PROPOSED XYRIS LATERAL

Flora and Vegetation Assessment

Appendices

AWE LIMITED

FEBRUARY 2018

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Appendix A: Results of Protected Matters Search for the Study Area (DoEE 2017a)

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

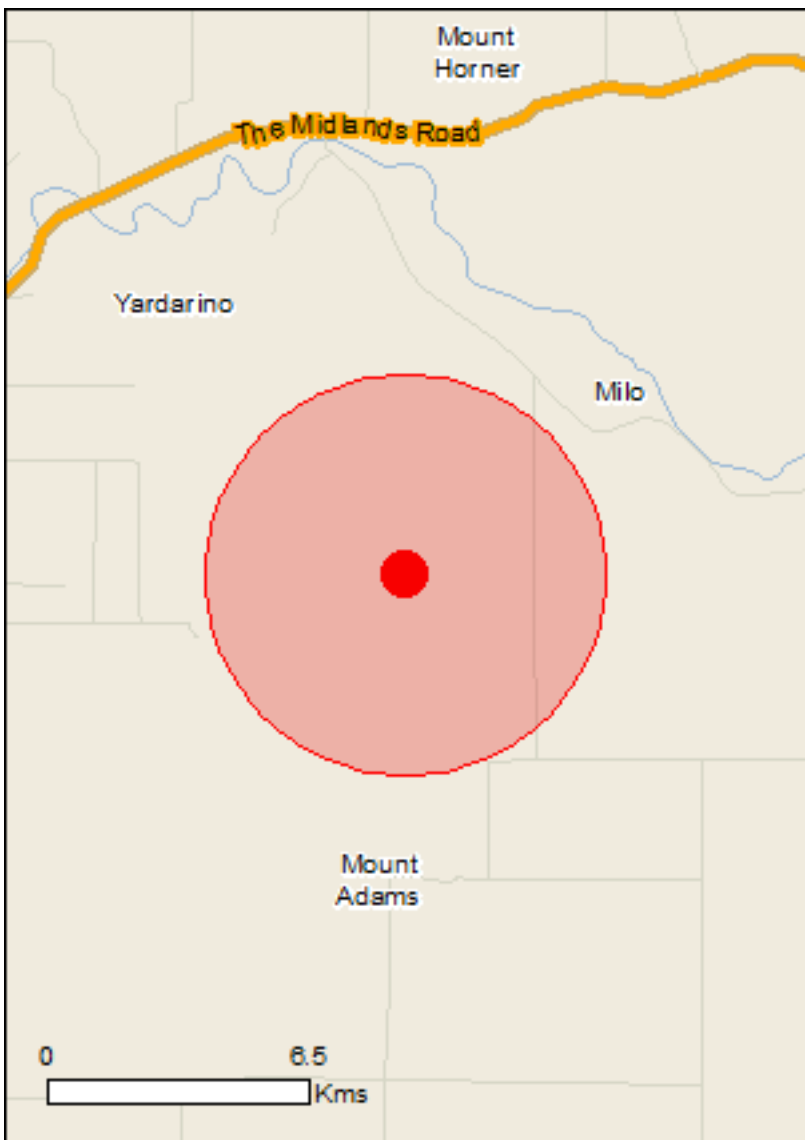
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 08/06/17 16:21:13

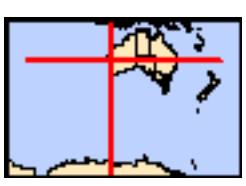
Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



Coordinates

Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	18
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	11
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus latirostris		
Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Dasyurus geoffroii		
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Parantechinus apicalis		
Dibbler [313]	Endangered	Species or species habitat may occur within area
Plants		
Conostylis dielsii subsp. teres		
Irwin's Conostylis [3614]	Endangered	Species or species habitat likely to occur within area
Conostylis micrantha		
Small-flowered Conostylis [17635]	Endangered	Species or species habitat may occur within area
Eucalyptus crispata		
Yandanooka Mallee [24268]	Vulnerable	Species or species habitat may occur within area
Eucalyptus impensa		
Eneabba Mallee [56711]	Endangered	Species or species habitat may occur within area
Eucalyptus leprophloia		
Scaly Butt Mallee, Scaly-butt Mallee [56712]	Endangered	Species or species habitat may occur within area
Eucalyptus x balanites		
Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Hemiandra gardneri		
Red Snakebush [7945]	Endangered	Species or species habitat may occur within area
Hypocalymma longifolium		
Long-leaved Myrtle [8081]	Vulnerable	Species or species habitat may occur within area
Paracaleana dixonii		
Sandplain Duck Orchid [86882]	Endangered	Species or species habitat likely to occur within area
Thelymitra stellata		
Star Sun-orchid [7060]	Endangered	Species or species habitat may occur within area
Wurmbea tubulosa		
Long-flowered Nancy [12739]	Endangered	Species or species habitat may occur within area
Reptiles		
Egernia stokesii badia		
Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Yardanogo	WA

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-29.30778 115.10528

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix B: Definitions, Categories and Criteria for Threatened and Priority Ecological Communities (DEC 2013)

1. GENERAL DEFINITIONS

Ecological Community: A naturally occurring biological assemblage that occurs in a particular type of habitat.

Note: The scale at which ecological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified.

A **threatened ecological community** (TEC) is one which is found to fit into one of the following categories; "presumed totally destroyed", "critically endangered", "endangered" or "vulnerable".

Possible threatened ecological communities that do not meet survey criteria are added to DEC's Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological Communities that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

An **assemblage** is a defined group of biological entities.

Habitat is defined as the areas in which an organism and/or assemblage of organisms lives. It includes the abiotic factors (eg. substrate and topography), and the biotic factors.

Occurrence: a discrete example of an ecological community, separated from other examples of the same community by more than 20 metres of a different ecological community, an artificial surface or a totally destroyed community.

By ensuring that every discrete occurrence is recognised and recorded future changes in status can be readily monitored.

Adequately Surveyed is defined as follows:
"An ecological community that has been searched for thoroughly in most likely habitats, by relevant experts."

Community structure is defined as follows:
"The spatial organisation, construction and arrangement of the biological elements comprising a biological assemblage" (eg. *Eucalyptus salmonophloia* woodland over scattered small shrubs over dense herbs; structure in a faunal assemblage could refer to trophic structure, eg. dominance by feeders on detritus as distinct from feeders on live plants).

Definitions of Modification and Destruction of an ecological community:
Modification: "changes to some or all of ecological processes (including abiotic processes such as hydrology), species composition and community structure as a direct or indirect

result of human activities. The level of damage involved could be ameliorated naturally or by human intervention."

Destruction: "modification such that reestablishment of ecological processes, species composition and community structure within the range of variability exhibited by the original community is unlikely within the foreseeable future even with positive human intervention."

Note: Modification and destruction are difficult concepts to quantify, and their application will be determined by scientific judgement. Examples of modification and total destruction are cited below:

Modification of ecological processes: The hydrology of Toolibin Lake has been altered by clearing of the catchment such that death of some of the original flora has occurred due to dependence on fresh water. The system may be bought back to a semblance of the original state by redirecting saline runoff and pumping waters of the rising underground watertable away to restore the hydrological balance. Total destruction of downstream lakes has occurred due to hydrology being altered to the point that few of the original flora or fauna species are able to tolerate the level of salinity and/or water logging.

Modification of structure: The understorey of a plant community may be altered by weed invasion due to nutrient enrichment by addition of fertiliser. Should the additional nutrients be removed from the system the balance may be restored, and the original plant species better able to compete. Total destruction may occur if additional nutrients continue to be added to the system causing the understorey to be completely replaced by weed species, and death of overstorey species due to inability to tolerate high nutrient levels.

Modification of species composition: Pollution may cause alteration of the invertebrate species present in a freshwater lake. Removal of pollutants may allow the return of the original inhabitant species. Addition of residual highly toxic substances may cause permanent changes to water quality, and total destruction of the community.

Threatening processes are defined as follows:
"Any process or activity that threatens to destroy or significantly modify the ecological community and/or affect the continuing evolutionary processes within any ecological community."

Examples of some of the continuing threatening processes in Western Australia include: general pollution; competition, predation and change induced in ecological communities as a result of introduced animals; competition and displacement of native plants by introduced species; hydrological changes; inappropriate fire regimes; diseases resulting from introduced microorganisms; direct human exploitation and disturbance of ecological communities.

Restoration is defined as returning an ecological community to its pre-disturbance or natural state in terms of abiotic conditions, community structure and species composition.

Rehabilitation is defined as the re-establishment of ecological attributes in a damaged ecological community although the community will remain modified.

2. DEFINITIONS AND CRITERIA FOR PRESUMED TOTALLY DESTROYED, CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE ECOLOGICAL COMMUNITIES

Presumed Totally Destroyed (PD)
An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.

An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant **and either** of the following applies (A or B):

A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats **or**

B) All occurrences recorded within the last 50 years have since been destroyed

Critically Endangered (CR)
An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.

An ecological community will be listed as **Critically Endangered** when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting **any one or more** of the following criteria (A, B or C):

A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% **and either or both** of the following apply (i or ii):

i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years);

ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated.

B) Current distribution is limited, **and one or more** of the following apply (i, ii or iii):

i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years);

ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes;

iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.

C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).

Endangered (EN)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

An ecological community will be listed as **Endangered** when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting **any one or more** of the following criteria (A, B, or C):

A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement **and either or both** of the following apply (i or ii):

i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years);

ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.

B) Current distribution is limited, **and one or more** of the following apply (i, ii or iii):

i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years);

ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes;

iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.

C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

Vulnerable (VU)
An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

An ecological community will be listed as **Vulnerable** when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium (within approximately 50 years) to long-term future. This will be determined on the basis of the best available information by it meeting **any one or more** of the following criteria (A, B or C):

A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.

B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.

C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

3. DEFINITIONS AND CRITERIA FOR PRIORITY ECOLOGICAL COMMUNITIES PRIORITY ECOLOGICAL COMMUNITY LIST

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community. Ecological Communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

Priority One: Poorly-known ecological communities:

Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Priority Two: Poorly-known ecological communities:

Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Priority Three: Poorly known ecological communities:

(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:

(ii) Communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or;

(iii) Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

Priority Four: Ecological communities:

Communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.

(i) Rare. Ecological communities known from few occurrences 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 communities are usually represented on conservation lands.

(ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category.

(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Priority Five: Conservation Dependent ecological communities:

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Current as of January 2013

Appendix C: Conservation Codes for Western Australian Flora and Fauna (DPaW 2015)

Specially protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such.

Categories of specially protected fauna and flora are:

T **Threatened species**

Published as Specially Protected under the *Wildlife Conservation Act 1950,* and listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).

Threatened fauna is that subset of 'Specially Protected Fauna' declared to be 'likely to become extinct' pursuant to section 14(4) of the Wildlife Conservation Act.

Threatened flora is flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F(2) of the Wildlife Conservation Act.

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. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

EN **Endangered species**

Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

VU **Vulnerable species**

Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

EX **Presumed extinct species**

Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.

IA **Migratory birds protected under an international agreement**

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 the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.

CD **Conservation dependent fauna**

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.

OS **Other specially protected fauna**

Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.

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 flora or fauna.

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.

1 **Priority 1: 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.

2 Priority 2: 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.

3 Priority 3: 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.

4 Priority 4: 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.

[1]The definition of flora includes algae, fungi and lichens

[2]Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

Appendix D: Environmental Weed Strategy - Criteria for the Assessment and Rating of Weeds in Terms of their Environmental Impact on Biodiversity (Department of Conservation and Land Management 1999)

Criteria Used To Determine Weed Rating:

- Invasiveness – ability to invade bushland in good to excellent condition or ability to invade waterways. (Score as yes or no).

- **Distribution** – wide current or potential distribution including consideration of known history of wide spread distribution elsewhere in the world. (Score as yes or no).

- **Environmental Impacts** – ability to change the structure, composition and function of ecosystems. In particular an ability to form a monoculture in a vegetation community. (Score as yes or no).

The Rating System Used in the Environmental Weed Strategy for Western Australia

High	A weed species would have to score yes for all three criteria. Rating a weed species as high would indicate prioritising this weed for control and/or research.
Moderate	A weed species would have to score yes for two of the above criteria. Rating a weed species as moderate would indicate that control or research effort should be directed to it if funds are available, however it should be monitored (possibly a reasonably high level of monitoring).
Mild	A weed species scoring one of the criteria. A mild rating would indicate monitoring of the weed and control where appropriate.
Low	A weed species would score none of the criteria. A low rating would mean that this species would require a low level of monitoring.

Appendix E: Flora Taxa Recorded in the Study Area

Family	Taxon
Amaranthaceae	*Ptilotus polystachyus*
Anarthriaceae	*Lyginia barbata*
	Lyginia imberbis
Araliaceae	*Trachymene pilosa*
Asparagaceae	*Acanthocarpus* sp. Ajana (C.A. Gardner 8596)
Asteraceae	**Arctotheca calendula*
	**Hypochaeris glabra*
	Olearia sp. Kennedy Range (G. Byrne 66)
	Podotheca gnaphalioides
	**Urospermum picroides*
	**Ursinia anthemoides*
Boraginaceae	**Echium plantagineum*
Brassicaceae	**Raphanus raphanistrum*
Campanulaceae	**Wahlenbergia capensis*
Casuarinaceae	*Allocasuarina huegeliana*
	Allocasuarina humilis
Chenopodiaceae	*Rhagodia preissii* subsp. *obovata*
Colchicaceae	*Burchardia congesta*
Crassulaceae	*Crassula colorata*
Cyperaceae	*Mesomelaena pseudostygia*
	Schoenus pleiostemoneus
Dilleniaceae	*Hibbertia hypericoides*
Ecdeiocoleaceae	*Ecdeiocolea monostachya*
Fabaceae	*Acacia latipes* subsp. *latipes*
	Acacia rostellifera
	Acacia scirpifolia
	**Chamaecytisus palmensis*
	Gompholobium tomentosum
	Isotropis cuneifolia
	**Lupinus cosentinii*
	**Trifolium arvense*
Goodeniaceae	*Dampiera ?oligophylla*
	Lechenaultia linarioides
	Verreauxia reinwardtii
Gyrostemonaceae	*Gyrostemon ramulosus*
Haemodoraceae	*Conostylis candicans*
	Haemodorum spicatum
Hemerocallidaceae	*Arnocrinum preissii*
	Corynotheca micrantha
Iridaceae	*Patersonia occidentalis*
Lauraceae	*Cassytha flava*
	Cassytha glabella

Loranthaceae	*Nuytsia floribunda*
Malvaceae	*Seringia hermanniifolia*
Myrtaceae	*Baeckea* sp. Walkaway (A.S. George 11249) (P3)
	Calothamnus glaber
	Calothamnus quadrifidus
	Calytrix fraseri
	Calytrix strigosa
	Chamelaucium uncinatum
	Eremaea beaufortioides
	Eremaea ectadioclada
	Eremaea violacea
	Eucalyptus todtiana
	Leptospermum erubescens
	Leptospermum spinescens
	Melaleuca leuropoma
	Phymatocarpus porphyrocephalus
	Pileanthus filifolius
	Scholtzia laxiflora
	Verticordia densiflora var. *densiflora*
	Verticordia grandis
Orobanchaceae	**Orobanche minor*
Poaceae	*Aristida holathera* var. *holathera*
	Austrostipa elegantissima
	Austrostipa hemipogon
	**Avena fatua*
	**Bromus diandrus*
	**Chloris gayana*
	**Ehrharta longiflora*
	**Lolium rigidum*
	Neurachne alopecuroidea
	**Pentameris airoides*
	**Vulpia myuros*
Polygalaceae	*Comesperma volubile*
Polygonaceae	**Emex australis*
	Muehlenbeckia adpressa
Proteaceae	*Banksia attenuata*
	Banksia elegans (P4)
	Banksia menziesii
	Banksia prionotes
	Grevillea leucopteris
	Hakea polyanthema
	Persoonia acicularis
	Petrophile macrostachya
	Stirlingia latifolia
	Synaphea spinulosa subsp. *spinulosa*

Restionaceae	*Alexgeorgea nitens*
	Chordifex sinuosus
	Desmocladus asper
	Desmocladus parthenicus
	Lepidobolus preissianus
Rhamnaceae	*Stenanthemum notiale*
Scrophulariaceae	**Dischisma capitatum*
Solanaceae	**Solanum nigrum*
	Solanum oldfieldii
Zamiaceae	*Macrozamia fraseri*

Appendix F: Raw Data Recorded within Relevés in the Study Area

Site Name:	XYR-01
Site Type:	RELEVE
Survey Date:	09/12/2016
GPS Location:	GDA94 Zone 50 316459E 6756377N
Landform Type:	Lower Slope
Slope Class:	Gently Inclined (3 degrees)
Aspect:	S
Soil Type:	Sand
Soil Colour:	Yellow
Rock Outcrop:	No bedrock exposed
CF Abundance:	0%
Vegetation Condition:	Southern Vegetation Condition - 5 - Degraded
Disturbance:	Grazing, Extensive Clearing, Exotic Weeds
Fire:	>10 years

DOMINANT TAXA IN VEGETATION STRATA

Upper Stratum 1:	*Acacia rostellifera*
Lower Stratum 1:	**Bromus diandrus*, **Ehrharta longiflora*

SPECIES LIST

Taxon Name	Avg. Height	Cover Alive
Acacia rostellifera	2.5	70
**Bromus diandrus*	0.6	10
**Ehrharta longiflora*	0.7	80

PHOTO

Site Name:	XYR-02
Site Type:	RELEVE
Survey Date:	09/12/2016
GPS Location:	GDA94 Zone 50 315962E 6756412N
Landform Type:	Open Depression
Slope Class:	Very Gently Inclined (1 degree)
Aspect:	S
Soil Type:	Sand
Soil Colour:	Yellow
Rock Outcrop:	No bedrock exposed
CF Abundance:	0%
Vegetation Condition:	Southern Vegetation Condition - 5 - Degraded
Disturbance:	Grazing, Extensive Clearing, Exotic Weeds
Fire:	>10 years

DOMINANT TAXA IN VEGETATION STRATA

Upper Stratum 1:	*Acacia rostellifera*
Lower Stratum 1:	**Avena fatua*, **Ehrharta longiflora*

SPECIES LIST

Taxon Name	Avg. Height	Cover Alive
Acacia rostellifera	5	95
**Avena fatua*	0.7	5
**Ehrharta longiflora*	0.7	95

PHOTO

Site Name:	XYR-03
Site Type:	RELEVE
Survey Date:	09/12/2016
GPS Location:	GDA94 Zone 50 315634E 6756571N
Landform Type:	Simple Slope
Slope Class:	Very Gently Inclined (1 degree)
Aspect:	S
Soil Type:	Sand
Soil Colour:	Yellow
Rock Outcrop:	No bedrock exposed
CF Abundance:	0%
Vegetation Condition:	Southern Vegetation Condition - 4 - Good
Disturbance:	Grazing - Cattle, Extensive Clearing, Exotic Weeds
Fire:	>10 years

DOMINANT TAXA IN VEGETATION STRATA

Upper Stratum 1:	*Banksia prionotes*, *Eucalyptus todtiana*
Mid Stratum 1:	*Acacia scirpifolia*, *Eremaea beaufortioides*, *Grevillea leucopteris*
Mid Stratum 2:	*Banksia attenuata*
Lower Stratum 1:	**Avena fatua*, **Ehrharta longiflora*

SPECIES LIST

Taxon Name	Avg. Height	Cover Alive
Acacia scirpifolia	2.5	3
**Avena fatua*	0.7	3
Baeckea sp. Walkaway (A.S. George 11249) (P3)	1.6	0.5
Banksia attenuata	1.2	2
Banksia prionotes	8	20
Desmocladus parthenicus	0.2	0.1
**Ehrharta longiflora*	0.8	90
Eremaea beaufortioides	2.2	4
Eucalyptus todtiana	6	5
Gompholobium tomentosum	0.7	0.2
Grevillea leucopteris	3	2
Mesomelaena pseudostygia	0.6	1
**Ursinia anthemoides*	0.5	1
Verreauxia reinwardtii	0.7	1

PHOTO

Site Name:	XYR-04
Site Type:	RELEVE
Survey Date:	09/12/2016
GPS Location:	GDA94 Zone 50 315599E 6756596N
Landform Type:	Simple Slope
Slope Class:	Very Gently Inclined (1 degree)
Aspect:	S
Soil Type:	Sand
Soil Colour:	Yellow
Rock Outcrop:	No bedrock exposed
CF Abundance:	0%
Vegetation Condition:	Southern Vegetation Condition - 3 - Very Good
Disturbance:	Grazing
Fire:	>10 years

DOMINANT TAXA IN VEGETATION STRATA

Upper Stratum 1:	*Banksia menziesii*, *Banksia prionotes*, *Eucalyptus todtiana*
Mid Stratum 1:	*Acacia scirpifolia*, *Banksia attenuata*
Mid Stratum 2:	*Eremaea beaufortioides*, *Petrophile macrostachya*, *Baeckea* sp. Walkaway (A.S. George 11249) (P3)
Lower Stratum 1:	*Desmocladus asper*, *Mesomelaena pseudostygia*

SPECIES LIST

Taxon Name	Avg. Height	Cover Alive
Acacia scirpifolia	2.5	2
Austrostipa hemipogon	0.7	0.2
Baeckea sp. Walkaway (A.S. George 11249) (P3)	1.7	2
Banksia attenuata	3	3
Banksia menziesii	6	5
Banksia prionotes	7	5
Calothamnus glaber	2.5	1
Calytrix strigosa	0.7	0.2
Desmocladus asper	0.3	40
Eremaea beaufortioides	1.3	3
Eucalyptus todtiana	7	5
Hibbertia hypericoides	0.7	0.2
Lepidobolus preissianus	0.4	0.5
Mesomelaena pseudostygia	0.6	2
Patersonia occidentalis	0.4	0.1
Petrophile macrostachya	1.3	3
Verreauxia reinwardtii	0.8	1
Verticordia densiflora var. *densiflora*	1.3	0.2

PHOTO

Site Name:	XYR-05
Site Type:	RELEVE
Survey Date:	09/12/2016
GPS Location:	GDA94 Zone 50 314908E 6756855N
Landform Type:	Lower Slope
Slope Class:	Very Gently Inclined (1 degree)
Aspect:	W
Soil Type:	Sand
Soil Colour:	Yellow
Rock Outcrop:	No bedrock exposed
CF Abundance:	0%
Vegetation Condition:	Southern Vegetation Condition - 2 - Excellent
Fire:	>10 years

DOMINANT TAXA IN VEGETATION STRATA

Upper Stratum 1:	*Banksia menziesii*
Upper Stratum 2:	*Banksia attenuata*
Mid Stratum 1:	*Melaleuca leuropoma*, *Petrophile macrostachya*, *Pileanthus filifolius*
Lower Stratum 1:	*Chordifex sinuosus*, *Mesomelaena pseudostygia*

SPECIES LIST

Taxon Name	Avg. Height	Cover Alive
Alexgeorgea nitens	0.1	0.5
Banksia attenuata	1.6	20
Banksia elegans (P4)	2	1
Banksia menziesii	3.5	15
Calytrix fraseri	0.6	0.1
Cassytha glabella		0.1
Chordifex sinuosus	0.3	20
Ecdeiocolea monostachya	0.8	1
Eremaea violacea	0.5	0.1
Isotropis cuneifolia	0.1	0.1
Lyginia barbata	0.4	0.1
Melaleuca leuropoma	0.7	20
Mesomelaena pseudostygia	0.5	30
Neurachne alopecuroidea	0.3	0.1
Petrophile macrostachya	1	2
Pileanthus filifolius	0.8	3
Schoenus pleiostemoneus	0.2	0.1
Stenanthemum notiale	0.2	0.1
Stirlingia latifolia	0.7	1

PHOTO

Appendix G: Location Details of Significant Flora Recorded within the Study Area

Note: All locations are in datum GDA94, Zone 50

Taxon	Status	Easting	Northing	Record Location	Count
Baeckea sp. Walkaway (A.S. George 11249)	P3	315634	6756571	XYR-03	1
Baeckea sp. Walkaway (A.S. George 11249)	P3	315599	6756596	XYR-04	2
Baeckea sp. Walkaway (A.S. George 11249)	P3	316590	6756367	Opportunistic	1
Banksia elegans	P4	315036	6756823	Opportunistic	3
Banksia elegans	P4	315036	6756827	Opportunistic	1
Banksia elegans	P4	314988	6756844	Opportunistic	7
Banksia elegans	P4	314964	6756848	Opportunistic	8
Banksia elegans	P4	314950	6756808	Opportunistic	20
Banksia elegans	P4	314934	6756779	Opportunistic	15
Banksia elegans	P4	314891	6756859	Opportunistic	12
Banksia elegans	P4	314915	6756875	Opportunistic	10
Banksia elegans	P4	314908	6756855	XYR-05	6
Banksia elegans	P4	315355	6756665	Opportunistic	1
Banksia elegans	P4	315348	6756693	Opportunistic	5
Banksia elegans	P4	315318	6756712	Opportunistic	1
Banksia elegans	P4	315289	6756723	Opportunistic	6
Banksia elegans	P4	315043	6756829	Opportunistic	4