

Conservation Significant Vertebrate Fauna Assessment



Talawana Track Upgrade

Lake Disappointment Potash Project Reward Minerals Ltd

October 2017
FINAL

On behalf of:

Reward Minerals Limited
PO Box 1104
NEDLANDS WA 6909
T: (08) 9386 4699
E: admin@rewardminerals.com

Prepared by:

Greg Harewood
Zoologist
PO Box 755
BUNBURY WA 6231
M: 0402 141 197
E: gharewood@iinet.net.au

TABLE OF CONTENTS

SUMMARY	III
1. INTRODUCTION.....	1
1.1 BACKGROUND	1
1.2 SURVEY SCOPE.....	1
2. METHODS	2
2.1 HABITAT ASSESSMENT	2
2.2 LITERATURE REVIEW.....	2
2.2.1 Database Searches.....	2
2.2.2 Previous Fauna Surveys in the Area.....	2
2.3 DETAILED FAUNA SURVEYS	5
2.3.1 Targeted Surveys.....	5
2.3.2 Acoustic Bat Recordings.....	5
2.3.3 Motion Sensing Cameras.....	6
2.3.4 Night Parrot Survey.....	7
2.3.5 Spotlighting/Head Torching.....	7
2.3.6 Other Targeted and Opportunistic Surveys.....	8
2.4 FAUNA CONSERVATION CATEGORIES.....	8
2.5 TAXONOMY AND NOMENCLATURE	9
2.6 LIKELIHOOD OF OCCURRENCE – FAUNA OF CONSERVATION SIGNIFICANCE.....	9
2.7 CRITERIA FOR IMPACT ASSESSMENT.....	10
2.8 SURVEY LIMITATIONS.....	11
3. RESULTS.....	13
3.1 HABITAT ASSESSMENT	13

3.2 LITERATURE REVIEW.....	15
3.3 DETAILED FAUNA SURVEYS	16
3.3.1 Targeted Surveys.....	16
3.3.2 Acoustic Bat Recordings	17
3.3.3 Motion Sensing Cameras.....	18
3.3.4 Night Parrot Survey.....	18
3.3.5 Spotlighting/Head Torching.....	18
3.3.6 Other Targeted and Opportunistic Surveys.....	18
4. POTENTIAL IMPACTS ON VERTEBRATE FAUNA OF CONSERVATION SIGNIFICANCE.....	18
5. CONCLUSION & RECOMMENDATIONS	20
6. REFERENCES.....	23

TABLES

TABLE 1:	Assessment Criteria of Impacts upon Fauna
TABLE 2:	Fauna Survey Limitations and Constraints
TABLE 3:	Landform and Vegetation Communities
TABLE 4:	Summary of Potential Vertebrate Fauna Species
TABLE 5:	Likelihood of Occurrence and Possible Impacts – Fauna Species of Conservation Significance

FIGURES

- FIGURE 1: Study Area and Surrounds
- FIGURE 2: Vegetation Communities – Talawana Track Map 1 (Courtesy Botanica Consulting 2017)
- FIGURE 3: Vegetation Communities – Talawana Track Map 2 (Courtesy Botanica Consulting 2017)
- FIGURE 4: Vegetation Communities – Talawana Track Map 3 (Courtesy Botanica Consulting 2017)
- FIGURE 5: Camera Trap and Bat Recording Locations – Talawana Track
- FIGURE 6:
- FIGURE 7: Camera Trap Recording Results (Dec 2016 - Mar 2017)

APPENDICES

- APPENDIX A: Conservation Categories
- APPENDIX B: DPAW & EPBC Database Search Results
- APPENDIX C: Vertebrate Fauna Observed or Potentially in Study Area
- APPENDIX D: Species Profiles

Acronyms/Abbreviations:

BA: Birdlife Australia (Formerly RAOU, Birds Australia).

BC Bill: *Biodiversity Conservation Bill* (2015). WA Government.

CALM: Department of Conservation and Land Management (now DPaW), WA Government.

CAMBA: China Australia Migratory Bird Agreement 1998.

°C: Degrees Celsius.

DEC: Department of Environment and Conservation (now DPaW), WA Government.

DEH: Department of Environment and Heritage (now DoE), Australian Government.

DEP: Department of Environment Protection (now DER), WA Government.

DEWHA: Department of the Environment, Water, Heritage and the Arts (now DoE), Australian Government

DER: Department of Environment Regulation (formerly DEC, DoE), WA Government.

DMP: Department of Mines and Petroleum (formerly DoIR), WA Government.

DoE: Department of Environment (now DER/DPaW), WA Government.

DotE: Department of the Environment (now DotEE), Australian Government.

DotEE: Department of the Environment and Energy (formerly DoE, SEWPaC, DWEHA, DEH), Australian Government.

DoIR: Department of Industry and Resources (now DMP), WA Government.

DPaW: Department of Parks and Wildlife (formerly DEC, CALM, DoE), WA Government.

EP Act: *Environmental Protection Act 1986*, WA Government.

EPA: Environmental Protection Authority, WA Government.

EPBC Act: *Environment Protection and Biodiversity Conservation Act 1999*, Australian Government.

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.

JAMBA: Japan Australia Migratory Bird Agreement 1981.

JORC: The Australasian code for reporting of exploration results, mineral resources and ore reserves as defined by the Joint Ore Reserves Committee.

km: Kilometre.

m: Metre.

mm: Millimetre.

P: Priority (DPaW classification of conservation significance)

RAOU: Royal Australia Ornithologist Union (now Birdlife Australia).

ROKAMBA: Republic of Korea-Australia Migratory Bird Agreement 2007.

S: Schedule (*WC Act* classification of conservation significance)

SEWPaC: Department of Sustainability, Environment, Water, Population and Communities (now DotE, formerly DEH, DEWHA), Australian Government

SSC: Species Survival Commission, International.

WA: Western Australia.

WAM: Western Australian Museum, WA Government.

WC Act: *Wildlife Conservation Act 1950*, WA Government.

SUMMARY

This report details the results of a vertebrate fauna assessment of a section of the Talawana Track (the study area) which forms part of Reward Minerals Limited (Reward) Lake Disappointment Potash (LDP) Project area (Figure 1).

The Talawana Track study area extends in the west from its junction with the Balfour Downs Road 220 km eastward to the Willjabu Track intersection. It is understood that the existing track is to be upgraded to a standard suitable for haul trucks which will transport Potash product to coastal export facilities. Upgrading of the track will require up to 190 ha of native vegetation clearing to be carried out.

The assessment has been undertaken to address a request from the DotEE for additional information on likely impacts on *EPBC Act* listed threatened and migratory fauna species which may result as a consequence of the Talawana Track upgrade component of the proposed Lake Disappointment Potash Project (*EPBC* 2016/7727).

The assessment has included a literature review and a range of field surveys with a primary focus on identifying any likely impacts on vertebrate fauna species of conservation significance which may result because of the proposed works proceeding, in addition to providing recommendations for some management/mitigation measures.

Based on the literature review, current documented distributions, habitat preferences and survey results 11 fauna species of conservation significance have been listed as potential species for the Talawana Track study area. These species are:

- Unpatterned Robust Lerista *Lerista macropisthopus remota* – P2 (DPaW Priority Species);
- Great Desert Skink *Liopholis kintorei* – S3 (*WC Act*), Vulnerable (*EPBC Act*);
- Peregrine Falcon *Falco peregrinus* – S7 (*WC Act*);
- Grey Falcon *Falco hypoleucos* - S3 (*WC Act*);
- Princess Parrot *Polytelis alexandrae* - P2 (DPaW Priority Species), Vulnerable (*EPBC Act*);
- Night Parrot (*Pezoporus occidentalis*) – S1 (*WC Act*), Endangered (*EPBC Act*);
- Rainbow Bee-eater *Merops ornatus* – S5 (*WC Act*), Migratory (*EPBC Act*);
- Brush-tailed Mulgara *Dasycercus blythi* – P4 (DPaW Priority Species);
- Northern Marsupial Mole *Notoryctes caurinus* – P4 (DPaW Priority Species);
- Greater Bilby *Macrotis lagotis* - S3 (*WC Act*), Vulnerable (*EPBC Act*); and

- Western Pebble-mound Mouse *Pseudomys chapmani* - P4 (DPaW Priority Species).

Using currently available information a preliminary impact assessment suggests that no “significant impacts” on any *EPBC Act* listed threatened vertebrate species are likely. This conclusion is primarily based on the fact that the area of vegetation clearing required is relatively small, scattered over a wide area and the presence of vast expanses of similar habitat in adjoining areas. The limited amount of clearing is unlikely to have any more than a minor impact (i.e. short-term population decline within project area, no change in viability of conservation status of population.) on any species which may be present.

Despite the anticipated impact on vertebrate fauna inhabiting the area being negligible/minor it is recommended that a fauna management plan be formulated for implementation during proposed site works. The management plan should detail various avoidance and mitigation measures with the aim of minimising impact on fauna and fauna habitat as much as reasonable and practicable.

The following recommendations are provided for guidance for the formulation of a management plan. This listing is not exhaustive and the document will need to be finalised after liaison with project personnel and relevant regulatory authorities. It is recommended that:

- Planning for road works should aim to avoid the need to clear as much of the existing vegetation as possible.
- During site works areas requiring clearing should be clearly marked and access to other areas restricted to prevent accidental clearing of areas to be retained.
- Immediately prior to clearing operations commencing suitably experienced “fauna spotters” should be employed to inspect clearing area for burrows of significant vertebrate fauna species.
- Any identified burrows considered to be occupied or highly likely to be occupied should be avoided and the appropriate action taken to ensure any fauna inhabiting these are not injured or killed. Preferably this would involve re-routing the road so that the burrow is retained. If this is not feasible it may be necessary to delay clearing at this location until the burrow is vacated by the occupant/s of its/their own accord or alternatively trapping/catching the animal/s for relocating to suitable retained habitat nearby.
- Design additional project infrastructure, including access routes, vehicle and plant storage and turn around areas, borrow pits etc. so that:
 - previously disturbed areas are used where possible; and
 - areas of sensitive vegetation are avoided.
- Fuel and chemical storage facilities should be located appropriate distance away from watercourses.

- No dead, standing or fallen timber should be removed unnecessarily. Logs (hollow or not) and other debris resulting from land clearing should be used to enhance fauna habitat in untouched and rehabilitated areas if possible.
- All staff working on site should be made aware that all native fauna is protected by law.
- Native fauna injured during clearing or normal site operations should be taken to a designated veterinary clinic or a DPaW nominated wildlife carer.
- Any holes, pits or trenches required for services should be kept open for only as long as necessary and suitable escape ramps (45° batter) and bridging provided if the site is to be left unattended for extended periods. Significant sized holes, pits or trenches should be inspected for fauna immediately prior to filling.
- Disruption to surface and sub-surface hydrology should be minimised where possible and levees and drains designed to mimic natural drainage flows where disruptions will occur.
- The likelihood of vehicle collisions with animals along the Talawana Track when in operation is anticipated to be low, however a register of incidences and fauna sightings should be maintained and reviewed on a regular basis. If considered warranted operational procedures and management strategies should be assessed, added or changed accordingly based on the results.

1. INTRODUCTION

1.1 BACKGROUND

This report details the results of a vertebrate fauna assessment of a section of the Talawana Track (the study area) which forms part of Reward Minerals Limited (Reward) Lake Disappointment Potash (LDP) Project area. The Project area is situated within the Little Sandy Desert, approximately 180km south of Telfer and 285km east of Newman, Western Australia (Figure 1).

The Talawana Track study area extends in the west from its junction with the Balfour Downs Road 220 km eastward to the Willjabu Track intersection. It is understood that the existing track is to be upgraded to a standard suitable for haul trucks which will transport Potash product to Newman and then to export facilities at Port Hedland or Geraldton. Upgrading of the track will require up to 190 ha of native vegetation clearing to be carried out. Most of this clearing will be along a 44km section of the road between the Cotton Creek (Parnngurr) Community turnoff to the Willjabu Track intersection.

The assessment has been undertaken to address a request from the DotEE for additional information on likely impacts on *EPBC Act* listed threatened and migratory fauna species which may result as a consequence of the Talawana Track upgrade component of the proposed Lake Disappointment Potash Project (*EPBC* 2016/7727). The assessment has therefore been carried out with a primary focus on identifying any likely impacts on vertebrate fauna species of conservation significance which may result because of the proposed works proceeding in addition to providing recommendations for some management/mitigation measures.

1.2 SURVEY SCOPE

The scope of the fauna assessment reported on here was to:

- Document the vertebrate fauna assemblages within the habitats of the study area;
- Identify fauna of conservation significance (particularly state and federally listed threatened, migratory and priority fauna species) present or potentially present within the study area; and
- Identify potential impacts on conservation significant fauna based on the results and the proposed works.

2. METHODS

2.1 HABITAT ASSESSMENT

The landforms and associated vegetation communities and identified during the flora and vegetation survey of the Talawana Track study area carried out by Botanica Consulting (Botanica 2017) have been used as the basis for a classification of areas into broad fauna habitat types.

2.2 LITERATURE REVIEW

2.2.1 Database Searches

Searches of the following databases were undertaken to aid in the compilation of a list of vertebrate fauna potentially occurring within the study area:

- DPaW's NatureMap Database Search (combined data from DPaW, Western Australian Museum, Birds Australia and consultants reports) (DPaW 2017b); and
- Protected matters search tool (Department of the Environment – DotEE 2017a).

It should be noted that these lists are based on observations from a broad area and therefore may include species that would only ever occur as vagrants in the actual study area due to a lack of suitable habitat or the presence of only marginal habitat. The databases also often included very old records and in some cases the species in question have become locally or regionally extinct.

Information from these sources should therefore be taken as indicative only and local knowledge and information needs also to be taken into consideration when determining what actual species may be present within the specific area being investigated.

2.2.2 Previous Fauna Surveys in the Area

Very few fauna surveys, assessments and reviews have been undertaken in nearby areas in the past. The limited number of reports available have been used to assist in compiling the potential fauna assemblage for the general area. Those reports referred to included, but were not limited to:

- Actis Environmental and Alexander Holm & Associates (2009). Lake Disappointment Potash Project Environmental Review and Program of Works. Unpublished report for Reward Minerals.
- Bamford, M.J & A.R. (2007). Kintyre Project Area. Fauna observations from site visit, October 2007. Unpublished report for Canning Resources.
- Bamford Consulting Ecologists (2010). Kintyre Project Area Review of Vertebrate Fauna. Unpublished report for Cameco Australia Pty Ltd.

- Bamford Consulting Ecologists (2011). Targeted fauna survey for the proposed Kintyre haul route. Unpublished report for Cameco Australia Pty Ltd.
- Blyth, J., A. Burbidge & W. Boles (1997). Report on an expedition to the western desert and eastern Pilbara areas in search of the Night Parrot *Pezoporus occidentalis*. *Eclectus*. 2:25-30.
- Browne-Cooper, R. & Bamford, M. (2010). Targeted fauna survey for the proposed Kintyre Uranium Mine Project. Unpublished report for Cameco Australia Pty Ltd.
- Davies, S.J.J.F., M. Bamford & M. Bamford (1988). The Night Parrot: a search in the Lake Disappointment area, September 1987. Royal Australasian Ornithologists Union Report (RAOU) Series. 49. Melbourne.
- Harewood, G. (2012). Targeted Fauna Survey Proposed Access Track, Camp Site and Borrow Pit Lake Disappointment. Unpublished report for Reward Minerals Ltd.
- Harewood, G. (2015). Marsupial Mole Monitoring Survey (April 2014). Lake Disappointment Potash Project. Unpublished report for Reward Minerals Ltd.
- Harewood, G. (2016). Fauna Survey (Level2) – Phase 1 (May 2013) and Phase 2 (October 2013) Lake Disappointment Potash Project. Unpublished report for Reward Minerals Ltd.
- Hart Simpson and Associates Pty Ltd (1994). Kintyre Project. Fauna studies 1986 to 1992. Unpublished report for Canning Resources.
- Start, A. N. *et al.* (2013). Terrestrial mammals of the south-western Little Sandy Desert, Western Australia *Australian Mammalogy*, 2013, 35, 54–64.

As with the database searches some reports refer to species that would not occur in the study area due to a lack of suitable habitat (extent and/or quality) and this fact was taken into consideration when compiling the potential fauna species list. It should also be noted that the NatureMap database is likely to include some records from previous fauna surveys in the area including some of those listed above.

2.2.3 Existing Publications

The following represent the main publications used to identify and refine the potential fauna species list for the study area:

- Anstis, M. (2013). Tadpoles and Frogs of Australia. New Holland Publishers, Sydney.
- Barrett, G., Silcocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). The New Atlas of Australian Birds. Royal Australasian Ornithologists Union, Victoria.

- Bush, B. and Maryan, B. (2011). Field Guide to Snakes of the Pilbara, Western Australia. WA Museum, Perth.
- Churchill, S. (2008). Australian Bats. Second Edition, Allen & Unwin.
- Cogger, H.G. (2014). Reptiles and Amphibians of Australia. 7th Edition. CSIRO Publishing.
- Johnstone, R.E. and Storr, G.M. (1998). Handbook of Western Australian Birds: Volume 1 – Non-passerines (Emu to Dollarbird). Western Australian Museum, Perth Western Australia.
- Johnstone, R.E. and Storr, G.M. (2004). Handbook of Western Australian Birds: Volume 2 – Passerines (Blue-winged Pitta to Goldfinch). Western Australian Museum, Perth Western Australia.
- Menkhorst, P. and Knight, F. (2011). A Field Guide to the Mammals of Australia. Third Edition, Oxford University Press, Melbourne.
- Pizzey, G & Knight, F. (2012). The Field Guide to the Birds of Australia. 9th Edition. Harper Collins, Sydney.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1983). Lizards of Western Australia II: Dragons and Monitors. WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1990). Lizards of Western Australia III: Geckos and Pygopods. WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1999). Lizards of Western Australia I: Skinks. Revised Edition, WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (2002). Snakes of Western Australia. Revised Edition, WA Museum, Perth.
- Tyler M.J. & Doughty P. (2009). Field Guide to Frogs of Western Australia, Fourth Edition, WA Museum, Perth.
- Van Dyck, S., Gynther, I. & Baker, A. Eds (2013). Field Companion to The Mammals of Australia. Queensland Museum.
- Van Dyck, S. & Strahan, R. Eds (2008). The Mammals of Australia. Third edition. Queensland Museum.
- Wilson, S. and Swan, G. (2013). A Complete Guide to Reptiles of Australia. Third Edition, Reed, New Holland, Sydney.
- Woinarski, J., Burbidge, A. & Harrison, P. (2014). The Action Plan for Australian Mammals 2012. CSIRO Publishing.

2.3 DETAILED FAUNA SURVEYS

2.3.1 Targeted Surveys

Targeted surveys either side of the Talawana Track from the Parnngurr turnoff to the Willjabu Track turn off was carried out in October 2012 (Harewood 2012). This was followed up with additional surveys in June 2017 along other sections of the proposed Talawana Track realignment/widening west this point. The species targeted were:

- Giant Desert Skink (*Liopholis kintorei*);
- Mulgara (*Dasyercus cristicauda*);
- Marsupial Mole (*Notmyctes caurinus*);
- Greater Bilby (*Macrotis lagotis*).

The surveys involved searching for burrows, tracks, scats, diggings and other signs of the abovementioned species.

For the purpose of these assessments the entire length of the Talawana Track was considered to represent potential habitat for one or more of the targeted fauna species. In 2012 (from the Parnngurr turnoff to the Willjabu Track turn off) vegetation either side of the track was surveyed at least once by way of a series of transects either on foot and/or on slow moving quad bikes to a distance of 50m from its current alignment. In most instances the survey was carried out by a team of three people using individual quad bikes simultaneously following parallel transects on one side of the track about 10 to 25 metres apart (depending on ground vegetation density) as guided by the central survey team who navigated using a handheld GPS. This was then repeated on the other side of the track on the return journey.

The 2017 surveys were all carried out on foot and were generally undertaken by one person walking a single transect along proposed realignments and widenings.

2.3.2 Acoustic Bat Recordings

A series of bat call surveys have been undertaken in various sections of the entire LDP project area and in some regional locations to date. The surveys have been undertaken at the following locations and dates:

- Phase 1 fauna survey (May 2013): recordings were taken over six nights at six locations along or near the Willjabu Track from McKay Creek to Lake Disappointment (Harewood 2016).
- Phase 2 fauna survey (October 2013): recordings were taken over four nights at four locations along or near the Willjabu Track from McKay Creek to Lake Disappointment (Harewood 2016).

- Phase 3 fauna survey (October 2016): recordings taken at McKay Creek (near the Willjabu Track), McKay Range (just south of Talawana Track) and at two regional locations: Durba Springs (Durba Hills) and Desert Queens Baths (Broadhurst Range – Karlamilyi National Park).
- Talawana Track Botanical Survey (December 2016): recordings were taken over two nights at two locations along the Talawana Track.
- Phase 4 fauna survey (March 2017): recordings were taken over two nights at two locations near McKay Creek/Talawana Track/northern Willjabu Track.
- Targeted fauna survey (June 2017): recordings were taken over 21 nights at four locations along the Talawana Track.

The acoustic bat recordings were undertaken using a Wildlife Acoustics SM2+ Bat Detector set to operate from sunset to sunrise in each instance. The detectors convert ultrasonic echolocation signals produced by bats into audible electronic signals that are then recorded. The recordings were later processed by Bob Bullen (Bat Call WA Pty Ltd) to determine the presence of species specific calls.

The location of the camera traps are shown in Figure 5.

2.3.3 Motion Sensing Cameras

A number of motion sensing infrared cameras (“camera traps”) have been deployed in various sections of the entire LDP project area to date. The camera trap surveys have been undertaken at the following locations:

- Phase 1/2 fauna survey (May - October 2013): Forty one camera traps were placed at various locations within the LDP project area during the Phase 1 survey. Photos on the cameras were downloaded during the Phase 2 survey after about 170 days of operation, with some being re-deployed (Harewood 2016). None of the cameras were deployed within the Talawana Track study area
- Phase 3 fauna survey (October 2016): Six camera traps were placed at various locations within the LDP project area during the Phase 3 survey. Three of the six cameras were deployed within the Talawana Track study area.
- Phase 3a fauna survey (December 2016): Twenty six additional camera traps were placed at various locations along the Talawana Track study area during this phase of survey work.

The location of the camera traps are shown in Figure 5.

2.3.4 Night Parrot Survey

In June 2017 a targeted survey for the night parrot (*Pezoporus occidentalis*) carried out in accordance with “interim” guidelines issued by DBCA (DPaW 2017) was undertaken. The surveys were carried out in areas of apparently suitable habitat along the Talawana Track and some other areas outside of the study area.

The survey included:

- passive acoustic surveys;
- listening surveys; and
- targeted and area searches around waterholes/bores while looking for night parrot feathers.

The surveys were carried out in areas of most likely roosting and nesting habitat (e.g. long unburnt spinifex, in particular near areas of healthy stands of samphire, if present) located within the defined study area.

Passive call detection using automated recording units (ARUs) was undertaken using Wildlife Acoustic SM2+ and SM4 recorders (eight in total). Seven of these units were placed in areas of suitable habitat and left to record for six nights in accordance with DBCA guidelines (DPaW 2017). One “roving” ARU was also deployed and moved to a new location each night. In total nine sites along the Talawana Track were surveyed (Figure 5).

Recordings were analysed for night parrot calls by Bob Bullen (Bat Call WA Pty Ltd) and in the case of some recordings also by Nigel Jacket.

The listening surveys were carried out by two personnel (Greg Harewood and George Swan) at wide spaced (several hundred metres) intervals within identified habitat at three locations along the Talawana Track (Figure 6). The surveys commenced just before sunset and continued until approximately one hour after last light. Both personnel are familiar with WA night parrot calls.

Survey work also included daytime targeted searches at waterholes and area searches for feathers. Camera traps were deployed at water holes/troughs where considered likely to be effective.

2.3.5 Spotlighting/Head Torching

A single nocturnal survey was undertaken along a small section of the Talawana Track during the October 2016 survey near a reported greater bilby sighting (Dan Tenardi pers. comms. 2016) along the Talawana Track.

2.3.6 Other Targeted and Opportunistic Surveys

During the course of all the survey work non-systematic opportunistic observations of fauna species were made and recorded. Secondary evidence of fauna such as tracks, diggings and scats were also noted. During the October 2016 survey the area near a reported greater bilby sighting (Dan Tenardi pers. comms. 2016) along the Talawana Track was searched for evidence of the burrows/tracks.

2.4 FAUNA CONSERVATION CATEGORIES

The conservation significance of fauna species has been assessed using data from the following sources:

- *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. Administered by the Australian Government Department of the Environment and Energy (DotEE);
- *Wildlife Conservation Act 1950 (WC Act)*. Administered by the Western Australian Department of Parks and Wildlife (DPaW) (Govt. of WA 2017);
- Red List produced by the Species Survival Commission (SSC) of the World Conservation Union (also known as the IUCN Red List - the acronym derived from its former name of the International Union for Conservation of Nature and Natural Resources). The Red List has no legislative power in Australia but is used as a framework for State and Commonwealth categories and criteria; and the
- DPaW Priority Fauna list. A non-legislative list maintained by DPaW for management purposes (DPaW 2017a).

The *EPBC Act* also requires the compilation of a list of migratory species that are recognised under international treaties including the:

- Japan Australia Migratory Bird Agreement 1981 (JAMBA);
- China Australia Migratory Bird Agreement 1998 (CAMBA);
- Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA); and
- Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals).

(Note - Species listed under JAMBA are also protected under Schedule 3 of the *WC Act*.)

All migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as matters of national environmental significance (NES) under the *EPBC Act*.

The conservation status of all vertebrate fauna species listed as occurring or possibly occurring in the vicinity of the Project area has been assessed using the most recent lists

published in accordance with the above-mentioned instruments and is indicated as such in the fauna listings of this report. A full listing of conservation codes are provided in Appendix A.

2.5 TAXONOMY AND NOMENCLATURE

Taxonomy and nomenclature for vertebrate fauna species used in this report is generally taken from the DPaW's WA Fauna Census Database which is assumed to follow Aplin and Smith (2001) for amphibians and reptiles and Johnstone (2001) for birds. Jackson and Groves (2015) has been used for mammals.

Common names are taken from the Western Australia Museum (WAM) recognised primary common name listings when specified, though where common names are not provided they have been acquired from other publications. Sources include Cogger (2014), Wilson and Swan (2013), Van Dyck & Strahan (2013), Christidis and Boles (2008), Bush *et al.* (2010), Bush *et al.* (2007), Tyler & Doughty (2009), and Glauret (1961). Not all common names are generally accepted.

2.6 LIKELIHOOD OF OCCURRENCE – FAUNA OF CONSERVATION SIGNIFICANCE

Fauna of conservation significance identified during the literature review as previously being recorded in the general area were assessed and ranked for their likelihood of occurrence within the study area itself. The rankings and criteria used were:

- Would Not Occur: There is no suitable habitat for the species in the study area and/or there is no documented record of the species in the general area since records have been kept and/or the species is generally accepted as being locally/regionally extinct (supported by a lack of recent records).
 - Locally Extinct: Populations no longer occur within a small part of the species natural range, in this case within 10 or 20km of the study area. Populations do however persist outside of this area.
 - Regionally Extinct: Populations no longer occur in a large part of the species natural range, in this case within the southern forest regions. Populations do however persist outside of this area.
- Unlikely to Occur: The study area is outside of the currently documented distribution for the species in question, or no suitable habitat (type, quality and extent) was identified as being present during the field assessment. Individuals of some species may occur occasionally as vagrants/transients especially if suitable habitat is located nearby but the study area itself would not support individuals or a population the species.
- Possibly Occurs: The study area is within the known distribution of the species in question and habitat of at least marginal quality was identified as being present

during the field assessment, supported in some cases by recent records being documented in literature from within or near the study area. In some cases, while a species may be classified as possibly being present at times, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

- Known to Occur: The species in question was positively identified as being present (for sedentary species) or as using the study area as habitat for some other purpose (for non-sedentary/mobile species) during the field survey. This information may have been obtained by direct observation of individuals or by way of secondary evidence (e.g. foraging debris, tracks and scats). In some cases, while a species may be classified as known to occur, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

2.7 CRITERIA FOR IMPACT ASSESSMENT

In general impacts on fauna which may result as a consequence of development are related to :

- Habitat loss: partial or total clearing, degradation;
- Ongoing mortality: roadkill, animals striking infrastructure (e.g. fences) and entrapment in trenches;
- Habitat fragmentation: includes roads, rail lines, pipes and drainage channels;
- Disturbance: dust, noise, light and general disturbance;
- Changed fire regimes: more frequent or less frequent fires;
- Interactions with other species: feral or over-abundant native species;
- Interruption to hydrological processes: changing water flow frequency and intensity in creeks/rivers; and
- Weed invasion or the introduction of plant pathogens.

An assessment of the potential impacts of the proposal on fauna and habitat has been carried out based on the results of the overall assessment. The severity of anticipated impacts has been quantified on the basis of predicted population change as outlined in the table below (from Bamford 2011).

Table 1: Assessment Criteria of Impacts upon Fauna

Severity of impact	Observed impact
Negligible	No population decline.
Minor	Short-term population decline within project area, no change in viability of conservation status of population.
Moderate	Permanent population decline, no change in viability of conservation status of population.
High	Permanent population decline resulting in change in viability or conservation status of population.

Impacts (i.e. population decline) can result from the following:

- Habitat loss: partial or total clearing, degradation;
- Ongoing mortality: roadkill, animals striking infrastructure (e.g. fences) and entrapment in trenches;
- Habitat fragmentation: includes roads, rail lines, pipes and drainage channels;
- Disturbance: dust, noise, light and general disturbance;
- Changed fire regimes: more frequent or less frequent fires;
- Interactions with other species: feral or over-abundant native species;
- Interruption to hydrological processes: changing water flow frequency and intensity in creeks/rivers; and
- Weed invasion or the introduction of plant pathogens.

2.8 SURVEY LIMITATIONS

The fauna assessment was designed and carried out to conform with a Level 2 survey as defined in EPA Guidance statement No. 56 (EPA 2004). The assessment has included a literature review aimed at providing a list of expected species and a series of surveys including targeted and opportunistic fauna observations, the use of motion sensing cameras and bat detector recordings, the results of which are still pending in some cases.

Fauna species are indicated as potentially present within this report based on there being suitable (quality and extent) habitat within the study area. With respect to trapping, targeted and opportunistic observations, the possibility exists that certain species may not have been detected during field investigations due to:

- seasonal inactivity during field survey;
- species present within micro habitats not surveyed;

- cryptic species able to avoid detection; and
- transient wide-ranging species not present during survey period.

The lack of observational data on some species should therefore not be taken as necessarily indicating that a species is absent from the site.

In recognition of survey limitations a precautionary approach has been adopted for this assessment. Any fauna species that would possibly occur within the study area as identified through ecological databases, publications, discussions with local experts/residents and the habitat knowledge of the Author has been assumed to potentially occur in the study area.

Fauna survey limitations and constraints are summarised in Table 2.

Table 2: Fauna Survey Limitations and Constraints

Potential Constraint	Survey Limitation (Yes/No) Significant Moderate Negligible	Comments on Survey Outcomes
Competency/Experience of the consultant carrying out the survey.	No	Consultant Zoologists that executed the survey have conducted many level 1 and level 2 surveys in WA and can be regarded as suitably qualified.
Scope.	No	The survey carried out was a Level Two survey, comprising of a literature review and a series of field surveys that have included habitat assessments, camera trap and bat recording and opportunistic observations. No constraints encountered.
Proportion of fauna identified, recorded and/or collected.	No	To date field surveys over the entire LDP project area have recorded about 70% of listed potential vertebrate species considered likely to be present in the area. It should be noted that the potential species list is very likely an over estimation of the species that use the LDP project area on a regular basis.
Sources of information.	Yes, Moderate	The Talawana Track study area has not been subject to detailed surveys in the past and specific fauna values are not well documented.
The proportion of the task achieved and further work.	No	With respect to the Talawana Track study area it is considered that sufficient work has been completed to assess the areas fauna values and likely impacts for this scale of proposed works.
Timing/weather/season/cycle.	No	Surveys have been carried out to coincide with the recommended survey periods (EPA/DEC 2010).

Potential Constraint	Survey Limitation (Yes/No) Significant Moderate Negligible	Comments on Survey Outcomes
Disturbances (e.g. fire, flood, accidental human intervention etc.) which affected results of survey.	No	No disturbances of significance occurred. Some equipment (camera traps) lost due to flooding.
Intensity (in retrospect, was the intensity adequate).	No	Based on results achieved the assessment of this area is considered adequate. At this stage no further surveys targeting specific areas and species are warranted however some results are pending and this conclusion may need to be reviewed.
Completeness (e.g. was relevant area fully surveyed).	No	The entire Talawana Tack survey area is easily accessed.
Resources (e.g. degree of expertise available in animal identification to taxon level).	No	No unresolved problems/uncertainties arose with respect to identifying most of the observed vertebrate fauna species.
Remoteness and/or access problems.	No	The area is remote but access is relatively easy.
Availability of contextual (e.g. biogeographic) information on the region.	No	Previous fauna survey data for the wider area is limited though general biogeographic data is available.

3. RESULTS

3.1 HABITAT ASSESSMENT

Detailed vegetation/landform mapping of the study area has been undertaken by Botanica Consulting (2017). The vegetation/landform units can be regarded as being analogous to broad scale fauna habitats for the purpose of this assessment.

Descriptions of the various landforms and vegetation units identified within Talawana Track study area are provided in the table below and their extent shown in Figures 2 to 4. Additional information can be found within the flora and vegetation report (Botanica 2017).

Table 3: Landform and Vegetation Communities (Botanica 2017)

Landform	Major Vegetation Group	Floristic Community
Dunefield	Casuarina Forests and Woodlands (MVG 8)	Low forest of <i>Allocasuarina decaisneana</i> over open scrub of <i>Acacia/ Grevillea</i> and mid-dense hummock grass of <i>Triodia basedowii</i> on sand dunes/ swales
	Hummock Grasslands (MVG20)	Open low woodland of <i>Corymbia opaca</i> over low scrub of <i>Acacia/Grevillea</i> spp. and mid-dense hummock grass of <i>Triodia basedowii</i> on sand dunes/ swales
		Scrub of <i>Acacia/Eremophila/Grevillea</i> spp. over mid-dense hummock grass of <i>Triodia basedowii</i> on sand dunes/ swales
Open Depression	Acacia Forests and Woodlands (MVG 6)	Low woodland of <i>Acacia</i> spp. over low scrub of <i>Senna artemisioides</i> and mixed dwarf scrub in drainage depression
	Eucalypt Woodland (MVG 5)	Open low woodland of <i>Eucalyptus camaldulensis/ Corymbia</i> spp. over mid-dense hummock grass of <i>Triodia</i> spp. in creekline
Plain	Hummock Grasslands (MVG20)	Open low woodland of <i>Corymbia</i> spp./ <i>Hakea lorea</i> over low scrub of <i>Acacia</i> spp. and mid-dense hummock grass of <i>Triodia</i> spp. in sandplain
		Open shrub mallee of <i>Eucalyptus gamophylla/ E. kingsmillii</i> subsp. <i>kingsmillii</i> over low scrub of <i>Acacia bivenosa</i> and mid-dense hummock grass of <i>Triodia basedowii</i> in sandplain
Rocky Hillslope	Acacia Forests and Woodlands (MVG 6)	Scrub of <i>Acacia</i> spp. over mixed low scrub and mid-dense hummock grass of <i>Triodia pungens</i> on rocky hillslope
	Mallee Woodlands and Shrublands (MVG 14)	Open shrub mallee of <i>Eucalyptus gamophylla/ E. kingsmillii</i> subsp. <i>kingsmillii</i> over low scrub of <i>Acacia/ Grevillea</i> spp. and mid-dense hummock grass of <i>Triodia</i> spp. on rocky hillslope
Rocky Plain	Acacia Forests and Woodlands (MVG 6)	Low woodland of <i>Acacia</i> spp. over low scrub of <i>Eremophila/ Senna</i> spp. And mid-dense hummock grass of <i>Triodia basedowii</i> on rocky plain
	Hummock Grasslands (MVG20)	Open low woodland of <i>Corymbia aspera</i> over low scrub of <i>Acacia</i> spp. and mid-dense hummock grass of <i>Triodia basedowii</i> on rocky plain

3.2 LITERATURE REVIEW

A list of expected fauna species likely to occur in the study area was compiled from information obtained during the literature review and is presented in Appendix B. This listing was refined after information gathered during the various site surveys were reviewed. The DPaW NatureMap database search results are summarised in this species listing, though it should be noted that many of the records in the DPaW database are from the survey reported on here. The raw database search results from NatureMap (DPaW 2017b) and the Protected Matters Search Tool (DotEE 2017) are contained within Appendix C.

Table 4 below provides a summary of the potential fauna species considered most likely to be present based on species group and conservation status.

Table 4: Summary of Potential Vertebrate Fauna Species (as listed in Appendix B)

Group	Total Number of <u>Potential</u> Species	Potential Number of <u>Specially Protected</u> Species	Potential Number of <u>Migratory</u> Species	Potential Number of <u>Priority</u> Species
Amphibians	9	0	0	0
Reptiles	75	1	0	1
Birds	97	3	1	0
Non-Volant Mammals	24 ⁶	1	0	3
Volant Mammals (Bats)	11	0	0	0
Total	216⁶	5	1	4

Superscript = number of introduced species included in total. Note: Where a species has two classifications the higher category is tabled.

The list of potential fauna takes into consideration that firstly the species in question is not known to be locally extinct and secondly that suitable habitat for each species, as identified during the field work, is present within the study area, though compiling an accurate list has limitations.

The specific habitat and microhabitat requirements and ecology of many of the species known to occur in the wider area are often not well understood and/or documented. It can therefore be difficult to exclude species from the potential list based on a lack of a specific habitat or microhabitat within the study area.

As a consequence of this limitation the potential fauna list produced is most likely an overestimation of those species that actually utilise the study area for some purpose.

Some species may be present in the general area but may only use the study area itself on rare occasions or as vagrants/transients.

Based on the literature review, current documented distributions, habitat preferences and field survey results (detailed below), 11 fauna species of conservation significance have been listed as potential species for the Talawana Track study area. These species are:

- Unpatterned Robust Lerista *Lerista macropisthopus remota* – P2 (DPaW Priority Species);
- Great Desert Skink *Liopholis kintorei* – S3 (WC Act), Vulnerable (EPBC Act);
- Peregrine Falcon *Falco peregrinus* – S7 (WC Act);
- Grey Falcon *Falco hypoleucos* - S3 (WC Act);
- Princess Parrot *Polytelis alexandrae* - P2 (DPaW Priority Species), Vulnerable (EPBC Act);
- Night parrot (*Pezoporus occidentalis*) – S1 (WC Act), Endangered (EPBC Act);
- Rainbow Bee-eater *Merops ornatus* – S5 (WC Act), Migratory (EPBC Act);
- Brush-tailed Mulgara *Dasycercus blythi* – P4 (DPaW Priority Species);
- Northern Marsupial Mole *Notoryctes caurinus* – P4 (DPaW Priority Species);
- Greater Bilby *Macrotis lagotis* - S3 (WC Act), Vulnerable (EPBC Act); and
- Western Pebble-mound Mouse *Pseudomys chapmani* - P4 (DPaW Priority Species).

A number of other species of conservation significance, while possibly present in the wider area are not listed as potential species due to known localised extinction (and no subsequent recruitment from adjoining areas) and/or lack of suitable habitat. Details on conservation significant species and reasons for the omission of some from the potential listing are provided in Appendix D and Table 5.

3.3 DETAILED FAUNA SURVEYS

3.3.1 Targeted Surveys

The targeted surveys carried along various sections of the Talawana Track since 2012 have not detected evidence of any of the fauna species of interest despite the presence of apparently suitable habitat for some species.

These results do not however eliminate the possibility that some species may still frequent the area (and other sections of the track to the east). For example evidence (fresh

burrows) of the presence of the great desert skink was found during monitoring of plot sites for the Desert Rangelands Project carried out by the Martu people and reported in 2013 (exact date of observation unknown). This record is located directly adjacent to the Talawana Track about 2.1km west of the Willjabu Track intersection. The current status of this burrow is unknown as it has not been relocated.

There are also several records of the brush-tailed mulgara and the greater bilby from the Talawana Track and/or nearby areas (DPaW 2017b, Desert Rangelands Project 2013 – DPaW unpublished data) and both species must therefore be regarded as a potential species where ever suitable habitat is present. A single greater bilby has also been seen along this section of the track (Dan Tenardi pers. comms. 2016).

No suitable habitat for the northern marsupial mole was found during this targeted survey however evidence of the species was found in dunes south of the Talawana Track during the same survey and during subsequent surveys (Harewood 2012, 2015 and 2016). These results suggest that the species is very likely to be widespread and relatively common in dunes systems through the wider area. Suitable habitat along the Talawana Track is however limited in extent and its presence in these areas is yet to be confirmed but it is considered likely that they occur wherever suitable habitat is present (i.e. sand dunes).

Historical records (1980 – individuals, 1994 - mounds) of the western Pebble-mound mouse also exist for the McKay Range, just south of the Talawana Track (DPaW, 2017b), this area being at the extreme south eastern limit of the species documented range. The Talawana Track passes through some low rocky hillsides that extend northwards from the McKay Range and these areas may represent suitable habitat for the species. The current status of the species in this area is however unknown, though no evidence of the species was observed during a survey along the track in these locations in 2012 or 2017 (Harewood 2012, 2017). The species may be locally extinct however it must be assumed to be present, unless confirmed otherwise.

3.3.2 Acoustic Bat Recordings

To date 11 bat species have been recorded during various surveys carried out for the LDP Project. Only four of these species have been recorded along or near the Talawana Track (Phase 3 and 4 Surveys December 2016/June 2017 – Figure 5), none of which are of conservation significance.

There are no documented records of the Pilbara leaf-nose bat occurring south of the ranges making up much of the western most part of the Karlamilyi National Park where it has only recently been recorded at a location 50km north of the Talawana Track (Bullen and Harewood 2016). The ghost bat was not recorded at this location, with the closest most recent documented records of this species to the Talawana Track being from Telfer, ~150km north (dated 2015 – DPaW 2017b).

Additional bat surveys undertaken by the Author in the McKay Ranges, McKay Creek, south along the Willjabu Track and at Durba Springs (Harewood 2016, 2017) have failed to detect either species. These observations and the apparent lack of favoured habitat within the Talawana Track study area suggests that neither species would be likely, under normal circumstances, to frequent the area.

3.3.3 Motion Sensing Cameras

The motion sensing cameras set up in October and December 2016 within sections of the Talawana Track study area were retrieved in March 2017. No fauna species of conservation significance were recorded on cameras during this survey or during other cameras trap survey completed prior. A summary of the results are provided in Figure 7.

3.3.4 Night Parrot Survey

The analysis of call recordings made along the Talawana Track did not detect the night parrot and no calls were heard during night listening surveys. Despite this the species must still be considered as potentially occurring given the presence of apparently suitable habitat and its known presence to the south.

3.3.5 Spotlighting/Head Torching

No fauna species of conservation significance were recorded along that section of the Talawana Track subject to a nocturnal spotlighting survey in October 2016.

3.3.6 Other Targeted and Opportunistic Surveys

The only fauna species of conservation significance recorded during this aspect of survey work is the rainbow bee-eater which was recorded at various locations along the track during the Phase 3a survey (December 2016). The rainbow bee-eater has also been observed numerous times within other sections of the LDP project area with most sightings being at or very near McKay Creek (near Willjabu Track). It has also been observed breeding in this area (Harewood 2016, Harewood unpublished data). It is suspected to be a resident in the area all year round.

4. POTENTIAL IMPACTS ON VERTEBRATE FAUNA OF CONSERVATION SIGNIFICANCE

A preliminary assessment of the scale of potential impacts on vertebrate fauna species of conservation significance which may result as a consequence of the proposed Talawana Track upgrade proceeding in its current form is provided in the table below. The assessment is based on the requirement to clear up to 190 ha of vegetation along various sections of the track.

Table 5: Likelihood of Occurrence and Possible Impacts – Fauna Species of Conservation Significance

Species	Conservation Status (see Appendix A for codes)			Habitat Present	Likelihood of Occurrence	Possible Impact/Severity of Impact
	EPBC Act	WC Act	DPAW Priority			
Unpatterned Robust Lerista <i>Lerista macropisthopus remota</i>	-	-	P2	Yes - sand dunes/sand plains	Possibly Occurs	Loss/modification of small areas of habitat/Negligible to Minor.
Great Desert Skink <i>Liopholis kintorei</i>	Vulnerable	S3	-	Yes - sand plains and sand dunes vegetated with spinifex	Possibly Occurs	Loss/modification of small areas of habitat/Negligible to Minor.
Eastern Great Egret <i>Ardea alba (modesta)</i>	Migratory	S5	-	No/Marginal	Unlikely to Occur	No impact will occur/Negligible.
Peregrine Falcon <i>Falco peregrinus</i>	-	S7	-	Yes – Air space over area - foraging habitat only.	Possibly Occurs but only rarely	Loss/modification of small areas of foraging habitat/Negligible.
Grey Falcon <i>Falco hypoleucos</i>	-	S3	-	Yes – Air space over area - foraging habitat only.	Possibly Occurs but only rarely	Loss/modification of small areas of foraging habitat/Negligible.
Various Migratory Shorebirds/Waders	Migratory	S5	-	No	Would Not Occur	No impact will occur/Negligible.
Oriental Plover <i>Charadis veredus</i>	Migratory	S5	-	No/Very Marginal	Unlikely to Occur	No impact anticipated/Negligible.
Night Parrot <i>Pezoporus occidentalis</i>	Endangered	S1	-	Yes/Marginal	Possibly Occurs	Loss/modification of small areas of habitat/Negligible.
Princess Parrot <i>Polytelis alexandrae</i>	Vulnerable	-	P4	Yes – foraging habitat - low woodlands and scrublands	Possibly Occurs but only rarely.	Loss/modification of small areas of foraging habitat/Negligible.
Fork-tailed Swift <i>Apus pacificus</i>	Migratory	S5	-	Yes - Air space over area - foraging habitat only.	Unlikely and then flyover only on very rare occasions	No impact anticipated/Negligible.
Rainbow Bee-eater <i>Merops ornatus</i>	Migratory	S5	-	Yes – most terrestrial habitats with roosting options.	Known to occur	Loss/modification of small areas of habitat/Negligible.
Barn Swallow <i>Hirundo rustica</i>	Migratory	S5	-	Yes - Air space over area - foraging habitat only.	Unlikely and then only on very rare occasions	No impact anticipated/Negligible.
Striated Grasswren (sandplain) <i>Amytornis striatus striatus</i>	-	-	P4	Yes/Very Marginal	Unlikely to Occur	No impact anticipated/Negligible.
Grey Wagtail <i>Motacilla cinerea</i>	Migratory	S5	-	No	Would Not Occur	No impact will occur/Negligible.
Yellow Wagtail <i>Motacilla flava</i>	Migratory	S5	-	No	Would Not Occur	No impact will occur/Negligible.

Species	Conservation Status (see Appendix A for codes)			Habitat Present	Likelihood of Occurrence	Possible Impact/Severity of Impact
	EPBC Act	WC Act	DPaW Priority			
Brush-tailed Mulgara <i>Dasyurus blythi</i>	-	-	P4	Yes – sand/loam plains.	Possibly Occurs	Loss/modification of small areas of habitat/Negligible to Minor.
Northern Quoll <i>Dasyurus hallucatus</i>	Endangered	S3	-	No/Very Marginal	Unlikely to Occur	No impact anticipated/Negligible.
Northern Marsupial Mole <i>Notoryctes caurinus</i>	-	-	P4	Yes – sand dunes	Possibly Occurs	Loss/modification of small areas of habitat/Negligible.
Greater Bilby <i>Macrotis lagotis</i>	Vulnerable	S3	-	Yes.	Possibly Occurs	Loss/modification of small areas of habitat/Negligible to Minor.
Pilbara Leaf-nosed Bat <i>Rhinonictis aurantius</i>	Vulnerable	S3	-	No	Would Not Occur	No impact will occur/Negligible.
Ghost Bat <i>Macroderma gigas</i>	Vulnerable	S3	-	No	Would Not Occur	No impact will occur/Negligible.
Western Pebble- mound Mouse <i>Pseudomys chapmani</i>	-	-	P4	Yes	Possibly Occurs	Loss/modification of small areas of habitat/Negligible to Minor.

With respect to *EPBC Act* listed threatened species, the assessment which is based on available information, suggests that no “significant impact” is likely as the loss/modification of potential habitat is unlikely to compromise any *EPBC Act* criteria (DotE 2013) for any of the species in question. This conclusion is primarily based on the fact that the area of vegetation clearing required is relatively small and scattered over a long, linear road corridor and the presence of vast expanses of similar habitat in adjoining areas.

5. CONCLUSION & RECOMMENDATIONS

The fauna assessment of the Talawana Track study area was undertaken for the purposes of identifying the potential fauna assemblages present, thereby allowing a review of likely impacts, in particular in relation to conservation significant species to be carried out.

Based on the literature review, current documented distributions, habitat preferences and field survey results 11 fauna species of conservation significance have been listed as potential species for the Talawana Track study area. These species are:

- Unpatterned Robust Lerista *Lerista macropisthopus remota* – P2 (DPaW Priority Species);
- Great Desert Skink *Liopholis kintorei* – S3 (*WC Act*), Vulnerable (*EPBC Act*);

- Peregrine Falcon *Falco peregrinus* – S7 (WC Act);
- Grey Falcon *Falco hypoleucos* - S3 (WC Act);
- Princess Parrot *Polytelis alexandrae* - P2 (DPaW Priority Species), Vulnerable (EPBC Act);
- Night Parrot (*Pezoporus occidentalis*) – S1 (WC Act), Endangered (EPBC Act);
- Rainbow Bee-eater *Merops ornatus* – S5 (WC Act), Migratory (EPBC Act);
- Brush-tailed Mulgara *Dasycercus blythi* – P4 (DPaW Priority Species);
- Northern Marsupial Mole *Notoryctes caurinus* – P4 (DPaW Priority Species);
- Greater Bilby *Macrotis lagotis* - S3 (WC Act), Vulnerable (EPBC Act); and
- Western Pebble-mound Mouse *Pseudomys chapmani* - P4 (DPaW Priority Species).

Using currently available information a preliminary impact assessment suggests that no “significant impacts” on any EPBC Act listed threatened vertebrate species are likely. This conclusion is primarily based on the fact that the area of vegetation clearing required is relatively small, scattered over a wide area and the presence of vast expanses of similar habitat in adjoining areas. The limited amount of clearing is unlikely to have any more than a minor impact (i.e. short-term population decline within study area, no change in viability of conservation status of population.) on any species which may be present.

Despite the anticipated impact on vertebrate fauna inhabiting the area being negligible/minor it is recommended that a fauna management plan be formulated for implementation during proposed site works. The management plan should detail various avoidance and mitigation measures with the aim of minimising impact on fauna and fauna habitat as much as reasonable and practicable.

The following recommendations are provided for guidance for the formulation of a management plan. This listing is not exhaustive and the document will need to be finalised after liaison with project personnel and relevant regulatory authorities. It is recommended that:

- Planning for road works should aim to avoid the need to clear as much of the existing vegetation as possible.
- During site works areas requiring clearing should be clearly marked and access to other areas restricted to prevent accidental clearing of areas to be retained.

- Immediately prior to clearing operations commencing suitably experienced “fauna spotters” should be employed to inspect clearing area for burrows of significant vertebrate fauna species.
- Any identified burrows considered to be occupied or highly likely to be occupied should be avoided and the appropriate action taken to ensure any fauna inhabiting these are not injured or killed. Preferably this would involve re-routing the road so that the burrow is retained. If this is not feasible it may be necessary to delay clearing at this location until the burrow is vacated by the occupant/s of its/their own accord or alternatively trapping/catching the animal/s for relocating to suitable retained habitat nearby.
- Design additional project infrastructure, including access routes, vehicle and plant storage and turn around areas, borrow pits etc. so that:
 - previously disturbed areas are used where possible; and
 - areas of sensitive vegetation are avoided.
- Fuel and chemical storage facilities should be located appropriate distance away from watercourses.
- No dead, standing or fallen timber should be removed unnecessarily. Logs (hollow or not) and other debris resulting from land clearing should be used to enhance fauna habitat in untouched and rehabilitated areas if possible.
- All staff working on site should be made aware that all native fauna is protected by law.
- Native fauna injured during clearing or normal site operations should be taken to a designated veterinary clinic or a DPaW nominated wildlife carer.
- Any holes, pits or trenches required for services should be kept open for only as long as necessary and suitable escape ramps (45° batter) and bridging provided if the site is to be left unattended for extended periods. Significant sized holes, pits or trenches should be inspected for fauna immediately prior to filling.
- Disruption to surface and sub-surface hydrology should be minimised where possible and levees and drains designed to mimic natural drainage flows where disruptions will occur.
- The likelihood of vehicle collisions with animals along the Talawana Track when in operation is anticipated to be low, however a register of incidences and fauna sightings should be maintained and reviewed on a regular basis. If considered warranted operational procedures and management strategies should be assessed, added or changed accordingly based on the results.

6. REFERENCES

- Actis Environmental and Alexander Holm & Associates (2009). Lake Disappointment Potash Project Environmental Review and Program of Works.
- Anstis, M. (2013). Tadpoles and Frogs of Australia. New Holland Publishers, Sydney.
- Aplin, K.P. and Smith, L.A. (2001). Checklist of the frogs and reptiles of Western Australia, Records of the Western Australian Museum Supplement No. 63, 51-74.
- Bamford Consulting Ecologists (2005). Fauna survey of proposed iron ore mine: Cloudbreak. Unpublished report for Fortescue Metals Group.
- Bamford, M.J & A.R. (2007). Kintyre Project Area. Fauna observations from site visit, October 2007. Unpublished report for Canning Resources.
- Bamford Consulting Ecologists (2010). Kintyre Project Area Review of Vertebrate Fauna. Unpublished report for Cameco Australia Pty Ltd.
- Bamford Consulting Ecologists (2011). Targeted fauna survey for the proposed Kintyre haul route. Unpublished report for Cameco Australia Pty Ltd.
- Barrett, G., Silcocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). The New Atlas of Australian Birds. Royal Australasian Ornithologists Union, Victoria.
- Benshemesh, J. & Mann, S. (2009). Survey of marsupial moles in North central WA: Great Sandy, Gibson and Little Sandy Deserts. Report to Department of Natural Resources, Environment and the Arts, Northern Territory Government. July 2009.
- Birdlife Australia. (2017). Oriental Plover. [ONLINE] Available at: <http://www.birdlife.org.au/bird-profile/oriental-plover>. [Accessed 16 February 2017].
- Blyth, J., A. Burbidge & W. Boles (1997). Report on an expedition to the western desert and eastern Pilbara areas in search of the Night Parrot *Pezoporus occidentalis*. Eclectus. 2:25-30.
- Botanica Consulting (2017). Level 2 Flora & Vegetation Survey Lake Disappointment Project. Unpublished report for Reward Minerals Ltd. January 2017.
- Braithwaite, R.W., and Griffiths, A.D. (1994). Demographic variation and range contraction in the northern quoll, *Dasyurus hallucatus* (Marsupialia: Dasyuridae). Wildlife Research 21, 203-217.
- Browne-Cooper, R. & Bamford, M. (2010). Targeted fauna survey for the proposed Kintyre Uranium Mine Project. Unpublished report for Cameco Australia Pty Ltd.

Bullen, B. & Harewood, G. (2016). Pilbara Leaf-nosed Bat record from Karlamilyi National Park in the Little Sandy Desert. The Australasian Bat Society Newsletter, Number 47, Late 2016.

Bush, B., Maryan, B., Browne-Cooper, R. & Robinson, D. (2007). Reptiles and Frogs in the Bush: Southwestern Australia. UWA Press, Nedlands.

Bush, B. and Maryan, B. (2011). Field Guide to Snakes of the Pilbara, Western Australia. WA Museum, Perth.

Christidis, L. and Boles, W.E. (2008). Systematics and Taxonomy of Australian Birds. CSIRO Publishing, Melbourne.

Churchill, S. (2008). Australian Bats. Second Edition, Allen & Unwin.

Cogger, H.G. (2014). Reptiles and Amphibians of Australia. 7th Edition. CSIRO Publishing.

Cogger, H. G., Cameron E. E., Sadler R. A. & Eggler, P. (1993). The Action Plan for Australian Reptiles. [Online]. Canberra, ACT: Australian Nature Conservation Agency. Available from:
<http://www.environment.gov.au/biodiversity/threatened/action/reptiles/index.html>

Davies, S.J.J.F., M. Bamford & M. Bamford (1988). The Night Parrot: a search in the Lake Disappointment area, September 1987. Royal Australasian Ornithologists Union Report (RAOU) Series. 49. Melbourne.

Department of the Environment (DotE) (2013). Matters of National Environmental Significance. Significant Impact Guidelines 1.1, *EPBC Act 1999*.

Department of the Environment and Energy (DotEE) (2017a). *EPBC Act* Protected Matters Report: "By Line" Talawana Track Study area (plus 10 km buffer). Available from: <http://www.environment.gov.au>. Accessed 12/02/17 13:59:45.

Department of the Environment & Energy. (DoEE) (2017b). *Polytelis alexandrae* — Princess Parrot, Alexandra's Parrot. [ONLINE] Available at: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=758. [Accessed 16 February 2017].

Department of the Environment & Energy. (DoEE) (2017c). *Pezoporus occidentalis* — Night Parrot. [ONLINE] Available at: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59350. [Accessed 16 February 2017].

Department of Parks and Wildlife (DPaW) (2017a). Threatened and Priority Fauna Rankings. 6 January 2017

Department of Parks and Wildlife (DPaW) (2017b). NatureMap Database search. “By Line” Talawana Track Study area (plus 10 km buffer). 12/02/2017.

Department of Parks and Wildlife (2017c). Interim guideline for preliminary surveys of night parrot (*Pezoporus occidentalis*) in Western Australia. Version 1 May 2017.

Duncan, Anne. & Baker, G. B. & Montgomery, Narelle. & Natural Heritage Trust (Australia) (1999). The action plan for Australian bats / edited by Anne Duncan, G. Barry Baker and Narelle Montgomery; with assistance from Lindy Lumsden et al. Natural Heritage Trust, Canberra.

Environmental Protection Authority (EPA) (2002). Terrestrial Biological Surveys As An Element of Biodiversity Protection. Position Statement No. 3. EPA, Perth.

Environmental Protection Authority (EPA) (2004). Guidance for the Assessment of Environmental Factors - Terrestrial fauna surveys for environmental impact assessment in Western Australia. Guidance Statement No 56 EPA, Perth.

Environmental Protection Authority (EPA) and Department of Environment and Conservation (DEC) (2010). Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessments (eds B. M. Hyder, J. Dell and M. A. Cowan), Perth Western Australia.

Garnett, S.T. and G.M. Crowley (2000). The Action Plan for Australian Birds 2000. Natural Heritage Trust and Environment Australia, Canberra, Australia.

Glauret, L. (1961). A Handbook of the Lizards of Western Australia. Handbook 6, Western Australian Naturalists Club, Perth.

Government of Western Australia (2017). *Wildlife Conservation Act 1950*. Wildlife Conservation (Specially Protected Fauna) Notice 2016. Government Gazette, WA. 6 January 2017.

Harewood, G. (2012). Targeted Fauna Survey Proposed Access Track, Camp Site and Borrow Pit Lake Disappointment. Unpublished report for Reward Minerals Ltd.

Harewood, G. (2015). Marsupial Mole Monitoring Survey (April 2014). Lake Disappointment Potash Project. Unpublished report for Reward Minerals Ltd.

Harewood, G. (2016). Fauna Survey (Level2) – Phase 1 (May 2013) and Phase 2 (October 2013) Lake Disappointment Potash Project. Unpublished report for Rewards Minerals Ltd.

Hart Simpson and Associates Pty Ltd (1994). Kintyre Project. Fauna studies 1986 to 1992. Unpublished report for Canning Resources.

- Higgins, P. J. (1999). Handbook of Australian, New Zealand and Antarctic Birds. Volume 4: Parrots to Dollarbird. Oxford University Press, Melbourne.
- How, R., Cooper, N.K. and Bannister, J.L. (2001). Checklist of the mammals of Western Australia, Records of the Western Australian Museum Supplement No. 63, 91-98.
- How, R.A., Spencer P.B.S. & Schmitt L.H. (2009). Island populations have high conservation value for northern Australia's top marsupial predator ahead of a threatening process. 1-12. Journal of Zoology. Page(s) 1-12.
- Johnstone, R.E. (2001). Checklist of the birds of Western Australia, Records of the Western Australian Museum Supplement No. 63, 75-90.
- Johnstone, R.E. and Storr, G.M. (1998). Handbook of Western Australian Birds: Volume 1 – Non-passerines (Emu to Dollarbird). Western Australian Museum, Perth Western Australia.
- Johnstone, R.E. and Storr, G.M. (2004). Handbook of Western Australian Birds: Volume 2 – Passerines (Blue-winged Pitta to Goldfinch). Western Australian Museum, Perth Western Australia.
- Masters, P., Dickman, C. R., and Crowther, M. (2003). Effects of cover reduction on mulgara *Dasyercus cristicauda* (Marsupialia: Dasyuridae), rodent and invertebrate populations in central Australia: implications for land management. Austral Ecology 28, 658-665.
- McAlpin, S. (2001). A recovery plan for the Great Desert Skink (*Egernia kintorei*) 2001-2011. Alice Springs: Arid Lands Environment Centre. Available from: <http://www.environment.gov.au/biodiversity/threatened/publications/recovery/great-desert-skink/index.html>. In effect under the EPBC Act from 26-Mar-2002.
- Menkhorst, P. and Knight, F. (2011). A Field Guide to the Mammals of Australia. Oxford University Press, Melbourne.
- Morcombe, M. (2004). Field Guide to Australian Birds. Steve Parish Publishing, Archerfield, Queensland.
- Murphy, S. (2015). Shining a light: The research unlocking the secrets of the mysterious Night Parrot. Australian Birdlife 4, 30-35.
- Pizzey, G & Knight, F. (2012). The Field Guide to the Birds of Australia. 9th Edition. Harper Collins, Sydney.
- Simpson, K. and Day, N. (2010). Field Guide to the Birds of Australia. Penguin Books, Ringwood.

Start, A. N., Burbidge, A. A., Kendrick, P.G. and McKenzie, N.L. (2013). Terrestrial mammals of the south-western Little Sandy Desert, Western Australia Australian Mammalogy, 2013, 35, 54–64.

Storr, G.M., Smith, L.A. and Johnstone R.E. (1983). Lizards of Western Australia II: Dragons and Monitors. WA Museum, Perth.

Storr, G.M., Smith, L.A. and Johnstone R.E. (1990). Lizards of Western Australia III: Geckos and Pygopods. WA Museum, Perth.

Storr, G.M., Smith, L.A. and Johnstone R.E. (1999). Lizards of Western Australia I: Skinks. Revised Edition, WA Museum, Perth.

Storr, G.M., Smith, L.A. and Johnstone R.E. (2002). Snakes of Western Australia. Revised Edition, WA Museum, Perth.

Tyler M.J. & Doughty P. (2009). Field Guide to Frogs of Western Australia, Fourth Edition, WA Museum, Perth.

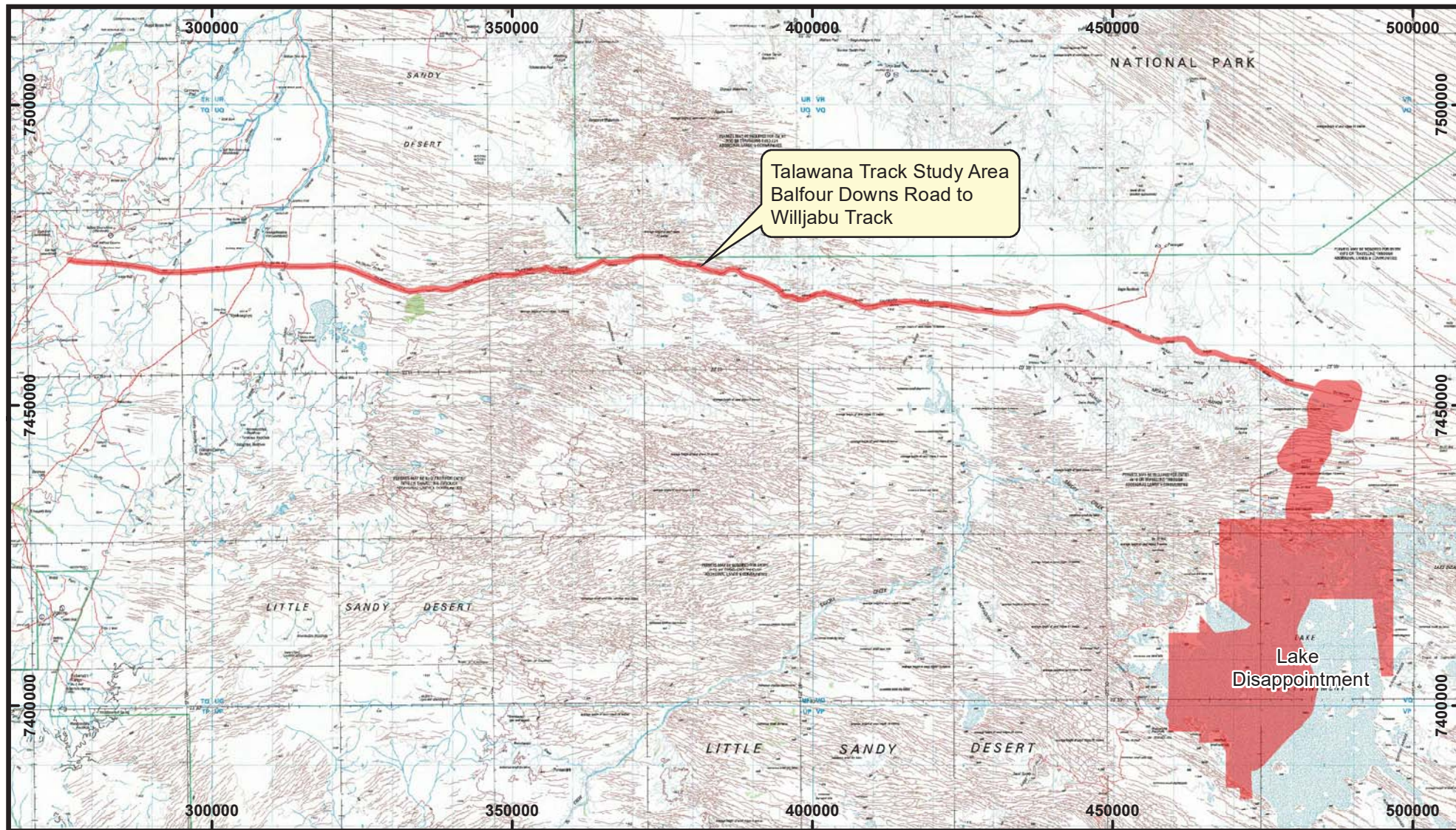
Van Dyck, S., Gynther, I. & Baker, A. Eds (2013). Field Companion to The Mammals of Australia. Queensland Museum.

Van Dyck, S. & Strahan, R. Eds (2008). The Mammals of Australia. Third edition Queensland Museum.

Wilson, S. and Swan, G. (2013). A Complete Guide to Reptiles of Australia. Reed, New Holland, Sydney.

Woinarski, J., Burbidge, A. & Harrison, P. (2014). The Action Plan for Australian Mammals 2012. CSIRO Publishing.

FIGURES



Legend

Lake Disappointment Potash Project Area



0 10 20 30 40 50
Kilometres
MGA Zone 51



DRAWN: G Harewood
DATE : Feb 2017
SCALE: 1:930,000

Reward Minerals Ltd
Lake Disappointment
Potash Project
**Study Area
and
Surrounds**

Figure: 1



7,490,000 mN

7,480,000 mN

7,470,000 mN

7,460,000 mN

7,450,000 mN

280,000 mE

290,000 mE

300,000 mE

310,000 mE

320,000 mE

330,000 mE

340,000 mE

350,000 mE

Closed Depression	Plain
CD-CSSF1	P-HG1
CD-OGHSR1	P-HG2
Dunefield	Rocky Hillslope
D-CFW1	RH-AFW1
D-HG1	RH-MWS1
D-HG2	Rocky Plain
Open Depression	RP-AFW1
OD-AFW1	RP-HG1
OD-EW1	
OD-OS1	
Playa	
Lake Disappointment	

Botanica Consulting	
Vegetation Communities Talawana Track Map 1	
Date: 20/02/2017	
Author: L. Pike	
Editor:	
Client:	
Scale: 1:20,000	Proportion: 1cm = 200m (1:20,000)



360,000 mE

370,000 mE

380,000 mE

390,000 mE

400,000 mE

410,000 mE

420,000 mE

7,490,000 mN

7,480,000 mN

7,470,000 mN

7,460,000 mN

7,450,000 mN

Closed Depression

- CD-CSSSF1
- CD-OGHSR1

Dunefield

- D-CFW1
- D-HG1
- D-HG2

Open Depression

- OD-AFW1
- OD-EW1
- OD-OS1

Playa

- Lake Disappointment

Plain

- P-HG1
- P-HG2

Rocky Hillslope

- RH-AFW1
- RH-MWS1

Rocky Plain

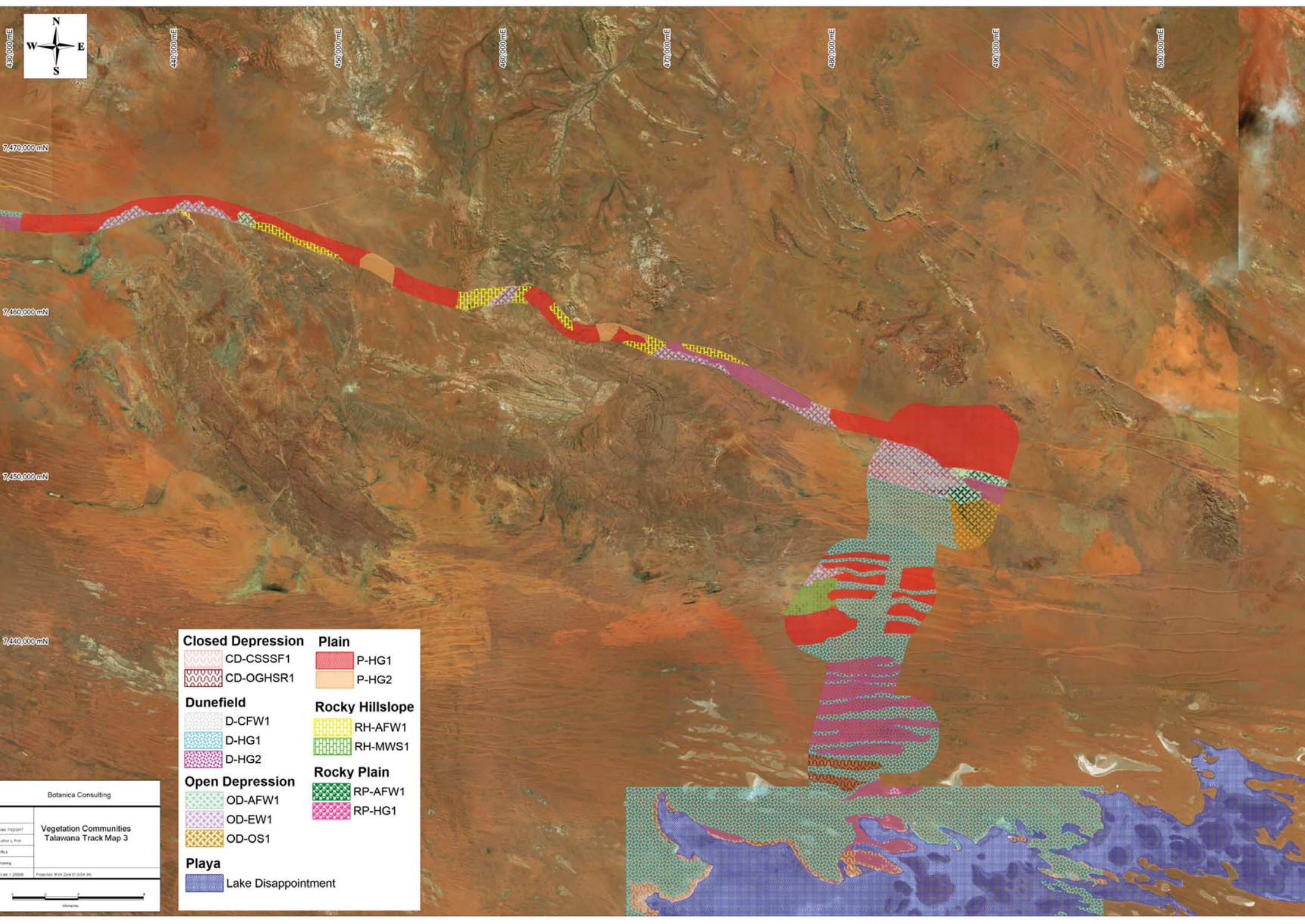
- RP-AFW1
- RP-HG1

Botanica Consulting

Date: 7/23/2017
Author: J. Fox
Office:
Drawing:
Scale: 1:20000
Projection: NAD 83, Zone 10, UTM

Vegetation Communities Talawana Track Map 2

0 1 2 3 4
kilometres



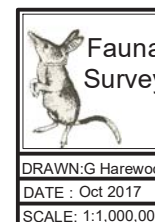
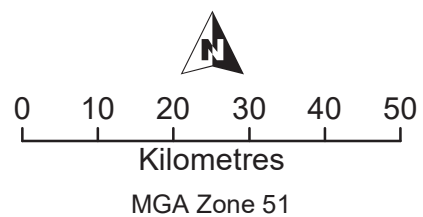
Closed Depression		Plain	
	CD-CSSSF1		P-HG1
	CD-OGHSR1		P-HG2
Dunefield		Rocky Hillslope	
	D-CFW1		RH-AFW1
	D-HG1		RH-MWS1
	D-HG2		
Open Depression		Rocky Plain	
	OD-AFW1		RP-AFW1
	OD-EW1		RP-HG1
	OD-OS1		
Playa			
	Lake Disappointment		

Botanica Consulting	
Vegetation Communities Talavana Track Map 3	
Drawn by	
Author L. Park	
Office	
Drawing	
© 2008	Projection WGS 1984 UTM 50S



Legend

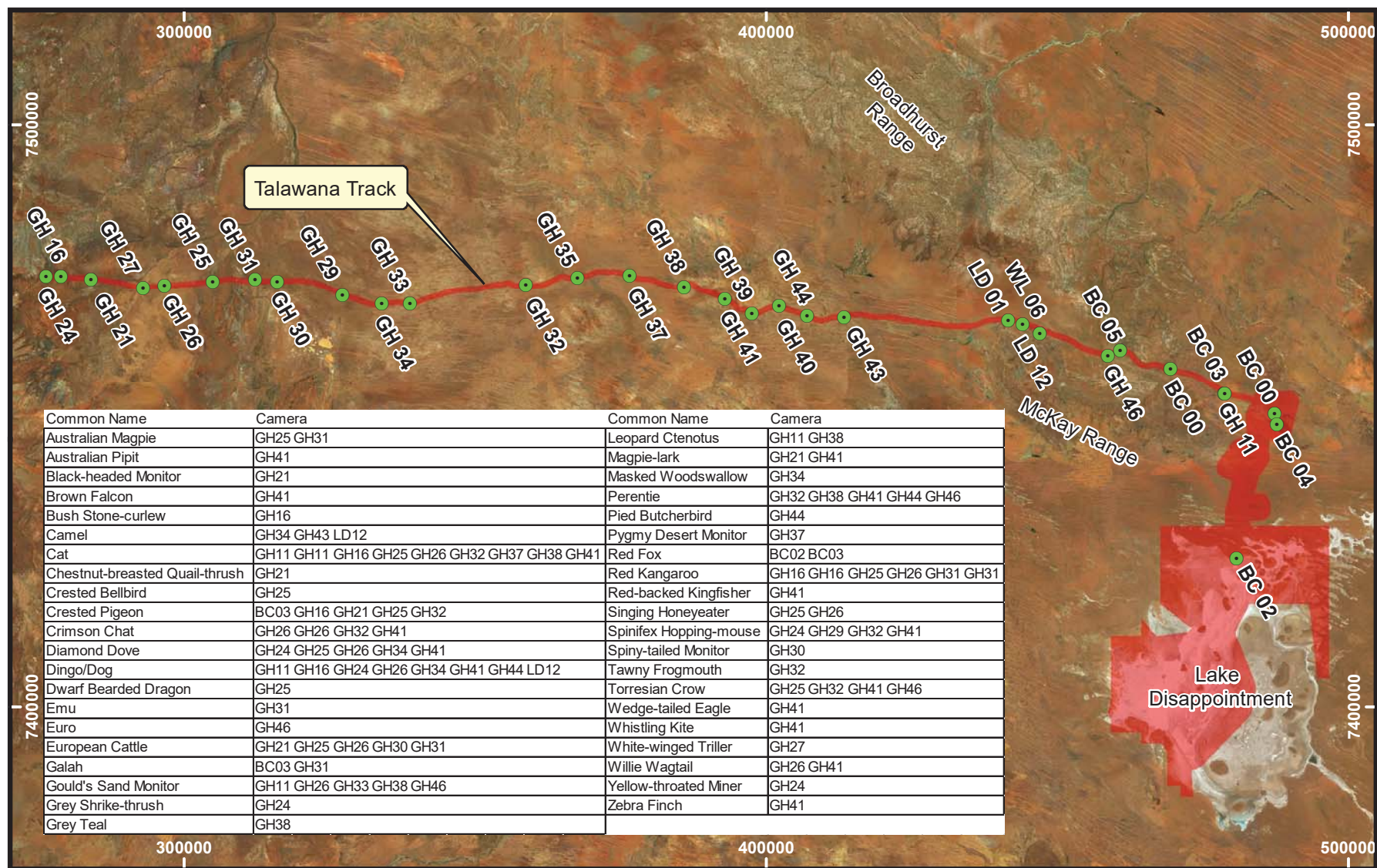
- Lake Disappointment Potash Project Area
- Camera Trap (2016/2017)
- Bat Recording Site (2016/2017)



**Reward Minerals Ltd
Lake Disappointment
Potash Project**

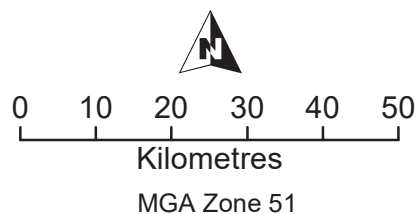
**Camera Trap and
Bat Recording Locations
Talawana Track**

Figure: 5



Legend

- Lake Disappointment Potash Project Area
- Camera Traps Deployed October/December 2016



DRAWN: G Harewood
DATE : May 2017
SCALE: 1:1,000,000

Reward Minerals Ltd
Lake Disappointment
Potash Project

Camera Trap
Recording Results
(Dec 2016 - Mar 2017)

APPENDIX A

Conservation Categories

EPBC Act (1999) Threatened Fauna Categories

Threatened fauna may be listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* in any one of the following categories:

Category	Code	Description
Extinct	E	There is no reasonable doubt that the last member of the species has died.
*Extinct in the wild	EW	A species (a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
*Critically Endangered	CE	A species is facing an extremely high risk of extinction in the wild in the immediate future.
*Endangered	EN	A species: (a) is not critically endangered; and (b) is facing a very high risk of extinction in the wild in the near future.
*Vulnerable	VU	A species (a) is not critically endangered or endangered; and (b) is facing a high risk of extinction in the wild in the medium-term future.
Conservation Dependent	CD	A species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered
*Migratory	Migratory	(a) all migratory species that are: (i) native species; and (ii) from time to time included in the appendices to the Bonn Convention; and (b) all migratory species from time to time included in annexes established under JAMBA, CAMBA and ROKAMBA; and (c) all native species from time to time identified in a list established under, or an instrument made under, an international agreement approved by the Minister.
Marine	Ma	Species in the list established under s248 of the <i>EPBC Act</i>

Note: Only species in those categories marked with an asterix are matters of national environmental significance (NES) under the *EPBC Act*.

Wildlife Conservation (Specially Protected Fauna) Notice 2015 Categories

Published as Specially Protected under the *Wildlife Conservation Act 1950*, and listed under Schedules 1 to 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.

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.

Category	Code	Description
Schedule 1 Critically Endangered species	CR	Threatened species considered to be facing an extremely high risk of extinction in the wild.
Schedule 2 Endangered species	EN	Threatened species considered to be facing a very high risk of extinction in the wild.
Schedule 3 Vulnerable species	VU	Threatened species considered to be facing a high risk of extinction in the wild.
Schedule 4 Presumed extinct species	EX	Species which have been adequately searched for and there is no reasonable doubt that the last individual has died.
Schedule 5 Migratory birds protected under an international agreement	IA	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.
Schedule 6 Fauna that is of special conservation need as conservation dependent fauna	CD	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
Schedule 7 Other specially protected fauna.	OS	Fauna otherwise in need of special protection to ensure their conservation.

Western Australian DPaW Priority Fauna Categories

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna 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.

Category	Code	Description
Priority 1 Poorly Known Species.	P1	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.
Priority 2 Poorly Known Species.	P2	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.
Priority 3 Poorly Known Species.	P3	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.
Priority 4 Rare, Near Threatened and other species in need of monitoring.	P4	<p>(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.</p> <p>(b) Near Threatened: Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.</p> <p>(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>

*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).

IUCN Red List Threatened Species Categories

The *IUCN Red List of Threatened Species*[™] is a checklist of taxa that have undergone an extinction risk assessment using the *IUCN Red List Categories and Criteria*.

Categories are summarized below.

Category	Code	Description
Extinct	EX	Taxa for which there is no reasonable doubt that the last individual has died.
Extinct in the Wild	EW	Taxa which is known only to survive in cultivation, in captivity or and as a naturalised population well outside its past range and it has not been recorded in known or expected habitat despite exhaustive survey over a time frame appropriate to its life cycle and form.
Critically Endangered	CR	Taxa facing an extremely high risk of extinction in the wild.
Endangered	EN	Taxa facing a very high risk of extinction in the wild.
Vulnerable	VU	Taxa facing a high risk of extinction in the wild.
Near Threatened	NT	Taxa which has been evaluated but does not qualify for CR, EN or VU now but is close to qualifying or likely to qualify in the near future.
Least Concern	LC	Taxa which has been evaluated but does not qualify for CR, EN, VU, or NT but is likely to qualify for NT in the near future.
Data Deficient	DD	Taxa for which there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.
Not Evaluated	NE	Taxa which has not been evaluated.

A full list of categories and their meanings are available at:

<http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>

APPENDIX B

DPAW & EPBC Database Search Results

NatureMap Species Report

Created By Greg Harewood on 12/02/2017

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Line'
Vertices 22° 50' 53" S, 120° 49' 49" E 22° 54' 42" S, 122° 24' 29" E 22° 53' 38" S, 122° 28' 18" E 22° 54' 55" S, 122° 32' 20" E 22° 57' 27" S, 122° 39' 19" E 22° 59' 22" S, 122° 44' 37" E 23° 04' 39" S, 122° 49' 54" E 23° 05' 55" S, 122° 53' 43" E 23° 05' 55" S, 122° 53' 43" E
Group By Species Group

Species Group	Species	Records
Amphibian	3	7
Bird	101	809
Invertebrate	12	13
Mammal	22	104
Reptile	39	162
TOTAL	177	1095

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Amphibian				
1.	25375 <i>Cyclorana maini</i> (Sheep Frog)			
2.	25392 <i>Litoria rubella</i> (Little Red Tree Frog)			
3.	25442 <i>Uperoleia micromeles</i> (Tanami Toadlet)			
Bird				
4.	24559 <i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
5.	24264 <i>Acanthiza robustirostris</i> (Slaty-backed Thornbill)			
6.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
7.	25544 <i>Aegotheles cristatus</i> (Australian Owlet-nightjar)			
8.	24301 <i>Aegotheles cristatus</i> subsp. <i>cristatus</i> (Australian Owlet-nightjar)			
9.	24312 <i>Anas gracilis</i> (Grey Teal)			
10.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
11.	25670 <i>Anthus australis</i> (Australian Pipit)			
12.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
13.	25538 <i>Aquila morphnoides</i> (Little Eagle)			
14.	41324 <i>Ardea modesta</i> (Eastern Great Egret)		IA	
15.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
16.	24610 <i>Ardeotis australis</i> (Australian Bustard)			
17.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
18.	24355 <i>Artamus minor</i> (Little Woodswallow)			
19.	24356 <i>Artamus personatus</i> (Masked Woodswallow)			
20.	24357 <i>Artamus superciliosus</i> (White-browed Woodswallow)			
21.	24318 <i>Aythya australis</i> (Hardhead)			
22.	<i>Barnardius zonarius</i>			
23.	25715 <i>Cacatua roseicapilla</i> (Galah)			
24.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
25.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
26.	24269 <i>Calamanthus campestris</i> (Rufous Fieldwren)			
27.	24564 <i>Certhionyx variegatus</i> (Pied Honeyeater)			
28.	<i>Cheramoeca leucosterna</i>			
29.	24488 <i>Cheramoeca leucosternus</i> (White-backed Swallow)			
30.	24833 <i>Cincloramphus cruralis</i> (Brown Songlark)			
31.	24834 <i>Cincloramphus mathewsi</i> (Rufous Songlark)			
32.	25580 <i>Cinclosoma castaneothorax</i> (Chestnut-breasted Quail-thrush)			
33.	24289 <i>Circus assimilis</i> (Spotted Harrier)			
34.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
35.	24416 <i>Corvus bennetti</i> (Little Crow)			
36.	25593 <i>Corvus orru</i> (Torresian Crow)			
37.	25701 <i>Coturnix ypsilophora</i> (Brown Quail)			
38.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
39.	25595	<i>Cracticus tibicen</i> (Australian Magpie)			
40.	25596	<i>Cracticus torquatus</i> (Grey Butcherbird)			
41.	25547	<i>Dacelo leachii</i> (Blue-winged Kookaburra)			
42.	25607	<i>Dicaeum hirundinaceum</i> (Mistletoebird)			
43.	24470	<i>Dromaius novaehollandiae</i> (Emu)			
44.		<i>Egretta novaehollandiae</i>			
45.		<i>Elanus axillaris</i>			
46.	25540	<i>Elanus caeruleus</i> (Black-shouldered Kite)			
47.		<i>Elseyornis melanops</i>			
48.	24631	<i>Emblema pictum</i> (Painted Finch)			
49.		<i>Eolophus roseicapillus</i>			
50.	24570	<i>Epthianura tricolor</i> (Crimson Chat)			
51.	24368	<i>Eurostopodus argus</i> (Spotted Nightjar)			
52.	25621	<i>Falco berigora</i> (Brown Falcon)			
53.	25622	<i>Falco cenchroides</i> (Australian Kestrel)			
54.	25623	<i>Falco longipennis</i> (Australian Hobby)			
55.	25624	<i>Falco peregrinus</i> (Peregrine Falcon)		S	
56.	24476	<i>Falco subniger</i> (Black Falcon)			
57.	25727	<i>Fulica atra</i> (Eurasian Coot)			
58.	42314	<i>Gavicalis virescens</i> (Singing Honeyeater)			
59.	24401	<i>Geopelia cuneata</i> (Diamond Dove)			
60.	25585	<i>Geopelia striata</i> (Zebra Dove)			
61.	24404	<i>Geophaps plumifera</i> (Spinifex Pigeon)			
62.	24271	<i>Gerygone fusca</i> subsp. <i>fusca</i> (Western Gerygone)			
63.	24443	<i>Grallina cyanoleuca</i> (Magpie-lark)			
64.	24295	<i>Haliastur spheurnus</i> (Whistling Kite)			
65.	24297	<i>Hamirostra melanostemon</i> (Black-breasted Buzzard)			
66.	25734	<i>Himantopus himantopus</i> (Black-winged Stilt)			
67.	24367	<i>Lalage tricolor</i> (White-winged Triller)			
68.	25661	<i>Lichmera indistincta</i> (Brown Honeyeater)			
69.		<i>Lophochroa leadbeateri</i>			
70.		<i>Lophoictinia isura</i>			
71.	24326	<i>Malacorhynchus membranaceus</i> (Pink-eared Duck)			
72.	25651	<i>Malurus lamberti</i> (Variegated Fairy-wren)			
73.	25652	<i>Malurus leucopterus</i> (White-winged Fairy-wren)			
74.	24583	<i>Manorina flavigula</i> (Yellow-throated Miner)			
75.	24736	<i>Melopsittacus undulatus</i> (Budgerigar)			
76.	24598	<i>Merops ornatus</i> (Rainbow Bee-eater)		IA	
77.	25542	<i>Milvus migrans</i> (Black Kite)			
78.	25748	<i>Ninox novaeseelandiae</i> (Boobook Owl)			
79.	24742	<i>Nymphicus hollandicus</i> (Cockatiel)			
80.	24407	<i>Ocyphaps lophotes</i> (Crested Pigeon)			
81.	24618	<i>Oreoica gutturalis</i> (Crested Bellbird)			
82.	25680	<i>Pachycephala rufiventris</i> (Rufous Whistler)			
83.	24624	<i>Pachycephala rufiventris</i> subsp. <i>rufiventris</i> (Rufous Whistler)			
84.	24627	<i>Pardalotus rubricatus</i> (Red-browed Pardalote)			
85.	25682	<i>Pardalotus striatus</i> (Striated Pardalote)			
86.	24659	<i>Petroica goodenovii</i> (Red-capped Robin)			
87.	24409	<i>Phaps chalcoptera</i> (Common Bronzewing)			
88.	24841	<i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
89.	25703	<i>Podargus strigoides</i> (Tawny Frogmouth)			
90.	24681	<i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)			
91.	25706	<i>Pomatostomus temporalis</i> (Grey-crowned Babbler)			
92.	42323	<i>Ptilotula keartlandi</i> (Grey-headed Honeyeater)			
93.	42344	<i>Pumella albiglans</i> (White-fronted Honeyeater)			
94.	25614	<i>Rhipidura leucophrys</i> (Willie Wagtail)			
95.	30948	<i>Smicromis brevirostris</i> (Weebill)			
96.	42310	<i>Sugomel niger</i> (Black Honeyeater)			
97.	25705	<i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
98.	24331	<i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
99.	30870	<i>Taeniopygia guttata</i> (Zebra Finch)			
100.	24845	<i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
101.	42351	<i>Todiramphus pyrrhopygius</i> (Red-backed Kingfisher)			
102.	25549	<i>Todiramphus sanctus</i> (Sacred Kingfisher)			
103.	24851	<i>Turnix velox</i> (Little Button-quail)			
104.	25762	<i>Tyto alba</i> (Barn Owl)			

Invertebrate

105.		<i>Argiope protensa</i>			
106.		<i>Bogidiellidae</i> sp.			
107.		<i>Diacyclops humphreysi humphreysi</i>			

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
108.		<i>Enchytraeus Pilbara</i> sp. 2 (PSS)			
109.		<i>No invertebrates</i>			
110.		<i>Ostracoda (unident.)</i>			
111.		<i>Parabathynellidae</i> sp.			
112.		<i>Parastenocaris</i> sp.			
113.		<i>Scolopendra morsitans</i>			
114.		<i>Trichocyclops gnalooma</i>			
115.		<i>Tubificidae stygo</i> type 1 (imm <i>Ainudrilus</i> WA25/26?) (PSS)			
116.		<i>Urodacus hoplurus</i>			

Mammal

117.	24254	<i>Camelus dromedarius</i> (Dromedary, Camel)	Y		
118.	24039	<i>Canis lupus</i> subsp. <i>dingo</i> (Dingo)	Y		
119.	24186	<i>Chalinolobus gouldii</i> (Gould's Wattled Bat)			
120.	24091	<i>Dasykaluta rosamondae</i> (Little Red Kaluta)			
121.	24041	<i>Felis catus</i> (Cat)	Y		
122.	24135	<i>Macropus robustus</i> subsp. <i>erubescens</i> (Euro, Biggada)			
123.	24136	<i>Macropus rufus</i> (Red Kangaroo, Marlu)			
124.	24168	<i>Macrotis lagotis</i> (Bilby, Dalgyte)		T	
125.	24223	<i>Mus musculus</i> (House Mouse)	Y		
126.	24094	<i>Ningau ridei</i> (Wongai Ningau)			
127.	24224	<i>Notomys alexis</i> (<i>Spinifex</i> Hopping-mouse)			
128.	24147	<i>Notoryctes caurinus</i> (Northern Marsupial Mole)		T	
129.	24194	<i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)			
130.	24233	<i>Pseudomys chapmani</i> (Western Pebble-mound Mouse, Ngadji)		P4	
131.	24237	<i>Pseudomys hermannsburgensis</i> (Sandy Inland Mouse)			
132.	24174	<i>Saccolaimus flaviventris</i> (Yellow-bellied Sheathtail-bat)			
133.	24200	<i>Scotorepens greyii</i> (Little Broad-nosed Bat)			
134.	24116	<i>Sminthopsis macroura</i> (Stripe-faced Dunnart)			
135.	24120	<i>Sminthopsis youngsoni</i> (Lesser Hairy-footed Dunnart)			
136.	24185	<i>Tadarida australis</i> (White-striped Freetail-bat)			
137.	24205	<i>Vespadelus finlaysoni</i> (Finlayson's Cave Bat)			
138.	24040	<i>Vulpes vulpes</i> (Red Fox)	Y		

Reptile

139.	30833	<i>Amphibolurus longirostris</i> (Long-nosed Dragon)			
140.	30893	<i>Cryptoblepharus buchananii</i>			
141.	25458	<i>Ctenophorus caudicinctus</i> (Ring-tailed Dragon)			
142.	24865	<i>Ctenophorus caudicinctus</i> subsp. <i>caudicinctus</i> (Ring-tailed Dragon)			
143.	25459	<i>Ctenophorus isolepis</i> (Crested Dragon, Military Dragon)			
144.	24875	<i>Ctenophorus isolepis</i> subsp. <i>gularis</i> (Central Military Dragon)			
145.	24876	<i>Ctenophorus isolepis</i> subsp. <i>isolepis</i> (Crested Dragon, Military Dragon)			
146.	24882	<i>Ctenophorus nuchalis</i> (Central Netted Dragon)			
147.	25025	<i>Ctenotus ariadnae</i>			
148.	25461	<i>Ctenotus brooksi</i>			
149.	25032	<i>Ctenotus calurus</i>			
150.	25037	<i>Ctenotus dux</i>			
151.	25041	<i>Ctenotus grandis</i> subsp. <i>grandis</i>			
152.	25044	<i>Ctenotus hanloni</i>			
153.	25045	<i>Ctenotus helenae</i>			
154.	25052	<i>Ctenotus leonhardii</i>			
155.	25057	<i>Ctenotus nasutus</i>			
156.	25064	<i>Ctenotus pantherinus</i> subsp. <i>ocellifer</i> (Leopard Ctenotus)			
157.	25066	<i>Ctenotus quattuordecimlineatus</i>			
158.	25090	<i>Cyclodomorphus melanops</i> subsp. <i>melanops</i> (Slender Blue-tongue)			
159.	24926	<i>Diplodactylus conspicillatus</i> (Fat-tailed Gecko)			
160.	24899	<i>Diporiphora valens</i> (Southern Pilbara Tree Dragon)			
161.	43381	<i>Eremiascincus pallidus</i> (Western Narrow-banded Skink, Narrow-banded Sand Swimmer)			
162.	24956	<i>Gehyra pilbara</i>			
163.	24957	<i>Gehyra purpurascens</i>			
164.	24959	<i>Gehyra variegata</i>			
165.	24961	<i>Heteronotia binoei</i> (Bynoe's Gecko)			
166.	30926	<i>Lerista amnicorum</i>			
167.	25125	<i>Lerista bipes</i>			
168.	25005	<i>Lialis burtonis</i>			
169.	25184	<i>Menetia greyii</i>			
170.	24904	<i>Moloch horridus</i> (Thorny Devil)			
171.	24966	<i>Nephurus laevis</i>			
172.	25263	<i>Pseudonaja modesta</i> (Ringed Brown Snake)			
173.	24982	<i>Rhynchoedura ornata</i> (Western Beaked Gecko)			

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
174.	24924	<i>Strophurus ciliaris</i> subsp. <i>aberrans</i>			
175.	24927	<i>Strophurus elderi</i>			
176.	25218	<i>Varanus gouldii</i> (Bungarra or Sand Monitor)			
177.	25526	<i>Varanus tristis</i> (Racehorse Monitor)			

Conservation Codes

T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

¹ For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.



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: 12/02/17 13:59:45

[Summary](#)

[Details](#)

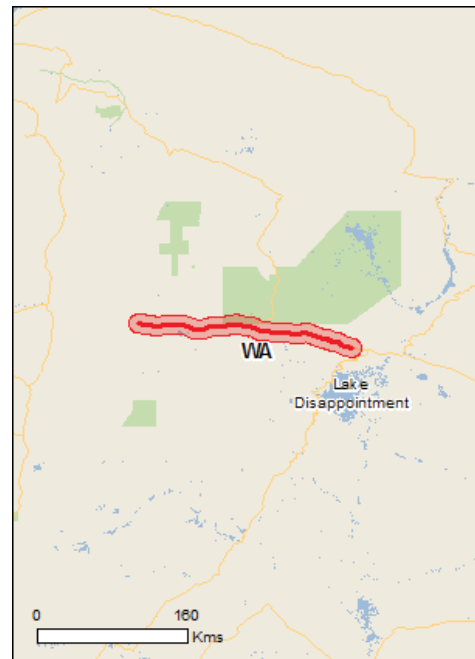
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

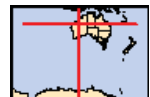
[Acknowledgements](#)



This map may contain data which are
©Commonwealth of Australia
(Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 10.0Km



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:	8
Listed Migratory Species:	6

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:	9
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:	10
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
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat likely to occur within area
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat known to occur within area
Mammals		
Dasyurus hallucatus Northern Quoll, Digul [331]	Endangered	Species or species habitat likely to occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat likely to occur within area
Rhinonictis aurantia (Pilbara form) Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Liopholis kintorei Great Desert Skink, Tjakura, Warrarna, Mulyamiji [83160]	Vulnerable	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		
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area

Migratory Wetlands Species

Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		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		
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 known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may 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
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Name	State
Karlamilyi	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 Resources 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
--	--

Mammals

Camelus dromedarius Dromedary, Camel [7]	Species or species habitat likely to occur within area
---	--

Canis lupus familiaris Domestic Dog [82654]	Species or species habitat likely to occur within area
--	--

Equus asinus Donkey, Ass [4]	Species or species habitat likely to occur within area
---------------------------------	--

Equus caballus Horse [5]	Species or species habitat likely to occur within area
-----------------------------	--

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

Name	Status	Type of Presence
Cenchrus ciliaris		
Buffel-grass, Black Buffel-grass [20213]		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

-22.82584 120.82256,-22.828305 120.831532,-22.830466 120.860705,-22.831197 120.885248,-22.835105 120.916213,-22.840146 120.94951,-22.846131 120.966567,-22.846363 121.004509,-22.845923 121.014958,-22.841472 121.080514,-22.838695 121.101324,-22.837318 121.117529,-22.835339 121.129386,-22.838464 121.148522,-22.838594 121.167314,-22.840235 121.174959,-22.840523 121.208955,-22.839481 121.247402,-22.843637 121.271687,-22.848281 121.284894,-22.856943 121.306153,-22.862884 121.318596,-22.877586 121.364345,-22.878426 121.376966,-22.876477 121.39189,-22.877096 121.400278,-22.875382 121.412198,-22.875622 121.415563,-22.877212 121.421266,-22.877136 121.43118,-22.874247 121.443528,-22.861501 121.488705,-22.861036 121.492727,-22.856594 121.509277,-22.857074 121.516139,-22.856407 121.522824,-22.856683 121.540487,-22.85482 121.547774,-22.852004 121.551914,-22.852711 121.557587,-22.84985 121.573109,-22.848366 121.588161,-22.847603 121.591386,-22.845968 121.593748,-22.847361 121.59779,-22.850229 121.601651,-22.851216 121.608224,-22.849807 121.625214,-22.853844 121.636412,-22.851603 121.642045,-22.850421 121.6531,-22.847943 121.656905,-22.839908 121.6789,-22.837073 121.684814,-22.83724 121.687725,-22.83917 121.694481,-22.839395 121.698966,-22.837185 121.72584,-22.836595 121.728821,-22.831058 121.742566,-22.831191 121.776719,-22.834965 121.791399,-22.841327 121.808511,-22.842678 121.817472,-22.845784 121.826398,-22.846095 121.840633,-22.847516 121.845143,-22.849056 121.847678,-22.856741 121.877763,-22.85236 121.887157,-22.850978 121.891721,-22.851571 121.901771,-22.85875 121.912205,-22.867169 121.940235,-22.878064 121.963458,-22.882366 121.970903,-22.890057 121.977852,-22.890245 121.98485,-22.891626 121.987737,-22.892832 121.994981,-22.895663 121.999576,-22.895664 122.013451,-22.888368 122.030987,-22.888109 122.038544,-22.886024 122.043926,-22.896893 122.080121,-22.899987 122.085742,-22.901657 122.095488,-22.90797 122.110662,-22.906488 122.127345,-22.90412 122.138169,-22.902456 122.157326,-22.900961 122.166313,-22.902234 122.172351,-22.900828 122.187512,-22.90296 122.195797,-22.904225 122.209034,-22.903951 122.221573,-22.904809 122.235793,-22.908984 122.260092,-22.91135 122.276038,-22.91386 122.287439,-22.914467 122.299975,-22.917829 122.324127,-22.919215 122.343817,-22.918785 122.366645,-22.916552 122.378265,-22.911626 122.392564,-22.911934 122.402823,-22.909118 122.432772,-22.913 122.449424,-22.920247 122.474177,-22.922211 122.478955,-22.92709 122.486731,-22.928469 122.491142,-22.929035 122.496613,-22.931945 122.50434,-22.93697 122.522275,-22.942316 122.53609,-22.950479 122.547022,-22.952986 122.553453,-22.958401 122.576252,-22.962108 122.588131,-22.962337 122.590036,-22.961528 122.591179,-22.960541 122.594099,-22.959961 122.600528,-22.961151 122.602618,-22.959871 122.607066,-22.957018 122.611839,-22.957604 122.620105,-22.958912 122.623279,-22.9594 122.629336,-22.962722 122.634781,-22.97375 122.644121,-22.977601 122.648365,-22.980976 122.661048,-22.979777 122.666982,-22.979263 122.675216,-22.984192 122.690826,-22.989829 122.705952,-22.990336 122.71576,-22.993811 122.73936,-22.997408 122.743954,-23.008518 122.765386,-23.015016 122.779274,-23.02363 122.792514,-23.028783 122.814354,-23.039356 122.86249

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.

APPENDIX C

Vertebrate Fauna Observed or Potentially in Study Area

Fauna Observed or Potentially Present

Compiled by Greg Harewood - Feb 2017

Recorded = X

Talawana Track Study Area - Lake Disappointment Potash Project

Oct 2012 - Field survey results from Harewood, G. (2012) .Targeted Fauna Survey Proposed Access Track, Camp Site and Borrow Pit, Lake Disappointment Potash Project.

May 2013 and Oct 2013 - Field survey results from Harewood, G. (2014) . Fauna Survey (Level 2) Phase 1 (May 2013) and Phase 2 (October 2013) Lake Disappointment Potash Project.

Oct 2016 - Field survey results from Harewood, G. (Pending) Fauna Survey (Level 2) Phase 1 Borefields, Lake Disappointment Potash Project.

DPaW (2017). NatureMap Database Search. "By Line" 122°49' 30" E, 23°16' 09" S – Study Area (plus 10km buffer). 12 Feb 2017.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Amphibia							
Myobatrachidae							
Ground or Burrowing Frogs							
<i>Neobatrachus aquilonius</i>	Northern Burrowing Frog	LC		X			
<i>Neobatrachus sutor</i>	Shoemaker Frog	LC		X			
<i>Notaden nichollsi</i>	Desert Spadefoot	LC		X	X		
<i>Platyplectrum spenceri</i>	Spencer's Burrowing Frog	LC					
<i>Uperoleia micromeles</i>	Tanami Toadlet	LC		X			X
Hylidae							
Tree or Water-Holding Frogs							
<i>Cyclorana longipes</i>	Long-footed Frog	LC					
<i>Cyclorana maini</i>	Main's Frog	LC		X			X
<i>Cyclorana platycephala</i>	Water-holding Frog	LC					
<i>Litoria rubella</i>	Little Red Tree Frog	LC					X

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
----------------------------	----------------	------------------------	-------------	-------------	-------------	-------------	--------------

Reptilia

Carphodactylidae

Knob-tailed Geckos

<i>Nephurus laevis</i>	Pale Knob-tail Gecko		X	X	X	X
------------------------	----------------------	--	---	---	---	---

<i>Nephurus levis</i>	Smooth Knob-tail Gecko			X		
-----------------------	------------------------	--	--	---	--	--

Diplodactylidae

Geckoes

<i>Crenadactylus ocellatus</i>	Clawless Gecko					
--------------------------------	----------------	--	--	--	--	--

<i>Diplodactylus conspicillatus</i>	Fat-tailed Gecko		X	X	X	X
-------------------------------------	------------------	--	---	---	---	---

<i>Lucasium stenodactylum</i>	Box-patterned Gecko		X	X	X	
-------------------------------	---------------------	--	---	---	---	--

<i>Rhynchoedura ornata</i>	Western Beaked Gecko		X	X	X	X
----------------------------	----------------------	--	---	---	---	---

<i>Strophurus ciliaris</i>	Northern Spiny-tailed Gecko		X	X	X	X
----------------------------	-----------------------------	--	---	---	---	---

<i>Strophurus elderi</i>	Jewelled Gecko		X	X	X	X
--------------------------	----------------	--	---	---	---	---

<i>Strophurus jeanae</i>	Southern Phasmid Gecko					
--------------------------	------------------------	--	--	--	--	--

Gekkonidae

Geckoes

<i>Gehyra pilbara</i>	Pilbara Dtella					X
-----------------------	----------------	--	--	--	--	---

<i>Gehyra purpurascens</i>	Purple Arid Dtella			X		X
----------------------------	--------------------	--	--	---	--	---

<i>Gehyra variegata</i>	Variegated Dtella		X	X	X	X
-------------------------	-------------------	--	---	---	---	---

<i>Heteronotia binoei</i>	Bynoe's Gecko		X	X	X	X
---------------------------	---------------	--	---	---	---	---

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Pygopodidae							
Legless Lizards							
<i>Delma butleri</i>	Unbanded Delma						
<i>Delma desmosa</i>	Desert Delma			X	X	X	
<i>Delma nasuta</i>	Long-nosed Delma				X	X	
<i>Lialis burtonis</i>	Burton's Legless Lizard			X	X	X	X
<i>Pygopus nigriceps</i>	Western Hooded Scaly-foot				X		
Agamidae							
Dragon Lizards							
<i>Ctenophorus isolepis</i>	Central Military Dragon		X	X	X	X	X
<i>Ctenophorus nuchalis</i>	Central Netted Dragon		X	X	X	X	X
<i>Diporiphora paraconvergens</i>	Grey-striped Western Desert Dragon		X	X	X	X	
<i>Gowidon longirostris</i>	Long-nosed Dragon		X	X	X	X	
<i>Moloch horridus</i>	Thorny Devil		X	X	X		X

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Varanidae							
Monitor's or Goanna's							
<i>Varanus acanthurus</i>	Spiny-tailed Monitor			X	X		
<i>Varanus brevicauda</i>	Short-tailed Pygmy Monitor			X	X		
<i>Varanus eremius</i>	Pygmy Desert Monitor			X	X	X	
<i>Varanus giganteus</i>	Perentie						
<i>Varanus gilleni</i>	Pygmy Mulga Monitor			X	X	X	
<i>Varanus gouldii</i>	Sand Goanna		X	X	X	X	X
<i>Varanus tristis</i>	Racehorse Goanna						X

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Scincidae Skinks							
<i>Carlia triacantha</i>	Desert Rainbow-skink						
<i>Ctenotus ariadnae</i>	Ariadna's Ctenotus						X
<i>Ctenotus brooksi</i>	Brook's Wedge-snouted Ctenotus			X	X	X	X
<i>Ctenotus calurus</i>	Blue-tailed Ctenotus					X	X
<i>Ctenotus dux</i>	Narrow-lined Ctenotus			X	X	X	X
<i>Ctenotus grandis</i>	Giant Desert Ctenotus			X			X
<i>Ctenotus hanloni</i>	Nimble Ctenotus						X
<i>Ctenotus helenae</i>	Dusky Ctenotus			X	X	X	X
<i>Ctenotus leae</i>	Orange-tailed Finesnout Ctenotus						
<i>Ctenotus leonhardii</i>	Leonhardi's Skink						X
<i>Ctenotus nasutus</i>	Long-snouted Ctenotus						X
<i>Ctenotus pantherinus</i>	Leopard Ctenotus		X	X	X	X	X
<i>Ctenotus piankai</i>	Pianka's Ctenotus			X	X	X	
<i>Ctenotus quattuordecimlineatus</i>	Fourteen-lined Ctenotus					X	X
<i>Ctenotus schomburgkii</i>	Barred Wedge-snout Ctenotus						

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
<i>Cyclodomorphus melanops melanops</i>	Spiniflex Slender Blue-tongue						
<i>Eremiascincus fasciolatus</i>	Narrow-banded Sand Swimmer			X	X	X	
<i>Eremiascincus richardsonii</i>	Broad-banded Sand Swimmer						
<i>Lerista bipes</i>	Western Two-toed Slider			X	X	X	X
<i>Lerista desertorum</i>	Central Deserts Robust Slider						
<i>Lerista ips</i>	Robust Worm-slider			X	X	X	
<i>Lerista macropisthopus remota</i>	Unpatterned Robust Lerista	P2			X	X	
<i>Lerista timida</i>	Shy Slider						
<i>Lerista vermicularis</i>	Slender Duneslider						
<i>Lerista xanthura</i>	Yellow-tailed Plain Slider			X	X		
<i>Liopholis inornata</i>	Desert Skink						
<i>Liopholis kintorei</i>	Great Desert Skink	S3 VU VU A1c					
<i>Liopholis striata</i>	Night Skink						
<i>Menetia greyii</i>	Common Dwarf Skink			X	X		X
<i>Morethia ruficauda</i>	Fire-tailed Skink				X	X	

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
<i>Notoscincus ornatus</i>	Ornate Snake-eyed Skink			X	X	X	
<i>Proablepharus reginae</i>	Spinifex Snake-eyed Skink						
<i>Tiliqua multifasciata</i>	Desert Blue Tongue Lizard			X		X	
Typhlopidae Blind Snakes							
<i>Ramphotyphlops endoterus</i>	Desert Blind Snake			X	X	X	
<i>Ramphotyphlops gryp</i>	Northern Beaked Blind Snake			X	X	X	
Boidae Pythons, Boas							
<i>Aspidites ramsayi</i>	Woma					X	

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Elapidae Elapid Snakes							
<i>Acanthophis pyrrhus</i>	Desert Death Adder						
<i>Brachyuropsis fasciolata</i>	Narrow-banded Shovel-nosed Snake					X	
<i>Demansia shinei</i>	Shine's Whipsnake						
<i>Furina ornata</i>	Moon Snake				X	X	
<i>Pseudechis australis</i>	Mulga Snake				X	X	X
<i>Pseudonaja mengdeni</i>	Gwardar				X		X
<i>Pseudonaja modesta</i>	Ringed Brown Snake				X		X
<i>Simoselaps anomalus</i>	Desert Banded Snake				X	X	
<i>Suta fasciata</i>	Rosen's Snake						

Aves

Casuariidae

Emus, Cassowaries

<i>Dromaius novaehollandiae</i>	Emu	LC					X
---------------------------------	-----	----	--	--	--	--	---

Phasianidae

Quails, Pheasants

<i>Coturnix pectoralis</i>	Stubble Quail	LC			X		
----------------------------	---------------	----	--	--	---	--	--

<i>Coturnix ypsilophora</i>	Brown Quail	LC					X
-----------------------------	-------------	----	--	--	--	--	---

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Accipitridae							
Kites, Goshawks, Eagles, Harriers							
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk	LC					
<i>Accipiter fasciatus</i>	Brown Goshawk	LC		X			X
<i>Aquila audax</i>	Wedge-tailed Eagle	LC		X			X
<i>Aquila morphnoides</i>	Little Eagle	LC		X			X
<i>Circus assimilis</i>	Spotted Harrier	LC		X	X		X
<i>Elanus caeruleus</i>	Black-shouldered Kite	LC	X	X	X		X
<i>Haliastur sphenurus</i>	Whistling Kite	LC		X			X
<i>Hamirostra isura</i>	Square-tailed Kite	LC		X			
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	LC		X			X
<i>Milvus migrans</i>	Black Kite	LC		X			X

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Falconidae Falcons							
<i>Falco berigora</i>	Brown Falcon	LC	X	X	X	X	X
<i>Falco cenchroides</i>	Australian Kestrel	LC		X	X	X	X
<i>Falco hypoleucos</i>	Grey Falcon	S3 VU D1					
<i>Falco longipennis</i>	Australian Hobby	LC		X			X
<i>Falco peregrinus</i>	Peregrine Falcon	S7 LC		X			X
<i>Falco subniger</i>	Black Falcon	LC		X	X		X
Otididae Bustards							
<i>Ardeotis australis</i>	Australian Bustard	LC	X	X	X	X	X
Turnicidae Button-quails							
<i>Turnix velox</i>	Little Button-quail	LC	X	X	X		X
Burhinidae Stone Curlews							
<i>Burhinus grallarius</i>	Bush Stone-curlew	LC					
Charadriidae Lapwings, Plovers, Dotterels							
<i>Vanellus tricolor</i>	Banded Lapwing	LC			X		

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Columbidae Pigeons, Doves							
<i>Geopelia cuneata</i>	Diamond Dove	LC		X	X	X	X
<i>Geophaps plumifera</i>	Spinifex Pigeon	LC					X
<i>Ocyphaps lophotes</i>	Crested Pigeon	LC		X	X	X	X
<i>Phaps chalcoptera</i>	Common Bronzewing	LC		X	X		X
Psittacidae Parrots							
<i>Cacatua roseicapilla</i>	Galah	LC	X	X	X	X	X
<i>Cacatua sanguinea</i>	Little Corella	LC				X	X
<i>Melopsittacus undulatus</i>	Budgerigar	LC		X	X	X	X
<i>Nymphicus hollandicus</i>	Cockatiel	LC		X	X	X	X
<i>Pezoporus occidentalis</i>	Night Parrot	S1 EN EN B2ab(iii)c(ii,iii,i					
<i>Platycercus zonarius</i>	Australian Ringneck	LC				X	
<i>Polytelis alexandrae</i>	Princess Parrot	P4 VU NT		X			

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Cuculidae Parasitic Cuckoos							
<i>Chrysococcyx basalis</i>	Horsfield's Bronze Cuckoo	LC					X
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo	LC					
<i>Cuculus pallidus</i>	Pallid Cuckoo	LC		X	X		
Strigidae Hawk Owls							
<i>Ninox novaeseelandiae</i>	Boobook Owl	LC	X	X			X
Tytonidae Barn Owls							
<i>Tyto alba</i>	Barn Owl	LC			X		X
Podargidae Frogmouths							
<i>Podargus strigoides</i>	Tawny Frogmouth	LC			X		X
Caprimulgidae Nightjars							
<i>Eurostopus argus</i>	Spotted Nightjar	LC			X	X	X
Aegothelidae Owlet-nightjars							
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar	LC			X		X
Halcyonidae Tree Kingfishers							
<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher	LC	X	X	X	X	X

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Meropidae Bee-eaters							
<i>Merops ornatus</i>	Rainbow Bee-eater	S5 Mig JA LC	X	X	X	X	X
Maluridae Fairy Wrens, GrassWrens							
<i>Amytornis striatus</i>	Striated Grasswren			X			
<i>Malurus lamberti</i>	Variegated Fairy-wren	LC		X	X	X	X
<i>Malurus leucopterus</i>	White-winged Fairy-wren	LC		X	X	X	X
<i>Stipiturus ruficeps</i>	Rufous-crowned Emu-wren	LC		X			
Acanthizidae Thornbills, Geryones, Fieldwrens & Whitefaces							
<i>Acanthiza apicalis</i>	Broad-tailed Thornbill	LC					
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill	LC					
<i>Aphelocephala nigricincta</i>	Banded Whiteface	LC					
<i>Calamanthus campestris</i>	Rufous Fieldwren	LC	X	X	X		X
<i>Gerygone fusca</i>	Western Gerygone	LC		X			X
<i>Smicromnis brevirostris</i>	Weebill	LC					X

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Pardalotidae							
Pardalotes							
<i>Pardalotus rubricatus</i>	Red-browed Pardalote	LC		X	X	X	X
<i>Pardalotus striatus</i>	Striated Pardalote	LC					X
Meliphagidae							
Honeyeaters, Chats							
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	LC		X	X		X
<i>Certhionyx niger</i>	Black Honeyeater	LC					
<i>Certhionyx variegatus</i>	Pied Honeyeater	LC		X	X	X	X
<i>Epthianura aurifrons</i>	Orange Chat	LC		X			
<i>Epthianura tricolor</i>	Crimson Chat	LC	X	X	X	X	X
<i>Lichenostomus keartlandi</i>	Grey-headed Honeyeater	LC	X	X			
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	LC		X	X	X	
<i>Lichenostomus virescens</i>	Singing Honeyeater	LC	X	X	X	X	
<i>Lichmera indistincta</i>	Brown Honeyeater	LC		X	X		X
<i>Manorina flavigula</i>	Yellow-throated Miner	LC	X	X	X	X	X
<i>Phylidonyris albifrons</i>	White-fronted Honeyeater	LC		X	X		

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Petroicidae Australian Robins							
<i>Petroica cucullata</i>	Hooded Robin	LC					
<i>Petroica goodenovii</i>	Red-capped Robin	LC		X	X		X
Cinclosomatidae Whipbirds, Wedgebills, Quail Thrushes							
<i>Cinclosoma castaneothorax</i>	Chestnut-breasted Quail-thrush	LC					X
<i>Psophodes occidentalis</i>	Western Wedgebill	LC					
Pachycephalidae Crested Shrike-tit, Crested Bellbird, Shrike Thrushes, Whistlers							
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	LC					
<i>Oreoica gutturalis</i>	Crested Bellbird	LC				X	X
<i>Pachycephala rufiventris</i>	Rufous Whistler	LC		X			X
Dicruridae Monarchs, Magpie Lark, Flycatchers, Fantails, Drongo							
<i>Grallina cyanoleuca</i>	Magpie-lark	LC		X	X	X	X
<i>Rhipidura fuliginosa</i>	Grey Fantail	LC		X			
<i>Rhipidura leucophrys</i>	Willie Wagtail	LC		X			X
Campephagidae Cuckoo-shrikes, Trillers							
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	LC	X	X	X	X	X
<i>Lalage tricolor</i>	White-winged Triller	LC		X	X	X	X

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Artamidae Woodswallows, Butcherbirds, Currawongs							
<i>Artamus cinereus</i>	Black-faced Woodswallow	LC		X	X	X	X
<i>Artamus minor</i>	Little Woodswallow	LC					X
<i>Artamus personatus</i>	Masked Woodswallow	LC	X	X			X
<i>Artamus superciliosus</i>	White-browed Woodswallow	LC					X
Cracticidae Currawongs, Magpies & Butcherbirds							
<i>Cracticus nigrogularis</i>	Pied Butcherbird	LC					X
<i>Cracticus tibicen</i>	Australian Magpie	LC				X	X
<i>Cracticus torquatus</i>	Grey Butcherbird	LC					X
Corvidae Ravens, Crows							
<i>Corvus bennetti</i>	Little Crow	LC					X
<i>Corvus orru</i>	Torresian Crow	LC		X	X	X	X
Ptilonorhynchidae Bowerbirds							
<i>Ptilonorhynchus guttatus</i>	Western Bowerbird			X			
Motacillidae Old World Pipits, Wagtails							
<i>Anthus australis</i>	Australian Pipit	LC	X	X	X	X	X

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Estrilidae Grass Finches & Mannikins							
<i>Taeniopygia guttata</i>	Zebra Finch	LC	X	X	X	X	X
Dicaeidae Flowerpeckers							
<i>Dicaeum hirundinaceum</i>	Mistletoebird	LC		X			X
Hirundinidae Swallows, Martins							
<i>Cheramoeca leucosternus</i>	White-backed Swallow	LC	X	X	X	X	X
<i>Hirundo ariel</i>	Fairy Martin	LC		X			
<i>Hirundo nigricans</i>	Tree Martin	LC		X			
Sylviidae Old World Warblers							
<i>Cincloramphus cruralis</i>	Brown Songlark	LC	X	X			X
<i>Cincloramphus mathewsi</i>	Rufous Songlark	LC		X		X	X
<i>Eremiornis carteri</i>	Spinifex-bird	LC	X				

Mammalia

Thylacomyidae

Bilbies

<i>Macrotis lagotis</i>	Greater Bilby	S3 VU VU C1					X
-------------------------	---------------	-------------	--	--	--	--	---

Tachyglossidae

Echidnas

<i>Tachyglossus aculeatus</i>	Echidna	LC					
-------------------------------	---------	----	--	--	--	--	--

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Dasyuridae Carnivorous Marsupials							
<i>Antechinomys laniger</i>	Kultarr	LC					
<i>Dasycercus blythi</i>	Brush-tailed Mulgara	P4 LC					
<i>Dasykaluta rosamondae</i>	Little Red Kaluta	LC		X	X		X
<i>Ningai ridei</i>	Wongai Ningai	LC		X	X		X
<i>Planigale sp.</i>	Planigale sp.	LC		X			
<i>Pseudantechinus roryi</i>	Rory's Pseudantechinus						
<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	LC		X	X		X
<i>Sminthopsis ooldea</i>	Ooldea Dunnart	LC					
<i>Sminthopsis youngsoni</i>	Lesser Hairy-footed Dunnart	LC		X	X	X	X
Notoryctidae Marsupial Moles							
<i>Notoryctes caurinus</i>	Northern Marsupial Mole	P4 LC		X	X		X
Macropodidae Kangaroos, Wallabies							
<i>Macopus rufus</i>	Red Kangaroo	LC			X		X

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Emballonuridae							
Sheath-tailed Bats							
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tailed Bat	LC		X			X
<i>Taphozous georgianus</i>	Common Sheath-tailed Bat	LC		X			
<i>Taphozous hilli</i>	Hill's Sheath-tail-bat	LC				X	
Molossidae							
Freetail Bats							
<i>Austronomus australis</i>	White-striped Free-tailed Bat	LC		X			X
<i>Chaerephon jobensis</i>	Greater Northern Free-tailed Bat	LC				X	
<i>Ozimops lumsdenae</i>	Northern Free-tailed Bat	LC				X	
Vespertilionidae							
Ordinary Bats							
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	LC		X	X	X	X
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	LC		X	X	X	X
<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat	LC					
<i>Scotorepens greyii</i>	Little Broad-nosed Bat			X	X	X	X
<i>Vespadelus finlaysoni</i>	Finlayson's Cave Bat	LC		X	X	X	X

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	Oct 2012	May 2013	Oct 2013	Oct 2016	DPaW 2017
Muridae Rats, Mice							
<i>Mus musculus</i>	House Mouse	Introduced		X	X		X
<i>Notomys alexis</i>	Spinifex Hopping-mouse	LC		X	X		X
<i>Pseudomys chapmani</i>	Western Pebble-mound Mouse	P4 LC					X
<i>Pseudomys desertor</i>	Desert Mouse	LC			X		
<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse	LC		X	X	X	X
Canidae Dogs, Foxes							
<i>Canis lupus dingo</i>	Dingo	LC	X	X	X		
<i>Vulpes vulpes</i>	Red Fox	Introduced	X	X	X		X
Felidae Cats							
<i>Felis catus</i>	Cat	Introduced	X	X	X		X
Bovidae Horned Ruminants							
<i>Bos taurus</i>	European Cattle	Introduced				X	
Camelidae Camels							
<i>Camelus dromedarius</i>	Camel	Introduced	X	X	X	X	X
Leporidae Rabbits, Hares							
<i>Oryctolagus cuniculus</i>	Rabbit	Introduced					

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DPaW Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

APPENDIX D

Species Profiles

Unpatterned Robust Lerista *Lerista macropisthopus remota*

Status: This sub-species of the unpatterned robust lerista is listed as Priority 2 by DPaW.

Regional distribution: Described as the “Robertson Range and Mundiwindi, areas east of Newman” (Storr *et al.* 1999) and the “central interior” (Wilson & Swan 2013).

Habitat: *Acacia* shrublands and woodlands. Forms shelter in loose soil under leaf litter at bases of shrubs (Wilson & Swan 2013).

Likely presence in study area: This species has not been detected within the Talawana Track study area, however eight individuals have been captured during the various surveys carried out within other sections of the Lake Disappointment project area to date (Harewood 2016, Harewood unpublished data). All specimens were capture in sand dune and sand plain habitats along or near the Willjabu Track.

The nearest other records are from near Jigalong (DPaW 2017b) and the Lake Disappointment observations appear to represent a significant range extension for the species eastwards, though it is probably widespread in the general area given the large extent of suitable habitat (i.e. sand dunes/sand plains).

Listed as a potential species based on currently available information

Potential impact of proposed road upgrade: Loss/modification of relatively small areas of potential habitat. The degree of likely impact is anticipated to be negligible/minor given the extent of clearing at any one location will be small and linear in nature and the fact that habitats within the study area are common and widespread in adjoining areas.

Great Desert Skink *Liopholis kintorei*

Status: This species is listed as Schedule 3 under the *WC Act* and as Vulnerable under the *EPBC Act*.

Regional distribution: The species appears to have occurred in widespread, but connected, populations in the past in the Great Sandy, Gibson, Great Victoria and Tanami Deserts in the eastern interior of WA and adjacent areas in south-western NT and northwestern SA (Cogger 2014).

The reported distribution (2001 estimate) consists of, but is probably not limited to, seven isolated populations. Three populations occur in WA at Patjarr (< 2500 individuals), near the Kiwirrkura community, including the vicinity of Lake Mackay (< 500 individuals), and in Rudal River NP (unknown population size). Populations also occur in the NT in the Tanami Desert, including Rabbit Flat, Sangster's Bore, The Granites and near Kintore, (< 2250 individuals); in Uluru - Kata Tjuta NP including part of the Yulara borefields (< 500 individuals); and in the Yulara lease lands

including part of the Yulara borefields (< 350 individuals). Only one population is known to persist in SA, near Watarru on the Anangu-Pitjantjatjara Lands (< 50 individuals) (McAlpin 2001).

Habitat: Arid sand flats and clay based loamy soils vegetated with spinifex (Wilson and Swan 2013). Found in a variety of desert habitats on sandy, clay and loamy soils (Cogger 2014). Sandplain vegetated by spinifex and scattered shrubs seems to be the habitat type most widely used (McAlpin, 2001). In the Tanami Desert and parts of the Great Sandy Desert they also inhabit paleodrainage lines characterised by giant termite mounds and titree (*Melaleuca* spp.) shrubs.

Likely presence in study area: No evidence of this species has been found within any section of the Lake Disappointment Project area to date despite some targeted surveys including the eastern section of the Talawana Track (Harewood 2012, Harewood 2016). There is however a record of a fresh burrow on the Talawana Track made during monitoring of plot sites for the Desert Rangelands Project carried out by the Martu people and reported in 2013 (exact date of observation unknown). This record is located directly adjacent to the Talawana Track about 2.1km west of the Willjabu Track intersection. The current status of this burrow is unknown as it has not been relocated.

The closest DPaW records within NatureMap (2017b) are from Lake Dora which is situated about ~100km north of the Talawana Track at its closest point.

Given that evidence of this species presence along the Talawana Track has been reported in the past and that habitat in some sections of the study area does appear at least superficially suitable (sand/loam plains) it must be assumed to potentially be present.

Listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: Loss/modification of relatively small areas of potential habitat. The degree of likely impact is anticipated to be negligible/minor given the extent of clearing at any one location will be small and linear in nature and the fact that habitats within the study area are common and widespread in adjoining areas.

Eastern Great Egret *Ardea alba (modesta)*

Status: This species of egret is listed as Schedule 5 under the *WC Act* and as Migratory under the *EPBC Act* including international agreements to which Australia is a signatory. The eastern great egret is not a threatened species and can be regarded as common over its main documented range.

Regional distribution: The eastern great egret is common and very widespread in Australia and can occur in any suitable permanent or temporary habitat within most areas (Morcombe 2004). In WA it is however rarely recorded in the arid eastern interior south of Lake Gregory or east of Lake Nabberu (Johnston and Storr 1998).

Habitat: Wetlands, flooded pasture, dams, estuarine mudflats, mangroves and reefs (Morcombe 2004).

Likely presence in study area: Very rarely recorded in this general area. While this species has some potential to utilise low lying areas in the region (e.g. lakes, claypans, creeks, dams and roadside ditches) subject to temporary inundation after significant rain events it is very unlikely to occur anywhere along the Talawana Track under normal circumstances.

Not listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: No impact on this species or its preferred habitat will occur.

Cattle Egret *Ardea ibis*

Status: This species of egret is listed as Schedule 5 under the *WC Act* and as Migratory under the *EPBC Act* including international agreements to which Australia is a signatory. The cattle egret is not a threatened species and can be regarded as common over its main documented range.

Regional distribution: Widespread from the Kimberley to coastal south east Australia. Mostly a winter spring migrant to southern areas (Pizzey and Knight 2012). In WA the cattle egret is relatively common in the northern sections of its range but is an irregular visitor to the better watered parts of the state (Johnstone and Storr 1998). The population is expanding (Morcombe 2004).

Habitat: Moist pastures with tall grasses, shallow open wetlands and margins, mudflats (Morcombe 2004).

Likely presence in study area: Very rarely recorded in this general area. While this species has some potential to utilise low lying areas in the region (e.g. lakes, claypans, creeks, dams and roadside ditches) subject to temporary inundation after significant rain events it is very unlikely to occur anywhere along the Talawana Track under normal circumstances.

Not listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: No impact on this species or its preferred habitat will occur.

Peregrine Falcon *Falco peregrinus*

Status: This species is listed as Schedule 7 under the *WC Act*.

Regional distribution: Individuals of this species are uncommon/rare but wide ranging across Australia. Moderately common at higher levels of the Stirling Range, uncommon in hilly, north

west Kimberley, Hamersley and Darling Ranges; rare or scarce elsewhere (Johnstone and Storr 1998).

Habitat: Diverse from rainforest to arid shrublands, from coastal heath to alpine (Morcombe 2004). Mainly about cliffs along coasts, rivers and ranges and about wooded watercourses and lakes (Johnstone and Storr 1998). The species utilises the ledges, cliff faces and large hollows/broken spouts of trees for nesting. It will also occasionally use the abandoned nests of other birds of prey. Also known to utilise the pit walls of decommissioned open cut mines for nesting.

Likely presence in study area: The peregrine falcon has not been recorded within the actual Lake Disappointment project area to date but was observed in the Durba Hills about 15km south west of the southern tip of the Lake during surveys undertaken in 2013 (Harewood 2016). The species potentially breeds in this location given the presence of near vertical rocky cliff lines. There are also DPaW records from the McKay Ranges and Karlamilyi National Park (Rudall River National Park) (DPaW 2017b). Individuals of this species may therefore utilise airspace over the Talawana Track as foraging habitat given they have large home ranges, though it can be expected to occur only very occasionally.

Listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: Loss/modification of relatively small areas of potential foraging habitat. The degree of likely impact is anticipated to be negligible given the extent of clearing at any one location will be small and linear in nature and the fact that habitats within the study area are common and widespread in adjoining areas.

Grey Falcon *Falco hypoleucos*

Status: Listed as Schedule 3 under the *WC Act*.

Regional distribution: Within WA found in the northern half south to about 26°S (Gascoyne, Lake Carnegie and Warburton), casual further south (Johnstone and Storr 1998).

Habitat: Lightly treed plains, gibber deserts, sand ridges, pastoral lands, timbered water courses but seldom in driest deserts (Pizzey & Knight 2012). It has a distribution centred around ephemeral or permanent drainage lines, utilising old nests of other bird species situated in the tallest trees along the river systems (Garnett and Crowley 2000).

Likely presence in study area: This species may frequent the general area but because it is rare and nomadic with a sparse distribution its frequency of occurrence would be very low. The denser woodland bordering McKay Creek represents potential breeding habitat.

Listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: Loss/modification of relatively small areas of potential foraging habitat. The degree of likely impact is anticipated to be negligible given the extent of

clearing at any one location will be small and linear in nature and the fact that habitats within the study area are common and widespread in adjoining areas.

Migratory Shorebirds/Waders

A small number of migratory shorebird species have previously been recorded in the wider area. Not all specific species are discussed in detail.

Status: Migratory shorebirds are listed as such under the *EPBC Act*, the *WC Act* (Schedule 5) and under international agreements to which Australia is a signatory. Some species are also listed as threatened under various state and federal categories, others are not.

Regional Distribution: All species are either widespread summer migrants to Australia or residents. Most migratory shorebirds have a distribution limited to coastal areas. Some do however frequent arid inland areas, typically after significant rainfall events temporarily flood inland salt lakes, claypans and other low lying areas.

Habitat: Varies between species but includes beaches and permanent/temporary wetlands varying from billabongs, swamps, lakes, floodplains, sewerage farms, saltwork ponds, estuaries, lagoons, mudflats sandbars, pastures, airfields, sports fields and lawns.

Likely presence in study area: There is no suitable habitat for migratory waders along the Talawana Track.

No migratory shorebirds are listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: No impact on migratory shorebirds or their preferred habitat will occur.

Oriental Plover *Charadrius veredus*

Status: The oriental plover is listed as Schedule 5 under the *WC Act* and as Migratory under the *EPBC Act* including international agreements to which Australia is a signatory. The oriental plover is not a threatened species and it can be regarded as common over its main documented range.

Regional Distribution: Breeds in Mongolia and Manchuria – regular summer migrant to Australia (September to March) (Pizzey & Knight 2012). Kimberley, north western interior (Lake Gregory) and north west coastal plains (south to tropic); casual or vagrant elsewhere (south to 32°15'S) (Johnstone and Storr 1998).

Habitat: The oriental plover is generally found inland; in open grasslands in arid and semi-arid zones; and less often in estuarine or littoral environments. This species prefers flat inland plains, sparsely vegetated short grass with hard bare ground including claypans, playing fields, lawns and cattle camps. The oriental plover may move to lightly-wooded grasslands with the onset of the wet season (Birdlife Australia 2017).

Likely presence in study area: There are no records of this species within several hundred kilometres of the study area (DPaW 2017b). While some habitat appears superficially suitable it is unlikely to be specifically attracted to the area and it is only likely to occur as a casual/vagrant on very rare occasions at best.

Not listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: No impact on this species or its preferred habitat is anticipated.

Princess Parrot *Polytelis alexandrae*

Status: This species is listed as Priority 4 by the DPaW and as Vulnerable under the *EPBC Act*.

Regional Distribution: Rare, highly nomadic (Pizzey & Knight 2012). Found in the eastern deserts north to the Edgar Ranges, west to the Gregory Range, Well 18, Mt Bates, Lake Throssell and Mt Luck and south to Queen Victoria Spring and Carlisle Lakes, casual further north (Fossil Downs, Bohemia Downs) and west (head of Gascoyne, head of the Murchison, Wiluna, Wanjarri, Sandstone, Laverton, Kookynie, Menzies, Kanowna). Also deserts of eastern Australia (Johnstone and Storr 1998).

Habitat: Arid shrubland, particularly mulga, Desert Oak and Spinifex country including trees along watercourses (Simpson and Day 2010). The princess parrot inhabits sand dunes and sand flats supporting open woodlands and shrublands that usually consist of scattered stands of *Eucalyptus* (including *E. gongylocarpa* and mallee species), *Casuarina* or *Allocasuarina* trees and an understorey of shrubs such as *Acacia* (especially *A. aneura*), *Senna*, *Eremophila*, *Grevillea*, *Hakea* and a ground cover dominated by *Triodia* species (DotEE 2017b).

Likely presence in study area: Four individuals of this species were observed flying overhead during the May 2013 survey in the vicinity of Lake Disappointment (Harewood 2016). The denser woodland bordering McKay Creek represents potential breeding habitat though it is not known if it is used for this purpose. The species may also frequent sections of the Talawana Track study area at times while in transit though it would not be specifically attracted to the area and given it is highly nomadic, its frequency of occurrence would be very low and generally temporary.

Listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: No impact on this species or its preferred habitat is anticipated.

Night Parrot *Pezoporus occidentalis*

Status: This species is listed as Schedule 1 under the *WC Act* and as Endangered under the *EPBC Act*.

Regional Distribution: Historical evidence indicates that night parrots were distributed over much of semi-arid and arid Australia (Garnett and Crowley 2000). Extremely secretive and hard to flush, in WA, up until recently, there were only three accepted records of night parrots since 1935, all from the Pilbara region (1979, 1980 and 2005; DotEE 2017). There have also been several targeted surveys in WA for the night parrot in the past, including unsuccessful searches in the Lake Disappointment area in 1987 (Davies *et al.* 1988) and others in the Western Desert and East Pilbara areas in Western Australia in 1996 (Blyth *et al.* 1997).

There have however been several recent records (one in March 2017) of the species in the vicinity of Lorna Glen Station/Lake Carnegie (~ 320km south of Lake Disappointment) (Hamilton *et al.* 2017).

Habitat: Preferred habitat is thought to be spinifex grasslands or samphire and chenopod shrublands on claypans, floodplains or the margins of salt lakes, creeks or other water bodies (Johnstone and Storr 1998; Higgins 1999; DotEE 2017). Roosting and nesting sites are consistently reported as within clumps of dense vegetation, primarily old and large Spinifex clumps, but sometimes other vegetation types (Higgins 1999, Murphy 2015).

Likely presence in study area: A night parrot survey using ARUs along the Talawana Track in June 2017 (Harewood 2017) found no evidence of the species despite the presence of what appears, at least superficially, to be suitable habitat (i.e. long unburnt spinifex). The species was however detected further south near lake Disappointment during the same survey period. Additional surveys aimed at determining the status of this site and the presence of the bird in other regional locations are now being undertaken.

Listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: Loss/modification of relatively small areas of potential habitat. The degree of likely impact on habitat is anticipated to be negligible/minor given the extent of clearing at any one location will be small and linear in nature and the fact that habitats within the study area are common and widespread in adjoining areas

Fork-tailed Swift *Apus pacificus*

Status: The fork-tailed swift is listed as Schedule 5 under the *WC Act* and as Migratory under the *EPBC Act* including international agreements to which Australia is a signatory. The fork-tailed swift is not a threatened species and it can be regarded as common over its main documented range.

Regional Distribution: Breeds in the Himalayas, Siberia, Japan and south east Asia (Pizzey and Knight 2012). A summer migrant (Oct-Apr) to Australia (Morcombe 2004). Common in the Kimberley, uncommon to moderately common near north west, west and south west coast, rare or scarce elsewhere (Johnstone and Storr 1998).

Habitat: Low to very high airspace over varied habitat from rainforest to semi desert (Morcombe 2004).

Likely presence in study area: Fork-tailed swifts are potentially a very occasional summer visitor to the study area but they are entirely aerial and largely independent of terrestrial habitats.

Not listed as a potential species given it would only occur very rarely and then only for short periods.

Potential impact of proposed road upgrade: No impact on this species or its preferred habitat will occur.

Barn Swallow *Hirundo rustica*

Status: The barn swallow is listed as Schedule 5 under the *WC Act* and as Migratory under the *EPBC Act* including international agreements to which Australia is a signatory. The barn swallow is not a threatened species and it can be regarded as common over its main documented range.

Regional Distribution: Widespread in northern hemisphere, winters in southern hemisphere. In Australia occurs from Kimberley to north east and south east Queensland. Vagrant elsewhere.

Habitat: Open country, agricultural land especially near water, rail yards towns and overhead wires (Pizzey and Knight 2012).

Not listed as a potential species given it would only occur very rarely and then only for short periods.

Potential impact of proposed road upgrade: No impact on this species or its preferred habitat will occur.

Rainbow Bee-eater *Merops ornatus*

Status: This species is listed as Schedule 5 under the *WC Act* and as Migratory under the *EPBC Act* including international agreements to which Australia is a signatory. The rainbow bee-eater is not a threatened species and it can be regarded as common over its main documented range.

Regional Distribution: The rainbow bee-eater is a breeding resident in northern Australia and summer breeding migrant to southern Australia (Pizzey and Knight 2012).

Habitat: Open country, of woodlands, open forest, semi arid scrub, grasslands, clearings in heavier forest, farmlands (Morcombe 2004). Breeds underground in areas of suitable soft soil firm enough to support tunnel building. Nest is a burrow usually dug at a slight angle in flat ground, sometimes into sandy banks or cuttings and often on margins of roads and tracks (Johnstone and Storr 1998).

Likely presence in study area: The rainbow bee-eater has been observed numerous times within the Lake Disappointment project area with most sightings being at or very near McKay Creek. It has also been observed breeding in this area (Harewood 2016, Harewood unpublished data). It may be resident in the area all year round. It has been recorded along the Talwana Track and is likely to utilise various areas for foraging, roosting and possibly breeding.

Listed as a potential species based on currently available information

Potential impact of proposed road upgrade: Loss/modification of relatively small areas of potential habitat. The degree of likely impact is anticipated to be negligible/minor given the extent of clearing at any one location will be small and linear in nature and the fact that habitats within the study area are common and widespread in adjoining areas.

Striated Grasswren (sandplain) *Amytornis striatus striatus*

Status: This sub-species is listed as Priority 4 by DPaW.

Regional distribution: Found in the eastern deserts between lats.20° and 28°39'S (north to Sahara Track and Well 48 and including much of Great Sandy, Gibson and Great Victoria Deserts), west to Eriston and south to 39 km ENE of Laverton, 27 km S of Neale Junction and the Serpentine Lakes, with an apparently isolated population between Meekatharra and Wiluna and another near Queen Victoria Spring (Johnstone and Storr 1998).

Habitat: Mainly spinifex, with or without low shrubs (especially *Thryptomene maisonneuvei*) and herbage, on sandy or loamy plains; also bushy acacias (especially *A. ligulata* and *A. aneura*) on sandridges and interdunes, usually with spinifex (Johnstone and Storr 1998).

Likely presence in study area: Striated grasswrens were recorded during the May 2013 survey a few kilometres north of Lake Disappointment near the Willjabu Track. This record is based on calls only and is therefore somewhat tentative (Harewood 2016). NatureMap shows only three nearby specimens, all collected in 1966 east of Georgia Bore on the CSR (DPaW 2017b), with no records of this subspecies west of here. Based on this information this species is considered unlikely to occur with the Talawana Track study area.

Not listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: No impact on this species or its preferred habitat is anticipated.

Grey Wagtail *Motacilla cinerea*

Status: The grey wagtail is listed as Schedule 5 under the *WC Act* and as Migratory under the *EPBC Act* including international agreements to which Australia is a signatory. The grey wagtail is not a threatened species and it can be regarded as common over its main documented range.

Regional distribution: A rarely recorded, accidental vagrant that has on a few occasions been recorded on widely separated parts of the Australian coastline (Pizzey & Knight 2012).

Habitat: In Australia, near running water in disused quarries, sandy, rocky streams in escarpments and rainforest, sewerage ponds, ploughed fields and airfields (Pizzey & Knight 2012).

Likely presence in study area: This species preferred habitat is absent from the study area and under normal circumstances it would not occur.

Not listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: No impact on this species or its preferred habitat will occur.

Yellow Wagtail *Motacilla flava*

Status: The yellow wagtail is listed as Schedule 5 under the *WC Act* and as Migratory under the *EPBC Act* including international agreements to which Australia is a signatory. The yellow wagtail is not a threatened species and it can be regarded as common over its main documented range.

Regional distribution: A regular summer migrant to mostly coastal northern Australia, vagrant in southern Australia (Pizzey & Knight 2012).

Habitat: Habitat requirements for the yellow wagtail are highly variable, but typically include open grassy flats near water. Other preferred habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes and sewage farms. They also sometimes utilise tidal mudflats and edges of mangroves (Pizzey & Knight 2012).

Likely presence in study area: This species preferred habitat is absent from the study area and under normal circumstances it would not occur.

Not listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: No impact on this species or its preferred habitat will occur.

Brush-tailed Mulgara *Dasycercus blythi*

Status: Listed as Priority 4 by the DPaW.

Regional distribution: Distributed widely across central and inland Australia broadly bounded by the Tanami Desert in the north, Simpson Desert in the east, Great Victoria Desert in the south and the Carnarvon, Murchison and Pilbara regions in the west (Woinarski *et al.* 2014).

Habitat: The brush-tailed mulgara occurs in a range of vegetation types including hummock grass plains, sand ridges and mulga shrubland on loamy sand, however, the principal habitat is mature hummock grasslands of spinifex, especially *Triodia basedowii* and *T. pungens* where it lives in burrows that it digs on the flats between low sand dunes (Van Dyck & Strahan 2008). The location of brush-tailed mulgara colonies may be influenced by the presence of better watered areas such as paleo-drainage systems or drainage lines in sand plain or sand dune habitats (Masters *et al.* 2003).

Likely presence in study area: No evidence of Mulgara was found during the targeted survey carried out along a section of the Talawana Track in October 2012 (Harewood 2012) or during subsequent surveys to the south (Harewood 2016). There are however several records from the Talawana Track and nearby areas (DPaW 2017b, Desert Rangelands Project 2013 – DPaW unpublished data) and it must therefore be regarded as a potential species where ever suitable habitat (e.g. sand plains and sand ridges) is present.

Listed as a potential species based on currently available information

Potential impact of proposed road upgrade: Loss/modification of relatively small areas of potential habitat. The degree of likely impact is anticipated to be negligible/minor given the extent of clearing at any one location will be small and linear in nature and the fact that habitats within the study area are common and widespread in adjoining areas.

Northern Quoll *Dasyurus hallucatus*

Status: The northern quoll is listed as Schedule 3 under the *WC Act* and as Endangered under the *EPBC Act*.

Regional distribution: The northern quoll's former range extended over most of northern Australia particularly in higher rainfall and more rugged areas (Woinarski *et al.* 2014). A 75% reduction in habitat range occurred during the 20th century, so that the species is now restricted to the Pilbara and north Kimberley in Western Australia and a few discrete populations across the Northern Territory and eastern Queensland (Braithwaite and Griffiths 1994). The Pilbara populations may now be largely isolated (How *et al.* 2009).

In Western Australia the northern quoll has been recorded from many areas in the Kimberley, and several areas in the Pilbara, including the lower reaches of the Fortescue River (King 1989); Wittenoom Gorge (in the early 1990s); and banded ironstone ranges north-east of Marble Bar (WA Department of Environment and Conservation unpublished data).

Northern quolls also occur on a number of offshore islands in Western Australia (Adolphus, Augustus, Bigge, Boongaree, Capstan, Dolphin, Hidden, Koolan, Purrungku, Uwins and Wollaston: (Kendrick 2007).

An apparently isolated population of the northern quoll was confirmed within the Throssell and Broadhurst Ranges of the Karlamilyi National Park (Rudall River NP) in 2013. Evidence of the

species was recorded from two distinct locations of similar habitat: deep dissected rocky gorges containing caves and permanent waterholes. One individual was photographed by a motion-sensitive camera and several scats were collected, with mitochondrial DNA analysis confirming the identification. At the time these records were a significant range extension (~200 km) and due to habitat restrictions are likely to represent the very eastern extreme of the species' range (Turpin and Bamford 2014).

More recently (2014, 2015 and 2016) DPaW have obtained additional evidence of the species presence in the ranges making up the western half of the park in the form of motion sensing camera pictures, scats and a single live specimen (DpaW 2017b, <http://www.abc.net.au/news/2016-09-09/>).

Habitat: Northern quolls do not have highly specific habitat requirements and they can occur in a variety of habitats across their range. It is however known that important areas for northern quoll, consistent across its range, are the rocky hills, scree slopes and river systems/creek lines which have larger hollow bearing trees. Northern quolls do not need permanent water, but are often found in association with it, probably due to the increase abundance of prey. Other areas surrounding the above mentioned “important” habitats including open spinifex meadows, gibber plains, hill systems and similar landforms that provide foraging habitat and are also necessary for survival (Thompson 2010).

Refuge from fire and predation are critical to the survival of individual Northern Quolls (Thompson 2010). Documented daytime refuge sites (“dens”) included burrows, termite mounds, hollow logs, hollow trees, crevices and caves (Menkhorst & Knight 2011).

Likely presence in study area: There are no documented records of the northern quoll occurring south of the ranges making up much of the western most part of the Karlamilyi National Park. While evidence of northern quolls has been found about 30km north of the Talawana Track in a section of the ranges (DPaW 2017b) it is considered unlikely that quolls would under normal circumstances venture southwards out of this area given that habitat appears largely unsuitable or at best very marginal for them to utilise on a permanent basis.

Not listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: No impact on this species or its preferred habitat will occur.

Northern Marsupial Mole *Notoryctes caurinus*

Status: This species is listed as Priority 4 by DPaW.

Regional distribution: The distribution of the northern marsupial mole is known from scattered records throughout the sandy deserts of inland Australia including the Great Sandy, Little Sandy, Gibson, Tanami, Great Victoria and western Simpson Deserts. Most of these records derive from

specimens or traditional information provided by Aboriginal people to collectors (Benshemesh 2003).

Habitat: Very little is known about the habitat requirements of marsupial moles. They are most often recorded in sandy dunes habitats supporting various acacias and other shrubs and often but not always in association with spinifex. Such habitat is widespread in and typical of the sandy deserts. Marsupial moles may also occur in some sandy plains, and might also occupy sandy river flats, especially in areas where aeolian dunes also occur. Marsupial moles are not capable of travelling far across hard ground and continuity of suitable habitat is likely to be important for the occurrence of marsupial moles in an area (Benshemesh & Mann 2009).

Likely presence in study area: Evidence of the northern marsupial mole has been found during all fauna surveys carried out and reported on to date (Harewood 2012, 2015 and 2016). These results suggest that the species is very likely to be widespread and relatively common in dunes systems through the wider area. Suitable habitat along the Talawana track is however limited in extent and its presence in these areas is yet to be confirmed but it is considered likely that they occur wherever suitable habitat occurs (i.e. sand dunes).

Listed as a potential species based on currently available information

Potential impact of proposed road upgrade: Loss/modification of relatively small areas of potential habitat. The degree of likely impact is anticipated to be negligible given the extent of clearing at any one location will be small and linear in nature and the fact that habitats within the study area are common and widespread in adjoining areas.

Greater Bilby *Macrotis lagotis*

Status: The greater bilby is listed as Schedule 3 under the *WC Act* and as Vulnerable under the *EPBC Act*.

Regional distribution: The greater bilby formerly occurred over 70% of arid and semi-arid mainland Australia south of Latitude 18°S. Its range has however declined northwards and the decline is continuing. In WA wild subpopulations are now restricted predominately to the Tanami, Gibson, Little Sandy and Great Sandy Deserts, and parts of the Pilbara with a patchy population near Broome on the Dampier Peninsula (Wornarski *et al.* 2014).

Habitat: Three major vegetation types have been found to support this species: open tussock grassland (both grasses and forbs) growing on uplands and hills; mulga woodland/shrubland (both pure mulga and mixed stands of mulga/witchetty bush) growing on ridges and rises; and hummock grassland growing on sand plains and dunes, drainage systems, salt lake systems and other alluvial areas. Current habitat includes *Acacia* shrublands, spinifex and hummock grassland (Menkhorst and Knight 2011). Mitchell grass and stony downs country if cracking clay, also desert sand plains and dune fields sometimes with spinifex hummock grassland and acacia shrubland (Van Dyck *et al.* 2013).

Likely presence in study area: This species was the subject of a targeted survey along the eastern section of the Talawana Track study area prior to the construction of the Willjabu Track (Harewood 2012) and additional searches during the subsequent fauna surveys in the south, with no evidence of its presence being found (Harewood 2016, Harewood unpublished data).

One individual was however observed crossing the Talawana Track at night time (Dan Tenardi pers. comms. 2016) and there are a small number of records from nearby areas (Desert Rangelands Project 2013 – DPaW unpublished data) and it must therefore be regarded as a potential species, though it would appear, based on the overall records in this general area, to be uncommon at best.

Listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: Loss/modification of relatively small areas of potential habitat. The degree of likely impact is anticipated to be negligible/minor given the extent of clearing at any one location will be small and linear in nature and the fact that habitats within the study area are common and widespread in adjoining areas.

Pilbara Leaf-nosed Bat *Rhinonicteris aurantius*

Status: The Pilbara leaf-nose bat is listed as Schedule 3 under the *WC Act* and as Vulnerable under the *EPBC Act*.

Regional distribution: The Pilbara leaf-nose bat is found throughout the Pilbara region of WA and further south to Barlee Range in the adjacent Gascoyne region. Available distribution data suggests three geographically defined subpopulations: in the mines of the eastern Pilbara; scattered throughout the Hamersley Range and northern Gascoyne (Wornarski *et al.* 2014). This includes confirmed roosts at Bamboo Creek mine, Copper Hills mine, Klondyke Queen mine, Lalla Rookh mine and one cave in the Barlee Range; and 16 other likely permanent occurrences. Locations are defined as sites that support a colony, such as a cave or mine (Armstrong 2003).

Recently (October 2016) the species has been recorded within the Karlamilyi National Park at Desert Queens Baths (Bullen and Harewood 2016). This represents a range extension of about 100 km east of the previously accepted range for the species and is the first “live” record from the Little Sandy Desert.

Habitat: During the dry season this species roosts in caves and mine adits with stable, warm and humid microclimates. It is thought that forest areas can be used in the wet season if conditions are hot and humid (Churchill 2008).

Likely presence in study area: There are no documented records of the Pilbara leaf-nose bat occurring south of the ranges making up much of the western most part of the Karlamilyi National Park where it has only recently been recorded (Bullen and Harewood 2016) at a location 50km north of the Talawana Track.

Additional bat surveys undertaken in the McKay Ranges, McKay Creek, along the Talawana Track, south along the Willjabu Track and at Durba Springs (Harewood 2017) have failed to detect the species. The Talawana Track study area also lacks suitable primary roost habitat for the species (i.e. caves and mine adits). These observations suggest that the species would be unlikely, under normal circumstances, to frequent the Talawana Track study area.

Not listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: No impact on this species or its preferred habitat will occur.

Ghost Bat *Macroderma gigas*

Status and Distribution: The ghost bat is listed as Schedule 3 under the *WC Act* and as Vulnerable under the *EPBC Act*.

Regional distribution: Previously distributed across most of inland and northern Australia, this species is now restricted to the north of the continent from the arid Pilbara to rainforests of north Queensland (Churchill 2008, Van Dyck and Strahan 2008). Armstrong and Anstee (2000), in their summary of the geographic distribution of *M. gigas* in the Pilbara, reported that they had been present in the Abydos Plain, Chichester Plateau, Gascoyne Range, George Range, Hamersley Plateau and Oakover Valley.

Habitat: Requires undisturbed caves, rock piles and mine shafts for roosting. They forage for food over a wide range of habitats including arid spinifex hillsides, black soil grasslands, monsoon forest, open savannah woodland, tall open forest, deciduous vine forest and tropical rainforest (Churchill 2008). Its preferred habitat in the Hamersley Range is caves beneath bluffs of low rounded hills composed of Marra Mamba geology and granite rock piles in the eastern Pilbara (Armstrong and Anstee 2000).

Likely presence in study area: The closest most recent documented records of the ghost bat to the Talawana Track are from Telfer, ~150km north (dated 2015 – DPaW 2017b). Recent (2013 to 2016) bat surveys in the Karlamilyi National Park, McKay Ranges, McKay Creek, along the Talawana Track, south along the Willjabu Track and at Durba Springs have failed to detect the species (Harewood 2017). The Talawana Track study area also lacks suitable primary roost habitat for the species (i.e. caves, rock piles and mine shafts). These results suggest that the species would be unlikely, under normal circumstances, to frequent the Talawana Track study area.

Not listed as a potential species based on currently available information.

Potential impact of proposed road upgrade: No impact on this species or its preferred habitat will occur.

Western Pebble-mound Mouse *Pseudomys chapmani*

Status: This species is listed as Priority 4 by DPaW.

Regional distribution: *P. chapmani* is endemic to WA. Its current range extends from the ranges of the central and southern Pilbara to the ranges of the Little Sandy Desert. Suitable habitat for western pebble-mice is common but patchily distributed in the Pilbara bioregion. The persistence of abandoned mounds in the Gascoyne region, Murchison regions and isolated coastal ranges in the Pilbara indicates considerable decline in range. This decline has been attributed to foxes and exotic herbivores and possibly other factors.

Habitat: Found on stony hillsides with hummock grassland (Menkhorst & Knight 2011) often with a sparse overstorey of eucalypts and scattered shrubs (Van Dyck and Strahan 2008) and often close to narrow bands of *Acacia* dominated scrub along incised drainage lines (Start 2008). The species is well-known for the characteristic pebble-mounds which it constructs over underground burrow systems. These mounds are most common on spurs and lower slopes of rocky hills (Morris & Burbidge, 2008).

Likely presence in study area: Historical records (1980 – individuals, 1994 - mounds) of this species exist for the McKay Range, just south of the Talawana Track (DBCA 2017b), these being at the extreme south eastern limit of the species known range in this area. The Talawana Track passes through some low rocky hillsides that extend northwards from the McKay Range and these areas may represent suitable habitat for the species. The current status of the species in this area is however unknown, though no evidence of the species was observed during a survey along the track in these locations in 2012 and 2017 (Harewood 2012, 2017). The species is very likely to be locally extinct however it must be assumed to be present, unless confirmed otherwise.

Listed as a potential species based on currently available information

Potential impact of proposed road upgrade: Loss/modification of relatively small areas of potential habitat. The degree of likely impact is anticipated to be negligible/minor given the extent of clearing at any one location will be small and linear in nature and the fact that habitats within the study area are common and widespread in adjoining areas.

DISCLAIMER

This fauna assessment report (“the report”) has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Greg Harewood (“the Author”). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints. In accordance with the scope of services, the Author has relied upon the data and has conducted environmental field monitoring and/or testing in the preparation of the report. The nature and extent of monitoring and/or testing conducted is described in the report.

The conclusions are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of preparing the report. Also it should be recognised that site conditions, can change with time.

Within the limitations imposed by the scope of services, the field assessment and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

In preparing the report, the Author has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report (“the data”). Except as otherwise stated in the report, the Author has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (“conclusions”) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. The Author will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to the Author.

The report has been prepared for the benefit of the Client and no other party. The Author assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of the Author or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

The Author will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.