

1. Application details and outcomes

1.1. Permit application details

Permit number:	10481/1
Permit type:	Purpose Permit
Applicant name:	Tronox Management Pty Ltd
Application received:	8 January 2024
Application area:	0.63 hectares
Purpose of clearing:	Mineral Exploration
Method of clearing:	Driving an off-road vehicle or equipment over vegetation and using raised blade
Tenure:	Mining Lease 70/1413
Location (LGA area):	Shire of Dandaragan
Colloquial name:	Osprey Infill Exploratory Drilling

1.2. Description of clearing activities

Tronox Management Pty Ltd proposes to clear up to 0.63 hectares of native vegetation within a boundary of approximately 2.3 hectares, for the purpose of mineral exploration (Tronox, 2024b). The project is located approximately 30 kilometres west of Dandaragan, within the Shire of Dandaragan (GIS Database).

The application is to allow for the infill exploratory drilling at the Osprey Deposit on M 70/1413 (Tronox, 2024b).

1.3. Decision on application and key considerations

Decision:	Grant
Decision date:	6 June 2024
Decision area:	0.63 hectares of native vegetation

1.4. Reasons for decision

This clearing permit application was made in accordance with section 51E of the *Environmental Protection Act 1986* (EP Act) and was received by the Department of Mines, Industry Regulation and Safety (DMIRS) on 8 January 2024. DMIRS advertised the application for a public comment for a period of 21 days, and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix B), relevant datasets (Appendix E), supporting information provided by the applicant (Appendix A) including the results of a flora and vegetation survey (Umwelt, 2022b; 2024a; 2024b) the clearing principles set out in Schedule 5 of the EP Act (Appendix D), proposed avoidance and minimisation measures (Section 3.1), relevant planning instruments and any other matters considered relevant to the assessment (Section 3.3).

The assessment identified that the proposed clearing may result in:

- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values;
- impacts to conservation significant flora; and
- the loss of native vegetation that is suitable foraging habitat for *Zanda latirostris* (Carnaby's Cockatoo).

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing can be minimised and managed to be unlikely to lead to an unacceptable risk to environmental values.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds;
- undertake slow, progressive one-directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity;
- clearing to be undertaken during dry season only;

- method of clearing consisting of driving over the vegetation, using raised blades on unavoidable patches of dense thickets;
- clearing restricted to understorey vegetation - vegetation that has a diameter (measured at 130 centimetres from the base of the vegetation) less than 10 centimetres, for all species; and
- flora management condition limiting the number of individuals of *Babingtonia urbana*, *Chordifex reseminans*, *Comesperma rhadinocarpum*, *Hypocalymma quadrangulare* and *Poranthera asybosca* allowed to be cleared.

1.5. Site map

A site map of proposed clearing is provided in Figure 1.

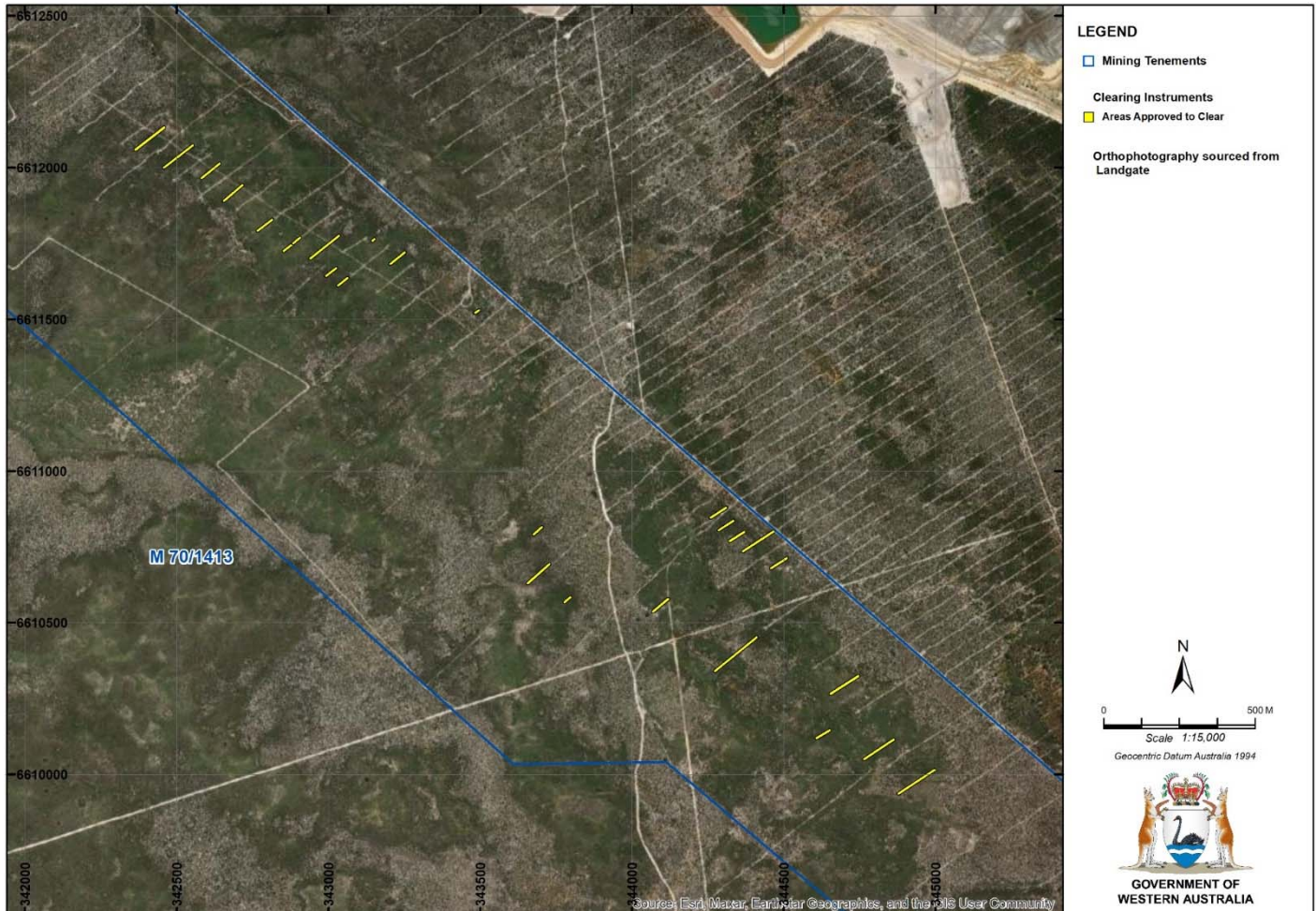


Figure 1. Map of the application area. The yellow area indicates the area within which conditional authorised clearing can occur under the granted clearing permit.

2. Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016 (WA) (BC Act)*
- *Conservation and Land Management Act 1984 (WA) (CALM Act)*
- *Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act)*
- *Mining Act 1978 (WA)*

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2014)
- *Procedure: Native vegetation clearing permits* (DWER, October 2021)
- *Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- *Technical guidance – Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2020)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

Evidence was submitted by the applicant, demonstrating that avoidance and mitigation measures such as those listed below will be undertaken:

- where there are no existing tracks, vegetation will be driven over, not removed. This methodology leaves the root stock and topsoil intact and removes the need to strip, stockpile and respread topsoil;
- access width has been minimised to 2.6 – 2.7 metres wide to accommodate a vehicle width;
- the drill program will be undertaken in the dry season in accordance with the project Dieback Management Plan to minimise dieback risks;
- significant foraging habitat for Carnaby's Cockatoo will be avoided (by avoiding trees and large woody shrubs); and
- minimise impacts to annual species by not drilling in the main growing season (winter) (Tronox, 2024a; 2024b).

The proponent has provided the following actions which will be taken to rehabilitate the disturbed areas:

- the disturbance to the vegetation proposed is temporary only;
- as the rootstock and topsoil remain in-situ, natural regeneration will follow;
- no vegetative material will be removed, accordingly seed stock will remain in-situ;
- access ways to be blocked to prevent repeated access where practicable;
- rehabilitation to be completed in accordance with program of work requirements; and
- Tronox exploration drilling in past years indicates the vegetation has recovered within an average of 18- 24 months (Tronox, 2024b).

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

3.2. Assessment of impacts on environmental values

The assessment against the clearing principles identified that the impacts of the proposed clearing present a risk biological values (fauna, flora, and vegetation). The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Biological values (flora) - Clearing Principles (a) and (c)

Assessment

Flora and vegetation surveys have been undertaken over the greater Osprey project area (an area of 1,320 hectares) which includes the application area (Umwelt 2022b; 2024a; 2024b). The flora and vegetation surveys undertaken by Umwelt during October 2021, 2022, and 2023 recorded 406 discrete vascular flora taxa, representing 65 families and 200 genera (Umwelt 2022b; 2024a; 2024b). There are records of 55 conservation flora species within 20 kilometres of the application area (Western Australian Herbarium, 1998-; GIS Database). The flora surveys identified 25 conservation significant flora within the survey area, seven of these species were located within the application area (Umwelt, 2022b; 2024a; 2024b).

Babingtonia urbana, Priority 3, is known from 26 locations over a range of 200 kilometres within the Swan Coastal Plain IBRA bioregion (Western Australian Herbarium, 1998-). The total number of plants at all locations is unknown, however 8,000 plants have been recorded at a subpopulation seven kilometres south-east of the application area (DBCA, 2023). Part of this subpopulation has since been taken through approved mining activities (DBCA, 2023). The flora surveys (Umwelt, 2022b; 2024a; 2024b) identified 354 individuals within the survey area, 58 of these were located within the application area. The clearing of 58 individuals would impact approximately 16 percent of the local population, resulting in a significant impact. The potential impacts to this species can be managed by implementing a flora management condition, permitting no more than 16 individuals (~ five percent) to be cleared.

Chordifex reseinans, Priority 2, is known from 29 locations over a range of 120 kilometres within the Geraldton Sandplains and Swan Coastal Plain IBRA bioregions (Western Australian Herbarium, 1998-). The total number of plants at all locations is unknown, however it is estimated to be greater than 100,000 plants (DBCA, 2023). The flora surveys (Umwelt, 2022b; 2024a; 2024b) identified 80 individuals within the survey area, seven of these were located within the application area. The clearing of seven individuals would impact approximately nine percent of the local population, resulting in a significant impact. The potential impacts to this species can be managed by implementing a flora management condition, permitting no more than four individuals (~ five percent) to be cleared.

Comesperma rhadinocarpum, Priority 3, is known from 18 locations over a range of 1,000 kilometres within the Coolgardie, Geraldton Sandplains, Great Victoria Desert, Jarrah Forest and Swan Coastal Plain IBRA bioregions (Western Australian Herbarium, 1998-). The flora surveys (Umwelt, 2022b; 2024a; 2024b) identified 18 individuals within the survey area, 15 of these were located within the application area. The clearing of 15 individuals would result in a significant impact to this species at a local scale. As these 15 individuals were recorded at one location, the impacts to this species will be managed by implementing a flora management condition, not permitting clearing individuals of this species.

Hypocalymma quadrangulare, Priority 3, is known from nine locations over a range of 200 kilometres within the Geraldton Sandplains and Swan Coastal Plain IBRA bioregions (Western Australian Herbarium, 1998-). The flora

surveys (Umwelt, 2022b; 2024a; 2024b) identified 1,255 individuals within the survey area, 85 of these were located within the application area. The clearing of 85 individuals would impact approximately seven percent of the local population, resulting in a significant impact. The potential impacts to this species can be managed by implementing a flora management condition, permitting no more than 62 individuals (~ five percent) to be cleared.

Isopogon panduratus subsp. *palustris*, Priority 3, is known from 23 locations over a range of 60 kilometres within the Geraldton Sandplains and Swan Coastal Plain IBRA bioregions (Western Australian Herbarium, 1998-). The flora surveys (Umwelt, 2022b; 2024a; 2024b) identified 282 individuals within the survey area, 11 of these were located within the application area (Umwelt, 2024a). The clearing of 11 individuals would not significantly impact this species at a local or regional level as there are several records and suitable habitat within the surrounding environment.

Poranthera asybosca, Priority 1, is known from two locations over a range of 120 kilometres within the Geraldton Sandplains and Swan Coastal Plain IBRA bioregions (Western Australian Herbarium, 1998-). The flora surveys (Umwelt, 2022b; 2024a; 2024b) identified 114 individuals within the survey area, 20 of these were located within the application area (Umwelt, 2024a). The clearing of 20 individuals would impact approximately 18 percent of the local population, resulting in a significant impact. The potential impacts to this species can be managed by implementing a flora management condition, permitting no more than six individuals (~ five percent) to be cleared.

Verticordia lindleyi subsp. *lindleyi*, Priority 4, is known from 83 locations over a range of 450 kilometres within the Geraldton Sandplains, Jarrah Forest and Swan Coastal Plain IBRA bioregions (Western Australian Herbarium, 1998-). The flora surveys (Umwelt, 2022b; 2024a; 2024b) identified 109 individuals within the survey area, one of these were located within the application area (Umwelt, 2024a). The clearing of one individual would not significantly impact this species as there are several records and suitable habitat within the surrounding environment.

Two Threatened flora species (*Macarthuria keigheryi* and *Anigozanthos viridis* subsp. *terraspectans*) were recorded within the survey area (Umwelt, 2022b; 2024a; 2024b). *Macarthuria keigheryi* was recorded within 300 metres of the application area and *Anigozanthos viridis* subsp. *terraspectans* was recorded within four kilometres of the application area (Umwelt, 2024a). Suitable habitat is present within the application area, however, given the distance of the Threatened flora the proposed clearing is not considered to significantly impact these species.

The flora and vegetation surveys recorded an additional 16 Priority flora species (See B.3) within the survey area, however no individuals of these species were recorded within the application area (Umwelt, 2022b; 2024a; 2024b). The proposed clearing is not considered to significantly impact these species as no individuals were recorded within the application area, however the cumulative impact of continued habitat loss has the potential to be significant in the future.

Two conservation significant species (*Caladenia denticulate* subsp. *albicans* – P1 and *Thelymitra pulcherrima* – P2) potentially occurring in the application area could not be surveyed due to timing constraints (Umwelt, 2022b). The timing of the survey did not coincide with the flowering period of these species, which is the only time where these taxa can be identified (Umwelt, 2022b). Both species are tuberous and summer dormant species, hence, if the proposed clearing occurs outside of the period when plants will be present, then any plants potentially occurring in areas to be impacted are less likely to be affected by clearing that does not include soil disturbance (DBCA, 2023). If soil disturbance is minimal, then impacts are likely to be minor, noting that impacts may be slightly greater for *Caladenia denticulate* subsp. *albicans* as it is poorly known (DBCA, 2023). As the clearing mainly consists of driving over vegetation, only using raised blades/buckets in areas with dense thickets, there will be no ground disturbance and the raised blade will avoid disturbance of the topsoil (Umwelt, 2022a; Umwelt 2022b).

The application area is located within the “Banksia Woodlands of the Swan Coastal Plain” Threatened Ecological Community (TEC), listed as Endangered under the *Environmental Protection and Biodiversity Conservation Act 1999* and a Priority 3 Ecological Community under the BC Act (GIS Database). The areas proposed to be cleared will be temporarily disturbed, the proponent has provided evidence of successful rehabilitation following previous drill programs (Appendix A) (Tronox, 2024a). As the clearing will be undertaken by driving over vegetation and avoiding the disturbance of topsoil, the disturbance of 0.63 hectares is not considered to significantly impact the PEC present within the application (Tronox, 2024b).

The application area is mapped within the dieback risk zone (GIS Database). The proponent has committed to undertake the drill program in the dry season in accordance with the project Dieback Management Plan to minimise the spread of dieback (Tronox, 2023; 2024). A dieback management condition which requires clearing during dry conditions will be placed on the permit, which aligns with the mitigation measures mentioned above proposed by Tronox (Umwelt, 2022a).

The application area intersects numerous wetlands and seasonal damp lands within an area identified in the Directory of Important Wetlands as the Lancelin Defence Training Area (GIS Database). The wetland chain is considered an important hydrological feature, supporting a diverse flora suite (DBCA, 2023). The proposed movement of soil, propagules and vegetative matter presents a risk of transporting/spreading and potentially introducing weeds and dieback into otherwise disease-free areas. It is considered important that Tronox undertake dieback mapping to inform the location of clean on entry points and that all areas are accessed in dry soil conditions only. Where sufficient information about mineral deposits can be obtained from adjacent drill lines located outside the wetlands, it is recommended that the program is rationalised wherever possible to avoid and/or reduce the requirement to enter the wetland areas.

Conclusion

Based on the above assessment, it is considered that the impacts of the proposed clearing can be managed to be environmentally acceptable if avoidance, mitigation and management measures are implemented.

For the reasons set out above, it is considered that the impacts of the proposed clearing on potential habitats for conservation significant flora species and ecological community can be managed with conditions to be environmentally acceptable. The proposed clearing has the potential to exacerbate the spread of weeds and dieback.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds;
- clearing restricted to understorey vegetation - vegetation that has a diameter (measured at 130 centimetres from the base of the vegetation) less than 10 centimetres, for all species;
- flora management condition limiting the number of individuals of *Babingtonia urbana*, *Chordifex reseminans*, *Comesperma rhadinocarpum*, *Hypocalymma quadrangulare* and *Poranthera asybosca* allowed to be cleared;
- method of clearing consisting of driving over the vegetation, using raised blades on unavoidable patches of dense thickets; and
- dieback management condition which requires clearing during dry conditions.

3.2.2. Biological values (fauna) - Clearing Principles (b)

Assessment

The areas proposed to be cleared contain foraging habitat for Carnaby's Cockatoo (*Zanda latirostris* – formerly *Calyptorhynchus latirostris*) listed as Endangered under both state and federal legislation (DCCEEW, 2023). The loss of feeding habitat has been identified as a leading cause of the decline of these species.

The Banksia Woodlands of the Swan Coastal Plain (TEC) are recognised as providing suitable foraging habitat for Carnaby's back cockatoo (*Zanda latirostris*) (DBCA, 2024). Carnaby's Cockatoos typically breeds in eucalypt forests and woodlands in the wheatbelt and migrates to the coast each year, to feed on the flowers and fruiting cones of Banksia and related species within the Banksia Woodlands of the Swan Coastal Plain (TEC) (DBCA, 2024). *Zanda latirostris* is listed as Endangered under the Commonwealth EPBC Act and the Biodiversity Conservation Act 2016 (BC Act). There are confirmed breeding sites for *Zanda latirostris* approximately five kilometres south of the proposed exploration area and it is expected this species utilises the Cooljarloo west area for feeding (DBCA, 2024).

All large trees which may support breeding or roosting habitat will not be permitted to clear, which will ensure that the impacts to Carnaby's cockatoo are limited (Umwelt, 2022a). The avoidance of felling mature trees, particularly Banksia species is supported as it may minimise impacts to Carnaby's Cockatoo foraging habitat (DBCA, 2023). The areas proposed to be cleared will be temporarily disturbed, the proponent has provided evidence of successful rehabilitation following previous drill programs (Appendix A) (Tronox, 2024b). As the clearing will be undertaken by driving over vegetation and avoiding the disturbance of topsoil, the disturbance of 0.63 hectares is not considered to lead to a significant impact to this species. A condition restricting the clearing only to understorey vegetation (avoiding trees felling) will prevent possible impacts to the potential foraging habitat for this fauna species. The applicant may have notification responsibilities under the EPBC Act for impacts to Carnaby's cockatoo and their habitats, as set out in the EPBC Act. The applicant has been advised to contact the federal Department of Climate Change, Energy, the Environment and Water (DCCEEW) to discuss EPBC Act referral requirements.

There are no other conservation significant fauna species recorded within the application area (GIS Database). The Jewelled southwest Ctenotus (Swan Coastal Plain subpopulation) (*Ctenotus gemmula* (Swan Coastal Plain subpopulation) – P3, black-striped snake (*Neelaps calonotos*) – P3, western brush wallaby (*Notamacropus irma*) - P4 and bothriembryontid land snail (*Bothriembryon perobesus*) – P1, have been recorded within 10 kilometres of the application area (GIS Database). Given the low impact of the associated method of clearing activities, the extent of the clearing and its spatial extent (small strips of drill lines distributed 100 meters apart), it is unlikely that the proposed clearing will have any significant impact to these fauna species as the application area does not comprise restrict habitat for them.

Conclusion

Based on the above assessment, it is considered that the impacts of the proposed clearing can be managed to be environmentally acceptable if avoidance, mitigation and management measures are implemented.

For the reasons set out above, it is considered that the impacts of the proposed clearing on potential habitats for conservation significant flora species can be managed with conditions to be environmentally acceptable.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- undertake slow progressive clearing to allow fauna to move into adjacent environments; and
- clearing restricted to the understorey vegetation, which only allows native vegetation that has a diameter (measured at 130 centimetres from the base of the vegetation) less than 10 centimetres, to be cleared.

3.3. Relevant planning instruments and other matters

The clearing permit application was advertised on 3 October 2023 by the Department of Mines, Industry Regulation and Safety inviting submissions from the public. No submissions were received in relation to this application.

The permit area is within the South West Native Title Settlement area (DPLH, 2024). This settlement resolves Native Title rights and interests over an area of approximately 200,000 square kilometres within the south west of Western Australia. The mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are no registered Aboriginal Sites of Significance within the application area (DPLH, 2024). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

It is noted that the proposed clearing may impact on Carnaby's Cockatoo (*Zanda latirostris*), which are a protected matter under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). The proponent may be required to refer the project to the (Federal) Department of Climate Change, Environment and Water for environmental impact assessment under the EPBC Act. The proponent is advised to contact the Department of Climate Change, Energy, the Environment and Water and the Environment for further information regarding notification and referral responsibilities under the EPBC Act.



Other relevant authorisations required for the proposed land use include:

- A Programme of Work approved under the *Mining Act 1978*.

It is the proponent's responsibility to liaise with the Department of Water and Environmental Regulation and the Department of Biodiversity, Conservation and Attractions, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

End

Appendix A. Additional information provided by applicant

Summary of comments	Consideration of comment
<p>The proponent provided details of successful rehabilitation following drill programs within the area (Tronox, 2024a).</p>  <p>Plate 1: Example of exploration drill rig avoiding large scale clearing by driving over and around vegetation instead of removal.</p>  <p>Plate 2: Example of a two year old exploration line where vegetation was previously been driven over.</p>	<p>The avoid, minimise and mitigation measures proposed by the proponent were deemed suitable and the clearing would not lead to a residual impact.</p>
<p>An additional flora survey was undertaken in October 2023 (Umwelt, 2024b).</p>	<p>The results of this survey will be considered in the assessment.</p>

Appendix B. Site characteristics

B.1. Site characteristics

Characteristic	Details
Local context	The project is located approximately 30 kilometres west of Dandaragan, within the Shire of Dandaragan in the intensive land use zone (GIS Database). The area is located within the Perth subregion of the Swan Coastal Plain Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (GIS Database).

Characteristic	Details
Ecological linkage & Conservation areas	The nearest conservation area, Wongonderrah Nature Reserve (R 26248), is located approximately 4.2 kilometres north of the application area (GIS Database). Given the size of the proposed clearing (0.63 hectares), it is not considered to act as an ecological linkage.
Vegetation description	<p>The vegetation of the application area is broadly mapped as the following Beard vegetation association:</p> <ul style="list-style-type: none"> Bassendean 1030: Low woodland; <i>Banksia attenuata</i> & <i>B. menziesii</i> (GIS Database). <p>A flora and vegetation survey was conducted over the application area by Umwelt Environmental and Social Consultants during October 2021, 2022, and 2023 (Umwelt, 2024b). The following vegetation associations were recorded within the application area (Umwelt, 2024b):</p> <ul style="list-style-type: none"> D-A (CLW VT 17): Low woodland to isolated trees of <i>Banksia attenuata</i> and <i>Banksia menziesii</i>, occasionally with <i>Eucalyptus todtiana</i> and <i>Nuytsia floribunda</i>, over mid isolated shrubs of <i>Xanthorrhoea preissii</i>, over low shrubland to sparse shrubland of mixed species dominated by <i>Bossiaea eriocarpa</i> and <i>Melaleuca clavifolia</i> and also <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>, <i>Jacksonia nutans</i> and <i>Eremaea pauciflora</i> var. <i>pauciflora</i>, over low sparse sedgeland and rushland of mixed species including <i>Lepidosperma</i> cf. <i>pubisquamum</i>, <i>Alexgeorgea nitens</i> and <i>Mesomelaena pseudostygia</i>, over low sparse forbland of mixed species including <i>Dasyogon obliquifolius</i> and <i>Patersonia occidentalis</i> var. <i>occidentalis</i>, on grey or brown deep sands or sandy loam on plains or flats within undulating plains and slopes of low dunes. W-C (CLW VT 1 / VT 5): Occasional low open woodland to isolated trees of mixed species including <i>Nuytsia floribunda</i>, <i>Banksia menziesii</i>, <i>Banksia attenuata</i>, <i>Banksia prionotes</i> and <i>Melaleuca preissiana</i>, over mid closed to open heathland of mixed species dominated by <i>Banksia telmatiaea</i>, <i>Regelia ciliata</i>, <i>Hakea obliqua</i> subsp. <i>parviflora</i> and occasionally <i>Beaufortia squarrosa</i> and <i>Calytrix aurea</i>, over low heathland to sparse heathland of mixed species including <i>Melaleuca seriata</i>, <i>Verticordia densiflora</i> var. <i>densiflora</i>, <i>Isopogon panduratus</i> subsp. <i>palustris</i> (P3), <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> and <i>Jacksonia hakeoides</i>, on grey, brown or yellow sandy loam or sand on seasonally damp to wet low lying plains, flats, open depressions and swamps; W-D (CLW VT2) : Occasional low isolated trees of <i>Melaleuca raphiophylla</i>, over mid heathland to open heathland of mixed species dominated by <i>Melaleuca viminea</i> subsp. <i>viminea</i>, <i>Banksia telmatiaea</i>, <i>Regelia ciliata</i> and occasionally <i>Melaleuca acutifolia</i> and <i>Kunzea micrantha</i> subsp. <i>petiolata</i>, over low open to sparse heathland of mixed species including <i>Melaleuca brevifolia</i> and <i>Hakea varia</i>, over low sparse sedgeland and rushland of mixed species including <i>Chaetanthus aristatus</i> and occasionally <i>Gahnia trifida</i>, on brown, grey or black clay loam or sandy loam on damp to wet plains, flats and open depressions; W-E (CLW VT 9a / VT 9b): Occasional low isolated trees of <i>Melaleuca raphiophylla</i>, <i>Eucalyptus rudis</i> subsp. <i>rudis</i>, <i>Banksia littoralis</i> and/or <i>Banksia menziesii</i>, over tall sparse to isolated shrubs of mixed species including <i>Acacia saligna</i> subsp. <i>Wheatbelt</i> (B.R. Maslin 8602), <i>Exocarpos sparteus</i> and occasionally <i>Viminaria juncea</i>, <i>Melaleuca incana</i> subsp. <i>incana</i> and <i>Hakea varia</i>, over mid open to sparse heathland of <i>Banksia telmatiaea</i> and other species including <i>Kunzea micrantha</i> subsp. <i>petiolata</i>, <i>Regelia ciliata</i>, <i>Melaleuca teretifolia</i> and <i>Hakea trifurcata</i>, over low sparse shrubland of mixed species including <i>Xanthorrhoea preissii</i>, <i>Hypocalymma balbakiae</i>, <i>Melaleuca viminea</i> subsp. <i>viminea</i> and <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i>, on brown or grey clay loam or sandy loam on damp to wet flats or plains.
Vegetation condition	<p>The vegetation surveys (Umwelt 2022b; 2024a; 2024b) adapted Keighery scale indicate the vegetation within the proposed clearing area is in excellent condition, interpreted as excellent through Keighery scale (1994), described as:</p> <ul style="list-style-type: none"> Excellent: Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species. <p>The full Keighery (1994) condition rating scale is provided in Appendix D.</p>
Climate and landform	The application area is mapped within elevations of 70 meters AHD (GIS Database). The climate of the region is subtropical, and the annual rainfall average of approximately 594.4 millimetres (BoM, 2024).
Soil description & Land degradation risk	The soil is mapped as part of the Bassendean 5 Subsystem, described as complex pattern of dunes or low sandy rises, poorly drained plains, (Complex of Bs1, Bs4 and Bs6; Bs4 or Bs6 dominant); saline depressions and swamps (DPIRD, 2024). The soil type mapped within the application area has a potentially high to extreme risk of wind erosion (GIS Database).
Waterbodies and Hydrogeography	There are no permanent watercourses within the application area (GIS Database). The application area falls within the Lancelin Defence Training Area Directory of Important Wetlands in Australia (DIWA) WA119 (GIS Database). The application area is located within the Jurien Proclaimed Groundwater Area and the Gingin Proclaimed Groundwater Area (RIWI Act); however, it is not within a Public Drinking Water Source Area (GIS Database). Groundwater salinity ranges between 500 to 1,000 milligrams per litre total dissolved solids (GIS Database).
Flora	There are records of 55 conservation significant flora within 20 kilometres of the application area (Umwelt, 2022b; 2024a; 2024b; GIS Database). The flora and vegetation surveys (Umwelt, 2022b; 2024a; 2024b) recorded 25 conservation significant flora species within 10 kilometres of the

Characteristic	Details
	application area (B.3). Seven Priority flora species were recorded within the application area (Umwelt, 2022b; 2024a; 2024b).
Ecological communities	The application area is mapped within the 'Banksia Woodlands of the Swan Coastal Plain' Threatened Ecological Community (TEC), listed as Endangered under the <i>Environmental Protection and Biodiversity Conservation Act 1999</i> and a Priority 3 Ecological Community under the BC Act (Umwelt, 2022b; GIS Database).
Fauna	There are records of five fauna of conservation significance within 10 kilometres of the application area (GIS Database).

B.2. Vegetation extent

	Pre-European area (ha)	Current extent (ha)	Extent Remaining %	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA Managed Lands
IBRA Bioregion Swan Coastal Plain	1,501,221.93	579,813.47	38.62	222,916.97	14.85
IBRA Subregion Perth	1,117,757.03	466,142.73	41.70	183,163.92	16.39
Local Government Shire of Dandaragan	671,022.05	296,637.75	44.21	129,128.89	19.24
Beard vegetation associations - State					
Veg Assoc No. 1030	139,012.86	88,949.55	63.99	17,117.26	12.31
Beard vegetation associations - Bioregion					
Veg Assoc No. 1030	134,788.56	86,013.90	63.81	14,981.00	11.11
Beard vegetation associations - subregion					
Veg Assoc No. 1030	114,215.61	79,563.09	69.66	13,418.40	11.75

Government of Western Australia (2019)

B.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix E.1), and biological survey information (Umwelt, 2022b; 2024a; 2024b), impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)
<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i>	T	Y	<5	19
<i>Anigozanthos humilis</i> subsp. <i>chrysanthus</i>	P4	Y	<1	65
<i>Arnocrinum gracillimum</i>	P3	Y	<7	21
<i>Babingtonia urbana</i>	P3	Y	<1	26
<i>Beaufortia bicolor</i>	P3	Y	<7	32
<i>Caladenia denticulata</i> subsp. <i>albicans</i>	P1	Y	<6	5
<i>Chordifex reseminans</i>	P2	Y	<1	29
<i>Comesperma rhadinocarpum</i>	P3	Y	<1	18
<i>Conospermum scaposum</i>	P3	Y	<1	47
<i>Conostephium magnum</i>	P4	Y	<10	33
<i>Desmocladius nodatus</i>	P3	Y	<1	21
<i>Grevillea cooljarloo</i> (Keighery & Olde)	P1	Y	<1	16
<i>Hensmania stoniella</i>	P3	Y	<1	47
<i>Hypocalymma quadrangulare</i>	P3	Y	<1	9
<i>Isopogon panduratus</i> subsp. <i>palustris</i>	P3	Y	<1	23

Species name	Conservation status	Suitable habitat features? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)
<i>Lepyrodia curvescens</i>	P2	Y	<5	21
<i>Levenhookia preissii</i>	P1	Y	<2	19
<i>Macarthuria keigheryi</i>	T	Y	<1	33
<i>Persoonia rudis</i>	P3	Y	<5	42
<i>Poranthera asybosca</i>	P1	Y	<1	2
<i>Poranthera moorokatta</i>	P2	Y	<1	15
<i>Schoenus griffinianus</i>	P4	Y	<2	44
<i>Schoenus pennisetis</i>	P3	Y	<1	44
<i>Stylidium hymenocraspedum</i>	P3	Y	<3	33
<i>Thelymitra pulcherrima</i>	P2	Y	<8	14
<i>Thysanotus glaucus</i>	P4	Y	<6	29
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	P4	Y	<1	83

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority, OS: Other Specially Protected

B.4. Fauna analysis table

Species name	Common Name	Conservation status	Distance of closest record to application area (km)	Suitable habitat features? [Y/N]
<i>Bothriembryon perobesus</i>	a bothriembryontid land snail (Moore River)	P1	<8	
<i>Ctenotus gemmula</i> (Swan Coastal Plain subpopulation)	jewelled southwest Ctenotus (Swan Coastal Plain subpopulation)	P3	<3	
<i>Neelaps calonotos</i>	black-striped snake, black-striped burrowing snake	P3	<5	
<i>Notamacropus irma</i>	western brush wallaby	P4	<5	
<i>Zanda latirostris</i>	Carnaby's cockatoo	EN	<5	

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority, OS: Other Specially Protected

Appendix C. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> "Native vegetation should not be cleared if it comprises a high level of biodiversity."</p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared contains conservation significant flora and vegetation (Umwelt, 2022b; 2024a; 2024b; GIS Database). A portion of the application area is mapped as the 'Banksia Woodlands of the Swan Coastal Plain' threatened ecological community (TEC), listed as Endangered under the <i>Environmental Protection and Biodiversity Conservation Act 1999</i> and a Priority 3 Ecological Community under the BC Act (GIS Database).</p>	At variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (b):</u> "Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."</p> <p><u>Assessment:</u></p> <p>The areas proposed to be cleared contains foraging habitats for conservation significant fauna (Umwelt, 2022b; 2024a; 2024b; GIS Database).</p>	At variance	Yes <i>Refer to Section 3.2.2, above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (c):</u> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u></p> <p>There are no known records of Threatened flora within the application area (GIS Database). Flora surveys did not record any species of Threatened flora within the application area, however, two Threatened flora species (<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i> and <i>Macarthuria keigheryi</i>) were recorded within the surrounding areas (Umwelt, 2022b; 2024; GIS Database).</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (d):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.”</i></p> <p><u>Assessment:</u></p> <p>The application area is located within the “Banksia Woodlands of the Swan Coastal Plain” Threatened Ecological Community (TEC), listed as Endangered under the <i>Environmental Protection and Biodiversity Conservation Act 1999</i> and a Priority 3 Ecological Community under the BC Act.</p>	May be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
Environmental value: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>The application area falls within the Swan Coastal Plain Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Approximately 38% of the pre-European vegetation still exists in the Swan Coastal Plain IBRA Bioregion (Government of Western Australia, 2019).</p> <p>The application area is broadly mapped as Beard vegetation associations 1030 (Umwelt, 2022b; GIS Database). Over 63% of the pre-European extent of the 1030 vegetation association remains uncleared at both the state and bioregional level (Government of Western Australia, 2019).</p> <p>The vegetation within the application area it is part of a larger remnant patch of vegetation. However, the temporary nature of the disturbances on a relatively small area (0.63 hectares) are unlikely to result in significant and permanent impacts to the remaining native vegetation associations.</p>	At variance	No
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u></p> <p>Given the distance to the nearest conservation area (GIS Database), the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.</p>	Not likely to be at variance	No
Environmental value: land and water resources		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p>The application area lies within the Lancelin Defence Training Area – Directory of Important Wetlands (Umwelt, 2022a; GIS Database).</p> <p>Lancelin Defence Training Area covers a total area of 2,000 hectares and it is registered within the Directory of Important Wetlands under Criteria 1 and 2 (DACA, 2023).</p> <p>Umwelt (2022a) have identified that the proposed clearing of this vegetation is unlikely to significantly affect this wetland as it represents only a relatively small proportion of the local vegetation association. In addition, the proposed clearing is unlikely to cause any impacts on surface or ground water hydrology, with no surface water present at the time of survey and exploration activities to be completed during the summer months (Umwelt, 2022a). However, the application area is likely to support a relatively</p>	At variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
<p>high diversity of wetland biota due to its proximity to surrounding nature reserves and national parks, and the large area of freshwater wetlands on the site (DBCA, 2023). Umwelt (2024b) reports that vegetation associations 'W-A, W-C and W-E' are wetland vegetation and classed the vegetation as having "very high significance". Therefore, despite the potential low impact due to the small scale of clearing, it is recommended the clearing to be undertaken on dry season, to avoid further impacts on potential wetland dependent flora and fauna, and also the spread of dieback.</p> <p>Given the low impact of the associated method of clearing activities and that the vegetation types within the application area are well represented locally, it is unlikely that the proposed clearing will have any significant environmental impact on riparian vegetation. However, a dieback management condition which requires clearing during dry conditions will be placed on the permit, which aligns with the mitigation measures mentioned above proposed by Tronox (Umwelt, 2022a).</p>		
<p><u>Principle (g):</u> "Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."</p> <p><u>Assessment:</u></p> <p>The mapped soil is highly susceptible to wind erosion (GIS Database). However, noting the extent of the application area (0.63 hectares) and that the clearing consists of driving over vegetation and using raised blade instead of stripping of topsoil (Umwelt, 2022a), the risks to cause wind erosion are extremely low. Therefore, the proposed clearing is not likely to have an appreciable impact on land degradation.</p>	Not likely to be at variance	No
<p><u>Principle (i):</u> "Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."</p> <p><u>Assessment:</u></p> <p>There are no Public Drinking Water Source Areas within or in close proximity to the application area (GIS Database).</p> <p>The wetland vegetation within the application area are likely to be seasonally moist, with surface water generally unlikely to be present (Umwelt, 2022a). The proposed clearing is unlikely to cause any significant impacts on surface or ground water hydrology provided that drilling is conducted during dry soil conditions where there is no risk of surface water being present in the intersected wetland areas (Umwelt, 2022a). Surface water flow is unlikely to be obstructed due to the minimal ground disturbance being resulted of vehicle tracks, and erosion or any significant change to the hydrological regime are unlikely to occur as the vegetation will not be completely removed (Umwelt, 2022a).</p>	Not likely to be at variance	No
<p><u>Principle (j):</u> "Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."</p> <p><u>Assessment:</u></p> <p>According to available databases, the mapped soils, the extent of the clearing and its shape (small strips of drill lines distributed 100 meters apart) (Umwelt, 2022a), the proposed clearing presents low risk to flooding (GIS Database). Therefore, these factors do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding.</p> <p>Given a small portion of the application area intersects with an ephemeral wetland, and the clearing does not consists of topsoil removal (Umwelt, 2022a), the proposed clearing is unlikely to contribute to waterlogging.</p>	Not likely to be at variance	No

Appendix D. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix E. Sources of information

E.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Bush Forever (Regional Scheme) (DPLH-022)
- Cadastre (LGATE-218)
- Contours (DPIRD-073)
- Clearing Regulations – Schedule One Areas (DWER-057)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrographic Catchments – Catchments (DWER-028)
- Hydrography – Inland Waters – Waterlines
- Hydrography, Linear (DWER-031)
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Pre-European Vegetation Statistics
- Interim Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available (DPIRD-027)
- Soil Landscape Mapping – Rangelands (DPIRD-064)
- WA Now Aerial Imagery

Restricted GIS Databases used:

- Black Cockatoo WTBC Breeding
- Black Cockatoo FRTBC Breeding

- Black Cockatoo BC Roosts
- Black Cockatoo BC Feeding SCP
- Black Cockatoo Feeding JF
- Black Cockatoo Feeding Areas Buffered
- Black Cockatoo Baudins Distribution
- Black Cockatoo Forest Red Tail Distribution
- Black Cockatoo Carnabys Distribution
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

E.2. References

- Bureau of Meteorology (BoM) (2023) Bureau of Meteorology Website – Climate Data Online, Dandaragan West. Bureau of Meteorology. <http://www.bom.gov.au/climate/data/> (Accessed 2 October 2023).
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Western Australia.
- Commonwealth of Australia (2001) *National Objectives and Targets for Biodiversity Conservation 2001-2005*, Canberra.
- Department of Biodiversity, Conservation and Attractions (DBCA) (2023) Advice received in relation to Clearing Permit Application CPS 9885/1. Species and Communities Branch, Department of Biodiversity, Conservation and Attractions, Western Australia, January 2023.
- Department of Biodiversity, Conservation and Attractions (DBCA) (2024) Advice received in relation to Program of work applications 121991, 122175, 122287, 121433 and 122232. Species and Communities Branch, Department of Biodiversity, Conservation and Attractions, Western Australia, May 2024.
- Department of Environment Regulation (DER) (2014) *A guide to the assessment of applications to clear native vegetation*. Perth. Available from: https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2_assessment_native_veg.pdf
- Department of Planning, Lands and Heritage (DPLH) (2024) Aboriginal Heritage Inquiry System. Department of Planning, Lands and Heritage. <https://espatial.dplh.wa.gov.au/AHIS/index.html?viewer=AHIS> (Accessed 23 May 2024).
- Department of Primary Industries and Regional Development (DPIRD) (2024) NRInfo Digital Mapping. Department of Primary Industries and Regional Development. Government of Western Australia. URL: <https://dpiird.maps.arcgis.com/apps/webappviewer/index.html?id=662e8cbf2def492381fc915aaf3c6a0f> (Accessed 23 May 2024).
- Department of Water and Environmental Regulation (DWER) (2021) Procedure: Native vegetation clearing permits. Joondalup. Available from: https://dwer.wa.gov.au/sites/default/files/Procedure_Native_vegetation_clearing_permits_v1.pdf
- Environmental Protection Authority (EPA) (2016) Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment. Available from: http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey_Dec13.pdf
- Government of Western Australia (2019) 2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019. WA Department of Biodiversity, Conservation and Attractions. <https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics>
- Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Tronox (2023) Clearing permit application form, CPS 10352/1, received 15 September 2023.
- Tronox (2024a) Osprey Mineral Sands Deposit 2023 Infill Exploratory Drilling Clearing Permit Application CPS 10352/1 Additional Supporting Information. Report prepared by Tronox Management Pty Ltd, January 2024.
- Tronox (2024b) Osprey Mineral Sands Deposit 2024 Infill Exploratory Drilling Clearing Permit Application Supporting Information. Report prepared by Tronox Management Pty Ltd, January 2024.
- Umwelt (2022a) Cooljarloo West 2022 Drilling Program NVCP Clearing Principle Assessment. Supporting document prepared for Tronox Management Pty Ltd by Umwelt Australia Pty Limited, August 2022.
- Umwelt (2022b) Cooljarloo Exploration Area Exploration Environmental Assessment 2022. Report prepared for Tronox Management Pty Ltd by Umwelt Australia Pty Limited, March 2022.
- Umwelt (2024a) Cooljarloo West Exploration Environmental Assessment 2024 Desktop Review, Field Survey and Impact Assessment. Report prepared for Tronox Management Pty Ltd by Umwelt Australia Pty Limited, March 2024.
- Umwelt (2024b) Detailed Flora and Vegetation Assessment Osprey Project. Report prepared for Tronox Management Pty Ltd by Umwelt Australia Pty Limited, February 2024.
- Western Australian Herbarium (1998-) FloraBase - the Western Australian Flora. Department of Biodiversity, Conservation and Attractions, Western Australia. <https://florabase.dpaw.wa.gov.au/> (Accessed 1 February 2024).

4. Glossary

Acronyms:

BC Act	<i>Biodiversity Conservation Act 2016</i> , Western Australia
BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia (now DPLH)

DAFWA	Department of Agriculture and Food, Western Australia (now DPIRD)
DCCEEW	Department of Climate Change, Energy, the Environment and Water, Australian Government
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DER	Department of Environment Regulation, Western Australia (now DWER)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DMP	Department of Mines and Petroleum, Western Australia (now DMIRS)
DoEE	Department of the Environment and Energy (now DCCEEW)
DoW	Department of Water, Western Australia (now DWER)
DPaW	Department of Parks and Wildlife, Western Australia (now DBCA)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DPLH	Department of Planning, Lands and Heritage, Western Australia
DRF	Declared Rare Flora (now known as Threatened Flora)
DWER	Department of Water and Environmental Regulation, Western Australia
EP Act	<i>Environmental Protection Act 1986</i> , Western Australia
EPA	Environmental Protection Authority, Western Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
PEC	Priority Ecological Community, Western Australia
RIWI Act	<i>Rights in Water and Irrigation Act 1914</i> , Western Australia
TEC	Threatened Ecological Community

Definitions:

{DBCA (2019) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia}:-

T Threatened species:

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of ‘Specially Protected Fauna’ listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of ‘Rare Flora’ listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR Critically endangered species

Threatened species considered to be “*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN Endangered species

Threatened species considered to be “*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU Vulnerable species

Threatened species considered to be “*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct Species:

EX Extinct species
Species where “*there is no reasonable doubt that the last member of the species has died*”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).
Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species
Species that “*is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).
Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species:

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species
Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).
Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.
Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependent fauna)
Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).
Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species
Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).
Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P Priority species:
Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.
Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.
Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

P1 Priority One - Poorly-known species

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

P2 Priority Two - Poorly-known species

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

P3 Priority Three - Poorly-known species

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

P4 Priority Four - Rare, Near Threatened and other species in need of monitoring

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Principles for clearing native vegetation:

- (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.
- (b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.
- (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.
- (d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.
- (e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.
- (f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
- (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.
- (h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.
- (i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.
- (j) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.