is regenerative and not destructive.

Research has shown that there is little evidence that timber harvesting increases bushfire severity in karri forests⁸.

Other research has shown that while weed cover does increase in karri forests following fire, most weed species present are ephemeral, and reduce in dominance as native species regenerate⁹.

In response to the appeal, DWER¹⁰ has advised that further measures can be undertaken to mitigate against the impacts of fire. This includes undertaking only one understorey burn, in spring or early summer and during conditions determined suitable by a Bush Fire Officer appointed under the *Bush Fires Act 1954*. Furthermore, to prevent combustion of retained

⁶ DBCA (2016) Karri treemarking procedure, FEM035, Forest Management Series, Perth; DBCA (2016) Karri treemarking ready reckoner field guide, CEM 039, Forest Management Series, Perth.

⁷ Whitford, K. (2009). *Reducing soil disturbance during timber harvesting*. Information Sheet 19 / 2009. Department of Environment and Conservation.

⁸ Attiwill, P.M., Ryan, M.F., Burrows, N., Cheney, N.P., McCaw, L., Neyland, M., and Read, S. (2013). Timber Harvesting Does Not Increase Fire Risk and Severity in Wet Eucalypt Forests of Southern Australia, *Conservation Letters* 7(4), 341–354

⁹ Wardell-Johnson et. al. 2004

¹⁰ DWER (2021) Appeal response, 19 August 2021.

habitat elements, DWER advised that all woody fuels present within a one metre radius should be removed.

We consider that the above management actions will minimise impacts to retained vegetation and habitat elements, and assist in regeneration of the application area.

Given the above, this ground of appeal should be upheld to the extent that permit conditions be strengthened.

1.4 Recommendations to the Minister

Amend the permit conditions to require the following:

Soil compaction and erosion mitigation

- Two log landings of up to 0.05ha (500m²) in total
- Extraction tracks are to be rehabilitated by scarifying the soil surface to reduce compaction and facilitate natural regeneration
- Operation of logging machinery is limited to dry conditions
- Rehabilitation of log landings and extraction tracks is limited to dry conditions

Fauna and fungi habitat

- The definition for habitat tree be corrected for measurement at 1.3 metres above ground-level.
- 'Thinning from below' approach be used to remove immature trees and retain mature trees at the minimum retention rate
- A minimum retention rate of 16 m²/ha basal area
- Retention of a minimum of 5 habitat trees per hectare
- Retention of a minimum of one 30 metre diameter patch of healthy understorey per hectare
- Retention of a minimum of 1 ground habitat log per hectare

Fire mitigation

- Prescribed burning of understorey to only occur:
 - on one occasion;
 - in spring or early summer; and
 - during conditions that have been determined to be suitable by a Bush Fire Officer appointed under the *Bush Fires Act 1954*.
- Removal of all woody fuels present within a 1 metre radius of each retained habitat element

Otherwise dismiss the appeals.

2 Reasons for recommendations

2.1 DWER's assessment of cumulative loss was appropriate

Our conclusion is that DWER's assessment of the cumulative loss of karri forest was adequately considered under clearing principle (e). We accept that the application area is not considered to be a significant remnant and our reasoning is explained below.

Appellants' concerns

Appellant 1 submitted that the clearing will unnecessarily fragment an intact remnant of karri forest and reduce its size by approximately one third. Appellant 2 submitted that pure and mixed karri forests should be protected for future generations due to their endemism, conservation value and substantial reductions from commercial logging practices. Concern was also raised regarding the release of carbon and subsequent reduced capacity for carbon capture and storage from the proposed clearing.

Vegetation description

A site inspection undertaken by DWER¹¹ and black cockatoo habitat survey¹² indicate that the application area contains two types of karri forest:

- Northern clearing area: consisting of jarrah (*Eucalyptus marginata*) and marri (*Corymbia calophylla*) woodland, with some karri (*Eucalyptus diversicolor*) present to the west and blackbutt (*Eucalyptus patens*) to the east; and
- Southern clearing area: consisting of a mosaic of karri, marri, and jarrah trees. Some *Agonis flexuosa*. Western portion has an understorey of sedges.

The above is consistent with vegetation described as 'karri forest' which can occur as either a pure stand of karri or as a mosaic mixed with marri, jarrah or blackbutt¹³.

Assessing cumulative loss

In its assessment¹⁴, DWER had regard to 'A guide to the assessment of applications to clear native vegetation Under Part V Division 2 of the Environmental Protection Act 1986 (December 2014) and information within datasets available to them.

DWER's assessment of the cumulative loss of karri forest was considered under clearing principle (e) which states that:

...Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

DWER concluded that the application area was not a significant remnant. Specifically, this was due to:

- the 'local area' (10km radius of the application area) has 61% of pre-European vegetation remaining which is above the 30% threshold DWER¹⁵ uses to define an extensively cleared landscape;
- the dominant *Crowea* vegetation complex¹⁶ (marri-karri forest) retained 86% of its pre-European extent with 81% secure in conservation estate (2018 data);

¹¹ DWER (2020) Site Inspection Report for Clearing Permit CPS 8761/1, 17 February 2020.

¹² Harewood (2021) Black cockatoo habitat tree assessment CPS 8761/1 Boorara Brook.

¹³ Forest Products Commission (2020) [Karri forest regeneration \(www.wa.gov.au\)](http://www.wa.gov.au)

¹⁴ DWER (2021) Decision report for Clearing Permit CPS 8761/1, 10 March 2021.

¹⁵ Commonwealth of Australia (2001) National Objectives and Targets for Biodiversity Conservation 2001-2005, Canberra.

¹⁶ Vegetation Complexes 2018 - South West Forest region of Western Australia ([DBCA-047](#))

- the other minor vegetation complexes¹⁷ within the application area have above 73% of their pre-European extent in conservation estate; and
- not forming a component of the South West Ecological Linkage - two of which are mapped approximately 1.2km NE and 2.3km SW of the application area.

Based on the above, DWER concluded that clearing principle (e) was 'not at variance' as the karri forest vegetation types within the application area are adequately represented, protected, and managed. We agree with DWER's assessment and conclusion under clearing principle (e).

We also note that as the permit is for thinning, some vegetation and fauna habitat elements are required to be retained. Furthermore, the understorey is required to regenerate as conditioned on the clearing permit.

To support regeneration of the application area, we consider that DWER's¹⁸ existing permit conditions are adequate. These include:

- thinning activities to be performed by a forestry operator with a minimum of five years of experience in conducting forestry activities to meet karri harvest and silvicultural standards;
- prior to undertaking any clearing authorised under this permit, an *environmental specialist*¹⁹ must determine the species composition, structure and density of the understorey of areas proposed to be thinned and where, in the opinion of an environmental specialist, there is evidence that understorey will not recover and develop towards its pre-clearing composition, structure and density, the applicant must undertake remedial action at an optimal time and until rehabilitation requirements are met;
- the applicant shall not clear native vegetation within 30 metres of the riparian vegetation of any watercourse or wetland; and

Carbon loss

DWER²⁰ advised that given the application area is not clear felling the clearing may reduce competition and promote growth of retained trees. DWER considers that this may enable opportunities for more carbon to be captured by the trees in the future. While this may eventuate, DWER's claim was unsubstantiated.

We consider that the release of carbon and subsequent loss of carbon storage is likely to be minor. This is due to the relatively small scale of timber harvest (in a landscape context), the requirement for retention of habitat for fauna, future regeneration of the forest, and the persistence of substantial areas of contiguous vegetation in conservation estate.

Conclusion

As noted previously, the mixed karri forest within the application area is adequately represented, protected, and managed in surrounding conservation estate. Given the State Government²¹ will end logging of south-west native forests²² from 2024, we consider that the impacts to the application area are insignificant in the landscape context.

¹⁷ All four vegetation complexes mapped in the Application area are defined in [section 3](#) of this report.

¹⁸ DWER (2021) Decision report for Clearing Permit CPS 8761/1, 10 March 2021.

¹⁹ Defined by DWER as 'an external person with experience relevant to the type of environmental advice that an environmental specialist is required to provide under this Permit, or who is approved by the CEO as a suitable environmental specialist.'

²⁰ DWER (2021) Appeal response, 19 August 2021.

²¹ [Protecting Western Australia's native forests, August 2021.](#)

²² in State Forests only

Recommendation

We recommend that this ground of appeal be dismissed.

2.2 DWER's fauna conditions require strengthening

Our conclusion is that DWER's assessment of impacts to fauna at the species-level was appropriate. However, the permit conditions require strengthening to minimise the local impacts to a range of conservation significant species. We explain further below.

Appellants' concerns

Appellant 1 submitted that the proposed clearing would disrupt wildlife and needlessly expose wildlife to traffic.

Appellant 2 submitted that the proposed clearing would result in harmful impacts on forest biodiversity and would constitute a breach of the precautionary principle and the principle of the conservation of biological diversity and ecological integrity. In support of this, the appellant submitted that:

- the principal aim of thinning is usually to maximise growth of the retained crop trees, selected because they are vigorous and of good form and therefore, will produce the most sawlogs;
- there are 26 forest-dwelling mammal and bird species dependent on hollows in standing trees for breeding²³. Thinning removes trees likely to develop hollows and thinned jarrah and karri regrowth will provide little or no habitat for these species for decades;
- the retention of two habitat trees per hectare suggests that the silvicultural activity is clear felling, not 'thinning', and does not meet the requirements of a single fauna species²⁴;
- the retention of 15 'habitat' trees per five hectares was based on a single study of a single species, the common brushtail possum²⁵, and took no account of the other 19 mammals and 31 bird species that require hollows in standing trees for breeding or shelter in south-western forests.

Species-level impacts unlikely

In their assessment, DWER²⁶ identified a range of conservation significant fauna that may utilise the application area. This includes:

- foraging, roosting and future breeding habitat for all three black cockatoo species (Carnaby's cockatoo, Baudin's cockatoo and forest red-tailed black cockatoo); and
- habitat for western ring-tail possum (WRP), quokka, short-nosed snake, quenda and south-western brush-tailed phascogale.

In response to the appeal, DWER²⁷ advised that the application area is outside of the key management zones for WRP, where individuals are concentrated²⁸. The two historical records from the local area (10km radius of the application area) are located on the boundary of the WRP management zones. Given this, DWER concluded that the application area is unlikely to provide significant habitat for WRP.

²³ Abbott, I. and Whitford, K. (2002). Conservation of vertebrate fauna using hollows in forests of south-west Western Australia: strategic risk assessment in relation to ecology, policy, planning and operations management. *Pacific Conservation Biology* 7 pp. 240-255.

²⁴ Environmental Protection Authority, Western Australia, Bulletin 652, October 1992, Appendix 2.

²⁵ Inions, G (1985) The interactions between possums, habitat trees and fire. BSc (Hons) thesis. ANU.

²⁶ DWER (2021) Decision report for Clearing Permit CPS 8761/1, 10 March 2021.

²⁷ DWER (2021) Appeal response, 19 August 2021.

²⁸ Department of Parks and Wildlife (2017). Western Ringtail Possum (*Pseudocheirus occidentalis*) Recovery Plan. Perth.

A black cockatoo habitat assessment²⁹ found that most trees within the application area contained either no hollows or hollows that were currently unsuitable for black cockatoo nesting. Given this, DWER concluded that the application area is unlikely to provide any current breeding habitat for black cockatoo species. However, they consider that the application area may provide future nesting habitat which is considered further below.

Other conservation significant fauna species that may utilise the smaller tree hollows include WRP and the south-western brush-tailed phascogale.

In response to the appeal, DWER³⁰ acknowledged that the application area may contain suitable nesting trees for south-western brush-tailed phascogales, which are able to utilise smaller hollows than black cockatoos³¹. DWER noted that brush-tailed phascogale are less commonly recorded from wetter forests (i.e. karri forests) and they consider that there is extensive suitable habitat within the local area. Given this, DWER advised that the habitat in the application area is unlikely to represent significant habitat for the south-western brush-tailed phascogale.

Already included in the permit under condition (5)(c) is the requirement to maintain riparian vegetation which is frequented by several terrestrial species including the quokka, short-nosed snake and quenda.

Given substantial contiguous fauna habitat of the same mapped vegetation complex exists in surrounding conservation estate, we agree with DWER that the proposed timber harvest is unlikely to change the conservation status of any fauna species.

However, we consider that the local impacts to fauna should be further minimised.

Minimising local impacts

Regarding the first appellant's concern that the clearing will expose wildlife to traffic, DWER³² advised that the clearing is 'thinning' and not clear-felling, and some habitat elements will be retained. Although habitat quality and carrying capacity will be reduced, we consider that fauna can still utilise the application area and adjacent contiguous vegetation in the local area. Given this, fauna will not be forced to traverse into nearby road areas.

Condition 6 on the permit requires the applicant to conduct clearing activities in a slow, progressive manner from one direction to the other. This is intended to allow fauna to move into adjacent native vegetation ahead of the clearing activity. We acknowledge that some local fauna impacts are likely to occur, particularly for less mobile fauna species.

In response to the appeal, DWER³³ was advised by DBCA that it is extremely hard to 'thin from above' (taking dominant mature trees) in a mixed forest stand, as the damage to retained habitat trees can be excessive. Also, this method removes the largest trees with the highest conservation value. DBCA advised that a more appropriate approach would be 'thinning from below' (taking smaller immature trees) at the mature retention rate of 16-18 m²/ha basal area. This will retain the larger dominant (tallest) and co-dominant trees which have the highest conservation value.

²⁹ Harewood, G. (2021). [Black Cockatoo Habitat Tree Assessment, CPS 8761/1](#).

³⁰ DWER (2021) Appeal response, 19 August 2021.

³¹ Soderquist, T. R. (1993b). Maternal strategies of *Phascogale tapoatafa* (Marsupialia: Dasyuridae). II. Juvenile thermoregulation and maternal attendance. *Australian Journal of Zoology* 41, 567–576; Traill, B. J., and Coates, T. D. (1993). Field observations on the brushtailed phascogale (*Phascogale tapoatafa*). *Australian Mammalogy* 16, 61–65.

³² DWER (2021) Appeal response, 19 August 2021.

³³ DBCA (2021) Advice to DWER - Appeal 007/21, 21 June 2021.

DWER were advised by DBCA that local impacts to fauna can be further reduced by retaining more fauna habitat elements. The required retention rates are outlined in DBCA's karri forest documents³⁴ and include retaining a higher basal area, more habitat trees and healthy understorey patches.

Habitat tree definition

We note that the incorrect height was used in the definition of habitat tree on the permit. DWER³⁵ confirmed that the basal area for habitat trees should be measured at 1.3 meters above ground level. DWER advised that the correct height will be used on this and all future clearing permits.

Conclusion

We consider that DWER's assessment of the impacts to fauna was generally appropriate and that the proposed clearing is unlikely to change the conservation status of any fauna species. However, to further minimise the potential local impacts, we consider that the permit conditions require strengthening based on advice from DBCA³⁶.

Recommendations

We recommend that this ground of appeal be upheld to the extent that the permit be amended to require:

- a 'thinning from below' approach that retains mature trees of highest conservation significance;
- retention of a minimum of 5 habitat trees per hectare, on average;
- a minimum retention rate of 16 m²/ha basal area;
- retention of a minimum of one 30 metre diameter patch of healthy understorey; and
- correction of the habitat tree definition to specify the correct measurement height of 1.3 metres above ground level.

2.3 DWER's consideration of forest health requires improvement

Our conclusion is that DWER's consideration of the impacts of the timber harvest on forest health requires improvement. The conditions require strengthening to further mitigate against decline in forest health. We explain our reasoning below.

Appellant's concerns

Appellant 2 submitted that the clearing would decrease the health and functioning of the application area through soil compaction, erosion, impacts on fungal habitat and fungal communities and the spread of dieback and marri canker.

The appellant submit that the logging machinery would compact more than 12 per cent of the application area³⁷ to result in increased soil bulk density, decreased porosity and water infiltration, and accelerated erosion. Jarrah and karri health and regrowth in compacted areas would be adversely impacted. In addition, it was submitted that logging and burning would

³⁴ DBCA (2016) Karri treemarking procedure, FEM035, Forest Management Series, Perth; DBCA (2016) Karri treemarking ready reckoner field guide, CEM 039, Forest Management Series, Perth.

³⁵ DWER (2021) Appeal response, 19 August 2021.

³⁶ DBCA (2021) Advice to DWER - Appeal 007/21, 21 June 2021.

³⁷ Whitford, K.R. and Mellican, A.E. (2011). Intensity, extent and persistence of soil disturbance caused by timber harvesting in jarrah (*Eucalyptus marginata*) forest on FORESTCHECK monitoring sites. Australian Forestry: Special Issue: ForestCheck. Volume 74, No. 4, pp. 269, 271.

modify the nutrient profile of the soil, including changes to phosphorus and nitrate content³⁸. The appellant noted that soil takes more than 80 years to recover, and areas of regrowth will start an 80-year recovery period again³⁹.

Land degradation

Consistent with current guidance⁴⁰, DWER's assessment⁴¹ considered land degradation and the effects of soil compaction from log landings under clearing principle (g). Condition 5(f) was imposed on the clearing permit requiring the rehabilitation of log landings by scarifying the soil surface to reduce compaction and facilitate natural regeneration.

DWER⁴² noted that the Whitford and Mellican (2011) study submitted in the appeal refers to jarrah forest only. However, DWER acknowledges that soil compaction may be more severe in karri forest when undertaken under moist soil conditions⁴³.

As advised by DBCA⁴⁴, DWER considered additional published sources of information on soil impacts. The degree to which forest soils are susceptible to soil rutting and compaction depends on their inherent attributes. The movement of heavy harvesting machinery can result in soil disturbance and compaction, particularly during wet conditions⁴⁵.

Karri is typically associated with loamy duplex soils, loams and loamy earths that have high water holding capacity and can be subject to seepage well into the dry season. Soils in karri forests usually have a moderate to very low trafficability rating even though they are generally well structured and contain relatively higher amounts of organic matter, i.e. soil attributes that reduce compaction.

DWER recommends that timber harvesting within karri areas should be restricted to summer and autumn prior to major rainfall. However, harvesting can be done in late spring on crest and upper slopes provided that soil profiles are deep and well drained⁴⁶.

DWER⁴⁷ considers that soil compaction may result in detrimental impacts to plant growth and other ecosystem processes. Soil compaction is likely to be most severe where log landings and extraction tracks have been established⁴⁸.

In addition to the requirement to rehabilitate log landings, DWER recommends further conditions to mitigate soil compaction, including:

- rehabilitation of extraction tracks;

³⁸ Bowd, E.J., Banks, S.C., Strong, C.L. and Lindenmayer, D.B. (2019). Long-term impacts of wildfire and logging on forest soils. *Nature Geoscience*, Vol. 12, 113–118.

³⁹ Whitford, K.R. and Mellican, A.E. (2011). Intensity, extent and persistence of soil disturbance caused by timber harvesting in jarrah (*Eucalyptus marginata*) forest on FORESTCHECK monitoring sites. *Australian Forestry: Special Issue: ForestCheck*. Volume 74, No. 4, pp. 269, 271.

⁴⁰ DWER (2014) [A guide to the assessment of applications to clear native vegetation](#); DWER (2019) [Procedure - Native vegetation clearing permits](#).

⁴¹ DWER (2021) Decision report for Clearing Permit CPS 8761/1, 10 March 2021.

⁴² DWER (2021) Appeal response, 19 August 2021.

⁴³ Whitford, K. (2009). Reducing soil disturbance during timber harvesting. Information Sheet 19 / 2009. Department of Environment and Conservation.

⁴⁴ DBCA (2021) Advice to DWER - Appeal 007/21, 21 June 2021.

⁴⁵ Smolinski, H. and Kuswardiyanto, K. (2007). Soil Survey and Assessment of Trafficability in the South-West Forests of Western Australia, Consultants Report to DEC, Western Australia, Sustainable Forest Management Series, SFM Technical Report No. 3.

⁴⁶ Department of Parks and Wildlife (DPAW) (2014) Karri Silviculture Guideline. Sustainable Forest Management Series, FEM Guideline 3.

⁴⁷ DWER (2021) Appeal response, 19 August 2021.

⁴⁸ Whitford and Mellican (2011)

- limiting the operation of logging machinery to dry conditions, as moist soils are more susceptible to becoming compacted by machinery⁴⁹; and
- limiting soil compaction rehabilitation activities to dry conditions, as ripping may be detrimental if carried out under moist soil conditions⁵⁰.

Furthermore, in response to the appeal, the applicant⁵¹ advised that a log landing of up to 3000m² is excessive comparative to the size of the application area. They advised that 2-3 landings of up to 500m² in total is more appropriate. We agree with their advice.

Forest diseases

DWER⁵² acknowledges that the proposed clearing may increase the risk of *Phytophthora cinnamomi* (dieback) spreading into the application area through the movement of machinery. To mitigate this risk, DWER included condition 4 for both weed and dieback management.

DWER notes that the research mentioned by appellant 2 indicates that dieback growth rate in jarrah trees may be exacerbated by thinning, as thinning can result in decreased water stress⁵³. However, this research found that the effect of thinning on dieback growth rate in jarrah was less pronounced in the high rainfall zone (>1100 mm), which includes the application area, compared to the intermediate and low rainfall zones of the northern jarrah forests.

Although some flora species within the application area may be susceptible to dieback, the proportion of susceptible species is substantially lower in karri forest when compared to jarrah forests and vegetation dominated by proteaceous species⁵⁴. Noting the above, we consider that the disease hygiene measures under condition 4 of the clearing permit are sufficient to mitigate against potential impacts from dieback.

DWER⁵⁵ notes that *Quambalaria coyrecup* (marri canker) has been found to be more prevalent in sites adjacent to completely degraded areas, such as along roadsides and paddocks, than within intact forest⁵⁶.

The spread or severity of the disease has not been linked to timber harvesting and promoting native revegetation following operations is the most appropriate action to maintain the health of native forests⁵⁷. To ensure appropriate forest revegetation, condition 5(g) requires the applicant to rehabilitate the understorey if it is not recovering to a pre-clearing species composition, structure, and density.

Fungi habitat

The assessment of impacts to fungi and other non-vascular flora species do not form part of a clearing permit assessment.

⁴⁹ Rab, M.A., Bradshaw, F.J., Campbell, R.G., and Murphy, S. (2005). Review of factors affecting disturbance, compaction and trafficability of soils with particular reference to timber harvesting in the forests of south-west Western Australia, Consultants Report to CALM, Western Australia, Sustainable Forest Management Series, SFM Technical Report No. 2, 146 pp.

⁵⁰ Department of Parks and Wildlife (DPAW) (2014) Karri Silviculture Guideline. Sustainable Forest Management Series, FEM Guideline 3.

⁵¹ Applicant response to appeal, 1 September 2021.

⁵² DWER (2021) Appeal response, 19 August 2021.

⁵³ Bunny, F.J., Crombie, D.S. and Williams, M.R. (1995).

⁵⁴ Shearer B. L. , Crane C. E. Cochrane A. (2004) Quantification of the susceptibility of the native flora of the South-West Botanical Province, Western Australia, to *Phytophthora cinnamomi*. Australian Journal of Botany 52, 435-443.

⁵⁵ DWER (2021) Appeal response, 19 August 2021.

⁵⁶ Paap, T. et al. (2016). A thirteen-year study on the impact of a severe canker disease of *Corymbia calophylla*, a keystone tree in Mediterranean-type forests. Forest Pathology. 47.

⁵⁷ Forest Products Commission (2020) Karri forest management plan. Perth, Australia.

The potential presence of state-listed Priority 3 Ecological Community (PEC) 'Epiphytic Cryptogams of the karri forest' was identified through the desktop assessment. Cryptogams reproduce by spores and do not produce flowers or seeds. The group consists of algae, fungi, slime moulds, lichens, liverworts, mosses, and hornworts⁵⁸. Due to the nature of the proposed clearing (i.e. thinning), DWER considered that the impacts to the PEC (if present) are unlikely to be significant.

DWER⁵⁹ agrees that the proposed clearing is likely to have impacts upon soil, litter, and woody debris, which may in turn have impacts on fungal composition⁶⁰. However, they consider that the amount of woody debris may increase because of the silviculture⁶¹ and the retention of habitat trees conditioned in this clearing permit will ensure the continuation of coarse woody debris able to support fungi in the future⁶².

DBCA advised⁶³ that there is provision for the retention of coarse woody debris (e.g. ground habitat logs) in the Karri tree marking for retention procedure⁶⁴ and Karri tree marking ready reckoner⁶⁵. The documents also require the retention of 30 metre vegetation patches. These measures allow for fungi habitat to be maintained.

Based on the above, we recommend that a minimum of one 30 metre diameter patch of healthy understorey be retained, on average, per hectare cleared. Additionally, the retention of ground habitat logs would further maintain habitat for fungi. As for habitat trees, removal of all woody fuels present within a 1 metre radius will be required to prevent combustion.

Conclusion

We consider that this ground should be allowed to the extent that conditions to maintain forest health strengthened. If any harvested areas have not been restored to the appropriate standard, the applicant or DWER may seek an extension to the permit.

Recommendations

To mitigate against soil compaction and facilitate regeneration, the permit should be amended to include:

- no more than 2 log landings up to 500m² in total;
- extraction tracks to be rehabilitated by scarifying the soil surface;
- operation of logging machinery be limited to dry conditions; and
- rehabilitation of log landings and extraction tracks be limited to dry conditions

To mitigate against impacts to fungi habitat the permit should require:

- retention of a minimum of one 30 metre diameter patch of healthy understorey;
- retention of one ground habitat log per hectare cleared; and
- remove all woody fuels present within a 1 metre radius of each retained ground habitat log.

⁵⁸ <https://www.csiro.au/en/research/plants/native/lichens-and-bryophytes>

⁵⁹ DWER (2021) Appeal response, 19 August 2021.

⁶⁰ Robinson, R.M. and Williams, M.R. (2011)

⁶¹ McCaw, W.L. (2011) Characteristics of jarrah (*Eucalyptus marginata*) forest at Forestcheck monitoring sites in south-west Western Australia: stand structure, litter, woody debris, soil and foliar nutrients. Australian Forestry 74, 254–265.

⁶² Wardlaw T, Grove S, Hopkins A, Yee M, Harrison K, Mohammed C (2009) The uniqueness of habitats in old eucalypts: Contrasting wood-decay fungi and saproxylic beetles of young and old eucalypts. Tasforests 18, 17–32

⁶³ DBCA (2021) Advice to DWER - Appeal 007/21, 21 June 2021.

⁶⁴ Department of Parks and Wildlife (DPAW) (2014) Karri treemarking for retention. Procedure FEM035.

⁶⁵ Department of Parks and Wildlife (DPAW) (2014) Karri treemarking ready reckoner. Field Guide FEM039.

2.4 Conditions relating to fire require strengthening

DWER's consideration of how the harvest might change forest flammability was generally appropriate. However, the conditions require strengthening to ensure the proposed post-harvest burn is regenerative and not destructive. We explain our reasoning below.

Appellant's concerns

Appellant 2 submitted that the proposed clearing may make the forest more, not less, flammable and may increase, not decrease, the risk of wildfires⁶⁶ and result in altered nutrients. The appellant noted that:

- thinning of regrowth may increase, not decrease, the 'fuel load' and the flammability of the forest. Thinning leaves large amounts of logging debris on the ground, and dead trees in the forest if the thinning is non-commercial, opens up the forest and allows more sunlight to reach the ground and dry out the debris⁶⁷;
- the climate on the floor of the forest is altered by thinning, with higher wind speeds and air temperatures, lower humidity and lower moisture content in the fuel itself. Understorey vegetation characteristics change because of these changes to the microclimate, especially increased light. Some understorey species grow vigorously and have a far higher flammability than the replaced woody species⁶⁸; and
- thinning followed by burning results in a massive response of flammable 'fire weeds', native and introduced. This greatly increases the fuel load and flammability.

Forest flammability

We note that the study submitted as part of the appeal relates to native forests of south-eastern Australia which differ substantially to karri forests. Research has shown that there is little evidence that timber harvesting increases bushfire severity in karri forests⁶⁹.

DWER⁷⁰ acknowledged that the proposed clearing is likely to produce logging debris, change the climate of the forest floor and allow for rapid growth of understorey species. However, DBCA⁷¹ advised that:

- there should be a reduction of forest fuel following the post-harvest burn which in turn will assist in the nutrient turnover on the site;
- the retained basal area per hectare should maintain productive capacity by trees that will grow and take up the gaps created in the canopy; and
- the initial understorey growth due to the increased sunlight will be short lived due to the overstorey canopy closing in soon after and shading the understorey out.

DWER⁷² notes that silvicultural burns in karri and mixed karri forest aim to mitigate bushfire related risk and prevent carbon loss in unplanned fire, amongst other objectives. Karri is sensitive to fire between the ages of five and 30 years old. It has been recognised that the harvested tops increase the fuel load on young regrowth, which is a causal factor in cambium

⁶⁶ Lindenmayer D., Mackey, B., Gould S., Norman P. and Taylor C. (2021) What are the relationships between native forest logging and bushfires? Bushfire Recovery Project Report No.3. Griffith University and The Australian National University, <https://www.bushfirefacts.org/>.

⁶⁷ Fagg, P.C. (2006). Thinning of Ash Eucalypt Regrowth. Native Forest Silviculture Guideline No. 13, Land and Natural Resources Division, Department of Sustainability and Environment, Victoria.

⁶⁸ Forestry Tasmania (2001). Thinning Regrowth Eucalypts. Native Forest Silviculture Technical Bulletin No. 13, Forestry Tasmania.

⁶⁹ Attiwill, P.M., Ryan, M.F., Burrows, N., Cheney, N.P., McCaw, L., Neyland, M., and Read, S. (2013). [Timber Harvesting Does Not Increase Fire Risk and Severity in Wet Eucalypt Forests of Southern Australia](#), *Conservation Letters* 7(4), 341–354

⁷⁰ DWER (2021) Appeal response, 19 August 2021.

⁷¹ DBCA (2021) Advice to DWER - Appeal 007/21, 21 June 2021.

⁷² DWER (2021) Appeal response, 19 August 2021.

damage to retained trees from the residual heat during prescribed fire⁷³. DBCA⁷⁴ advised that careful planning and climatic considerations are required for karri forest burns.

The applicant has advised in their timber harvesting management plan⁷⁵ that they plan to burn harvesting debris under cool conditions such that recently dried harvesting slash and any rolled understorey will burn. Post thinning burns in karri forest have been demonstrated to significantly reduce flammable logging debris, also known as “harvest slash”, without causing considerable damage to retained trees under optimal conditions⁷⁶.

The Reference Material for Karri Forest Silviculture (2015)⁷⁷ states that karri regrowth that is burnt as part of the regeneration process is at lower risk from fire for the first five years because of the relatively low fuel loads.

DWER notes that the study submitted by appellant 2 is based upon research in mature Mountain Ash (*Eucalyptus regnans*) forests found in eastern Australia. Research specific to Western Australia has found that there is little evidence that timber harvesting increases bushfire severity in karri forest⁷⁸.

Regarding an increase in weed species and cover after thinning, the Karri Silviculture Guidelines (2014)⁷⁹ state that weeds are likely to be excluded by native species as the forest regenerates over time. Research has shown that while weed cover does increase in karri forests following fire, most weed species present are ephemeral and reduce in dominance as native species regenerate⁸⁰. Accordingly, we consider that weed management conditions on the permit are sufficient to mitigate the risk of weed spread.

DWER acknowledges⁸¹ the impacts that fires can have on retained vegetation and that mitigation of these impacts should be undertaken where possible. Studies have shown that post-thinning burning is unlikely to result in considerable damage to retained vegetation when undertaken during moist soil conditions during spring. However, post-thinning burning can damage retained trees where coarse woody debris occurs within one metre of the retained stems⁸².

DWER notes that the burning season in karri forest can be extended to early summer to allow for variation in weather conditions. We consider that management actions to limit burning to spring and early summer, and the requirement to remove woody fuels surrounding retained habitat elements may help to protect retained vegetation.

Soil nutrient changes

DWER⁸³ advised that the proposed clearing may reduce the requirement for prescribed burning for the purpose of bushfire prevention. The timber harvesting management plan⁸⁴ prepared by the applicant states that:

⁷³ DBCA (2016) Karri silvicultural burning manual CEM072

⁷⁴ DBCA (2021) Advice to DWER - Appeal 007/21, 21 June 2021.

⁷⁵ [Applicant's timber harvest management plan](#) 9 December 2019 prepared by John Clarke

⁷⁶ McCaw, L., Smith, R.H., Neal, J.E. (1997). Prescribed Burning of Thinning Slash in Regrowth Stands of Karri (*Eucalyptus diversicolor*). 1. Fire Characteristics, Fuel Consumption and Tree Damage. *International Journal of Wildland Fire* 7(1) 29 – 40.

⁷⁷ Bradshaw, F J, (2015) Reference material for karri forest silviculture, Department of Parks and Wildlife, Perth.

⁷⁸ Attiwill, P.M., Ryan, M.F, Burrows, N., Cheney, N.P., McCaw, L., Neyland, M., and Read, S. (2013). Timber Harvesting Does Not Increase Fire Risk and Severity in Wet Eucalypt Forests of Southern Australia, *Conservation Letters* 7(4), 341–354.

⁷⁹ DPaW 2014, Karri Silviculture Guideline. Sustainable Forest Management Series, FEM Guideline 3.

⁸⁰ Wardell-Johnson et. al. 2004

⁸¹ DWER (2021) Appeal response, 19 August 2021.

⁸² McCaw et al 1997

⁸³ DWER (2021) Appeal response, 19 August 2021.

⁸⁴ [Applicant's timber harvest management plan](#) 9 December 2019 prepared by John Clarke

...the managed forest will need little attention for at least five years. At that time, a cycle of regular mild prescribed burning should be adopted to reduce the risk of damage from bushfires.

Frequent prescribed burning has been found to result in greater losses of nitrogen than timber harvesting and associated slash burning⁸⁵. DBCA⁸⁶ advised that a post-harvest prescribed burn be conducted, as per the karri silvicultural burning manual⁸⁷. The burn under prescribed conditions will stimulate the release of organically bound nutrients and allow for regeneration of nitrogen fixing understorey species which replenish soil nitrogen⁸⁸.

Conclusion

We conclude that additional management measures are required to mitigate the impacts of fire.

Recommendations

We recommend that this ground of appeal be upheld to the extent that the permit is amended to require:

- prescribed burning of understorey in accordance with condition 2(d) of this permit shall only occur:
 - on one occasion;
 - in spring or early summer; and
 - during conditions that have been determined to be suitable by a Bush Fire Officer appointed under the *Bush Fires Act 1954*; and
- all woody fuels present within a 1 metre radius of each retained habitat element be removed prior to the burn.

⁸⁵ McMurtrie, R. E. & Dewar, R. C. (1997) Sustainable forestry: a model of the effects of nitrogen removals in wood harvesting and fire on the nitrogen balance of regrowth eucalypt stands. *Australian Journal of Ecology*, vol. 22, pp. 243-255.

⁸⁶ DBCA (2021) Advice to DWER - Appeal 007/21, 21 June 2021.

⁸⁷ Department of Biodiversity, Conservation and Attractions (DBCA) (2016) Karri silvicultural burning manual, CEM072 Forest Management Series, Department of Biodiversity, Conservation and Attractions, Perth.

⁸⁸ DBCA (2021) Advice to DWER - Appeal 007/21, 21 June 2021.

3 Supporting information

3.1 Vegetation description of the application area

The majority (~80%) of the application area is mapped as the Crowea⁸⁹ (Crb) vegetation complex which is described as:

- Tall open forest of *Corymbia calophylla*-*Eucalyptus diversicolor* on upper slopes with *Allocasuarina decussata*-*Banksia grandis* on upper slopes in hyperhumid and perhumid zones.

The Crowea vegetation complex retains 86% of its pre-European extent with 81% in conservation estate.

Smaller areas of the application area are mapped as:

- Granite valleys S1, which is described as tall open forest of *Eucalyptus diversicolor*-*Corymbia calophylla* on slopes with some *Eucalyptus patens* and *Eucalyptus megacarpa* on valley floors in hyperhumid and perhumid zones;
- Granite Valleys Vh2, which is described as tall open forest of *Eucalyptus diversicolor*-*Eucalyptus patens* on slopes with *Agonis flexuosa*-*Allocasuarina decussata*-*Callistachys lanceolata* on valley floors in hyperhumid and perhumid zones; and
- Angove A, which is described as open forest of *Eucalyptus marginata* subsp. *marginata*-*Banksia ilicifolia*-*Nuytsia floribunda* with some *Eucalyptus diversicolor* on gently sloping sandy terrain in hyperhumid and perhumid zones.

The mapped vegetation type/s retain approximately 86, 85, 84 and 88 per cent of their original extents respectively⁹⁰.

3.2 Similar clearing permits

Table 2 lists clearing permits that are relevant to the current appeal due to their proximity to the application area of clearing permit CPS 8761/1 and the presence of similar environmental values. Most similar in regards to impacts and permit conditions is clearing permit CPS 8460/2.

Table 2 Clearing permits near CPS 8761/1

Clearing permit	Distance from CPS 8761/1
CPS 8502/1 road widening, Boorara Brook & Northcliffe	~5.3km NW
CPS 8460/2 silviculture/harvest, Eastbrook	~30km NNW
CPS 7619/1 road widening, Boorara Brook	~7.3km NE

⁸⁹ Vegetation Complexes - South West forest region of Western Australia ([DBCA-047](#))

⁹⁰ Government of Western Australia. (2019) [2018 Statewide Vegetation Statistics](#) incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019. WA DBCA.

Appendix 1 Appeal process

The Minister assesses the merits of a decision

Environmental appeals follow a merits-based process. This means the Minister can consider all the relevant facts, legislation and policy aspects of the decision and decide whether it was correct and preferable.

For clearing permits, the Minister can overturn the original decision to grant the permit if this was the basis of the original appeal submission. Alternatively, if the appeal submission was against the conditions of the permit, the Minister may modify the conditions only.

The appeal investigation will consider the extent to which conditions can address the issues raised, as well as any new information that may not have been available at the time of the original decision.

While process issues can be raised in an appeal, the focus of investigations will be on the substantive environmental matters relevant to DWER's conditions.

Appeals Convenor and DWER report to the Minister

To decide an appeal's outcome, the Minister for Environment must have a report from both:

- the Appeals Convenor [see section 109(3) of the EP Act], and
- the authority that originally made the decision under appeal [see section 106(1)].

To properly advise the Minister in the report, the investigation included:

- reviewing DWER's decision and appeal reports
- reviewing responses from the appellant
- meeting with the appellant and the permit holder's representatives
- reviewing other advice from DWER
- reviewing other information, policy and guidance as needed.

Table 3 lists documents considered in the appeals investigation.

Table 3 Documents reviewed in the appeals investigation

Document	Date
DWER clearing permit decision report and permit CPS 8761/1	10 March 2021
Appeal submission 1 – Mr Perlinks	11 March 2021
Appeal submission 2 – Dr Schultz	31 March 2021
DBCA advice to DWER	21 June 2021
DWER response to appeal 007/21	19 August 2021