

Newman Water Pipeline Enhancement Project: Desktop Fauna Survey

*Providing sustainable environmental strategies,
management and monitoring solutions
to industry and government.*




ecologia
ENVIRONMENT

**Newman Water Pipeline
Enhancement Project:
Desktop Fauna Survey**



6 August 2008

Document Status						
Rev No.	Author	Reviewer/s	Date	Approved for Issue		
				Name	Distributed To	Date
1	S. Pynt	D.Cancilla	01.04.08	C. Cox	F. Rigden, MPDJV	03.04.08
2.	S. Pynt	V. Cartledge S. Ford	30.06.08	S. Ford	F. Rigden E. Tomich M. Gale M. Forward	30.06.08
3	S. Pynt	S. Ford	04.08.08	S. Ford	F. Rigden	06.08.08

ecologia Environment (2008). Reproduction of this report in whole or in part by electronic, mechanical or chemical means including photocopying, recording or by any information storage and retrieval system, in any language, is strictly prohibited without the express approval of BHPBIO or *ecologia Environment*.

Restrictions on Use

This report has been prepared specifically for BHPBIO. Neither the report nor its contents may be referred to or quoted in any statement, study, report, application, prospectus, loan, or other agreement document, without the express approval of BHPBIO and/or *ecologia Environment*.



ecologia Environment
 1025 Wellington Street
 WEST PERTH WA 6005
 Phone: 08 9322 1944
 Fax: 08 9322 1599
 Email: admin@ecologia.com.au

Table of Contents

Executive Summary	iv
1.0 INTRODUCTION.....	1
1.1 PROJECT OVERVIEW	1
1.2 LOCATION	1
1.3 SURVEY OBJECTIVES	1
1.4 LEGISLATIVE FRAMEWORK.....	4
1.5 STATUTORY FRAMEWORK.....	5
1.6 PREVIOUS BIOLOGICAL SURVEYS.....	7
2.0 BIOPHYSICAL ENVIRONMENT	7
2.1 CLIMATE.....	7
2.2 BIOGEOGRAPHY	8
2.3 LAND SYSTEMS.....	9
3.0 SURVEY METHODS.....	11
3.1 LITERATURE REVIEW AND DATABASE SEARCHES	11
3.2 IMPACT RISK ASSESSMENT	11
4.0 RESULTS.....	12
4.1 FAUNA HABITAT	12
4.2 POTENTIALLY OCCURRING FAUNA	13
4.2.1 Native Mammals	13
4.2.2 Birds.....	13
4.2.3 Reptiles.....	14
4.2.4 Amphibians	14
4.2.5 Introduced Species	14
5.0 CONSERVATION SIGNIFICANT FAUNA.....	15
6.0 IMPACT ASSESSMENT	18
6.1 IMPACTS ON FAUNAL ASSEMBLAGES	18
6.2 IMPACTS TO ECOLOGICAL FUNCTION AND BIODIVERSITY	19
6.3 POTENTIAL IMPACTS TO FAUNA SPECIES OF CONSERVATION SIGNIFICANCE	20
6.3.1 Rainbow Bee-eater (<i>Merops ornatus</i>) – EPBC Migratory	20
6.3.2 Western Pebble-mound mouse (<i>Pseudomys chapmani</i>) – DEC Priority 4	20
6.3.3 Unnamed blind-snake (<i>Ramphotyphlops ganeï</i>) – DEC Priority 1	20
6.3.4 Pilbara Olive Python (<i>Liasis olivaceus barroni</i>) – EPBC Vulnerable, WCA Schedule 1	20
7.0 REFERENCES.....	22

Tables

Table 1.1	Definitions of relevant categories under the EPBC Act.....	5
Table 1.2	Definition of Schedules under the WC Act.....	6
Table 1.3	Definition of DEC Priority Codes.....	6
Table 2.1	Land systems occurring within the Newman Pipeline Project area	10
Table 4.1	Summary of the four major fauna habitats of the project area and representative photos (taken by <i>ecologia</i> flora consultants during a Level 1 survey of the project area).	12
Table 5.1	Conservation significant fauna potentially occurring in the study area.	15

Figures

Figure 1.1	The Project Area	3
Figure 2.1:	Summary of climatic data between 1956 - 2003 from Newman weather station (Bureau of Meteorology, 2008).....	8
Figure 2.2	Hamersley subregion (PIL-3) according to IBRA v6.1.	9

Appendices

APPENDIX A	REGIONAL FAUNA DATA.....	23
APPENDIX B	RESULTS OF DEC DATABASE SEARCH.....	37
APPENDIX C	RISK ASSESSMENT	41

1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

ecologia Environment (*ecologia*) was commissioned by BHP Billiton Iron Ore (BHPBIO) to undertake a Desktop Fauna Survey of the impact footprint for the Newman water supply project. The aim of this study was to provide an assessment of the vertebrate fauna assemblage and fauna habitats potentially occurring within the project footprint and to assess the potential risks to any conservation significant fauna (Figure 1.1).

BHPBIO proposes to construct a new water pipeline linking the existing pipeline systems surrounding the town of Newman in Western Australia to meet the future process water demands for the Newman Hub projects. BHPBIO also intends to replace selected sections of the existing pipelines.

The project area covers approximately 762 ha in total, comprising one new pipeline corridor of which the alignment covers 400 ha and the existing sections of the K and E-Lines covering approximately 301 ha.

1.2 LOCATION

The project area surrounds the town of Newman in WA, which is situated approximately 1050 km NNE of Perth, in the Hamersley subregion of the Pilbara bioregion.

1.3 SURVEY OBJECTIVES

ecologia's objectives are aligned with those specified in the Environmental Protection Authority's (EPA) Guidance Statement No. 56, and are detailed below:

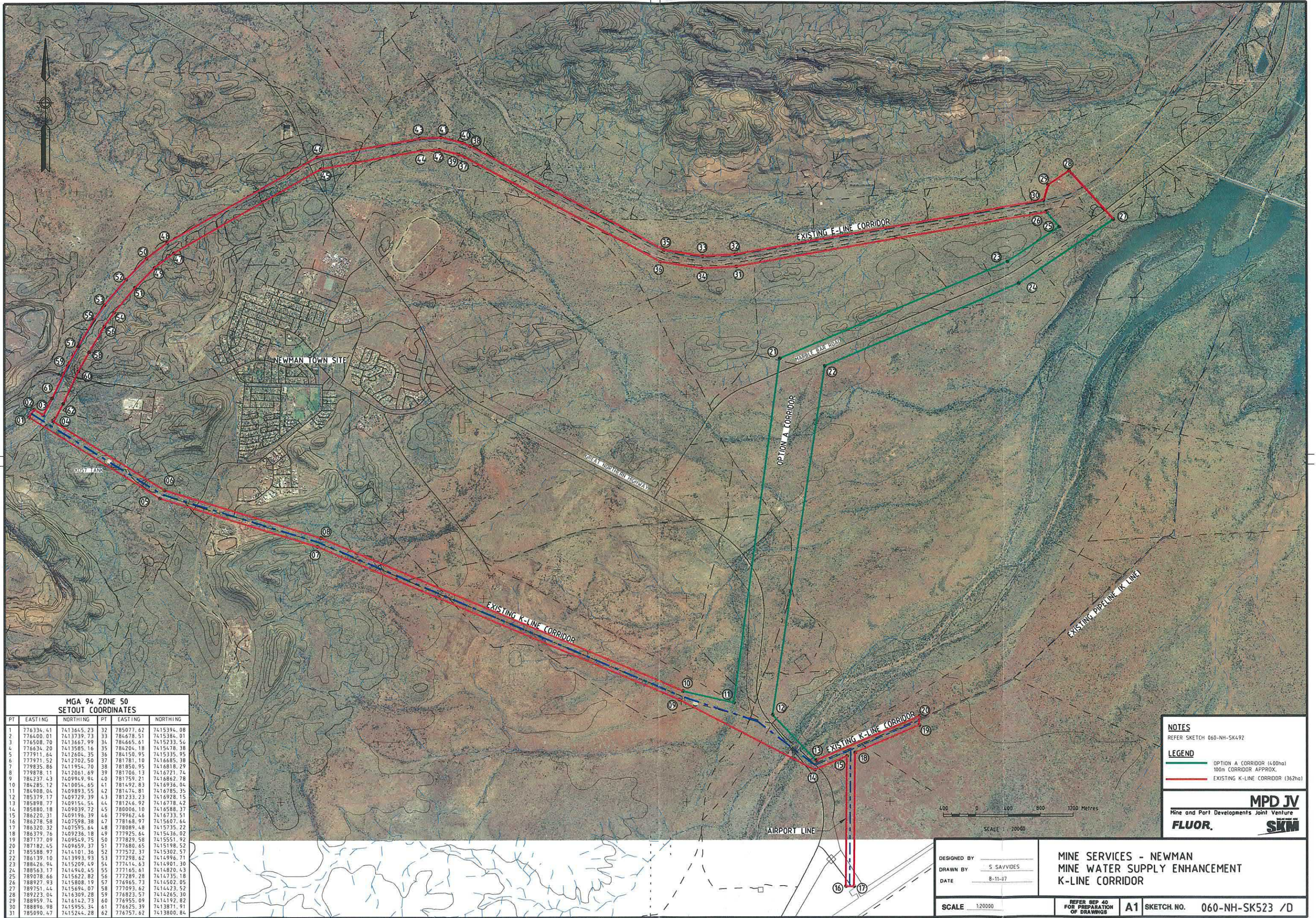
- To maintain the abundance, species diversity and geographical distribution of terrestrial fauna; and
- To protect specially protected (threatened) fauna, consistent with the provisions of the *Wildlife Conservation Act 1950*.

The primary aim of this study was to provide sufficient information to enable an assessment of the potential impact of the project on the vertebrate fauna of the area, ensuring that these objectives are upheld.

ecologia undertook a survey that satisfies the requirements documented in the EPA's Guidance Statement No. 56 and Position Statement No. 3, providing:

- A review of background information (including literature and database searches);
- An inventory of vertebrate fauna species occurring in the study areas, incorporating recent published and unpublished records;
- An inventory of species of biological and conservation significance recorded or likely to occur within the project areas and surrounds;
- A description of fauna habitats occurring in the study areas;

- A description of the characteristics of the faunal assemblage;
- An appraisal of the current knowledge-base for the area, including a review of previous surveys conducted in the area which are relevant to the current study;
- A review of regional and biogeographical significance, including the conservation status of species potentially occurring in the project areas;
- A risk assessment to determine likely impacts of threatening processes on vertebrate fauna within the study areas; and
- Assessment of the information found against Clearing Principle B.



MGA 94 ZONE 50
SETOUT COORDINATES

PT	EASTING	NORTHING	PT	EASTING	NORTHING
1	776334.41	7413645.23	32	785077.62	7415394.08
2	776400.01	7413739.73	33	784678.51	7415384.01
3	776508.70	7413667.99	34	784665.61	7415233.56
4	776634.20	7413585.16	35	784204.18	7415438.38
5	777911.64	7412604.35	36	784150.95	7415335.95
6	777971.52	7412702.50	37	781781.10	7416685.38
7	779835.86	7411954.70	38	781850.95	7416818.29
8	779878.11	7412061.69	39	781706.13	7416771.74
9	784237.43	7409949.94	40	781755.21	7416862.78
10	784285.12	7410054.65	41	781492.83	7416936.04
11	784908.04	7409893.55	42	781474.81	7416785.35
12	785379.17	7409729.39	43	781233.23	7416928.15
13	785898.77	7409154.54	44	781244.92	7416778.42
14	785880.18	7409039.72	45	780006.10	7416588.37
15	786220.31	7409196.39	46	779962.46	7416733.51
16	786278.58	7407598.38	47	778168.97	7415607.64
17	786320.32	7407595.64	48	778089.48	7415735.22
18	786379.76	7409236.18	49	777925.64	7415436.02
19	787177.09	7409549.75	50	777825.58	7415551.92
20	787182.45	7409459.37	51	777680.65	7415198.52
21	785588.97	7414101.36	52	777572.37	7415302.57
22	786139.10	7413993.93	53	777298.62	7414996.71
23	788426.94	7415209.49	54	777414.63	7414901.30
24	788563.17	7414940.45	55	777165.61	7414870.43
25	789278.66	7415622.82	56	777285.28	7414735.18
26	788927.93	7415808.19	57	776965.73	7414502.05
27	789751.44	7415694.07	58	777093.62	7414423.52
28	789223.04	7416309.28	59	776823.57	7414265.30
29	788959.74	7416142.73	60	776955.09	7414172.82
30	788948.98	7415955.34	61	776625.41	7413871.91
31	785990.47	7415244.28	62	776757.62	7413800.84

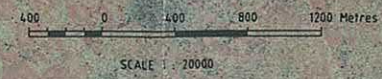
NOTES
REFER SKETCH 060-NH-SK492

LEGEND

- OPTION A CORRIDOR (400ha)
- 100m CORRIDOR APPROX.
- EXISTING K-LINE CORRIDOR (362ha)

MPD JV
Mine and Port Developments Joint Venture

FLUOR. **SKM**



DESIGNED BY _____
DRAWN BY S SAYVIDES
DATE 8-11-07

**MINE SERVICES - NEWMAN
MINE WATER SUPPLY ENHANCEMENT
K-LINE CORRIDOR**

SCALE 1:20000

REFER SEP 40 FOR PREPARATION OF DRAWINGS

A1 SKETCH NO. 060-NH-SK523 /D

1.4 LEGISLATIVE FRAMEWORK

The *Environmental Protection Act 1986* (EP Act) is “an Act to provide for an Environmental Protection Authority (EPA), for the prevention, control and abatement of environmental pollution, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing.” Section 4a of this Act outlines five principles that are required to be addressed to ensure that the objectives of the Act are addressed. Three of these principles are relevant to native fauna and flora:

- *The Precautionary Principle*

Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

- *The Principles of Intergenerational Equity*

The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

- *The Principle of the Conservation of Biological Diversity and Ecological Integrity*

Conservation of biological diversity and ecological integrity should be a fundamental consideration.

Projects undertaken as part of the Environmental Impact Assessment (EIA) process are required to address guidelines produced by the EPA, in this instance Guidance Statement No. 56: Terrestrial Fauna Surveys for Environmental Impact in Western Australia (EPA, 2004), and principles outlined in the EPA’s Position Statement No. 3, Terrestrial Biological Surveys as an element of Biodiversity Protection (EPA, 2002).

Native fauna in Western Australia are protected at a Federal level under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and at a State level under the *Wildlife Conservation Act 1950* (WC Act).

The EPBC Act was developed to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance, to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources; and to promote the conservation of biodiversity. The EPBC Act includes provisions to protect native species (and in particular to prevent the extinction and promote the recovery of threatened species) and ensures the conservation of migratory species. In addition to the principles outlined in Section 4a of the EP Act, Section 3a of the EPBC Act includes a principle of ecologically sustainable development dictating that decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.

The WC Act was developed to provide for the conservation and protection of wildlife in Western Australia. Under Section 14 of this Act, all fauna and flora within Western Australia is protected; however, the Minister may, via a notice published in the *Government Gazette*, declare a list of fauna taxa identified as likely to become extinct, or as rare, or otherwise in need of special protection. The current listing was gazetted in January 2008.

1.5 STATUTORY FRAMEWORK

Fauna species that have been formally recognised as rare, threatened with extinction, or as having high conservation value are protected by law under Commonwealth and State legislation. At the national level, fauna are protected under the EPBC Act. Within WA, rare fauna are listed under the WC Act. International Agreements include the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA).

Schedule 1 of the Commonwealth EPBC Act contains a list of species that are considered Critically Endangered, Endangered, Vulnerable, Extinct, Extinct in the wild and Conservation Dependent. Definitions of categories relevant to fauna occurring or potentially occurring in the project area are provided in Table 1.1.

Table 1.1 Definitions of relevant categories under the EPBC Act

CATEGORY	DEFINITION
Endangered (EN)	The species is likely to become extinct unless the circumstances and factors threatening its abundance, survival or evolutionary development cease to operate; or its numbers have been reduced to such a critical level, or its habitats have been so drastically reduced, that it is in immediate danger of extinction.
Vulnerable (VU)	Within the next 25 years, the species is likely to become endangered unless the circumstances and factors threatening its abundance, survival or evolutionary development cease to operate.
Migratory (MIG)	Species are defined as migratory if they are listed in an international agreement approved by the Commonwealth Environment Minister, including: the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals) for which Australia is a range state; The Agreement between the Government of Australia and the Government of the Peoples Republic of China for the Protection of Migratory Birds and their Environment (CAMBA); or The Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA).

Classification of rare and endangered fauna under the WC Act recognises four distinct schedules, as listed in Table 1.2 below. In addition, the Department of Environment and Conservation (DEC) maintains a Priority Fauna list which includes those species removed from the Wildlife Conservation Act and other species known from only a few populations or in need of monitoring. Five Priority Codes are recognised, as described in Table 1.3.

Table 1.2 Definition of Schedules under the WC Act

SCHEDULE	DEFINITION
Schedule 1 (S1)	Fauna which are Rare or likely to become extinct, are declared to be fauna that is in need of special protection.
Schedule 2 (S2)	Fauna which are presumed extinct are declared to be fauna that is in need of special protection.
Schedule 3 (S3)	Birds which are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction are declared to be fauna that is in need of special protection.
Schedule 4 (S4)	Declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned above.

Table 1.3 Definition of DEC Priority Codes

PRIORITY	DEFINITION
Priority One (P1)	<i>Taxa with few, poorly known populations on threatened lands.</i> Taxa which are known from few specimens or sight records from one or a few localities, on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
Priority Two (P2)	<i>Taxa with few, poorly known populations on conservation lands.</i> Taxa which are known from few specimens or sight records from one or a few localities, on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
Priority Three (P3)	<i>Taxa with several, poorly known populations, some on conservation lands.</i> Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
Priority Four (P4)	<i>Taxa in need of monitoring.</i> Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could if present circumstances change. These taxa are usually represented on conservation lands.
Priority Five (P5)	<i>Taxa in need of monitoring</i> Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

1.6 PREVIOUS BIOLOGICAL SURVEYS

The Pilbara bioregion is well surveyed, as a result of an increased global demand for Iron Ore. Species lists from seven previous studies (listed below) conducted within a 40 km radius of the Newman Water Pipeline project were compiled to produce a comprehensive table of potential mammal, bird, reptile and amphibian species potentially occupying the project area.

- *ecologia* (1995a) Orebody 18: Biological Assessment Survey (Unpublished Report commissioned by BHP Billiton Iron Ore Pty Ltd).
- *ecologia* (1995b) Orebody 25: Biological Assessment Survey (Unpublished Report commissioned by BHP Billiton Iron Ore Pty Ltd).
- *ecologia* (1998) Orebody 23 Extension: Biological Assessment Survey (Unpublished Report commissioned by BHP Billiton Iron Ore Pty Ltd).
- *ecologia* (2004) Jimblebar - Wheelarra Hill: Biological Survey (Unpublished Report commissioned by BHP Billiton Iron Ore Pty Ltd).
- *ecologia* (2008) Newman – Jimblebar: Level 1 Reconnaissance Survey (Unpublished Report commissioned by BHP Billiton Iron Ore Pty Ltd).
- ENV (2006a) OB24 Flora and Fauna Assessment – Phase II: Summary Report (Unpublished Report on behalf of *Asset Development Projects*).
- ENV (2006b) Mount Whaleback Fauna Assessment Survey – Phase III: Summary Report (Unpublished Report commissioned by BHP Billiton Iron Ore Pty Ltd).

2.0 BIOPHYSICAL ENVIRONMENT

2.1 CLIMATE

The tropical-arid climate experienced in the survey area is characterised by two distinct seasons; a hot wet summer from October to April and a mild dry winter from May to September.

Annual evaporation exceeds rainfall by as much as 500 mm per year and the rainfall is seasonally low and unpredictable, arising from tropical cyclones from January to March as they move south from northern Australian waters, and extensive cold fronts from May to June moving easterly across the state and occasionally reach the northern Gascoyne (Beard, 1975).

The climate experienced throughout the year is generally very dry, as both high temperatures and humidity seldom occur simultaneously. The temperature range is large and maxima are high. Summer temperatures may reach as high as 46°C (average maximum ranging from 22.2 – 38.8°C) and winter temperatures may drop to -2°C (average minimum ranging from 8.0 - 25.3°C) (Bureau of Meteorology, 2008).

The closest current Bureau of Meteorology (BoM) weather station is located at Newman Airport, approximately 5 km west of the water pipeline survey area (Figure 2.1).

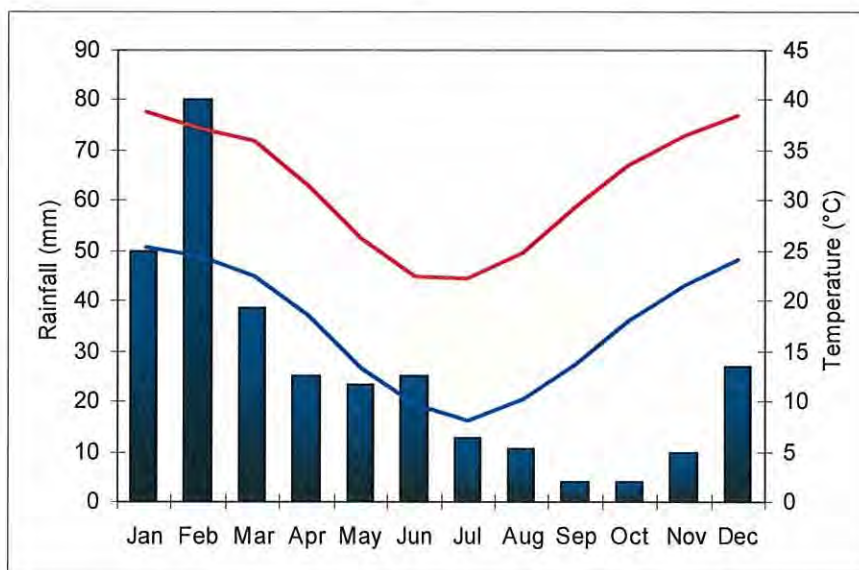


Figure 2.1: Summary of climatic data between 1956 - 2003 from Newman weather station (Bureau of Meteorology, 2008).

2.2 BIOGEOGRAPHY

A biogeographic regionalisation of Australia has been developed collaboratively, in which bioregions (broad scale regionalisations) are formally recognised and mapped, called the Interim Biogeographic Regionalisation for Australia (IBRA) (DEH, 2004). IBRA version 6.1 represents a landscape based approach to classifying the land surface of Australia. Eighty-five biogeographic regions and 405 subregions have been delineated, each reflecting a unifying set of major environmental influences which shape the occurrence of flora and fauna and their interaction with the physical environment across Australia. Subregions are more localised and homogeneous geomorphologic units in each bioregion, and 53 of these are recognised in Western Australia (DEC, 2002).

The project corridor is located in the Hamersley subregion (PIL-3) of the Pilbara bioregion (Figure 2.2), located in the southern section of the Pilbara Craton and consists of a mountainous area of Proterozoic sedimentary ranges and plateaus dissected by gorges and consisting of basalt, shale and dolerite. Habitats include mulga low woodland over bunch grasses on fine-textured soils in valley floors, and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges. The subregion is extensive, covering almost 6.25 million ha.

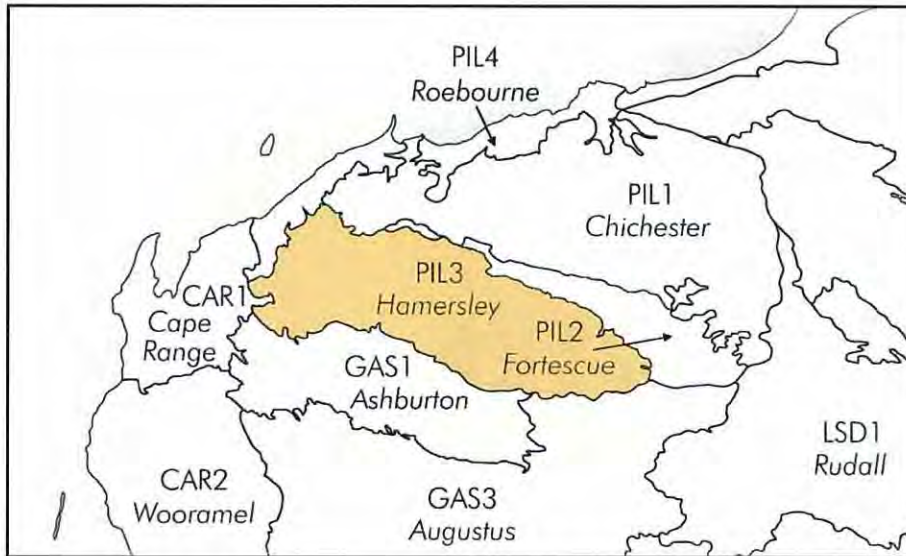


Figure 2.2 Hamersley subregion (PIL-3) according to IBRA v6.1.

2.3 LAND SYSTEMS

An inventory of the land systems occurring in the Pilbara was completed by Van Vreeswyk *et al.* (2004). The survey aimed to provide a comprehensive description and mapping of the biophysical resources of the region, together with an evaluation of the condition of soils and vegetation throughout. The survey mapping classifies the Pilbara region into 102 land systems, of which the project corridor traverses six. Each land system is classified into a particular land type defined by the landforms and vegetation present (Table 2.1).

Table 2.1 Land systems occurring within the Newman Pipeline Project area

Land Type	Land System	Land system as proportion of bioregion (%)	Description
1. Hills and ranges with spinifex grasslands	Newman (New)	8.0	Rugged jaspilite plateaus, ridges and mountains supporting hard spinifex grasslands.
1. Hills and ranges with spinifex grasslands	Rocklea (Roc)	12.7	Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands.
9. Stony gilgai plains with tussock grasslands	White Springs (WSP)	0.01	Quaternary eluvium, residual deposits of clay, basalt pebbles, cobbles and poorly consolidated gravel, supporting tussock and hard spinifex grasslands.
12. Wash plains on hardpan with grove mulga shrubland	Spearhole (Sph)	0.07	Quaternary alluvium and colluvium, supporting groved mulga shrublands and hard spinifex.
17. River plains with grassy woodlands and shrublands, and tussock grasslands	River (Riv)	2.3	Active flood plains and major rivers supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands.
10. Stony plains with acacia shrublands	Elimunna (Eli)	0.3	Stony plains on basalt supporting sparse acacia and cassia shrublands and patchy tussock grasslands.

3.0 SURVEY METHODS

The survey methods adopted by *ecologia* are aligned with the EPA's Guidance Statement No. 56 (2004) and Position Statement No. 3 (2002). The project area occurs in the Pilbara bioregion. Based on consultation with DEC stakeholders and Guidance Statement No. 56, a Desktop Fauna Survey, comprising a literature review and database search, was recommended (Section 3.1).

Sufficient survey data within a 40 km radius of the project area was available for the preparation of this report, including numerous dual phase Level 2 surveys (see Section 1.6). Therefore, a Desktop Survey was considered adequate to assess the potential fauna assemblages (including conservation significant fauna) and habitats likely to be present in the project area. However, without a reconnaissance survey it was not possible to provide detailed fauna habitat descriptions relating to the requirements of conservation significant fauna.

3.1 LITERATURE REVIEW AND DATABASE SEARCHES

Several previous studies and databases were consulted in the formulation of potential fauna (and conservation significant fauna) lists as presented in Appendix A. These were:

- Western Australian Museum FaunaBase (WAM);
- Birds Australia (Birdata);
- Department of Environment, Water, Heritage and the Arts protected matters database (*EPBC Act* Protected Matters Search Tool); and
- DEC's Threatened Fauna Database (Appendix B).

3.2 IMPACT RISK ASSESSMENT




A risk assessment (Appendix C) was undertaken to determine potential impacts arising from the project on vertebrate fauna and the residual impacts following the implementation of management procedures. Significance of the risks were classified as either High (site/issue specific management programmes required, advice/approval from regulators required), Moderate (specific management and procedures must be specified) or Low (managed by routine procedures). Potential impacts to conservation significant fauna are discussed in Section 6.3.


4.0 RESULTS

4.1 FAUNA HABITAT

Based on the landforms and vegetation communities recorded by *ecologia* flora consultants in April (2008a), four major fauna habitats occur within the water pipeline corridor: floodplain, hillslope, drainage line and flat plain. A summary of each habitat type is presented in Table 4.1 below.

Table 4.1 Summary of the four major fauna habitats of the project area and representative photos (taken by *ecologia* flora consultants during a Level 1 survey of the project area).

Fauna habitat description	Representative photo
<p>Floodplain</p> <p>Isolated clumps of <i>Corymbia candida</i> subsp. <i>dipsodes</i> moderate trees, over sparse small trees of <i>Acacia pruinocarpa</i>, over 1-2 m shrubs of sparse <i>A. sclerophylla</i> var. <i>sclerophylla</i> over sparse mixed grasses on sandy / loamy clay soils.</p>	
<p>Hillslope</p> <p>Sparse small trees of <i>A. inaequilatera</i> over sparse tall shrubs of mixed <i>Acacia</i> spp., over 1-2 m mixed shrubs and moderately dense <i>Triodia wiseana</i> and <i>T. epactia</i> hummock grass on a hard stony substrate.</p>	
<p>Drainage line</p> <p>Open tall trees of <i>Eucalyptus victrix</i> over moderately dense 5-15 m trees of <i>C. candida</i> subsp. <i>dipsodes</i> and <i>A. citrinoviridis</i> over sparse small shrubs of <i>Malvastrum americanum</i> over open mixed herbs on soft alluvial sands.</p>	

Fauna habitat description	Representative photo
<p>Flat plain</p> <p>Open tall trees of <i>C. candida</i> subsp. <i>dipsodes</i> and <i>A. citrinoviridis</i>, over sparse medium sized <i>Triodia</i> sp., over small mixed shrubs, on sandy loam soil.</p>	

4.2 POTENTIALLY OCCURRING FAUNA

Based on a review of previous studies conducted by *ecologia* and ENV (specified in Section 1.6) and database searches specified in Section 3.1, 28 native and six introduced mammal species, 126 bird species, 77 reptile species and seven amphibian species potentially occur in the project area (Appendix A). Three mammal species, seven bird species (five rare, two migratory) and two reptile species are regarded as conservation significant fauna. Four mammal species and nine reptile species are Pilbara regional endemics.

4.2.1 Native Mammals

Twenty-eight mammal species from nine families potentially occur in the project area. This includes the echidna, seven dasyurids (family: Dasyuridae), nine bats (four families: Megadermatidae, Emballonuridae, Molossidae and Vespertilionidae), five rodents (family: Muridae) and four macropods (family: Macropodidae).

Of these, the Black-flanked Rock Wallaby (*Petrogale lateralis lateralis* – Vulnerable, Schedule 1), Western Pebble-mound Mouse (*Pseudomys chapmani* – Priority 4) and the Ghost Bat (*Macroderma gigas* – Priority 4) are listed as rare fauna, while the Little Red Kaluta (*Dasykaluta rosamondae*), Pilbara Ningau (Ningau *timealeyi*), an undescribed Planigale (*Planigale* sp.) and the Western Pebble-mound Mouse (*P. chapmani*) are endemic to the Pilbara. Mammals potentially occurring are presented in Appendix A.1.

4.2.2 Birds

One hundred and twenty-six bird species from 41 families potentially occur in the project area. The families Meliphagidae (Honeyeaters), Accipitridae (Kites, Goshawks, Eagles and Harriers), Acanthizidae (Gerygones and Thornbills) and Ardeidae (Herons and Egrets) are likely to be the most speciose families potentially occurring in or near the project area, contributing 14, 11, eight and seven species respectively (Appendix A.2).

Conservation significant bird species include the Peregrine Falcon (*Falco peregrinus* – Schedule 4), Grey Falcon (*Falco hypoleucos*), Bush Stone-curlew (*Burhinus grallarius*), Australian Bustard (*Ardeotis australis*), Star Finch (*Neochmia ruficauda*), all Priority 4 species, and two species listed as Migratory under the EPBC Act: Great Egret (*Ardea alba*) and Rainbow Bee-eater (*Merops ornatus*) (Table 5.1).

4.2.3 Reptiles

Seventy-seven reptile species potentially occurring in the project area stem from nine families: Agamidae (Dragons), Boidae (Pythons), Cheluidae (Turtles), Elapidae (Front-fanged Snakes), Gekkonidae (Geckos), Pygopodidae (Legless Lizards), Scincidae (Skinks), Typhlopidae (Blind-snakes) and Varanidae (Monitors) (Appendix A.3)

Conservation significant reptiles include the Pilbara Olive Python (*Liasis olivaceus barroni* – Vulnerable, Schedule 1) and *Ramphotyphlops ganei* (a blind-snake – Priority 1). *Diplodactylus savagei* (Sand Gecko), *D. wombeyi* (Sand Gecko), *Delma pax* (a legless lizard), *Lerista zietzi* (a sand swimmer), *L. Neander* (a sand swimmer), *Varanus pilbarensis* (Pilbara Rock Monitor), *Acanthophis wellsi* (Pilbara Death Adder) and *Demansia rufescens* (Rufous Whipsnake) are endemic to the Pilbara, as are *L. olivaceus barroni* and *R. ganei*.

4.2.4 Amphibians

Seven amphibian species from two families potentially occur in the project area. These include: *Cyclorana maini* (Main's Burrowing Frog), *Cyclorana platycephala* (Water Holding Frog) and *Litoria rubella* (Desert Tree Frog) from the Hylidae and *Limnodynastes spenceri* (Spencer's Frog), *Neobatrachus centralis* (Desert Trilling Frog), *Notaden nichollsi* (Desert Spadefoot) and *Uperoleia russelli* (Russell's Toadlet) from the Myobatrachidae.

4.2.5 Introduced Species

Six species of introduced mammal are likely to occur within the project area: the House Mouse (**Mus musculus*), Rabbit (**Oryctolagus cuniculus*), Feral Cat (**Felis catus*), Feral Dog / Dingo (**Canis familiaris* / **Canis familiaris dingo*) and Cow (**Bos taurus*).

5.0 CONSERVATION SIGNIFICANT FAUNA

The likelihood of occurrence of conservation significant fauna, which includes rare fauna and species listed as Migratory under the EPBC Act, was assessed for each species potentially occurring. Factors contributing to the assessment of a species as either of High, Medium, Low or Very Low likelihood of occurrence were the habitat(s) preferred by the species and the nature of previous records (if any) of that species in the area. This is presented in Table 5.1, below.

Table 5.1 Conservation significant fauna potentially occurring in the study area.

EPBC = *Environment Protection and Biodiversity Conservation Act 1999*; WCA = *Wildlife Conservation Act 1950*; DEC = Department of Environment and Conservation Priority fauna

SPECIES	COMMON NAME	CONSERVATION SIGNIFICANCE			HABITAT	PREVIOUS RECORDS	LIKELIHOOD OF OCCURRENCE
		EPBC	WCA	DEC			
MAMMALS							
<i>Pseudomys chapmani</i>	Western Pebble-mound mouse			P4	Spinifex grassed spurs and lower scree slopes with small pebbles	DEC's Threatened Fauna Database (2004) and Orebody 24 (ENV, 2006a)	MEDIUM Potential habitat in rocky areas near Newman Hub
<i>Petrogale lateralis lateralis</i>	Black-flanked Rock Wallaby	VU	S1		Deep caves and fissures in rocky areas inaccessible to foxes	DEC's Threatened Fauna Database (1975)	VERY LOW No sightings for over 30 years in the Pilbara
<i>Macroderma gigas</i>	Ghost Bat			P4	Caves or deep rock fissures	DEC's Threatened Fauna Database (1967) and ENV (2006a)	LOW No suitable roosts within the project area

SPECIES	COMMON NAME	CONSERVATION SIGNIFICANCE			HABITAT	PREVIOUS RECORDS	LIKELIHOOD OF OCCURRENCE
		EPBC	WCA	DEC			
BIRDS							
<i>Falco hypoleucos</i>	Grey Falcon			P4	Lightly wooded coastal and riverine plains	DEC's Threatened Fauna Database 12 km NNE of Newman	LOW May occur transiently, no suitable breeding areas
<i>Falco peregrinus</i>	Peregrine Falcon		S4		Coastal cliffs, riverine gorges and wooded watercourses	Birdata records and recorded nearby at Orebodies 23 (<i>ecologia</i> , 1998) and 25 (<i>ecologia</i> , 1995a)	LOW May occur transiently, no suitable breeding areas
<i>Neochmia ruficauda</i>	Star Finch			P4	Grasslands with sparse vegetation near water	Mount Whaleback (ENV, 2006b)	LOW Little suitable habitat available
<i>Burhinus grallarius</i>	Bush Stone-curlew			P4	Lightly wooded country next to daytime shelter of thickets or long grass	Birdata records and Wheelarra Hill (<i>ecologia</i> , 2004)	LOW Little suitable habitat available
<i>Ardeotis australis</i>	Australian Bustard			P4	Open grasslands, chenopod flats and low heathland	Birdata records and Orebody 18 (<i>ecologia</i> , 1995a)	MEDIUM Some suitable habitat available, though proximity to Newman town makes occurrence less likely

SPECIES	COMMON NAME	CONSERVATION SIGNIFICANCE			HABITAT	PREVIOUS RECORDS	LIKELIHOOD OF OCCURRENCE
		EPBC	WCA	DEC			
REPTILES							
<i>Liasis olivaceus barroni</i>	Pilbara Olive Python	VU	S1		Gorges and escarpments of Pilbara	DEC's Threatened Fauna Database (1975) and Orebody 24 (ENV, 2006a)	MEDIUM Potential habitat in rocky areas near Newman Hub
<i>Ramphotyphlops ganei</i>	A Blind-snake			P1	Moist gorges and gullies	DEC's Threatened Fauna Database (1985)	MEDIUM Potential habitat in rocky areas near Newman Hub
MIGRATORY BIRDS							
<i>Merops ornatus</i>	Rainbow Bee-eater	MIG			Lightly wooded, preferably sandy country, near water	Often previously recorded, most recently by <i>ecologia</i> (2008)	HIGH A common species likely to occur in the area. Breeding possible in sandy loam and embankments, where present.
<i>Ardea alba</i>	Great Egret	MIG			Shallow waters (salt or fresh); waters suitable for stalking small fish, crustaceans and amphibians	Birdata	LOW Little suitable habitat available

6.0 IMPACT ASSESSMENT

The risk assessment presented in Appendix C summarises the threatening processes and risk factors applicable to the fauna habitats and assemblages within the project area.

The most notable impact on fauna inhabiting the project corridor will be vegetation clearing, which will result in loss of fauna habitat and direct mortality of species unable or unwilling to relocate. Because the impact footprint is narrow, the project is anticipated to have minimal overall effects on native fauna habitat as any displacement will be localised and suitable habitat exists adjacent to the project area.

Generally, increases in human activity is correlated with an increase in feral fauna. However, given the proximity of the project area to Newman and the well-established populations of feral species associated with the town, these populations are unlikely to increase further as a result of the project activities.

Other potential disturbances to native fauna include:

- Animals falling into trenches/sumps – exposure to extremes of temperature without shelter, dehydration, starvation, predation from feral fauna and other native fauna, as well as the possibility of being buried alive;
- Animal death from increased vehicle activity;
- Dust pollution may affect the quality of adjacent fauna habitats, further decreasing the likelihood of individuals displaced from the project area surviving;
- Increased risk of fire associated with clearing and construction activities; and
- Noise pollution, putting further stress on fauna inhabiting the area.

6.1 IMPACTS ON FAUNAL ASSEMBLAGES

Within the impact footprint there will be an unavoidable loss of some biodiversity as native vegetation is cleared and fauna are displaced into adjacent habitats. These habitats and fauna populations will be exposed to negative impacts such as dust, noise pollution and increased vehicle activity, but following construction the access roads and infrastructure would be used less frequently, reducing these effects.

Because of the proximity of the proposed works to Newman townsite, feral fauna are already common and widespread in the area, with feral cats being particularly abundant. The project is therefore not expected to result in a long-term increase in feral fauna provided that food waste is managed responsibly. Similarly, the risk of fire is not expected to increase post-construction, but there is a heightened risk of fire during construction activities or vegetation clearing. Fire poses the most significant risk to adjacent habitats because of its ability to rapidly spread through large areas causing significant alteration to fauna habitat, which is often slow to recover in arid areas such as the Pilbara.

None of the four major fauna habitats within the project area represent ideal habitat for conservation significant fauna and all are well represented throughout the Pilbara bioregion.

The Western Pebble-mound mouse may be present on hillslopes with small rocks or pebbles. Such habitat was identified by the *ecologia* (2008a) flora consultants in April,

though without conducting a detailed search of the area the current status of the species cannot be resolved.

6.2 IMPACTS TO ECOLOGICAL FUNCTION AND BIODIVERSITY

Ecological function at the local and regional scale is not expected to be impaired in the longer-term as much of the project area's fauna habitats are already impacted by stock grazing and weeds. In rocky areas that may present access challenges to cattle, habitats are likely to be in better condition. It is in these habitats that some rare fauna could potentially occur. Any impacts to ecological function and biodiversity are expected to be greater in these better fauna habitats of the project area.

Once construction is completed and traffic is reduced, noise and pollution impacts are expected to decline in adjacent fauna habitats and short-term reductions in biodiversity and ecological function would be expected to recover to previous levels.

6.3 POTENTIAL IMPACTS TO FAUNA SPECIES OF CONSERVATION SIGNIFICANCE

Species with a 'Medium' likelihood of occurring within the project area are discussed in the following sections.

6.3.1 Rainbow Bee-eater (*Merops ornatus*) – EPBC Migratory

Rainbow Bee-eaters nest from August to January in sandy flats and embankments in which they dig tunnels (Johnstone and Storr, 1998). When nesting the birds are vulnerable to clearing; adult birds may abandon their chicks if disturbed and chicks may be killed directly by machinery during clearing.

Because some of the project footprint overlies sandy loams which Rainbow Bee-eaters prefer, it is possible that they nest within it.

6.3.2 Western Pebble-mound mouse (*Pseudomys chapmani*) – DEC Priority 4

The Western Pebble-mouse (*Pseudomys chapmani*) was described in 1980 and recognised as the builder of pebble-mounds in the Pilbara and adjacent regions of Western Australia. It inhabits hummock grassland areas of *Triodia*, *Cassia*, *Acacia* and *Ptilotus* on skeletal soils containing an abundance of small pebbles (Start and Kitchener, 1995). These conditions are most common on spurs and the lower slopes of ridges. The mice use the pebbles to construct mounds.

Suitable habitat may occur on hillslopes within the project area and clearing should avoid the distinctive mounds of this species where possible.

6.3.3 Unnamed blind-snake (*Ramphotyphlops ganeï*) – DEC Priority 1

This species has been recorded previously at Mt. Whaleback (DEC rare fauna database), and at scattered locations within the Pilbara, associated with moist gullies and gorges (Wilson and Swan, 2008). Although the species has not been recorded in or near Newman since 1985, it could occur in rocky gullies and rockier areas.

Because clearing is likely to be limited in this part of the project area, impacts to this species are unlikely. Blindsnakes are fossorial and are therefore likely to be disturbed by activities that disturb soil, such as clearing of topsoil, compaction of soil beneath roads, alteration of drainage channels (and associated alteration of soil moisture profiles) and more significant impacts such as blasting.

6.3.4 Pilbara Olive Python (*Liasis olivaceus barroni*) – EPBC Vulnerable, WCA Schedule 1

This large python inhabits watercourses and areas of permanent water in rocky gorges and gullies (Pearson, 1993). Although no permanent watercourses occur within the proposed alignment, Pilbara Olive Pythons may occur in drainage lines or on floodplains after heavy cyclonic rainfall. Because these landforms exist within the project area, the species may occur if suitable habitats are present. Pythons find significant cracks, crevices and cavities in rocks or trees near permanent or semi-permanent water to shelter in. Removal or disturbance of such habitats, if present, would reduce the available habitat for this species.

6.4 ASSESSMENT OF THE INFORMATION FOUND AGAINST CLEARING PRINCIPLE B

Criteria used to assess the information against Clearing Principle B of the EP Act (1986) (Schedule No. 5) are presented in Table 6.1 below. Based on this review it was concluded that no native vegetation within the project area comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Table 6.1 Response to Clearing Principle B criteria

CRITERIA	COMMENT
Native vegetation should not be cleared if it is or is likely to be habitat for fauna that is declared Specialty Protected under the WC Act.	Based on the information compiled during the desktop survey of the project area, and an assessment of fauna habitats, no fauna protected under the WC Act were identified as likely to occur.
Native vegetation should not be cleared if it is or is likely to be habitat for Priority Listed Fauna.	No Priority Listed Fauna were identified as likely to occur.
Native vegetation should not be cleared if it is or is likely to be habitat for fauna that is otherwise significant.	No otherwise significant fauna are likely to occur.
Native vegetation should not be cleared if it provides significant habitat for fauna species in the local area.	Fauna habitats identified within the project area are well represented throughout the Hamersley subregion and Pilbara bioregion. The habitat was largely degraded and unlikely to provide significant fauna habitat.
Native vegetation should not be cleared if it maintains ecological functions and processes that protect significant habitat for fauna.	No native vegetation within the project represents critical fauna habitat for conservation significant fauna or otherwise significant fauna.
Native vegetation should not be cleared if it forms, or is part of, an ecological linkage that is necessary for the maintenance of fauna.	The project area comprises historically disturbed habitat unlikely to act as an ecological linkage.
Native vegetation should not be cleared if it provides significant habitat for fauna communities (assemblages) and meta-populations.	Native vegetation within the project area is unlikely to provide significant habitat for fauna communities or meta-populations.

7.0 REFERENCES

- Beard, J. S. (1975). Pilbara. Explanatory notes to Sheet 4, 1:1,000,000 Series Vegetation Survey of Western Australia. Perth, University of Western Australia Press.
- Bureau of Meteorology (2008) Accessed 12th Feb 2008 URL: <http://www.bom.gov.au/>
- Department of Environment and Conservation (2002) *A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002* Accessed 6th June 2008. URL: <http://www.naturebase.net/content/view/960/1397/>.
- Department of Environment and Heritage (2004) *Interim Biogeographic Regionalisation for Australia (IBRA) Version 6.1* (Canberra, ACT).
- ecologia (1995a) Orebody 18: Biological Assessment Survey (Unpublished Report commissioned by BHP Billiton Iron Ore Pty Ltd.).
- ecologia (1995b) Orebody 25: Biological Assessment Survey (Unpublished Report commissioned by BHP Billiton Iron Ore Pty Ltd.).
- ecologia (1998) Orebody 23 Extension: Biological Assessment Survey (Unpublished Report commissioned by BHP Billiton Iron Ore Pty Ltd.).
- ecologia (2004) Jimblebar - Wheelarra Hill: Biological Survey (Unpublished Report commissioned by BHP Billiton Iron Ore Pty Ltd.).
- ecologia (2008) Newman – Jimblebar: Level 1 Reconnaissance Survey (Unpublished Report commissioned by BHP Billiton Iron Ore Pty Ltd.).
- ecologia (2008a) Newman Water Pipeline Enhancement Project: Vegetation and Flora Survey (Unpublished report commissioned by BHPBIO).
- ENV (2006a) OB24 Flora and Fauna Assessment – Phase II: Summary Report (Unpublished Report on behalf of *MPD JV Asset Development Projects*).
- ENV (2006b) Mount Whaleback Fauna Assessment Survey – Phase III: Summary Report (Unpublished Report commissioned by BHP Billiton Iron Ore Pty Ltd.).
- Environment Protection Authority (2002) *Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection* (Perth, Western Australia).
- Environmental Protection Authority (2004) *Guidance for the Assessment of Environmental Factors No. 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (Perth, Western Australia).
- Johnstone, R E and Storr, G M (1998) *Handbook of Western Australian Birds. Volume 1 – Non-Passerines (Emu to Dollarbird)* (West Australian Museum, Perth).
- Pearson, D J (1993) Distribution, status and conservation of pythons in Western Australia. In: Lunney, D and Ayers, D (eds) *Herpetology in Australia: a Diverse Discipline*, pp 383-395 (Royal Zoological Society of NSW, Sydney).
- Start, A N and Kitchener, D J (1995) Western Pebble-mound Mouse. In: *The Mammals of Australia* (ed. R Strahan), pp 590-592 (Reed New Holland Publishers, Australia).
- Van Vreeswyk, A M E, Payne, A L, Leighton, K A, and Hennig, P (2004) An inventory and condition survey of the Pilbara region, Western Australia. In *Department of Agriculture Technical Bulletin No. 92, December 2004*.
- Western Australian Museum FaunaBase, url: <<http://www.museum.wa.gov.au/faunabase/prod/index.htm>>
- Wilson, S and Swan, G (2008) *A Complete Guide to Reptiles of Australia*, (New Holland Publishers Australia Pty Ltd. Frenchs Forest, NSW).

APPENDIX A REGIONAL FAUNA DATA

CODES USED	
A	<i>ecologia</i> 1995a
B	<i>ecologia</i> 1995b
C	<i>ecologia</i> 1998
D	<i>ecologia</i> 2004
E	<i>ecologia</i> 2008
F	ENV 2006a
G	ENV 2006b

Appendix A-1 Regional mammal data

FAMILY and species	Common Name	EPBC	WCA	DEC	WAM	A	B	C	D	E	F	G
TACHYGLOSSIDAE												
<i>Tachyglossus aculeatus</i>	Echidna						✓				✓	✓
DASYURIDAE												
<i>Dasykaluta rosamondae</i>	Little Red Kaluta				✓	✓						
<i>Ningauai timealeyi</i>	Pilbara Ningauai				✓	✓		✓				
<i>Planigale</i> sp.	Undescribed Planigale				✓		✓					
<i>Pseudantechinus macdonnellensis</i>	Fat-tailed Antechinus								✓			
<i>Pseudantechinus woolleyae</i>	Woolley's Pseudantechinus				✓							
<i>Sminthopsis macroura</i>	Stripe-faced Dunnart				✓			✓			✓	
<i>Sminthopsis youngsoni</i>	Lesser Hairy-footed Dunnart				✓							
EMBALLONURIDAE												
<i>Saccolaimus flaviventris</i>	A bat										✓	✓
<i>Taphozous georgianus</i>	Common Sheath-tail Bat				✓						✓	✓
<i>Taphozous hilli</i>	Hill's Sheath-tail Bat				✓				✓			
FELIDAE												
* <i>Felis catus</i>	Cat							✓			✓	
LEPORIDAE												
* <i>Oryctolagus cuniculus</i>	Rabbit				✓		✓			✓	✓	
MACROPODIDAE												
<i>Macropus robustus erubescens</i>	Euro				✓	✓	✓	✓	✓	✓	✓	✓
<i>Macropus rufus</i>	Red Kangaroo				✓					✓	✓	
<i>Petrogale lateralis lateralis</i>	Black-flanked Rock Wallaby											
<i>Petrogale rothschildi</i>	Rothschild's Rock-Wallaby						✓				✓	✓
MEGADERMATIDAE												
<i>Macroderma gigas</i>	Ghost Bat			P4								✓
MOLLOSSIDAE												

FAMILY and species	Common Name	EPBC	WCA	DEC	WAM	A	B	C	D	E	F	G
<i>Chaerophon jobensis</i>	Northern Mastiff-bat				✓							
<i>Mormopterus beccarii</i>	Beccari's Freetail-bat				✓						✓	✓
MURIDAE												
* <i>Mus musculus</i>	House Mouse				✓	✓	✓	✓			✓	✓
<i>Notomys alexis</i>	Spinifex Hopping-mouse				✓							
<i>Pseudomys chapmani</i>	Western Pebble-mound Mouse			P4	✓	✓	✓		✓			✓
<i>Pseudomys desertor</i>	Desert Mouse				✓	✓					✓	
<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse				✓	✓	✓				✓	
<i>Zyzomys argurus</i>	Common Rock-rat				✓	✓	✓				✓	✓
VESPERTILIONIDAE												
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat				✓						✓	✓
<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat							✓				
<i>Scotorepens greyii</i>	Little Broad-nosed Bat				✓			✓			✓	✓
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat										✓	✓
<i>Vespadeilus finlaysoni</i>	Western Cave Eptesicus				✓						✓	✓
CANIDAE												
* <i>Canis familiaris dingo</i>	Dingo								✓	✓		✓
* <i>Vulpes vulpes</i>	Red Fox										✓	
BOVIDAE												
* <i>Bos taurus</i>	Cow								✓	✓		

Appendix A-2 Regional bird data

FAMILY and species	Common Name	EPBC	WCA	DEC	Birdata	WAM	A	B	C	D	E	F	G
DROMAIDAE													
<i>Dromaius novaehollandiae</i>	Emu				✓			✓					
PHASIANIDAE													
<i>Coturnix pectoralis</i>	Stubble Quail				✓								
<i>Coturnix ypsilophora</i>	Brown Quail				✓								✓
TURNICIDAE													
<i>Turnix velox</i>	Little Button-quail				✓			✓	✓	✓	✓	✓	✓
ARDEIDAE													
<i>Egretta novaehollandiae</i>	White-faced Heron				✓		✓						
<i>Egretta garzetta</i>	Little Egret				✓								
<i>Ardea pacifica</i>	White-necked Heron				✓				✓				
<i>Ardea alba</i>	Great Egret		MIG		✓								
<i>Ardea ibis</i>	Cattle Egret				✓								
<i>Ardea intermedia</i>	Intermediate Egret				✓								
<i>Nycticorax caledonicus</i>	Nankeen Night Heron				✓								
ACCIPITRIDAE													
<i>Accipiter cirrhocephalus</i>	Collared Sparrowhawk				✓				✓				
<i>Accipiter fasciatus</i>	Brown Goshawk				✓		✓					✓	
<i>Circus assimilis</i>	Spotted Harrier				✓			✓					
<i>Circus approximans</i>	Swamp Harrier				✓								
<i>Elanus axillaris</i>	Black-shouldered Kite				✓			✓			✓		
<i>Lophoictinia isura</i>	Square-tailed Kite				✓								
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard				✓							✓	✓
<i>Milvus migrans</i>	Black Kite				✓						✓	✓	✓
<i>Haliastur sphenurus</i>	Whistling Kite				✓			✓		✓	✓	✓	✓
<i>Aquila audax</i>	Wedge-tailed Eagle				✓		✓			✓	✓	✓	✓

FAMILY and species	Common Name	EPBC	WCA	DEC	Birdata	WAM	A	B	C	D	E	F	G
<i>Hieraaetus morphnoides</i>	Little Eagle				✓					✓			✓
FALCONIDAE													
<i>Falco berigora</i>	Brown Falcon				✓	✓	✓	✓	✓	✓		✓	✓
<i>Falco longipennis</i>	Australian Hobby				✓	✓	✓						✓
<i>Falco peregrinus</i>	Peregrine Falcon		S4		✓				✓	✓		✓	
<i>Falco cenchroides</i>	Australian Kestrel				✓	✓	✓	✓	✓	✓			✓
<i>Falco hypoleucos</i>	Grey Falcon			P4									
BURHINIDAE													
<i>Burhinus grallarius</i>	Bush Stone-curlew			P4	✓		✓						
OTIDIDAE													
<i>Ardeotis australis</i>	Australian Bustard			P4	✓	✓		✓					
COLUMBIDAE													
<i>Phaps chalcoptera</i>	Common Bronzewing				✓		✓		✓	✓		✓	
<i>Ocyphaps lophotes</i>	Crested Pigeon				✓		✓		✓	✓		✓	✓
<i>Geopelia humeralis</i>	Bar-shouldered Dove				✓								
<i>Geopelia striata</i>	Peaceful Dove				✓						✓		
<i>Geophaps plumifera</i>	Spinifex Pigeon				✓		✓	✓	✓	✓	✓	✓	✓
<i>Geopelia cuneata</i>	Diamond Dove				✓		✓	✓	✓	✓	✓	✓	✓
CACATUIDAE													
<i>Cacatua roseicapilla</i>	Galah				✓		✓	✓	✓	✓		✓	✓
<i>Cacatua sanguinea</i>	Little Corella				✓		✓	✓	✓	✓		✓	✓
<i>Nymphicus hollandicus</i>	Cockatiel				✓				✓				✓
PSITTACIDAE													
<i>Barnardius zonarius</i>	Australian Ringneck				✓		✓	✓	✓	✓		✓	✓
<i>Psephotus varius</i>	Mulga Parrot				✓								
<i>Neophema bourkii</i>	Bourke's Parrot				✓								✓
<i>Melopsittacus undulatus</i>	Budgerigar				✓			✓	✓	✓		✓	✓

FAMILY and species	Common Name	EPBC	WCA	DEC	Birddata	WAM	A	B	C	D	E	F	G
CUCULIDAE													
<i>Chalcites basal</i>	Horsfield's Bronze Cuckoo				✓		✓	✓	✓				✓
<i>Cuculus pallidus</i>	Pallid Cuckoo				✓		✓	✓	✓				✓
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo				✓				✓				
STRIGIDAE													
<i>Ninox connivens</i>	Barking Owl				✓								
<i>Ninox novaeseelandiae</i>	Southern Boobook				✓			✓	✓	✓			✓
TYTONIDAE													
<i>Tyto alba</i>	Barn Owl				✓		✓					✓	
PODARGIDAE													
<i>Podargus strigoides</i>	Tawny Frogmouth				✓		✓						✓
CAPRIMULGIDAE													
<i>Eurostopodus argus</i>	Spotted Nightjar				✓		✓	✓					✓
AEGOTHELIDAE													
<i>Aegotheles cristatus</i>	Australian Owllet-nightjar				✓			✓	✓				
CENTROPIDAE													
<i>Centropus phasianus</i>	Pheasant Coucal												✓
HALCYONIDAE													
<i>Dacelo leachii</i>	Blue-winged Kookaburra				✓				✓			✓	✓
<i>Todirhamphus pyrrophygia</i>	Red-backed Kingfisher				✓		✓	✓	✓	✓	✓	✓	✓
<i>Todirhamphus sanctus</i>	Sacred Kingfisher				✓						✓		✓
MEROPIDAE													
<i>Merops ornatus</i>	Rainbow Bee-eater	MIG			✓		✓				✓	✓	
CLIMATERIDAE													
<i>Climacteris melanura</i>	Black-tailed Treecreeper				✓								
MALURIDAE													
<i>Amytornis striatus</i>	Striated Grasswren				✓		✓	✓		✓		✓	✓

FAMILY and species	Common Name	EPBC	WCA	DEC	Birdata	WAM	A	B	C	D	E	F	G
<i>Malurus lamberti</i>	Variiegated Fairy-wren				✓		✓	✓	✓	✓	✓	✓	✓
<i>Malurus leucopterus</i>	White-winged Fairy-wren				✓		✓		✓	✓	✓	✓	✓
<i>Malurus splendens</i>	Splendid Fairy-wren				✓								
<i>Stipiturus ruficeps</i>	Rufous-crowned Emu-wren				✓								
PARDALOTIDAE													
<i>Pardalotus rubricatus</i>	Red-browed Pardalote				✓	✓	✓		✓	✓	✓		✓
<i>Pardalotus striatus</i>	Striated Pardalote				✓		✓	✓	✓	✓			✓
ACANTHIZIDAE													
<i>Smicromis brevirostris</i>	Weebill				✓				✓	✓	✓	✓	✓
<i>Gerygone fusca</i>	Western Gerygone				✓	✓			✓				✓
<i>Acanthiza apicalis</i>	Inland Thornbill				✓								
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill				✓								
<i>Acanthiza robustirostris</i>	Slaty-backed Thornbill				✓				✓				
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill				✓		✓		✓	✓	✓		✓
<i>Aphelocephala leucopsis</i>	Southern Whiteface				✓								
<i>Pyrrholaemus brunneus</i>	Redthroat				✓				✓				
MELIPHAGIDAE													
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater				✓		✓		✓	✓	✓	✓	✓
<i>Manorina flavigula</i>	Yellow-throated Miner				✓		✓		✓			✓	✓
<i>Lichenostomus keartlandi</i>	Grey-headed Honeyeater				✓		✓	✓	✓	✓	✓	✓	✓
<i>Lichenostomus virescens</i>	Singing Honeyeater				✓		✓	✓	✓	✓	✓	✓	✓
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater				✓		✓		✓	✓	✓	✓	✓
<i>Lichenostomus plumulus</i>	Grey-fronted Honeyeater								✓				
<i>Meliphreptus gularis</i>	Black-chinned Honeyeater				✓		✓		✓	✓			✓
<i>Lichmera indistincta</i>	Brown Honeyeater				✓		✓		✓	✓	✓		✓
<i>Phylidonyris albigrons</i>	White-fronted Honeyeater				✓			✓	✓	✓			✓
<i>Epthianura aurifrons</i>	Orange Chat					✓							

FAMILY and species	Common Name	EPBC	WCA	DEC	Birddata	WAM	A	B	C	D	E	F	G
<i>Epthianura tricolor</i>	Crimson Chat				✓			✓		✓			
<i>Certhionyx niger</i>	Black Honeyeater				✓			✓		✓			
<i>Certhionyx variegatus</i>	Pied Honeyeater				✓			✓					
<i>Conopophila whitei</i>	Grey Honeyeater				✓				✓				
PETROICIDAE													
<i>Melanodryas cucullata</i>	Hooded Robin				✓		✓	✓	✓	✓			✓
<i>Petroica goodenovii</i>	Red-capped Robin				✓				✓		✓	✓	
CINGLOSOMATIDAE													
<i>Psophodes occidentalis</i>	Chiming Wedgebill				✓								
<i>Cinlosoma castaneothorax</i>	Chestnut-breasted Quail-thrush				✓								
NEOSITTIDAE													
<i>Daphoenositta chrysoptera</i>	Varied Sittella				✓								
POMATOSTOMIDAE													
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler				✓		✓		✓	✓		✓	✓
<i>Pomatostomus superciliosus</i>	White-browed Babbler				✓				✓				
PACHYCEPHALIDAE													
<i>Oreoica gutturalis</i>	Crested Bellbird				✓		✓	✓	✓	✓	✓		✓
<i>Pachycephala rufiventris</i>	Rufous Whistler				✓		✓	✓	✓	✓	✓	✓	✓
<i>Colluricincla harmonica</i>	Grey Shrike-thrush				✓		✓	✓	✓	✓	✓	✓	✓
DICRURIDAE													
<i>Gallina cyanoleuca</i>	Magpie-lark				✓		✓		✓	✓	✓	✓	✓
<i>Rhipidura albiscapa</i>	Grey Fantail				✓				✓				
<i>Rhipidura leucophrys</i>	Willie Wagtail				✓		✓	✓	✓	✓	✓	✓	✓
CAMPEPHAGIDAE													
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike				✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Coracina maxima</i>	Ground Cuckoo-shrike				✓		✓						
<i>Lalage tricolor</i>	White-winged Triller				✓		✓	✓	✓	✓	✓	✓	✓

FAMILY and species	Common Name	EPBC	WCA	DEC	Birdata	WAM	A	B	C	D	E	F	G
ARTAMIDAE													
<i>Artamus personatus</i>	Masked Woodswallow				✓								
<i>Artamus cinereus</i>	Black-faced Woodswallow				✓		✓		✓		✓		✓
<i>Artamus minor</i>	Little Woodswallow				✓		✓	✓	✓			✓	✓
<i>Cracticus torquatus</i>	Grey Butcherbird				✓		✓					✓	✓
<i>Cracticus nigrogularis</i>	Pied Butcherbird				✓		✓	✓	✓	✓			✓
<i>Gymnorhina tibicen</i>	Australian Magpie				✓		✓		✓	✓	✓	✓	✓
CORVIDAE													
<i>Corvus bennetti</i>	Little Crow				✓								
<i>Corvus orru</i>	Torresian Crow				✓		✓		✓			✓	✓
PTILONORHYNCHIDAE													
<i>Chlamydera guttata</i>	Western Bowerbird				✓		✓		✓	✓		✓	✓
MOTACILLIDAE													
<i>Anthus novaeseelandiae</i>	Australian Pipit				✓		✓	✓	✓	✓		✓	
ESTRILDIDAE													
<i>Neochmia ruficauda</i>	Star Finch			P4									✓
<i>Emblema pictum</i>	Painted Finch				✓		✓	✓	✓	✓		✓	✓
<i>Taeniopygia guttata</i>	Zebra Finch				✓		✓	✓	✓	✓	✓	✓	✓
DICAEIDAE													
<i>Dicaeum hirundinaceum</i>	Mistletoebird				✓		✓	✓	✓			✓	✓
HIRUNDINIDAE													
<i>Cheramoeca leucosternus</i>	White-backed Swallow				✓		✓			✓			
<i>Hirundo nigricans</i>	Tree Martin				✓				✓	✓			
<i>Hirundo neoxena</i>	Welcome Swallow				✓								
<i>Hirundo ariel</i>	Fairy Martin				✓				✓	✓	✓	✓	✓

FAMILY and species	Common Name	EPBC	WCA	DEC	Birdata	WAM	A	B	C	D	E	F	G
ALAUDIDAE													
<i>Cinchorhamphus mathewsi</i>	Rufous Songlark				✓		✓					✓	✓
<i>Cinchorhamphus cruralis</i>	Brown Songlark				✓		✓						
<i>Eremiornis carteri</i>	Spinifexbird					✓	✓	✓	✓	✓		✓	✓
<i>Megalurus gramineus</i>	Little Grassbird				✓	✓							
<i>Mirafra javanica</i>	Singing Bushlark				✓								✓
SYLVIIDAE													
<i>Acrocephalus stentoreus</i>	Clamorous Reed-Warbler				✓								

Appendix A-3 Regional herpetofauna

FAMILY and species	Common Name	EPBC	WCA	DEC	WAM	A	B	C	D	E	F	G
AMPHIBIA												
HYLIDAE												
<i>Cyclorana platycephala</i>	Water Holding Frog											✓
<i>Cyclorana maini</i>	Main's Frog				✓							✓
<i>Litoria rubella</i>	Desert Tree Frog				✓							✓
MYOBATRACHIDAE												
<i>Limnodynastes spenceri</i>	Spencer's Frog					✓						
<i>Neobatrachus centralis</i>	Desert Trilling Frog					✓						
<i>Notaden nichollsi</i>	Desert Spadefoot					✓						
<i>Uperoleia russelli</i>	Russell's Toadlet					✓						
REPTILIA												
AGAMIDAE												
<i>Caimanops amphiboluroides</i>	Mulga Dragon				✓							
<i>Ctenophorus caudicinctus</i>	Ring-tailed Dragon				✓		✓	✓	✓	✓	✓	✓
<i>Ctenophorus isolepis</i>	Military Dragon				✓		✓	✓	✓	✓	✓	✓
<i>Ctenophorus nuchalis</i>	Central Netted Dragon				✓		✓					
<i>Ctenophorus reticulatus</i>	Western Netted Dragon				✓							
<i>Diporiphora valens</i>	A dragon										✓	
<i>Lophognathus longirostris</i>	Long-nosed Water Dragon				✓			✓	✓	✓	✓	✓
<i>Pogona minor</i>	Dwarf Bearded Dragon				✓		✓	✓	✓	✓	✓	✓
BOIDAE												
<i>Antaresia perthensis</i>	Pygmy Python				✓	✓	✓		✓			✓
<i>Antaresia stimsoni</i>	Stimson's Python				✓							✓
<i>Liasis olivaceus barroni</i>	Pilbara Olive Python	VU	S1		✓							✓
CHELUIDAE												
<i>Chelodina steindachneri</i>	A turtle				✓		✓					

FAMILY and species	Common Name	EPBC	WCA	DEC	WAM	A	B	C	D	E	F	G
ELAPIDAE												
<i>Acanthophis wellsi</i>	Death Adder				✓							✓
<i>Brachyurophis approximans</i>	NW Shovel-nosed Snake				✓	✓						✓
<i>Demansia psammophis cupreiceps</i>	Yellow-faced Whipsnake				✓						✓	
<i>Demansia rufescens</i>	Rufous Whipsnake				✓							
<i>Furina ornata</i>	Moon Snake				✓							✓
<i>Parasuta monachus</i>	Hooded Snake				✓							
<i>Pseudechis australis</i>	Mulga Snake				✓	✓			✓			✓
<i>Pseudonaja modesta</i>	Ringed Brown Snake				✓							✓
<i>Pseudonaja nuchalis</i>	Gwardar				✓							✓
<i>Suta fasciata</i>	Rosen's Snake				✓					✓		
<i>Suta punctata</i>	Spotted Snake				✓							
<i>Vermicella snelli</i>	Pilbara Bandy-Bandy				✓							
GKKONIDAE												
<i>Diplodactylus conspicillatus</i>	Fat-tailed Gecko										✓	
<i>Diplodactylus savagei</i>	A Gecko				✓						✓	
<i>Diplodactylus stenodactylus</i>	Pale-spouted Ground Gecko				✓	✓					✓	✓
<i>Diplodactylus wombeyi</i>	A Gecko				✓	✓						
<i>Gehyra punctata</i>	Spotted Dtella				✓		✓	✓	✓	✓	✓	✓
<i>Gehyra variegata</i>	Tree Dtella				✓	✓		✓	✓	✓		
<i>Heteronotia binoei</i>	Bynoe's Gecko				✓	✓	✓	✓	✓	✓	✓	✓
<i>Heteronotia spelea</i>	Desert Cave Gecko					✓						✓
<i>Nephrurus wheeleri cinctus</i>	Banded Knob-tailed Gecko				✓							✓
<i>Oedura marmorata</i>	Marbled Velvet Gecko				✓				✓			✓
<i>Rhynchoedura ornata</i>	Beaked Gecko				✓		✓					
<i>Strophurus elderi</i>	Jewelled Gecko					✓						
<i>Strophurus wellingtonae</i>	A Gecko				✓						✓	✓

FAMILY and species	Common Name	EPBC	WCA	DEC	WAM	A	B	C	D	E	F	G
PYGOPODIDAE												
<i>Delma borea</i>	A legless lizard										✓	
<i>Delma butleri</i>	Un-banded Delma				✓			✓				
<i>Delma haroldi</i>	A legless lizard				✓							
<i>Delma nasuta</i>	Long-nosed Delma				✓	✓	✓				✓	
<i>Delma pax</i>	A legless lizard				✓	✓	✓	✓			✓	
<i>Delma tincta</i>	A legless lizard					✓						
<i>Lialis burtonis</i>	Burton's Snake Lizard				✓	✓			✓		✓	✓
<i>Pygopus nigriceps</i>	Hooded Scalyfoot											✓
SCINCIDAE												
<i>Carlia munda</i>	A skink				✓					✓	✓	✓
<i>Carlia triacantha</i>	Rainbow Skink					✓		✓				
<i>Cryptoblepharus camabyi</i>	Fence Skink				✓		✓				✓	✓
<i>Ctenotus duricola</i>	A skink				✓	✓						
<i>Ctenotus helenae</i>	A skink				✓	✓	✓	✓			✓	✓
<i>Ctenotus leonhardii</i>	A skink				✓	✓	✓		✓		✓	
<i>Ctenotus pantherinus</i>	Leopara Skink				✓	✓	✓	✓	✓		✓	
<i>Ctenotus rutilans</i>	A skink				✓							
<i>Ctenotus saxatilis</i>	A skink				✓	✓	✓	✓			✓	✓
<i>Ctenotus uber</i>	A skink											✓
<i>Cyclodomorphus melanops</i>	Spinifex Slender Blue-tongue				✓		✓	✓	✓			
<i>Egernia depressa</i>	Pygmy Spiny-tailed Skink							✓				
<i>Egernia formosa</i>	A skink											✓
<i>Eremiascincus richardsonii</i>	Banded Skink				✓	✓						
<i>Lerista muelleri</i>	A skink						✓					
<i>Lerista neander</i>	A skink				✓	✓	✓	✓				
<i>Lerista zietzi</i>	A skink					✓	✓					✓

FAMILY and species	Common Name	EPBC	WCA	DEC	WAM	A	B	C	D	E	F	G
<i>Menetia greyii</i>	Common Dwarf Skink						✓					
<i>Menetia surda</i>	A skink				✓							
<i>Morethia ruficauda</i>	Three Striped Fire-tail Skink				✓	✓	✓				✓	✓
<i>Tiliqua multifasciata</i>	Central Blue-tongue Lizard					✓					✓	
<i>Tiliqua occipitalis</i>	Western Blue-tongue Lizard											✓
TYPHILOPIDAE												
<i>Ramphotyphlops ganei</i>	A Blind-snake			P1	✓							
<i>Ramphotyphlops grypops</i>	A Blind-snake				✓	✓	✓				✓	
<i>Ramphotyphlops hamatus</i>	A Blind-snake				✓							
VARANIDAE												
<i>Varanus acanthurus</i>	Ridge-tailed Monitor				✓	✓	✓	✓	✓		✓	✓
<i>Varanus brevicauda</i>	Short-tailed Monitor				✓							
<i>Varanus giganteus</i>	Perentie						✓		✓		✓	✓
<i>Varanus gouldii</i>	Gould's Monitor				✓							
<i>Varanus panoptes</i>	Yellow-spotted Monitor				✓	✓						
<i>Varanus pilbarensis</i>	Pilbara Rock Monitor						✓		✓			✓
<i>Varanus tristis</i>	Black-headed Monitor				✓	✓	✓			✓		✓

APPENDIX B RESULTS OF DEC DATABASE
SEARCH

Fauna records between - 23.2541, 119.8555 and -23.4547, 119.6638	
Herpetofauna	
Agamidae	<i>Caimanops amphiboluroides</i>
	<i>Ctenophorus caudicinctus caudicinctus</i>
	<i>Ctenophorus isolepis isolepis</i>
	<i>Ctenophorus nuchalis</i>
	<i>Ctenophorus reticulatus</i>
	<i>Lophognathus longirostris</i>
	<i>Pogona minor minor</i>
Cheluidae	<i>Chelodina steindachneri</i>
Elapidae	<i>Acanthophis wellsi</i>
	<i>Brachyurophis approximans</i>
	<i>Demansia psammophis cupreiceps</i>
	<i>Demansia rufescens</i>
	<i>Furina ornata</i>
	<i>Parasuta monachus</i>
	<i>Pseudechis australis</i>
	<i>Pseudonaja modesta</i>
	<i>Pseudonaja nuchalis</i>
	<i>Suta fasciata</i>
	<i>Suta punctata</i>
	<i>Vermicella snelli</i>
	<i>Acanthophis wellsi</i>
Gekkonidae	<i>Diplodactylus savagei</i>
	<i>Diplodactylus stenodactylus</i>
	<i>Diplodactylus wombeyi</i>
	<i>Gehyra punctata</i>
	<i>Gehyra variegata</i>
	<i>Heteronotia binoei</i>
	<i>Nephrurus wheeleri cinctus</i>
	<i>Oedura marmorata</i>
	<i>Rhynchoedura ornata</i>
	<i>Strophurus wellingtonae</i>
Pygopodidae	<i>Delma butleri</i>
	<i>Delma haroldi</i>
	<i>Delma nasuta</i>
	<i>Delma pax</i>
	<i>Lialis burtonis</i>
Scincidae	<i>Carlia munda</i>
	<i>Cryptoblepharus plagiocephalus</i>
	<i>Ctenotus duricola</i>
	<i>Ctenotus helenae</i>
	<i>Ctenotus leonhardii</i>
<i>Ctenotus pantherinus ocellifer</i>	

Fauna records between - 23.2541, 119.8555 and -23.4547, 119.6638	
	<i>Ctenotus rutilans</i>
	<i>Ctenotus saxatilis</i>
	<i>Cyclodomorphus melanops melanops</i>
	<i>Eremiascincus richardsonii</i>
	<i>Lerista neander</i>
	<i>Menetia surda surda</i>
	<i>Morethia ruficauda exquisite</i>
Typhlopidae	<i>Ramphotyphlops ganei</i>
	<i>Ramphotyphlops grypus</i>
	<i>Ramphotyphlops hamatus</i>
Varanidae	<i>Varanus acanthurus</i>
	<i>Varanus brevicauda</i>
	<i>Varanus gouldii</i>
	<i>Varanus panoptes rubidus</i>
	<i>Varanus tristis tristis</i>
Birds	
Acanthizidae	<i>Gerygone fusca mungi</i>
Accipitridae	<i>Aquila audax</i>
Campephagidae	<i>Coracina novaehollandiae subpallida</i>
Falconidae	<i>Falco cenchroides cenchroides</i>
Laridae	<i>Larus novaehollandiae novaehollandiae</i>
Meliphagidae	<i>Epthianura aurifrons</i>
Otididae	<i>Ardeotis australis</i>
Pachycephalidae	<i>Oreoica gutturalis</i>
Pardalotidae	<i>Pardalotus striatus murchisoni</i>
Psittacidae	<i>Neophema bourkii</i>
Scolopacidae	<i>Calidris acuminata</i>
	<i>Calidris melanotos</i>
	<i>Calidris subminuta</i>
	<i>Tringa hypoleucos</i>
Sylviidae	<i>Eremiornis carteri</i>
	<i>Megalurus gramineus gramineus</i>
Mammals	
	<i>Dasykaluta rosamondae</i>
	<i>Ningau timealeyi</i>
	<i>Planigale sp</i>
	<i>Pseudantechinus woolleyae</i>
	<i>Sminthopsis macroura</i>
	<i>Sminthopsis youngsoni</i>
Emballonuridae	<i>Taphozous georgianus</i>
	<i>Taphozous hilli</i>
Leporidae	<i>Oryctolagus cuniculus</i>
Macropodidae	<i>Macropus robustus erubescens</i>

Fauna records between - 23.2541, 119.8555 and -23.4547, 119.6638	
	<i>Macropus rufus</i>
Molossidae	<i>Chaerephon jobensis</i>
	<i>Mormopterus beccarii</i>
Muridae	<i>Mus musculus</i>
	<i>Notomys alexis</i>
	<i>Pseudomys chapmani</i>
	<i>Pseudomys desertor</i>
	<i>Pseudomys hermannsburgensis</i>
	<i>Zyomys argurus</i>
Vespertilionidae	<i>Chalinolobus gouldii</i>
	<i>Scotorepens greyii</i>
	<i>Vespadelus finlaysoni</i>

APPENDIX C RISK ASSESSMENT

Newman pipeline		Location: Pilbara				Date: 30 th June 2008				
Process/Activity	Event	Impact	Inherent Risk			Residual Risk				
			Likelihood	Consequence	Risk Level	Significance	Likelihood	Consequence	Risk Level	Significance
Vegetation Clearing	Removal of fauna habitat	Loss of current fauna habitat	5	2	10	Mod	4	2	8	Mod
Vegetation Clearing	Removal of fauna habitat	Loss of conservation significant fauna in the project area	2	4	8	Mod	1	4	4	Low
Vegetation Clearing	Removal of fauna habitat	Adverse impact to ecological function	3	3	9	Mod	2	2	4	Low
Human Activity	Increased feral fauna	Increased competition pressure on native fauna	3	3	9	Mod	1	2	2	Low
Human Activity	Increased feral fauna	Increased predation pressure on native fauna	3	3	9	Mod	1	3	3	Low

Newman pipeline		Location: Pilbara				Date: 30 th June 2008					
Process/Activity	Event	Impact	Inherent Risk			Residual Risk					
			Likelihood	Consequence	Risk Level	Significance	Likelihood	Consequence	Risk Level	Significance	
Construction	Fire	Destruction of fauna habitat	2	3	6	Mod	1	4	4	Low	
Construction	Fire	Destruction of fauna of conservation significance	2	4	8	Mod	1	4	4	Low	
Construction and clearing	Dust	Degradation of fauna habitat	3	3	9	Mod	2	2	4	Low	
Construction and clearing	Noise pollution	Disturbance to local fauna	2	2	4	Low	2	2	4	Low	
Construction and clearing	Weed introduction	Degradation of local fauna habitat	2	2	4	Low	2	2	4	Low	
Construction and clearing	Vehicle strikes	Direct fauna mortality	2	2	4	Low	1	2	2	Low	

Risk Matrix		LIKELIHOOD				
		5 - ALMOST CERTAIN	4 - LIKELY	3 - POSSIBLE	2 - UNLIKELY	1 - RARE
Risk Assessment Rating		Is expected to occur in most circumstances	Will probably occur in most circumstances	Could occur	Could occur but not expected	Occurs in exceptional circumstances
CONSEQUENCES	5 - CATASTROPHIC	25	20	15	10	5
	Significant impact to fauna species of conservation significance or regional biodiversity					
	4 - MAJOR	20	16	12	8	4
	Impact to fauna species of conservation significance in project area.					
	3 - MODERATE	15	12	9	6	3
Loss of fauna biodiversity in project area.						
2 - MINOR	10	8	6	4	2	
Short term or localised impact to fauna biodiversity.						
1 - INSIGNIFICANT	5	4	3	2	1	
No impact to fauna of conservation significance or to biodiversity.						