Government of Western Australia
Department of Mines, Industry Regulation and Safety

Clearing Permit Decision Report

1. Application details and outcomes

1.1. Permit application details

Permit number:	9431/1
Permit type:	Purpose Permit
Applicant name:	Thomas Edward Langley
Application received:	8 September 2021
Application area:	13.1 hectares
Purpose of clearing:	Sand mining and associated activities
Method of clearing:	Mechanical Removal
Tenure:	Mining Lease 09/135
	Miscellaneous Licence 09/26
Location (LGA area/s):	Shire of Carnarvon
Colloquial name:	Boora Pool Sand Project

1.2. Description of clearing activities

Thomas Edward Langley proposes to clear up to 13.1 hectares of native vegetation within a boundary of approximately 13.38 hectares, for the purpose of sand mining and associated activities.

1.3. Decision on application and key considerations

Decision:	Grant
Decision date:	4 February 2022
Decision area:	13.1 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 September 2021. DMIRS advertised the application for 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 A), relevant datasets (Appendix D), the clearing principles set out in Schedule 5 of the EP Act (Appendix B), relevant planning instruments and any other matters considered relevant to the assessment (Section 3). The Delegated Officer noted that the permit application has been made to support continuation of the Boora Pool Sand Project; a small sand extraction operation. A previously granted clearing permit (CPS 6989/1) was granted on 5 May 2016 and was valid from 28 May 2016 to 28 May 2021. Permit 6989/1 was held by the previous owner of the Boora Pool Sand Project, has now expired and is being replaced by this application. Annual environmental reporting information available to DMIRS suggests there is approximately 1.2 hectares of existing disturbance on Mining Lease 09/135 for sand extraction and stockpiling activities.

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;
- localised erosion if large trees stablising the bed and banks of the river bed are removed; and
- deterioration of surface water quality, as a result of erosion and increased sedimentation.

After consideration of the available information, (see Section 3.1), the Delegated Officer determined the proposed clearing poses some risks to land and water resources, however these risks can be adequately managed with conditions to ensure the proposal is environmentally acceptable.

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
- avoid impacts to riparian vegetation and maintain surface water flow, including a condition requiring no clearing of trees with a diameter, at 1.5 metres above the ground, of 500 millimetres or greater (or within the drip line of these trees)
- undertake clearing within three months of utilising cleared areas to minimise the potential for erosion and sedimentation

1.5. Site map

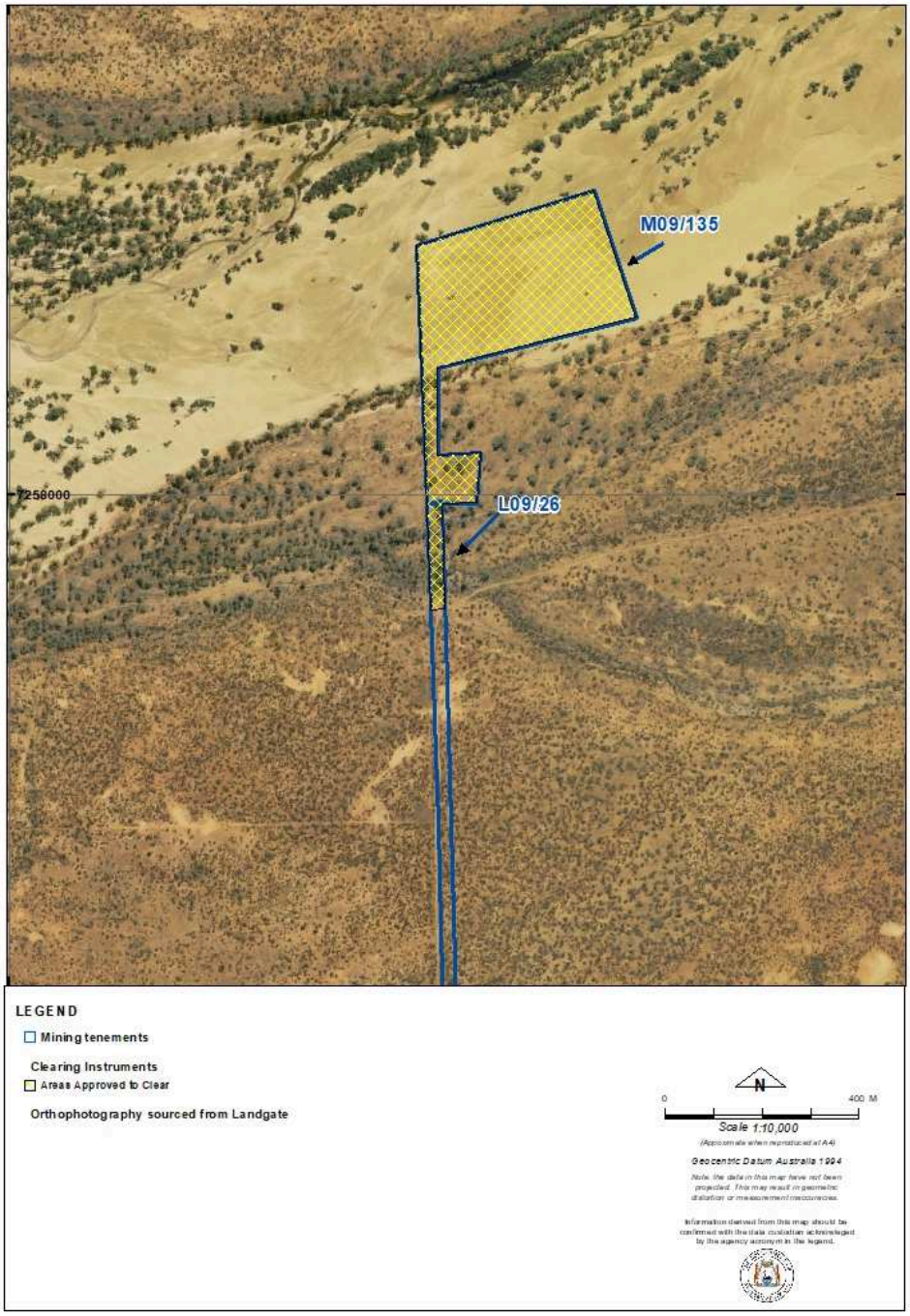

Figure 1 – The area cross hatched yellow indicates the area authorised to be cleared under the granted clearing permit.

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:
- *Mining Act 1978* (WA)
- *Rights in Water and Irrigation Act 1914*

The key guidance documents which inform this assessment are:
- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

No evidence of avoidance or mitigation measures was provided by the applicant to support this application. However, the Delegated Officer noted that the portion of the application area on the river bed is largely devoid of native vegetation and the pre-existing access track within Mining Lease 09/135 and Miscellaneous Licence 09/26 is in good condition and should not require further clearing.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix A) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles identified that the impacts of the proposed clearing present a risk to land and water resources. 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. Land and water resources - Clearing Principles (f), (g) (i) and (j)

Assessment

The proposed clearing area does include vegetation growing in, or in association with, an environment associated with a watercourse or wetland (see Appendix A). Riparian vegetation plays an important role in stabilising the bed and banks of the Gascoyne River, reducing erosion and sedimentation and providing nutrient cycling. Whilst the proposed clearing area is relatively small in a local and regional context, there will be a cumulative impact considering other clearing and land use activities in the catchment area. All efforts should be taken to avoid clearing wherever possible, particularly of larger vegetation. A condition requiring no clearing of trees with a diameter, at 1.5 metres above the ground, of 500 millimetres or greater (or within the drip line of these trees) will achieve this purpose. Other standard avoidance and mitigation conditions can also minimise the potential for localised erosion and subsequent sedimentation, which has the potential to adversely affect downstream surface water quality when the river is in flow. Care should also be taken to minimise the risk of clearing resulting in the spread and/or introduction of weeds into the riverbed and adjacent banks. This can be achieved by the implementation of a standard weed hygiene condition.

DWER's Midwest Gascoyne regional office did not raise concerns with respect to the proposed vegetation clearing impacting groundwater resources. DWER did raise a number of concerns about potential impacts to groundwater from the mining operation, and these are further discussed in section 3.3 (Relevant planning instruments and other matters). Given the relatively small scale of the proposed clearing and the proposed permit conditions requiring avoidance of large trees, the proposed vegetation clearing is not expected to significantly impact groundwater quality or quantity.

At the land system scale, the proposed clearing area is not considered susceptible to erosion (see Appendix A). However, DWER's Midwest Gascoyne regional office provided advice on the clearing permit application and noted potential for erosion at river access points and where vegetation removal destabilises banks. The Delegated Officer noted that the Boora Pool Sand Project already has established river access points and conditions can be imposed to ensure large trees are not cleared, thereby minimising erosion potential. A condition requiring clearing to be undertaken within three months of sand mining and associated activities commencing will also ensure areas are cleared incrementally as required. It is also noted that the mine has an approved Mine Closure Plan under the *Mining Act 1978* that requires reestablishment of vegetation on cleared areas post mining, further reducing long term erosion risks.

With respect to flooding, the proposed clearing will have a minor cumulative impact on the Gascoyne River's hydrology, acknowledging there are other sand extraction operations within the river and other land users on the river's floodplain, including irrigated horticulture. As noted by the Department of Agriculture and Food (2012), the Gascoyne River catchment is in poor condition and has been so since at least the 1960's and possibly as early as the 1930's. The catchment supports an extensive pastoral industry and the impacts of overgrazing and dry seasonal conditions have contributed to the catchment's poor condition. Whilst more perennial groundcover in the catchment will likely reduce the severity of flooding from minor and moderate storms, it would not likely make a substantial difference to major flood events, such as that experienced in December

2010. In the context of this clearing permit application, the proposed clearing area is small in comparison to the Gascoyne River catchment and the Nine Mile Bridge Sub-catchment (refer to Appendix A) and is unlikely to exacerbate the incidence or intensity of natural flood events.

Conclusion
Based on the above assessment, the proposed clearing has the potential to adversely impact land and water resources if avoidance, mitigation and management measures aren't implemented.

For the reasons set out above, it is considered that the impacts of the proposed clearing on land and water resources 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:

- avoid, minimise to reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds
- no clearing of trees with a diameter, at 1.5 metres above the ground, of 500 millimetres or greater (or within the drip line of these trees)
- avoid impacts to riparian vegetation where practicable and maintain surface water flow to minimise the potential for localised erosion and sedimentation, which can have adverse impacts on downstream water quality.
- clearing to take place within three months of sand extraction and associated activities commencing, to ensure cleared areas are opened up incrementally as required to reduce the potential for erosion and sedimentation.

3.3. Relevant planning instruments and other matters

Other relevant authorisations required for the proposed land use include:

- A Mining Proposal and Mine Closure Plan issued under *Mining Act 1978*.
- Permit to interfere with bed and banks under the *Rights in Water and Irrigation Act 1914*.

The clearing permit application was advertised on 1 October 2021 by the Department of Mines, Industry Regulation and Safety inviting submissions from the public. No submissions were received in relation to this application.

There are three native title claims over the area under application (DPLH, 2022). These claim has been determined by the Federal Court on behalf of the claimant groups. However, 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, 2022). 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 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.

DWER's Midwest Gascoyne regional office provided advice on the clearing permit application. DWER (2021) advised that best practice should be implemented when establishing access points to the river to reduce the damage and erosion created through accessing the river, no removal of trees to aid in the stabilising of banks, a limit on the area to be cleared, use of existing access tracks where appropriate and restoration work undertaken once activities have been completed. Best practice and conditions should be put in place to reduce the risk of contamination entering the surface and groundwater system, e.g. no storing of chemicals in the riverbed or in close proximity to the river, bunding and appropriate storage practices implemented, no refuelling or maintenance of plant to be undertaken in the riverbed, no activities to be undertaken when the river is flowing, no intersecting of the water table, a management plan to deal with spills and contamination to be implemented and monitoring of the groundwater.

DMIRS notes that some of DWER's advice and recommendations relate to potential impacts of the mining operation as opposed to the native vegetation clearing (aspects such as chemical and fuel storage, plant maintenance, depth of mining, mine closure and groundwater monitoring). Tenement conditions on M09/135 under the *Mining Act 1978* ensure that the sand mining operation is undertaken in an environmentally responsible manner and adequately address the best practice measures advised by DWER. The matters raised by DWER that are within the scope of the clearing permit assessment have been addressed in section 3.2 of this report.

End

Appendix A. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is located on the bed and banks of the Gascoyne River and is part of an expansive tract of uncleared native vegetation in the extensive land use zone of Western Australia.
Ecological linkage	According to available databases, there are no formal ecological linkages mapped over the application area. As the vegetation within the application area is within an extensively vegetated local area, the application area is not considered to be functioning as a significant ecological linkage in the local area.
Conservation areas	The application area is not located within or in close proximity to any conservation areas. There are no known conservation areas within a 20 kilometre radius of the application area.
Vegetation description	The application area has been mapped as the following Beard vegetation association: 308: Mosaic: Shrublands; *Acacia sclerosperma* sparse scrub / Succulent steppe; saltbush & bluebush. No on site vegetation survey has been undertaken to describe the vegetation in finer detail.
Vegetation condition	Aerial imagery indicates the vegetation within the proposed clearing area is in 'good' to 'completely degraded' condition (Keighery, 1994). The full Keighery (1994) condition rating scale is provided in 0.
Climate and landform	The application area is located in a semi-arid environment and receives low mean annual rainfall (233 millimetres) and high average annual evaporation rate (approximately 2,400 millimetres) The application area is located on the bed and banks of the Gascoyne River (within the seasonal river flow zone and on the associated floodplain).
Soil description and land degradation risk	The soil is mapped as: River System (235Ri) which is characterised by narrow, seasonally active flood plains and major river channels supporting close, tall shrublands or woodlands of acacias and fringing communities of eucalyptus sometimes with tussock grasses or spinifex. River drainage depression Subsystem (325Ri_4) which is characterised by concave drainage depressions cutting across the upper terraces of the Gascoyne River and carrying acacia shrubland with emergent coolabah (*Eucalyptus coolabah*). Undulating microrelief with common abraided channels. River lower terrace Subsystem (235Ri_6) which is characterised by lower, flood scoured, terraces of the Gascoyne River carrying acacia shrubland with emergent river red gum (*Eucalyptus camaldulensis*) and coolabah (*Eucalyptus coolabah*) and an understorey including buffel grass (*Cenchrus ciliaris*) The River land system is not normally susceptible to erosion (Payne, et al., 1987).
Waterbodies and hydrogeography	The desktop assessment and aerial imagery indicated that the proposed clearing is located within the bed and banks of the Gascoyne River. The Gascoyne River catchment is over eight million hectares in size. The application area is located within the Nine Mile Bridge sub-catchment, covering an area of approximately 18,000 hectares. The proposed clearing area is located within the Gascoyne Groundwater Area and the Gascoyne River and Tributaries Surface Water Area, proclaimed under *the Rights in Water and Irrigation Act 1914* (RIWI Act). The application area is located approximately six kilometres upstream of the Priority 1 Carnarvon Water Reserve Public Drinking Water Source Area. Groundwater salinity within the application area is mapped at 500 to 7,000 milligrams per litre total dissolved solids.

Characteristic	Details
Flora	According to available databases, there are no species of Threatened flora occurring within or near the application area. Flora databases indicate the following priority flora species have been recorded within a 50 kilometre radius of the application area: *Abutilon sp. Pritzelianum* (P3) *Acacia atopa* (P3) *Bergia auriculata* (P2) *Calandrinia rubrisabulosa* (P3) *Chthonocephalus spathulatus* (P3) *Chthonocephalus tomentallus (P2)* *Owenia acidula* (P3) *Rumex crystallinus* (P2) No onsite flora survey has been undertaken to target conservation significant flora within the application area. With consideration for the site characteristics set out above, relevant datasets, the habitat preferences of the aforementioned species, and the distribution of existing records, the application area is considered unlikely to provide suitable habitat for any conservation significant flora species.
Ecological communities	According to available databases, there are no Threatened Ecological Communities (TEC's) or Priority Ecological Communities (PEC's) occurring within or in close proximity to the application area.
Fauna	According to available fauna databases, a number of conservation significant fauna species have been recorded within 20 kilometres of the application area, including several migratory bird species and two species of fairy shrimp: *Acanthiza iredalei iredalei* (Slender-billed Thornbill) *Apus pacificus* (Fork-tailed Swift) *Ardea alba* (Great Egret) *Aredea ibis* (Cattle Egret) *Branchinella wellardi* (a species of fairy shrimp) *Charadrius veredus* (Oriental Plover) *Haliaeetus leucogaster* (White-bellied Sea Eagle) *Hirundo rustica* (Barn Swallow) *Merops ornatus* (Rainbow Bee-eater) *Paratemia contracta* (a species of fairy shrimp) No on site fauna survey has been conducted to describe the fauna habitats of the application area, or to sample and describe the fauna assemblage present. With consideration for the site characteristics set out above, relevant datasets, the habitat preferences of the aforementioned species, and the distribution of existing records, the application area is considered unlikely to provide significant habitat for fauna species, including those listed above.

Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		

Assessment against the clearing principles	Variance level	Is further consideration required?
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: The area proposed to be cleared is unlikely to contain locally or regionally significant flora, fauna, habitats, assemblages of plants.	Not likely to be at variance	No
Principle (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."* Assessment: The area proposed to be cleared is small in the context of similar, uncleared habitat available to fauna in the local and regional area. The application area is therefore unlikely to contain significant foraging, roosting or breeding habitat for fauna. The permit condition requiring no clearing of larger trees will also minimise potential impacts to fauna habitat.	Not likely to be at variance	No
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: There are no known records of Threatened flora within or in close proximity to the application area. The area proposed to be cleared is unlikely to contain habitat for threatened flora species listed under the BC Act.	Not likely to be at variance	No
Principle (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."* Assessment: There are no known records of threatened ecological communities within or in close proximity to the application area. The area proposed to be cleared is unlikely to comprise a threatened ecological community.	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		
Principle (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." Assessment: The extent of the mapped vegetation type and the native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area. Approximately 99% of the pre-European vegetation remains in the Carnarvon bioregion within which clearing is proposed.	Not at variance	No
Principle (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."* Assessment: Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of any conservation areas.	Not likely to be at variance	No
Environmental value: land and water resources		

Assessment against the clearing principles	Variance level	Is further consideration required?
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: Given the proposed clearing area is located within the bed and banks of a major non-perennial watercourse, vegetation is growing in, or in association with, an environment associated with a watercourse or wetland.	At variance	Yes *Refer to Section 3.2 above*
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils of the River land system are not generally susceptible to erosion. However, looking at the site in a more localised context, vegetation on the bed and banks of the river plays an important stabilisation role and localised erosion may occur, particularly if larger vegetation is removed.	May be at variance	Yes *Refer to Section 3.2 above*
Principle (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."* Assessment: Given the proposed clearing area is located within the bed and banks of a major non-perennial watercourse, and approximately 6 kilometres upstream of a Public Drinking Water Source area, it has the potential to adversely affect downstream water resources.	May be at variance	Yes *Refer to Section 3.2 above*
Principle (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."* Assessment: The proposed clearing area is known to experience natural flooding events on infrequent occasions, coinciding with major weather events. The proposed clearing area is small in comparison to the size of the Gascoyne River and is unlikely to cause, or exacerbate the incidence or intensity of flooding.	Not likely to be at variance	Yes *Refer to Section 3.2 above*

Appendix C. 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.

Condition	Description
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 D. Sources of information

D.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- 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)
- 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 Mapping – Best Available (DPIRD-027)
- Soil Landscape Mapping – Rangelands (DPIRD-064)
- WA Now Aerial Imagery

Restricted GIS Databases used:

- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

D.1. References

Department of Agriculture and Food (2012) A report on the Gascoyne River catchment following the 2010/11 flood events. Resource Management Technical Report 382. Department of Agriculture and Food, South Perth, May 2012.

Department of Environment Regulation (DER) (2013) *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) (2022) Aboriginal Heritage Inquiry System. Department of Planning, Lands and Heritage. https://espatial.dplh.wa.gov.au/AHIS/index.html?viewer=AHIS (Accessed 17 January 2022).

Department of Water and Environmental Regulation (DWER) (2021) Advice received in relation to Clearing Permit Application CPS 9431/1. Department of Water and Environmental Regulation, Western Australia, November 2021.

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.

Payne A. L., Curry P.J and Spencer G.F (1987) Technical Bulletin - An Inventory and Condition Survey of the Rangelands in the Carnarvon Basin of Western Australia, No. 73. Department of Agriculture, Government of Western Australia, Perth, Western Australia.

Western Australian Herbarium (1998-) FloraBase - the Western Australian Flora. Department of Biodiversity, Conservation and Attractions, Western Australia. https://florabase.dpaw.wa.gov.au/ (Accessed 17 January 2022).

4. Glossary

Acronyms:

BC Act	*Biodiversity Conservation Act 2016,* 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)
DAWE	Department of Agriculture, Water and the Environment, 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 DAWE)
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	*Environmental Protection Act 1986*, Western Australia
EPA	Environmental Protection Authority, Western Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (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	*Rights in Water and Irrigation Act 1914*, 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.