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Mainline Rail Expansion Vertebrate Fauna Survey

BHP Billiton Iron Ore Pty Ltd

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 8

1 INTRODUCTION 12

1.1 Biogeography 14

1.2 Climate 14

1.3 Vegetation 17

1.4 Geology, Landforms and Soils 18

1.5 Hydrology 20

1.6 Land use 20

2 METHODS 21

2.1 Permits and Field Team 21

2.2 Compliance 21

2.3 Level of assessment 22

2.4 Assessment of conservation significance 22

2.5 Taxonomy and nomenclature 25

2.6 Literature and database review 25

2.7 Vertebrate fauna survey 27

2.7.1 Weather 27

2.7.2 Sandplain Transects 28

2.7.3 Targeted Searches 29

2.7.4 Bat recordings 29

2.7.5 Motion camera recordings 29

2.7.6 Trapping 30

2.7.7 Genetic Analysis 30

2.7.8 Nocturnal Surveys 30

2.7.9 Northern Quoll Habitat Assessments 31

2.7.10 General Habitat Assessments 31

2.7.11 Potential limitations and constraints 33

3 VERTEBRATE FAUNA AND FAUNA HABITATS 34
3.1 Overall species diversity 34
3.2 Current field survey 34
3.2.1 Native mammals 40
3.2.2 Birds 41
3.2.3 Reptiles 42
3.2.4 Amphibians 43
3.2.5 Introduced fauna 43
3.3 Fauna habitats of the Study Area 44
4 SIGNIFICANT FAUNA AND FAUNA HABITATS 49
4.1 Significant fauna 49
4.2 Conservation significant fauna recorded 54
4.2.1 Northern Quoll (*Dasyurus hallucatus*) 54
4.2.2 Mulgara (*Dasycercus* spp.) 55
4.2.3 Greater Bilby (*Macrotis lagotis*) 56
4.2.4 Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) 57
4.2.5 Ghost Bat (*Macroderma gigas*) 58
4.2.6 Western Pebble-mound Mouse (*Pseudomys chapmani*) 59
4.2.7 Short-tailed Mouse (*Leggadina lakedownensis*) 59
4.2.8 Rainbow Bee-eater (*Merops ornatus*) 59
4.2.9 Oriental Pratincole (*Glareola maldivarum*) 60
4.2.10 Eastern Great Egret (*Ardea modesta*) 60
4.2.11 Fork-tailed Swift (*Apus pacificus*) 60
4.2.12 Oriental Plover (*Charadrius veredus*) 61
4.2.13 Common Greenshank (*Tringa nebularia*) 61
4.2.14 Peregrine Falcon (*Falco peregrinus*) 61
4.2.15 Australian Bustard (*Ardeotis australis*) 62
4.2.16 Bush Stone-curlew (*Burhinus grallarius*) 62
4.2.17 Grey Falcon (*Falco hypoleucos*) 62

4.2.18 Flock Bronzewing (*Phaps histrionica*) 63
4.2.19 Pictorella Mannikin (*Heteromunia pectoralis*) 63
4.2.20 Black-necked Stork (*Ephippiorhynchus asiaticus*) 63
4.2.21 Pin-striped Finesnout Ctenotus (*Ctenotus nigrilineatus*) 64
4.2.22 *Ctenotus* cf. *uber johnstonei* 64
4.3 Conservation significant fauna potentially occurring within the Study Area 71
4.4 Pilbara endemics 81
4.5 Species of interest 81
4.6 Important fauna habitats 82
4.6.1 Sandplains 82
4.6.2 Fortescue Marsh samphire 82
4.6.3 Gorge/Gully habitat 82
4.6.4 Major Drainage Line habitat 82
4.6.5 Boulder piles/ Granite domes 83
4.7 Priority Ecological Communities 83
4.8 Significant Wetlands 84
5. CONCLUSIONS 86
6. REFERENCES 87

Appendix A Conservation status codes 93
Appendix B Fauna recorded in the Study Area and identified in database searches 95
Appendix C Habitat assessment data 112
Appendix D Survey site locations 123
Appendix E Locations of conservation significant fauna recorded from the Study Area 139

FIGURES

Figure 1.1 Regional location 13

Figure 1.2 Average monthly temperature and rainfall observations at the northern, central and southern sections of the Study Area 16

Figure 2.1 Daily temperatures and rainfall measured at the northern, central and Southern sections of the Study Area during the three phases of the survey. 28

Figure 3.1 Sampling effort 39

Figure 3.2 Fauna habitats within the Study Area 48

Figure 4.1 Conservation significant fauna locations and significant fauna habitats 53

PLATES

Plate 4.1 Northern Quoll recorded on motion camera from the Mooka area in the Northern section of the Study Area. 55

Plate 4.2 Male Brush-tailed Mulgara (*Dasycercus blythi*) and an active Mulgara burrow near Gillam Siding 1 (March 2012). 56

Plate 4.3 Greater Bilby recorded on motion camera from near Turner River within the Northern section of the Study Area. 57

TABLES

Table 1.1 Vegetation types included in the Study Area according to Beard (1975) 17

Table 1.2 Geology of the study site as a stratigraphic column (Blockley, Tehnas et al. 1993) 18

Table 1.3 Soil-landscape zones included in the Study Area according to Tille (2006) 19

Table 2.1 Conservation significance status codes 24

Table 2.2 Databases used for the review 25

Table 2.3 Fauna habitat importance assessment criteria 32

Table 2.4 Survey limitations and constraints 33

Table 3.1 Summary of the number of species recorded/ have the potential to occur in the Study Area 34

Table 3.2 Relative position of previous fauna surveys in the vicinity of the Study Area 35

Table 3.3 Details of all surveys that overlap, to some degree, the current Study Area 36

Table 3.4 Overall survey effort from all surveys that overlap, to some degree, the current Study Area. 40

Table 3.5 Fauna habitats of the Study Area 45

Table 4.1 Conservation significant fauna recorded within the Study Area 65

Table 4.2 Conservation significant fauna potentially occurring within the Study Area 76

Table 4.3 Pilbara endemics and their current distribution 81

Table 4.4 Fauna habitat importance scores 84

EXECUTIVE SUMMARY

Biologic Environmental Survey (Biologic) was commissioned by BHP Billiton Iron Ore Pty Ltd (BHPBIO) to undertake a one season terrestrial vertebrate fauna survey and a comprehensive literature and database review of a corridor approximately 270 km long that covers BHPBIO's rail line between Yandi junction and Port Hedland.

The purpose of the project was to:

- Undertake a comprehensive literature and database review of all fauna surveys and fauna records within the Study Area; and,
- Undertake a one season vertebrate fauna survey of the Study Area to map fauna habitats, describe the vertebrate fauna assemblages within the Study Area and verify the outcomes of previous surveys.

Three databases: NatureMap by Department of Environment and Conservation (DEC), Western Australian Museum's database and BirdLife Australia's Birdata were accessed to determine the potential fauna of the Study Area.

Results of 20 previous fauna surveys, that share a boundary with the Study Area, or have boundaries that overlap and occur in the study area surrounds were incorporated into the literature review.

A single season terrestrial vertebrate fauna survey including fauna habitat assessments, nocturnal surveys, selective trapping and targeted surveys for significant fauna was undertaken by Biologic personnel during 16-29 February, 8-21 March and 12-25 April 2012. The survey targeted species identified during the database review and other species considered likely or possible to occur based on previous experience. A total of 735 km of targeted transects was undertaken on foot by experienced zoologists.

A total of 325 vertebrate fauna species have been recorded within the Study Area, consisting of 38 native and eight introduced mammal species, 170 native and two introduced bird species, 99 reptile species and eight amphibian species. A total of 148 species, comprising 23 native and four introduced mammal species, 64 native bird species, 50 reptile species and seven amphibian species were recorded during the current survey.

Twenty two species of conservation significance have been recorded within the Study Area:

Mammals

- Northern Quoll *Dasyurus hallucatus* –EPBC Endangered, WCA Schedule 1, IUCN Endangered;
- Mulgara *Dasycercus* spp. – *D. cristicauda*: EPBC Vulnerable, WCA Schedule 1, IUCN Least Concern | *D. blythi*: DEC Priority 4, IUCN Least Concern;

- Greater Bilby *Macrotis lagotis* – EPBC Vulnerable, WCA Schedule 1, IUCN Vulnerable;
- Pilbara Leaf-nosed Bat *Rhinonicteris aurantia* – EPBC Vulnerable, WCA Schedule 1, IUCN Least Concern;
- Ghost Bat *Macroderma gigas* – DEC Priority 4, IUCN Vulnerable;
- Western Pebble-mound Mouse *Pseudomys chapmani* – DEC Priority 4, IUCN Least Concern; and
- Short-tailed Mouse *Leggadina lakedownensis* – DEC Priority 4, IUCN Least Concern;

Birds

- Rainbow Bee-eater *Merops ornatus* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Oriental Pratincole *Glareola maldivarum* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Eastern Great Egret *Ardea modesta* – EPBC Migratory, WCA Schedule 3;
- Fork-tailed Swift *Apus pacificus* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Oriental Plover *Charadrius veredus* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Common Greenshank *Tringa nebularia* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Peregrine Falcon *Falco peregrinus* – WCA Schedule 4, IUCN Least Concern;
- Australian Bustard *Ardeotis australis* – DEC Priority 4, IUCN Least Concerned;
- Bush Stone-curlew *Burhinus grallarius* – DEC Priority 4, IUCN Least Concerned;
- Grey Falcon *Falco hypoleucos* – DEC Priority 4, IUCN Vulnerable;
- Flock Bronzewing *Phaps histrionica* – DEC Priority 4, IUCN Least Concerned:
- Pictorella Mannikin *Heteromunia pectoralis* – DEC Priority 4, IUCN Least Concerned; and
- Black-necked Stork *Ephippiorhynchus asiaticus* – IUCN Near Threatened;

Reptiles

- Pin-striped Finesnout Ctenotus *Ctenotus nigrilineatus* – DEC Priority 1; and
- *Ctenotus* cf. *uber johnstonei* – DEC Priority 2.

Based on records from databases (Nature Map and WAM records) and studies conducted in adjacent areas, the following 11 conservation significant species potentially occur within the Study Area:

Mammals

- Western Little Free-tailed Bat *Mormopterus loriae cobourgiana* – DEC Priority 1; and

- Spectacled Hare-wallaby *Lagorchestes conspicillatus leicharti* – DEC Priority 3;

Birds

- Night Parrot *Pezoporus occidentalis* – EPBC Endangered, WCA Schedule 1, IUCN Critically Endangered;
- Eastern Reef Egret *Egretta sacra* – EPBC Migratory, WCA Schedule 3, IUCN Least Concerned;
- Cattle Egret *Ardea ibis* – EPBC Migratory, WCA Schedule 3;
- White-bellied Sea-eagle *Haliaeetus leucogaster* – EPBC Migratory, WCA Schedule 3, IUCN Least Concerned;
- Barn Swallow *Hirundo rustica* – EPBC Migratory, WCA Schedule 3, IUCN Least Concerned;
- Eastern Osprey *Pandion cristatus* – EPBC Migratory; WCA Schedule 3; and
- Star Finch (western subspecies) *Neochmia ruficauda subclarescens* – DEC Priority 4, IUCN Near Threatened;

Reptiles

- Pilbara Olive Python *Liasis olivaceus barroni* – EPBC Vulnerable, WCA Schedule 1; and
- Pilbara Flat-headed Blind Snake *Ramphotyphlops ganei* – DEC Priority 1.

As the database search for potential species was conducted in a 5 km radius around the Study Area, a further 32 species of birds listed as Migratory under the EPBC Act and predominantly associated with coastal marine environments were picked up in database searches. It is deemed unlikely for these species to occur with any regularity or be reliant on habitat within the Study Area. However it is feasible for some of these species to be recorded in the very north of the Study Area at waterbodies, both man-made and storm/cyclone-related, and at the Fortescue Marsh samphire after flooding.

Twelve broad fauna habitats were identified within the Study Area: sandplain, Mulga, Fortescue Marsh samphire, crest/slope, gorge/gully, cracking clay or gilgai, stony plain, stony/ sandplain, granite domes/boulder piles, major drainage lines, drainage lines and artificial habitats. Five of these habitats: sandplain, Fortescue Marsh samphire, major drainage lines, gorge/gully and granite domes/boulder piles were considered as important, based on their ability to support conservation significant species.

The current study recorded active Greater Bilby and Mulgara burrows in sandplain habitat close to the BHPBIOTurner River rail accommodation Camp and identified vast areas of suitable habitat in the sandplains and stony/ sandplains in the northern section of the Study Area for both Bilby and Mulgara. While few previous records of the Crested-tailed Mulgara (*Dasycercus cristicauda*) occur in the area, a specimen collected during the current survey was identified as a Brush-tailed Mulgara (*Dasycercus blythi*) through morphological and

genetic studies. The distribution of boulder piles and granite domes, both of which are important Northern Quoll habitats, were also mapped in detail.

1 INTRODUCTION

Biologic Environmental Survey (Biologic) was commissioned by BHP Billiton Iron Ore (BHPBIO) to undertake a one season terrestrial vertebrate fauna survey and comprehensive literature and database review of an area that extends 1 km either side of the BHPBIO's mainline rail between Yandi Junction and Port Hedland, a distance of approximately 270 km. The area covered under the study measures approximately 540 km^2, and is hereafter referred to as the 'Study Area' (Figure 1.1).

This report provides:

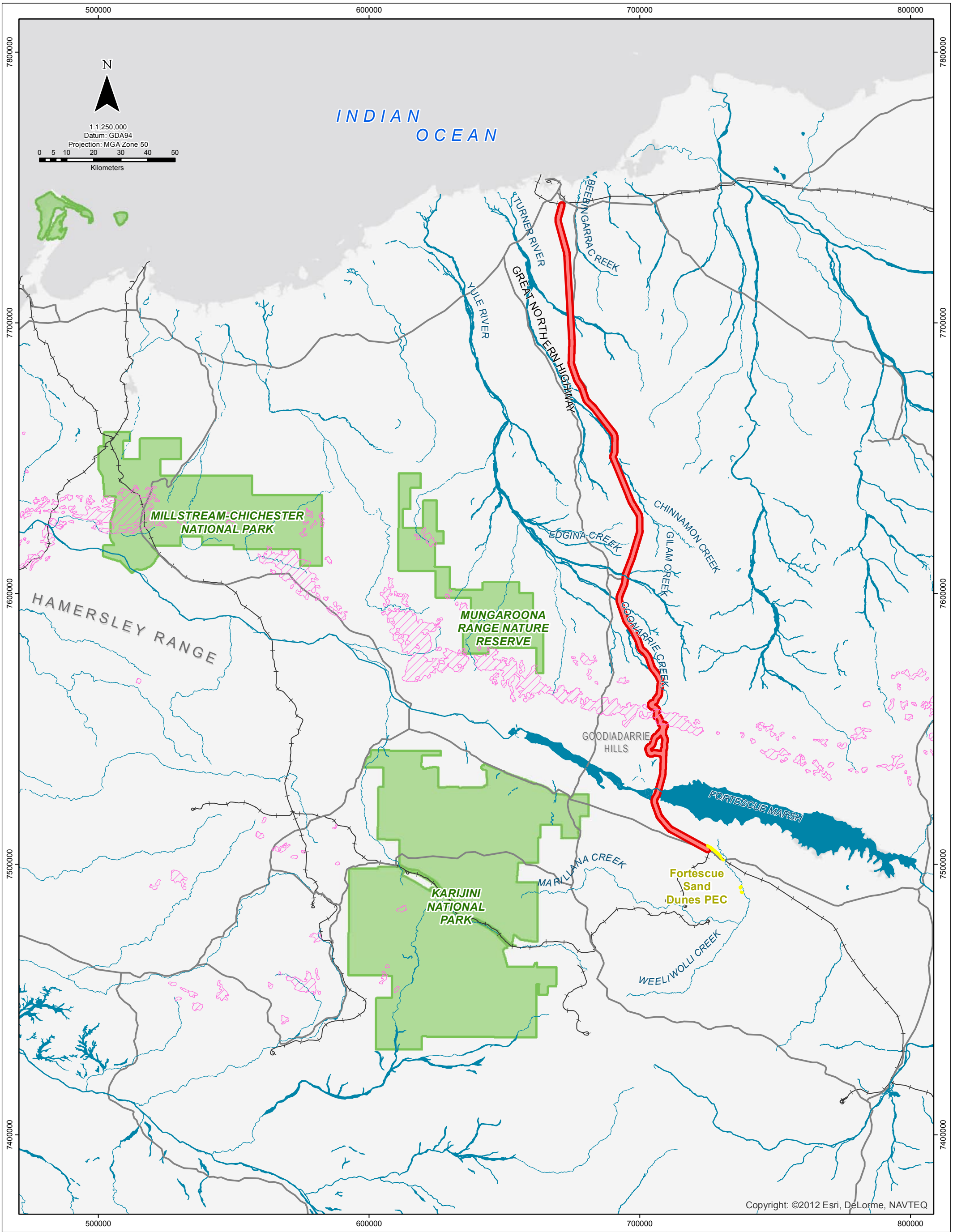
a) a contemporary review and assessment of:

1. Vertebrate fauna within the Study Area, based on consolidated data from all surveys undertaken to-date;
2. International, regional, state / local conservation value of fauna present, or likely to be present, in the Study Area;
3. Significant fauna habitats of targeted species in the Study Area evaluated using BHPBIO's Terrestrial Fauna Habitat Assessment Pro Forma (FRM-IEN-EMS-003); and
4. An updated fauna habitat map for the Study Area, indicating areas of suitable habitat for the conservation significant species and noting any significant habitat features.

b) an inventory of:

5. Species recorded from the Study Area and those that are likely to occur in the area based on previous fauna surveys and databases**;**
6. Characteristics of assessed habitats; and
7. Locations of conservation significant fauna reported within the Study Area.

Additionally, data from this work will contribute to databases at the Western Australian Museum, increasing the knowledge and understanding of the Pilbara fauna.



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BHPBIO MAINLINE

FIGURE 1.1
REGIONAL LOCATION

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Figure:	1.1	Date:	5/03/13
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Legend

- Survey Boundary
- Wona Land System
- Fortescue Sand Dunes PEC
- Nature Conservation Reserve
- Watercourses
- Roads
- Railways

1.1 Biogeography

The Study Area falls within the Pilbara biogeographical region as defined by the Interim Biogeographic Regionalisation of Australia (IBRA) (Thackway and Creswell 1995). The Pilbara bioregion is subdivided into four components (subregions): the Chichester (PIL-1), Fortescue Plains (PIL-2), Hamersley (PIL-3) and Roebourne (PIL-4). Three of these subregions are traversed by the Study Area (Figure 1.1).

The southern end of the Study Area follows the northern margin of the Hamersley subregion and the southern periphery of Fortescue Plains. The Fortescue Plains subregion contains the Fortescue Marsh which is listed as a nationally important wetland (Environment Australia 2001). It is also a proposed Ramsar site. Outside the Marsh this subregion is characterised by River Red Gum woodlands fringing drainage lines and deeply incised gorge systems (Kendrick 2001). Approximately 50km (~18.5%) of the linear distance of the Study Area lies within this subregion.

A majority of the Study Area (~185km; ~68.5%) lies within the Chichester subregion. This is the largest subregion of the Pilbara and covers 47% of the region (McKenzie, van Leeuwen et al. 2009). The subregion is characterised by significant areas of undulating Archaean granite and basalt plains that support a shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, with *Eucalyptus leucophloia* tree steppes occurring on ranges (Kendrick and McKenzie 2001).

The remaining northern end of the Study Area in the vicinity of Port Hedland is within the northern part of the Roebourne subregion. This section comprises mainly Quaternary alluvial and Aeolian coastal and sub coastal plains, with a grass savanna of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia translucens*. These plains contain extensive sandy to heavy clay substrates in areas transversed by active floodplains adjacent to large river systems within the subregion.

1.2 Climate

The Pilbara region has a semi-desert to tropical climate with highly variable, mostly summer rainfall. The average annual rainfall over the broader Pilbara area ranges from about 200 to 350 millimetres (mm), although it may show wide inter-annual fluctuations (Australian Natural Resources Atlas 2007).

The Pilbara climate is heavily influenced by tropical cyclones that develop over the Indian Ocean to the north of Australia. These sometimes cross the north-west coastline, bringing heavy rainfall to inland regions of the Pilbara. Average maximum summer temperatures are typically in the range of 35 degrees Celsius (°C) to 40 °C and winter maximum temperatures are generally between 22 °C and 30 °C (Bureau of Meteorology 2013).

The Study Area extends into a narrow area containing areas with persistently dry climates. A small area adjacent to the central part of the Study Area, within the Chichester subregion, experiences a winter drought climate (McKenzie, van Leeuwen et al. 2009).

Given the elongated shape and the length of the Study Area, the climatic conditions significantly change between the northern and southern ends. Therefore, climatic data from Port Hedland Airport (Station # 4032, which comes within 2.8 km of the northern end of the Study Area), Hillside Station (Station # 4015, which comes within 67 km of the central part of the Study Area) and Wittenoom (Station # 5026, which comes within 92 km of the southern part of the Study Area) were used as reference points for climatic observations in the Study Area (Bureau of Meteorology 2013). The average monthly temperatures and rainfalls observations at the three stations in the year prior to the survey are plotted against the longer-term averages in Figure 1.2.

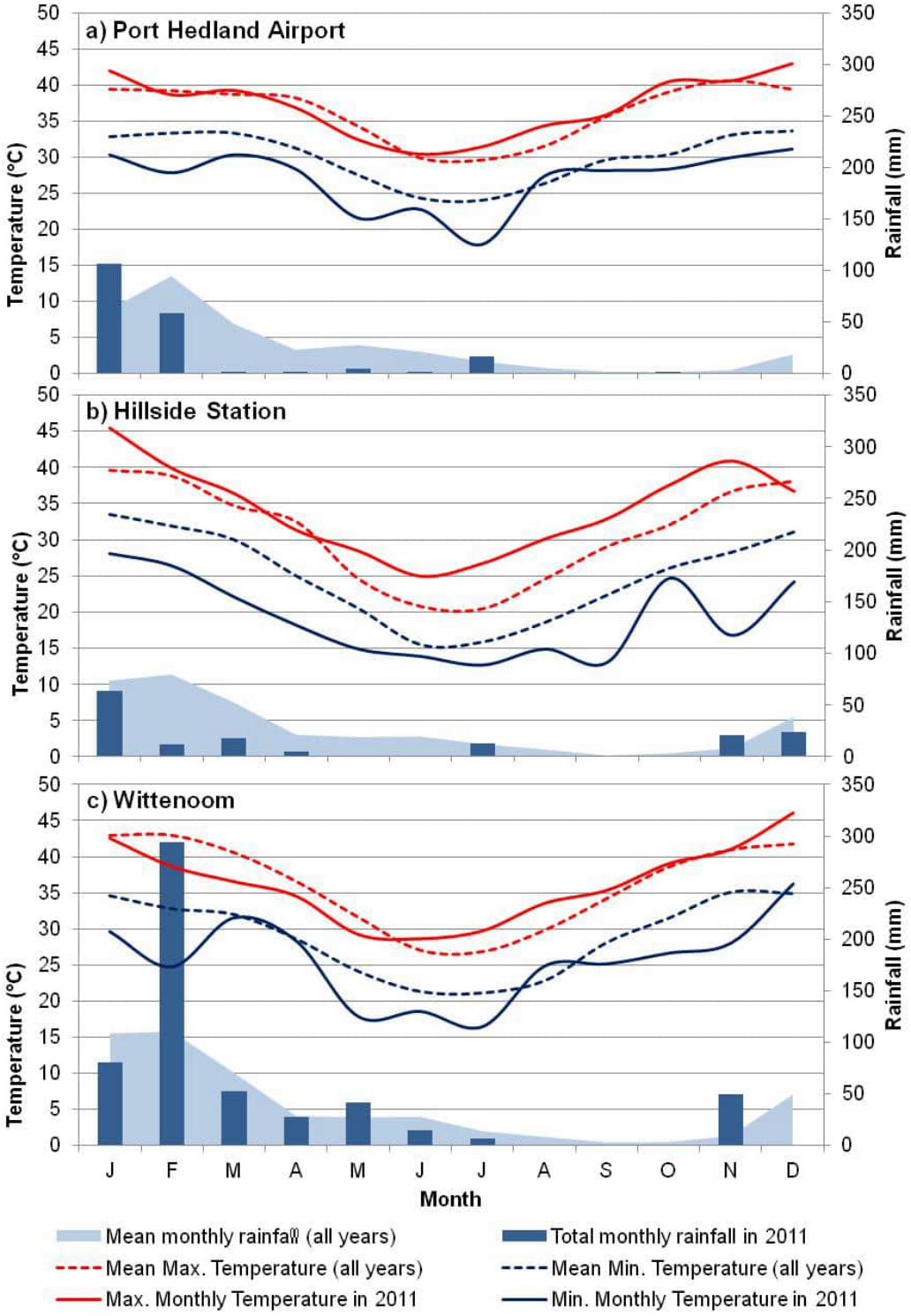


Figure 1.2 Average monthly temperature and rainfall observations at the northern (Port Hedland Airport), central (Hillside station) and southern (Wittenoom) sections of the Study Area. Data from the year prior to the survey are plotted against long-term averages (Bureau of Meteorology 2013).

1.3 Vegetation

In general, the Fortescue Plains subregion contains extensive salt marshes, Mulga-bunch grass and short grass communities on the plains (more towards the east). River red gum (*Eucalyptus camaldulensis*) and Coolabah (*E. victrix*) woodlands, with soft spinifex and Buffel grass (**Cenchrus ciliaris*) understorey, fringe the drainage lines and active floodplains. This is the northern limit of Mulga (*Acacia aneura*) in the Pilbara. The Chichester subregion supports Snappy gum *Eucalyptus leucophloia* tree steppes, and more dominantly a shrub steppe of Ranji bush (*Acacia pyrifolia*) over *Triodia pungens* hummock grasslands. Other spinifex species which may be present in the area include *T. basedowii*, *T. brizioides*, *T. lanigera*, *T. longiceps*, *T. epactia* and *T. plurinervata*. In the north, the Roebourne subregion comprises a grass savanna of mixed bunch and hummock grasses, and dwarf shrub steppe of different *Acacia* species. Samphire, *Sporobolus* and mangal occur on marine alluvial flats in this region. These coastal alluvial plains also support tussock grasslands of Roebourne Plains Grass (*Eragrostis xerophila*) with Neverfail (*E. setifolia*), Weeping Grass (*Chrysopogon fallax*), Swamp Grass (*Eriachne benthamii*) and scattered Snakewood (*Acacia xiphophylla*) and Prickly Wattle (*A. victoriae*).

On a finer scale, vegetation mapping of the Pilbara has been undertaken by Burbidge (1959) and Beard (1975). This was refined by Shepherd *et al.* (Shepherd, Beeston et al.) (2002) to account for clearing in the intensive land use zones. According to Beard (1975) the Study Area lies within the Fortescue Botanical District of the Eremaean Botanical Province. Broadly the vegetation within the Study Area is dominated by Spinifex, Wattles and occasional Eucalypts. The Study Area contains nine out of the 41 vegetation units present in the Pilbara region as mapped by Beard (1975). Table 1.1 discuss these in order from northern coastal areas to the southern interior along the Study Area.

Table 1.1 Vegetation types included in the Study Area according to Beard (1975)

Code	Broad distribution
Acacia stellaticeps dwarf shrubs over *Triodia epactia* hummock grassland	Coastal areas
Kanji *Acacia inaequilatera* shrubs over *Triodia epactia* hummock grassland	Broad granite plains south to Chichester Range
Coolibah *Eucalyptus victrix* and River Red Gum *E. camaldulensis* var. *obtusa* woodlands	Bordering major river systems
Acacia inaequilatera shrubs over mixed *Triodia epactia* and *T. wiseana* hummock grassland	Chichester Range
Short grassland on cracking clays	Chichester Range
Snappy Gum *Eucalyptus leucophloia* trees over *Triodia wiseana* hummock and Mulga *Acacia aneura* in valleys	Southern side of Chichester Range
Mulga groves	Plains around Fortescue Marsh
Succulent steppe with halophytes	Within Fortescue Marsh
Twin-leaf Mallee *Eucalyptus gamophylla* scattered over *Triodia basedowii* hummock grassland	Low footsteps of the Hamersley Range

1.4 Geology, Landforms and Soils

Geologicaly, the Pilbara region contains one of the most complete and best exposed Archaean to Early Proterozoic rock records in the world (Blake and Meakins 1993). These Archaean to Proterozoic rocks of the Pilbara Craton, and Fortescue and Hamersley Groups dominate the region and are overlain by Tertiary to Holocene regolith and rock units. The Study Area broadly spans though Archaean rocks in the north and Pilbara Granite-Greenstone Terranes further south (Table 1.2). Included in these terranes within the region are granitoid rocks, basic and ultrabasic volcanic rocks, and acidic volcanic rocks (Tille 2006).

Table 1.2 Geology of the study site as a stratigraphic column (Blockley, Tehnas et al. 1993)

Age	Group	Formation	Member	Notes
Tertiary				Alluvium, colluvium and calcrete
Archean to Early Proterozoic	Hamersley Group	Brockman Iron Formation	Yandicoogina Shale	Banded Iron Formation (BIF), chert and shale
			Joffre	
			Whaleback Shale	
			Dales Gorge Member	
		Mount McRae Shale		Shale, dolomite, BIF and chert
		Mount Sylvia Formation		
		Wittenoom Formation	Bee Gorge Member	Dolomite, (dolomitic) argillite, chert, carbonate and volcaniclastic rock
			Paraburdoo Member	
			West Angela Member	
		Marra Mamba iron	Mount Newman Member	BIF, shale and chert
			MacLeod Member	
			Nammuldi Member	
Archaean	Fortescue Group	Jeerinah Formation		Pelite, chert and meta-sandstone
		Maddina Formation		Metabasalt and breccia
		Tumbiana Formation		Metamorphic mafic and intermediate volcaniclastic, metabasalt and breccia, chert
			Meentheena Member	stromatolitic dolomite and limestone, carbonate-rich tuff, mudstone, and siltstone
		Kylena Formation		Metabasaltic lava flows with some breccia and meta-sandstone
	Yule Granitoid	Yule Granitoid Complex		Leucogranite with pegmatites

Within the Study Area, the landforms of Chichester subregion is characterised by rugged hills and ridges. The southern mid section of the Study Area runs through stony gilgai plains on the basaltic plateau surface. The sections within the Fortescue and interior of the Roebourne subregions lie on extensive alluvial plains that are sometimes bisected by active floodplains. These alluvial plains have a mixture of sandy surfaces and gilgai flats. The coastal section of Roebourne subregion consists bare tidal mudflats backed by low dunes.

van Vreeswyk et al. (2004) identified 21 broad soil groups from the Pilbara and interpreted their occurrence according to the regions geomorphology. Generally stony soils dominate the hilly terrain, whereas red shallow loams, red deep sandy duplexes and red sandy earths are associated with the stony foot slopes and plains beneath basaltic hills. The alluvial plains (including those of Fortescue River) and the numerous drainage lines have red loamy earths, red/brown non-cracking clays and red loamy earths. Moreover there are localised areas of gilgai cracking clays associated with the basalts of the Chichester Range.

The Pilbara region contains 10 soil-landscape zones of which six are included in the Study Area (Table 1.3).

Table 1.3 Soil-landscape zones included in the Study Area according to Tille (2006)

Zone	Code	Characteristics
Karratha Coast Zone	286	Coastal mudflats (with sandy coastal plains and some hills) on marine deposits (and some sedimentary and volcanic rocks of the Pilbara Craton). Tidal soils with some Calcareous loamy earths, Salt lake soils and Red/brown non-cracking clays. Also included are bare mudflats with some spinifex, tussock grasses, samphire and mangroves.
De Grey-Roebourne Lowlands Zone	281	Alluvial plains and sandplains (and some floodplains and stony plains) on alluvial and marine deposits over rocks of the northern Pilbara Craton. Red deep sandy duplexes with Red loamy earths and some Red/brown non-cracking clays, Cracking clays, Red sandy earths and Red deep loamy duplexes. Spinifex grasslands with Kanji and tussock grasslands.
Abydos Plains and Hills Zone	283	Stony plains (with some hills) on granitic rocks of the Pilbara Craton (East Pilbara Terrane). Red deep sandy duplexes and Red shallow loams with Stony soils, Red sandy earths and Red loamy earths. Spinifex grasslands with Kanji and some tussock grasslands.
Nullagine Hills Zone	280	Hills and ranges (with some stony plains) on volcanic and sedimentary rocks of the Pilbara Craton (including the Hamersley Basin). Stony soils with Red shallow loams and sands. Spinifex grasslands with Kanji and Snappy gum.
Chichester Ranges Zone	282	Hills and dissected plateaux (with some stony plains) on basalt and sedimentary rocks of the Hamersley Basin. Stony soils with some Red shallow loams and Hard cracking clays. Spinifex grasslands with Kanji and Snappy Gum.
Fortescue Valley Zone	284	Alluvial plains, hardpan wash plains and sandplains (with stony plains, floodplains and some salt lakes) on alluvial deposits over sedimentary rocks of the Hamersley Basin. Red deep sands, Red loamy earths and Red/brown non-cracking clays with some Red shallow loams and Hard cracking clays. Mulga shrublands and spinifex grasslands with some tussock grasslands and halophytic shrublands.

1.5 Hydrology

The Pilbara region is one of hydrologic extremes, with droughts of over three years on the same rivers that have floods equivalent to world peak flows (Ruprecht 1996). The region is also characterised by a transition from combined small winter and larger summer flows in the west to only summer flows in the east (Ruprecht 1996). However there are numerous permanent pools maintained by subsurface inflows and/or springs.

The most prominent waterbody in close proximity to the Study Area is the Fortescue Marsh (~40km to the east). This wetland is recognised as being of national significance (Environment Australia 2001), due to it *1*) representing an example for a wetland type in Australia, *2*) having an important ecological and a hydrological role, *3*) providing important habitats/refuges for animal taxa, and *4*) having outstanding historical or cultural significance. This inland floodplain system has the second largest recorded populations of wetland birds in WA (after Lake Gregory).

1.6 Land use

The dominant land uses along the Study Area include grazing, native pastures, conservation, urban areas and mining (Kendrick 2001). A majority of the land within the Study Area falls under pastoral leases or Aboriginal reserves while a smaller section go though unallocated crown land (Department of Environment and Conservation 2010). The Pilbara is the leading mineral resources sector region in WA, thus several active and proposed mines (e.g. Wodgina, Murrays Hill, Koodaideri, Yandi) and their associated infrastructure are in close proximity to parts of the Study Area.

Pastoral leases account for 60 % of the land area within the Pilbara, and a significant part of the Study Area. Of late, the pastoral industry has become increasingly dependent on live export of cattle through Port Hedland. Land degradation associated with fire frequencies, Buffel Grass (**Cenchrus ciliaris*) and overgrazing is a common feature of the region (McKenzie, van Leeuwen et al. 2009).

The existing mainland conservation estates (protected areas) managed by the Department of Environment and Conservation (DEC) include two national parks (Karijini and Millstream-Chichester), a conservation park (Cane River), a nature reserve (Mungaroona Range) and five former lease holds (Mardie, Meentheena, Mt Florence, Mt Minnie and Nanutarra: these pastoral leases have been purchased by DEC for biodiversity conservation but not yet gazetted (Department of Conservation and Land Management 2003)) totalling 14,922 km2 (Landgate 2009). The railine passes ~30km east of the Mungaroona Range nature reserve and through the Woodstock-Abydos Aboriginal Reserve which is not a part of Australia's biodiversity conservation estate system. Tourism is becoming an increasingly important industry in the Pilbara region.

2 METHODS

2.1 Permits and Field Team

The vertebrate fauna sampling for this survey was conducted under the "Licence To Take Fauna For Scientific Purposes" No. SF008482 issued to M. O'Connell.

The assessment was undertaken by ecologists with extensive experience with the fauna in the Pilbara. The following personnel were involved in the field component of the project:

- Mr. Morgan O'Connell – Senior Ecologist;
- Mr. Jeff Turpin – Senior Ecologist;
- Mr. Michael Brown – Senior Zoologist;
- Mr. Ray Lloyd – Senior Zoologist;
- Ms. Amy Griffiths – Senior Zoologist;
- Mr. Tom Rasmussen – Senior Zoologist; and,

Mr Robert Bullen (Bat Call WA) analysed the ultrasonic recordings of bat calls and Mr. Kyle Armstrong (Specialised Zoological) conducted the genetic analysis of Mulgara samples collected during the survey.

2.2 Compliance

This literature and database review and field survey was carried out in a manner consistent with the Western Australian (WA) Environmental Protection Authority (EPA), WA Department of Environment and Conservation (DEC) and BHPBIO's requirements for the environmental surveying and reporting of fauna, including the following guidance statements:

- *EPA Position Statement No. 2, Environmental Protection of Native Vegetation in Western Australia (EPA 2000);*
- *EPA Position Statement No. 3, Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA 2002);*
- *EPA Guidance No. 56, Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (EPA 2004);*
- *Technical Guide - Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA and DEC 2010);*
- *Department of the Environment, Water, Heritage and the Arts (2010) Survey Guidelines for Australia's Threatened Bats;*
- *Department of the Environment, Water, Heritage and the Arts (2010) Survey Guidelines for Australia's Threatened Birds;*
- *Department of the Environment, Water, Heritage and the Arts (2010) Survey Guidelines for Australia's Threatened Frogs;*
- *Department of the Environment, Water, Heritage and the Arts (2011) Survey Guidelines for Australia's Threatened Reptiles;* and

- *Department of the Environment, Water, Heritage and the Arts (2011) Survey Guidelines for Australia's Threatened Mammals.*

2.3 Level of assessment

The level of survey undertaken was a Level 1 fauna survey (EPA 2004) with three field visits undertaken. This survey was specifically designed to determine the presence of species, or their habitat, recognised as:

- threatened fauna on the IUCN Red List;
- threatened fauna under the EPBC Act;
- threatened fauna under the WCA;
- priority fauna recognised by the DEC; and
- other fauna species of local or regional conservation significance.

The current survey is one of 21 vertebrate fauna surveys undertaken in, or adjacent to, the Study Area since 2002. The previous work includes 17 Level 1 or Targeted surveys (ecologia 2007; ecologia 2008; ecologia 2008; ecologia 2008; ecologia 2008; ecologia 2008; ecologia 2008; ENV 2008; ENV 2008; ENV 2008; ENV 2008; ecologia 2009; ecologia 2009; ecologia 2009; Biologic 2010; ENV 2011; ENV 2011), a single one-season Level 2 survey (Biota 2004) and two two-season Level 2 surveys (Biota 2002; ecologia 2008) (see Table 3.3).

Additionally, a large number of surveys have been undertaken in adjoining and surrounding areas. Consequently, the review of species recorded and potentially occurring was considered to be comprehensive, particularly for conservation significant fauna, which were the focus of these surveys. Biologic considers that, with respect to Guidance Statement 56 (EPA 2004), the requirements for a comprehensive baseline fauna survey have been adequately met.

2.4 Assessment of conservation significance

Within Western Australia, native fauna are protected under the *Wildlife Conservation Act 1950* (WCA), and in general terms, any action that has the potential to impact on native fauna or its habitat needs to be approved by relevant State and/or Federal departments as dictated by the Western Australian *Environmental Protection Act 1986* (EP Act) and the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Certain fauna considered to be at risk of extinction or decline are afforded extra protection under these acts. For the purposes of this report, these species are called 'conservation significant species'. A summary of applicable legislation and status codes is provided in

Table 2.1 Conservation significance status codes

Details of conservation status codes are provided in Appendix A. The WCA was most recently updated with the *Wildlife Conservation (Specially Protected Fauna) Notice 2012*

A number of migratory bird and marine species are prioritised for conservation under the EPBC Act or international agreements. In addition, the International Union for Conservation of Nature (IUCN) compiles a Red List on which species at risk are listed (IUCN 2011).

Some species, for which there is insufficient information available for inclusion under the EPBC or WCA, are listed as Priority fauna by the DEC. Priority fauna are generally considered by the EPA and the DEC as species of conservation significance for all environmental impact assessments.

In this report, some species have been identified as having 'local' significance. Locally significant fauna may include short-range endemic (SRE) species, species that have declining populations or declining distributions, species at the extremes of their range, isolated outlying populations, species which may be undescribed (EPA 2004), or species that are rare in the Pilbara but are not otherwise formally recognised at a State or Federal level.

Table 2.1 Conservation significance status codes

Level	Agreement, Act or List	Status Codes
International	The **IUCN *Red List*** lists species at risk under nine categories (listed under 'Status Codes').	IUCN Extinct IUCN Extinct in the Wild IUCN Critically Endangered IUCN Endangered IUCN Vulnerable IUCN Near Threatened IUCN Least Concern IUCN Data Deficient IUCN Not Evaluated
	Migratory taxa listed under the following international conventions are generally listed as Migratory or Marine under the federal *Environment Protection and Biodiversity Conservation Act 1999* (see below): 1. Japan-Australia Migratory Bird Agreement (JAMBA); 2. China-Australia Migratory Bird Agreement (CAMBA); 3. Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA); and, 4. Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).	Generally listed as Migratory or Marine under the federal *Environment Protection and Biodiversity Conservation Act 1999*
Federal	***Environment Protection and Biodiversity Conservation Act 1999* (EPBC)** DSEWPaC lists threatened fauna, which are determined by the Threatened Species Scientific Committee (TSSC) according to criteria set out in the Act. The Act lists fauna that are considered to be of conservation significance under one of eight categories (listed under 'Status Codes').	Extinct Extinct in the Wild Critically Endangered Endangered Vulnerable Conservation Dependent Migratory Marine
State	***Wildlife Conservation Act 1950* (WCA)** At a state level, native fauna are protected under the *Wildlife Conservation Act 1950*. Species in need of conservation are given a ranking ranging from Critically Endangered to Vulnerable.	Schedule 1 Schedule 2 Schedule 3 Schedule 4
State	**DEC Priority list (DEC)** The DEC produces a list of Priority species and ecological communities (e.g. Priority Ecological Communities (PECs) or Threatened Ecological Communities (TECs)) that have not been assigned statutory protection under the *Wildlife Conservation Act 1950*. This system gives a ranking from Priority 1 to Priority 5.	Priority 1 Priority 2 Priority 3 Priority 4 Priority 5

2.5 Taxonomy and nomenclature

Taxonomy and nomenclature of checklists of WA mammals, reptiles and amphibians, published by the Western Australian Museum - WAM (Western Australian Museum 2009), has been adopted for this report. For birds, the current Birds Australia checklist, based on the most recent review of the systematics and taxonomy of Australian birds (Christidis and Boles 2008) has been used.

2.6 Literature and database review

Three databases were accessed to determine the potential fauna assemblage of the Study Area. These were:

- DEC's NatureMap – to determine threatened fauna recorded from the region which also incorporates the results of the Pilbara Biological Survey (DEC 2006);
- WA Museum's database – to determine vertebrate fauna species lodged in the museum's collection from within or adjacent to the survey area;
- Birds Australia's Birdata – to determine records of any significant bird species recorded in the area; and

Details of these database searches are given in Table 2.2.

Table 2.2 Databases used for the review

Provider	Database	Parameters
Department of Environment and Conservation (DEC 2012)	NatureMap. Accessed 11 May 2012	Records inside and within a 5km buffer zone of the study boundary
Western Australian Museum (WAM 2012)	Museum records. Accessed 11 May 2012	
Birds Australia (Birds Australia 2012)	Birdata. Accessed 11 May 2012	

A desktop review of vertebrate fauna surveys undertaken within and surrounding the Study Area was conducted. Twenty previous fauna surveys had boundaries overlap the current Study Area boundary:

- FMG Stage A Fauna Survey (Biota 2004)
- Mooka Siding Level 1 / Targeted Fauna Survey (Biologic 2010);
- Mooka West Fauna Assessment (ENV 2011);
- Port Hedland Regional Fauna Assessment (ENV 2011);
- Rail Turner River Camp Level One Fauna Assessment (ENV 2008);
- Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008);
- RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009);
- RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009);

- RGP5 Fauna Survey Quarry 1 (ecologia 2008), (*note that the report does not provide any co-ordinates*);
- RGP5 Fauna Survey Quarry 2 (ecologia 2008);
- RGP5 Fauna Survey Quarry 4 (ecologia 2008);
- RGP5 Fauna Survey Turner River Camp Expansion (ecologia 2008);
- RGP5 Fauna Survey Walla Siding to Turner Camp & Repeater 2 (ecologia 2008);
- RGP5 Northern Quoll Monitoring (ecologia 2009), (*note that the report does not provide any co-ordinates*);
- RGP5 Quarry 6 Fauna Assessment (ENV 2008);
- RGP5 Redmont/Cowra Camp and Borrow Areas Fauna Survey (ecologia 2007);
- RGP5 Level 2 Fauna Survey Chichester Deviation (ecologia 2008);
- RGP5 Targeted Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008);
- Yule River Level 1 Fauna Assessment (ENV 2008); and,
- Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002).

Additionally, six surveys have been conducted in nearby areas (boundaries do not overlap with the current Study Area) and provide a regional context for the fauna recorded in the Study Area. Regional surveys reviewed for this report were:

- Bird Survey of Nelson Point Wetlands in April 2011 (Bennelongia 2011);
- Boodarie Depot Terrestrial Fauna Assessment (ENV 2009);
- RGP5 Fauna Survey Newman to Jimblebar Junction (ecologia 2008), (*note that the report does not provide any co-ordinates*);
- RGP5 Repeater 9 Access Road Fauna Assessment (ENV 2008);
- Wallwork Road Bridge Fauna Assessment (ENV 2010); and,
- RGP5 Jimblebar Junction to Yandi Junction Railway Reserve and Repeaters 6, 7 and 8 Fauna Assessment (ENV 2008), (*note that the report does not provide any co-ordinates*).

2.7 Vertebrate fauna survey

At least 26 surveys have been undertaken to support approvals for construction of the BHPBIO rail and nearby proposed and constructed rail. Therefore ample baseline data is available for vertebrate fauna within the Study Area. Given the amount of contextual information available of the fauna within the Study Area, resources were allocated to undertaking targeted species surveys within selected habitats, undertaking habitat assessments to determine significant fauna habitat and undertaking targeted searches to record species that are currently missing from the species inventory.

To fulfil the objective of confirming the presence of conservation significant species, a range of fauna survey activities (sandplain transects, targeted searches, bat recordings, motion sensitive cameras, trapping, nocturnal surveys: sections 2.7.2-2.7.8) were employed to specifically target these species (see below). Three habitat types were identified as under sampled during the literature review. It was deemed appropriate that systematic trapping take place at these locations (Fortescue Marsh samphire, gilgai and the base of boulder piles) to ensure that no gaps in knowledge occur for the Study Area.

2.7.1 Weather

Daily temperatures and rainfall during the survey period are shown in Figure 2.1. Given the elongated shape and the length of the Study Area, data from the Port Hedland Airport (Station # 4032, located approx. 2.8 km to the north-west from the northern tip of the Study Area), Hillside Station Office (Station # 4015, located approx. 67 km to the east from the central section of the Study Area) and Wittenoom (Station # 5026, located approx. 92 km to the west from the southern end of the Study Area) have been used as reference points for climatic observations in the Study Area (Bureau of Meteorology 2013).

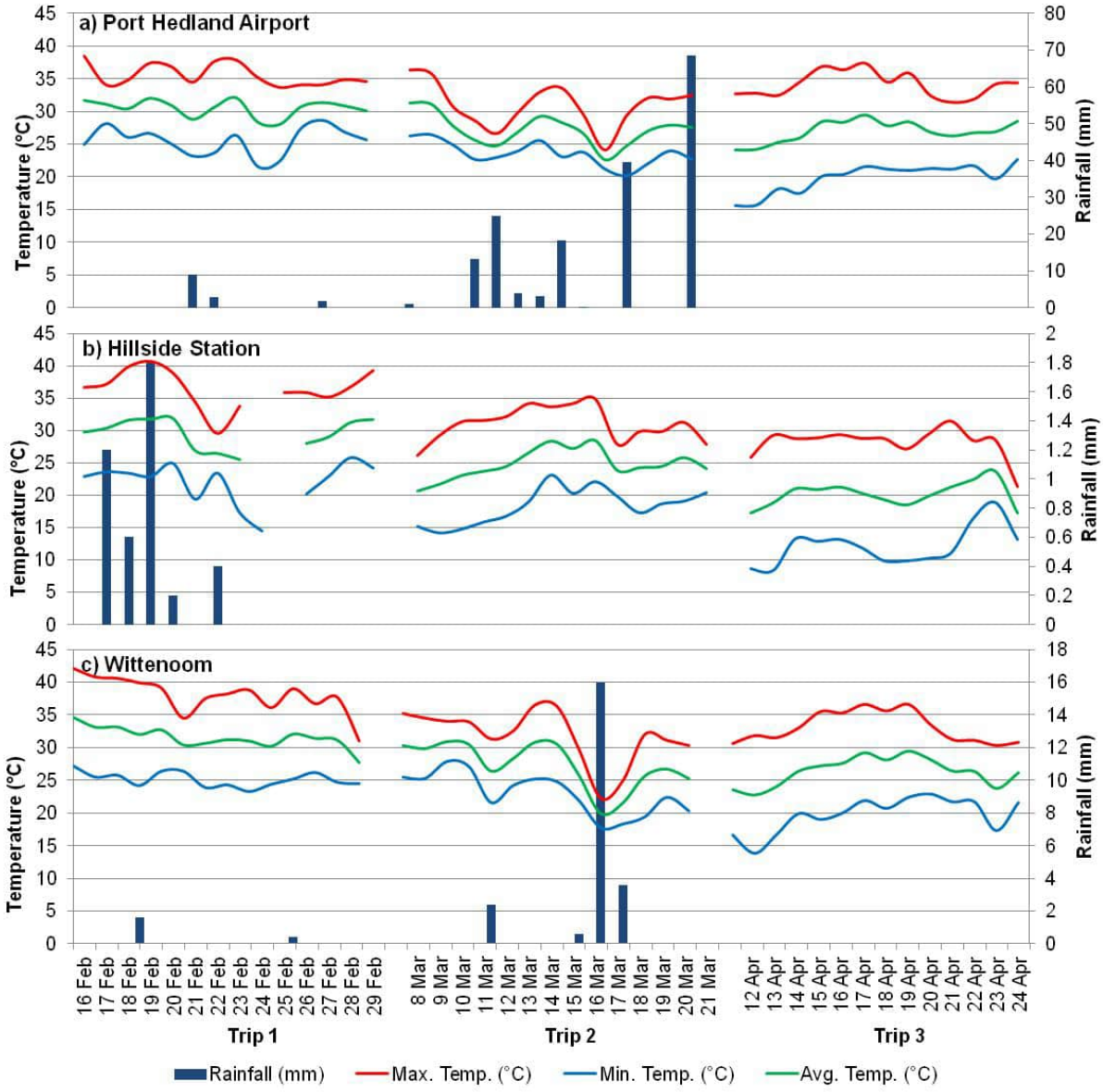


Figure 2.1 Daily temperatures and rainfall measured at the northern (Port Hedland Airport), central (Hillside station) and Southern (Wittenoom) sections of the Study Area during the three phases of the survey (Bureau of Meteorology, 2012).

2.7.2 Sandplain Transects

Meandering transects for searches within sandplains were the most utilised technique to record species of significance. From aerial photography, habitat mapping for the Roy Hill tenement (Biologic *in prep*.) and FMG's Rail (Biota 2004), and Biologic's prior experience in the area, it was estimated that ~250 km (longitudinal length) of the Study Area needed to be walked. Six people, with three on each side of the rail track, spaced approx. 300-350 m apart,

actively searched the Study Area for burrows, scratching, diggings and scats of target species (in particular Mulgara and Greater Bilby). The searches were restricted to one side or two transects instead of three in some areas either due to unnavigable landscape or the presence of non-target habitat (see Figure 3.1; note that the transects in the figure are idealised and do not represent the exact search paths). Extensive areas of Mulga were also avoided as this habitat is not known to harbor any of the species targeted. When a patch of particularly suitable habitat was located within the sandplains, the team of three individuals joined and undertook a more intense searching configuration (see Figure 3.1, 'Intense Search Areas'). When diggings, burrows or scats were observed, a general search of the area determined the extent of burrows.

2.7.3 Targeted Searches

Gullies and Gorges: Teams of two searched through the gullies and gorges located in the southern section of the Study Area in proximity to the Chichester Ranges. These gullies and gorges were first selected from aerial photography and subsequently checked on foot. All caves were thoroughly searched for the presence of target species such as bats, Northern Quolls and Pilbara Olive Pythons or indirect evidence for their presence (e.g. scats). Important physical characteristics of each cave were recorded. Locations and physical characteristics of permanent water bodies were also recorded.

Other Habitats: From habitat mapping (Biota 2004) and aerial photography it was evident that some habitats outside the transects required additional targeted sampling because sampling in these habitats were underrepresented in previous surveys. This was undertaken in habitats around the Fortescue Marsh in a bid to increase baseline knowledge. Accordingly, nine survey sites were selected to represent cracking clay and Mulga habitat. Each site was actively searched by raking leaf litter, peeling bark and rolling rocks by two individuals for 30-120 minutes depending on the extent of habitat present.

2.7.4 Bat recordings

Three SM2BAT detectors (Wildlife Acoustics, USA) recorded 264 hrs (22 nights) ultrasonic calls, using the manufacturer's recommendations contained in the user manual (Wildlife Acoustics 2010). Selectable filters and triggers were also set using the manufacturer's recommendations. Units were placed at ground level in locations likely to record significant bat species (caves, water points) and in all habitat types to increase baseline data (see Figure 3.1, 'Bat Detector'). Bat sound recordings began at sunset and continued until sunrise. Ultrasonic recordings were analysed by Bob Bullen (Bat Call WA).

2.7.5 Motion camera recordings

Motion sensitive cameras (Bushnell Trophy Cameras) were used to survey for larger mammals (e.g. macropods, possums), conservation significant species (e.g. northern quolls,

Greater Bilbies and Mulgaras) and introduced mammalian predators. Cameras were set up in suitable habitats or at burrows to target conservation significant species. Five cameras were activated for a total of 648 hrs during the study period (see Figure 3.1, 'Remote Camera').

2.7.6 Trapping

Trapping was in-corporated to the sampling effort to collect additional data on fauna present in three less-known, but potentially important habitats: *i.e.* Fortescue Marsh samphire, boulder piles and gilgai cracking clay. Trapping sites comprised fence lines, funnel traps and Elliott traps baited with rolled oats, peanut butter and sardines (see Figure 3.1, 'Funnel & Elliot traps'). Trapping was conducted for seven nights in cracking clay, five in Fortescue Marsh samphire and four among boulder piles.

Where potentially active burrows of Mulgara were recorded, traps were placed in close proximity in an effort to capture an individual. The locations of all traps were numbered, recorded with a GPS and their position marked with flagging tape. Traps were cleared within three hours of sunrise. Tissue samples and standard measurements (body lengths and weight) were taken whenever a conservation significant species was captured.

2.7.7 Genetic Analysis

Several available marker systems were developed at the Science Centre at South Australian Museum to distinguish the two species of *Dasycercus* from tissue samples based on molecular genetic characters. Samples of 5-6 individuals per species were chosen from the Australian Biological Tissue Collection (ABTC; South Australian Museum). The identifications of these had been checked and confirmed previously. An outgroup, *Dasyuroides byrnei* (ABTC26615), was included for comparison. New molecular genetic markers were developed based on custom-designed primers from three regions: bases 1–150 of the *NADH dehydrogenase 2 mitochondrial region* (ND2; primers M1555/M1556); bases 1–325 of the *NADH dehydrogenase 4 mitochondrial region* (ND4; primers M1557/M1558); and a 323 base pair fragment within the *interphotoreceptor retinoid-binding protein* (IRBP) nuclear sequence (primers G2243/G2244). The three gene regions were amplified using the Polymerase Chain Reaction (PCR) and Sanger sequenced in all 11 chosen representatives and the outgroup.

A single tissue sample collected from a mulgara at Abydos Station was PCR amplified and sequenced for the same regions using the custom designed primers and identified based on comparisons with the new molecular genetic framework from the ABTC samples in a distance-based phylogenetic tree.

2.7.8 Nocturnal Surveys

Nocturnal surveys were conducted throughout the entire length of the Study Area. Three vehicles, each with two personnel, traversed roads within the Study Area at low speed with spotlights searching for fauna. Searches were also undertaken on foot within 200 m of the

vehicles in habitat suitable for the target species (see Figure 3.1, 'Spotlighting'). Nocturnal searches targeted crepuscular or highly nocturnal fauna such as night birds, mammals, amphibians and reptiles such as snakes and geckos that may be largely hidden during the day. A total of eight nights of nocturnal spotlight searches were undertaken during the last field visit between 13-24 April 2012. During this time, nocturnal temperatures were reasonably warm and humid.

2.7.9 Northern Quoll Habitat Assessments

The entire length of the Study Area was surveyed for potential denning and foraging habitats for Northern Quolls (see bleow). The potential habitats were initially identified using aerial photographs. Typical Northern Quoll denning habitats in the Pilbara are associated with rocky habitats. While rocky habitats large and complex enough to support larger populations of Northern Quolls (*i.e.* quarries, large granite boulder areas) are used as core denning habitats, other smaller rocky areas (*i.e.* isolated rock piles) will be used as temporary or transient denning sites whilst individuals are dispersing or foraging over wider areas. Accordingly probable denning areas (ranges, escarpments, mesas, gorges, breakaways, boulder fields, major drainage lines and tree-lined creek lines) identified through aerial photographs were subsequently searched for quolls and secondary evidence such as scats and tracks. A total of 139 assessments were conducted during the current survey at potential Northern Quoll habitat locations (see Figure 3.1, 'Quoll survey sites'). Furthermore the presence of granite domes were mapped on aerial photography since these represent excellent foraging habitat for Northern Quolls (Figure 3.2). The domes also retain water in some locations attracting various vertebrates (especially breeding amphibians) and invertebrates. However, they are not suitable denning habitat for Northern Quolls due to a lack of crevices and structural complexity.

2.7.10 General Habitat Assessments

Habitat assessment sites were selected to include a representative set of fauna habitats/ community types within the Study Area and include areas of potential conservation significance. The sites spanned the complete geographic extent of the Study Area.

Onshore (*in prep*.) has recently completed a survey and review of vegetation and flora surveys conducted within the Study Area. Fauna habitat maps have been derived from vegetation boundaries defined during an earlier survey (Onshore 2011), and are based on field observations and fauna habitat assessments conducted by Biologic (current study).

A total of 137 fauna habitat assessments were conducted covering all the major habitats (see Figure 3.1, 'General Habitat'). Habitats in the Study Area were assessed using methodology and terminology adapted from the *Australian Soil and Land Survey Field Handbook*

(Commonwealth Scientific and Research Organisation 2009) and modified to suit the survey requirements. The characteristics recorded during the habitat assessments were:

- Site information, including photo and location (GDA94 / WGS84);
- Landform: slope, relative inclination of slope, morphological type and landform type;
- Vegetation: disturbance, condition, leaf litter %, twig litter %, wood litter, dead stags and hollow bearing trees per 2500 m^2, broad floristic formation, tree, shrub and grass structure (each at tall, mid and low strata), dominant trees, shrubs, grasses and herbs;
- Land surface: microrelief, sheet erosion, rill erosion, gully erosion, gully depth, abundance and size of coarse fragments, rock outcropping, water bodies, comments on nests, burrows, roosts and diggings;
- Soil: texture, colour, water status and strength; and
- Substrate: substrate form, rock type and comments on geology.

Fauna habitats were also assessed for the likelihood that they may support conservation significant fauna, and therefore represent 'important fauna habitats'. All major fauna habitats present within the Study Area were sampled and scored (High, Medium or Low) according to the criteria shown in Table 2.3. The importance of each fauna habitat for conservation significant fauna is discussed in Section 4.6.

Table 2.3 Fauna habitat importance assessment criteria

Score	Criteria
High	1) Used by EPBC Act listed threatened fauna or WCA Schedule 1 or 4 fauna for breeding, shelter or core foraging habitat, OR 2) Habitat for species listed as above is present in the Study Area, and there are records of that species within 50 km of the Study Area. If limited surveys have been undertaken in the vicinity of the Study Area then a precautionary approach will be used and the species will be considered likely to be present, OR 3) Uncommon habitat is critical habitat for a population of DEC listed Priority fauna. For example, if habitat is limited in the region and the habitat in the Study Area forms a significant portion of the known habitat for a Priority species, it would be scored as High significance.
Medium	1) Habitat supports DEC listed Priority fauna that are largely restricted to that habitat type within the Study Area. OR 2) Habitat supports EPBC Act listed Migratory and WCA Schedule 3 fauna. OR 3) Habitat supports a particularly diverse and uncommon faunal assemblage. Habitat that occurs throughout the region, and does not occur in small or isolated areas, is excluded.
Low	Habitat is widespread, common, and does not solely support any significant fauna.

2.7.11 Potential limitations and constraints

EPA Guidance Statement No. 56 (EPA 2004) outlines several potential limitations to fauna surveys. These are presented and discussed in Table 2.4 below.

Table 2.4 Survey limitations and constraints

Potential limitation or constraint	Applicability to this survey
Experience of personnel.	The field personnel involved in the survey had an average of five years fauna survey experience in the Pilbara.
Scope (what faunal groups were sampled and whether any constraints affect this).	Scope was a Level 1 survey and within that framework was completed. Habitat assessments, nocturnal surveys, bat call recordings and targeted surveys for conservation significant species were also conducted.
Proportion of fauna identified.	All fauna were identified at the point of capture or observation.
Sources of information (recent or historic) and availability of contextual information.	At the regional level, the Study Area has been the subject of many targeted biological surveys in the past, primarily for the resource sector. Site-specific data exists for all these surveys.
Proportion of the task achieved.	Three field surveys of the Study Area were completed.
Disturbances (e.g. fire or flood).	Rain was encountered towards the end of the second field survey. Additional surveying was scheduled for the third trip to defer any limitation to the survey. There were no other disturbances that had the potential to affect the completeness of the survey.
Intensity of survey.	A Level 1 survey was identified by BHPBIO as the requirement for this survey.
Completeness of survey.	The Level 1 survey is complete.
Resources (e.g. degree of expertise available).	All resources required to complete the survey were available.
Remoteness or access issues.	No restrictions to access were encountered. All habitats types within the Study Area were surveyed as well as all habitat considered to be suitable for conservation significant species.

3 VERTEBRATE FAUNA AND FAUNA HABITATS

3.1 Overall species diversity

Database searches and the review of previous survey reports indicated that 376 species of vertebrate fauna (excluding freshwater fish) have the potential to occur within the Study Area (Appendix B). This list comprises 42 species of native and eight species of introduced mammals, 186 species of native and two species of introduced birds, 126 species of reptiles and 12 species of amphibians. These species have either been recorded within the Study Area itself or in a ~5 km buffer region surrounding the Study Area. Details of previous surveys within the region are summarised in Tables 3.2 and 3.3.

The review of previous surveys and databases indicated that 61 fauna species of conservation significance have either been previously recorded or potentially occur within the Study Area. These species are discussed further in Sections 4.2 and 5.3.

3.2 Current field survey

During the current survey, 23 native and four introduced mammal, 74 bird, 50 reptile and seven amphibian species were recorded, totalling 158 species. Seventeen of these were species of conservation significance and are discussed in Section 4.2 with other conservation significant species reported from the area. Of the total, 23 species of vertebrates (including six species of conservation significance) were first recorded within the Study Area during the current study.

Table 3.1 Summary of the number of species recorded/ have the potential to occur in the Study Area

Group	No. of Spp. previously recorded from the Study Area[1]	Total No. of Spp. recorded during current study	No. of new records during the current study	No. additional species that could occur in the area[2]	Total number of species likely to be present in the area
Mammals (native)	36	23	1	3	**42**
Mammals (intro.)	8	4	0	0	**8**
Birds (native)	163	64	7	12	**182**
Birds (intro.)	2	0	0	0	**2**
Reptiles	88	50	12	26	**125**
Amphibians	7	7	1	2	**10**
Total	**303**	**148**	**22**	**44**	**369**

[1] During all surveys conducted within the Study Area including the current survey
[2] According to database searches

Table 3.2 Relative position of previous fauna surveys in the vicinity of the Study Area

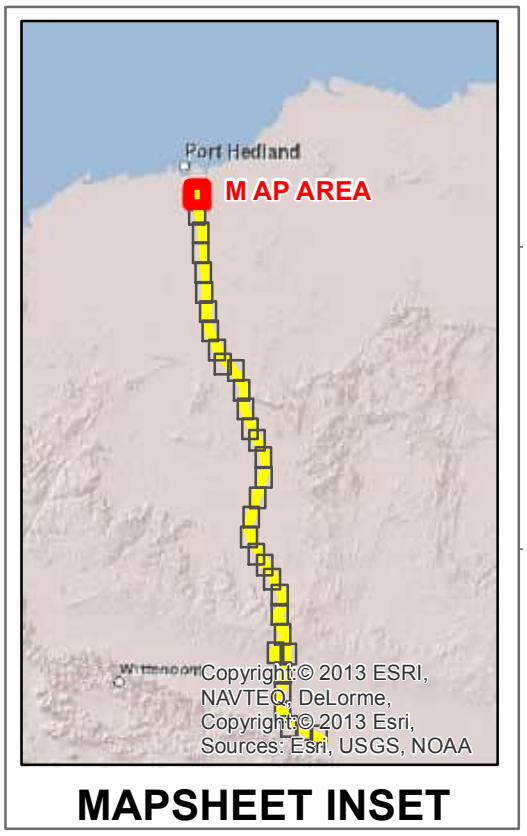
Report	Consultant	Year	Survey Type	Sites not within the Study Area	Distance from the Study Area
FMG Stage A Fauna Survey	Biota	2004	Single phase, Level 2	-	Majority of sites lie on the FMG Rail line running parallel to the BHP Mainline. This rail line falls outside, though adjacent, to the 1 km buffer of the Study Area.
Mooka Siding Level 1 / Targeted Fauna Survey	Biologic	2010	Level 1		Overlaps the current Study Area.
Mooka West Fauna Assessment	ENV	2011	Level 1/ Targeted	12 transects	Site boundary is adjoining to Study Area boundary; transects run between the Study Area and the FMG Rail line.
Port Hedland Regional Fauna Assessment	ENV	2011	Level 1	12	3 ANABAT sites, 2 motion camera sites, and 7 targeted transects were outside of the Study Area. These sites were situated up to 15 km away from the Mainline.
Rail Turner River Camp Level One Fauna Assessment	ENV	2008	Level 1	0	Site appears to be adjoining to the mainline, within the Study Area
Rapid Growth Project 5: M270SA Fauna Assessment	ENV	2008	Level 1	-	The survey boundary appears to lie within the 1 km radius of the Study Area.
RGP5 Fauna Survey Nelson Point to Bing Siding	Ecologia	2009	Level 1	3	3 trap sites lie outside the Study Area, falling along a side road running to the west of the Study Area.
RGP5 Fauna Survey Northern Quoll Wider Area Survey	Ecologia	2009	Level 1	20	Quarries 1, 2 and 4 fall within the Study Area. An additional 20 opportunistic/Elliott trap sites were situated up to 30 km away from the Study Area.
RGP5 Fauna Survey Quarry 1	Ecologia	2008	Level 1/ Targeted	0	Site lies adjoining the Minline. Site is within the Study Area.
RGP5 Fauna Survey Quarry 2	Ecologia	2008	Level 1/ Targeted	0	Site lies adjoining the Mainline. Site is within the Study Area.
RGP5 Fauna Survey Quarry 4	Ecologia	2008	Level 1	0	Site lies adjoining the Mainline. Site is within the Study Area.
RGP5 Fauna Survey Turner River Camp Expansion	Ecologia	2008	Level 1	0	Site lies adjoining the Mainline. Site is within the Study Area.
RGP5 Fauna Survey Walla Siding to Turner Camp & Repeater 2	Ecologia	2008	Level 1	0	Walla Siding, Turner Camp and Repeater 2 all lie adjoining the Mainline. Sites are within the Study Area.
RGP5 Northern Quoll Monitoring	Ecologia	2009	Targeted	0	Quarries 1, 2 and 3 are all adjoining the Mainline, within the Study Area.
RGP5 Quarry 6 Fauna Assessment	ENV	2008	Level 1	0	Site lies adjoining the Mainline. Site is within the Study Area.
RGP5 Redmont/Cowra Camp and Borrow Areas Fauna Survey	Ecologia	2007	Level 1	0	All sites appear to lie adjoining the Mainline, inclusive of the Chichester Deviation.
RGP5 Level 2 Fauna Survey Chichester Deviation	Ecologia	2008	Level 2. Two phase	0	All sites fall within the Study Area, inclusive of the Chichester Deviation.
RGP5 Targeted Northern Quoll Survey Quarry 1,2, 4 and East Turner River	Ecologia	2008	Level 1	0	All sites appear to lie adjoining the Mainline, inclusive of the Chichester Deviation.
Yule River Level 1 Fauna Assessment	ENV	2008	Level 1	0	Site lies adjoining the Mainline. Site is within the Study Area.
Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey	Biota	2002	Single Season, Level 2	0	Sites all fall on the Mainline within the Study Area

Table 3.3 Details of all surveys that overlap, to some degree, the current Study Area

Title	FMG Stage A Fauna Survey	Mooka Siding Level 1 / Targeted Fauna Survey	Mooka West Fauna Assessment	Port Hedland Regional Fauna Assessment	Rail Turner River Camp Level One Fauna Assessment	Rapid Growth Project 5: M270SA Fauna Assessment	RGP5 Fauna Survey Nelson Point to Bing Siding	RGP5 Fauna Survey Northern Quoll Wider Area Survey	RGP5 Fauna Survey Quarry 1	RGP5 Fauna Survey Quarry 2	RGP5 Fauna Survey Quarry 4	RGP5 Fauna Survey Turner River Camp Expansion	RGP5 Fauna Survey Walla Siding to Turner Camp & Repeater 2	RGP5 Northern Quoll Monitoring	RGP5 Quarry 6 Fauna Assessment	RGP5 Redmont/Cowra Camp and Borrow Areas Fauna Survey	RGP5 Level 2 Fauna Survey Chichester Deviation	RGP5 Targeted Northern Quoll Survey Quarry 1,2, 4 and East Turner River	Yule River Level 1 Fauna Assessment	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey	Current Survey
Survey information																					
Consultant	Biota	Biologic	ENV	ENV	ENV	ENV	Ecologia	Ecologia	Ecologia	Ecologia	Ecologia	Ecologia	Ecologia	Ecologia	ENV	Ecologia	Ecologia	Ecologia	ENV	Biota	Biologic
Year	2004	2010	2011	2011	2008	2008	2009	2009	2008	2008	2008	2008	2008	2009	2008	2007	2008	2008	2008	2002	2012
Type	Single phase, Level 2	Level 1	Desktop/ Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Targeted	Level 1	Level 1	Level 2. Two phase	Level 1	Level 1	Single Season, Level 2	Level 1
Relevance to the Study Area	Runs parallel on the east	Extends from railway line chainages 27.5 km to 38.5 km (approximately 10 km,	Site boundary adjoins Study Area boundary	Some sites fall outside of the Study Area	Sites fall within the Study Area	Site lies within 1 km radius of Study Area boundary	3 sites fall outside the Study Area along a side road	3 quarries fall inside Study Area; 20 trap sites outside of Study Area	Sites fall within the Study Area	Sites fall within the Study Area	Sites fall within the Study Area	Sites fall within the Study Area	Sites fall within the Study Area	Sites fall within the Study Area	Sites fall within the Study Area	Sites fall within the Study Area, inclusive of the Chichester Deviation	Sites fall within the Study Area, inclusive of the Chichester Deviation	Sites fall within the Study Area, inclusive of the Chichester Deviation	Sites fall within the Study Area	Sites fall within the Study Area	
Duration	20th May – 7th April 2004	20-26 July 2010; 1-5 Nov 2010	5-6 February 2011	11-20 July 2011	21 February 2008	21, 22, 25 May 2008	22 April 2008	13-18 September 2008	21st April 2008; 7th May 2008	7th May 2008	12th August 2008	19 April 2008	6-9 May 2008; 8 May 2008	23-27 June 2009	24-26 May 2008	13-16 November 2007	11-24 Oct 2007; 19 April-1 May 2008	14-15 July 2008	17-18 Jan 2008	29 Apr-14 May 2001; 23 June 2001-1 July 2001	16-29 Feb 2012; 8-21 Mar 2012; 12-25 Apr 2012
No. of trapping sites	18	0	0	0	0	0	0	15	1	0	0	0	0	3	0	0	13	0	0	33	3
Site composition	10 traps/site	N/A	N/A	N/A	N/A	N/A	N/A	Traps set in a straight line; 20-30 m spacing	24 Elliotts left at Quarry 1 overnight	N/A	N/A	N/A	N/A	1 trap per 6-9 m	N/A	N/A	Per site: 10 pitfall traps, 20 funnel traps, 20 Elliott traps and 2 cage traps	N/A	N/A	Per site; 10 pitfalls spaced 10 m apart; Elliotts used at 5 sites	10 transect lines per site. Twenty funnels, 10 elliots.
Trapping nights	Up to 5 nights/site	0	0	0	0	0	0	2	1	0	0	0	0	2 nights (Quarries 2, 3); 3 nights (Quarry 1)	0	0	Up to 13 nights/ phase	0	0	Up to 7 nights/site (256 trap nights total)	7 nights per site
Trapping effort																					
Cage nights	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	280	0	0	0	0
Elliott nights	0	0	0	0	0	0	0	483	24	0	0	0	0	346	0	0	2800	0	0	590	160
Funnel nights	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2800	0	0	0	160
Bucket nights	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2310	0
PVC pipe nights	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1400	0	0	0	0
Total trap effort	**1000**	**0**	**0**	**0**	**0**	**0**	**0**	**483**	**24**	**0**	**0**	**0**	**0**	**346**	**0**	**0**	**5880**	**0**	**0**	**2900**	**320**

Title	FMG Stage A Fauna Survey	Mooka Siding Level 1 / Targeted Fauna Survey	Mooka West Fauna Assessment	Port Hedland Regional Fauna Assessment	Rail Turner River Camp Level One Fauna Assessment	Rapid Growth Project 5: M270SA Fauna Assessment	RGP5 Fauna Survey Nelson Point to Bing Siding	RGP5 Fauna Survey Northern Quoll Wider Area Survey	RGP5 Fauna Survey Quarry 1	RGP5 Fauna Survey Quarry 2	RGP5 Fauna Survey Quarry 4	RGP5 Fauna Survey Turner River Camp Expansion	RGP5 Fauna Survey Walla Siding to Turner Camp & Repeater 2	RGP5 Northern Quoll Monitoring	RGP5 Quarry 6 Fauna Assessment	RGP5 Redmont/Cowra Camp and Borrow Areas Fauna Survey	RGP5 Level 2 Fauna Survey Chichester Deviation	RGP5 Targeted Northern Quoll Survey Quarry 1,2, 4 and East Turner River	Yule River Level 1 Fauna Assessment	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey	Current Survey
Bird surveys (hrs)	24.67	0	0	Not stated	Not stated	8	2.67	0	0	0	0	Not stated	Not stated	0	11	5.58	49.65	0	0	Not stated	During targeted transects
Bird survey methods	Unbounded area searches/ opportunistic	Several 20 minute / 2 ha area searches	0	Transects/ opportunistic	Systematic / opportunistic searches	Targeted searches	Systematic / opportunistic searches	N/A	Systematic / opportunistic searches	Systematic / opportunistic searches	Systematic / opportunistic searches	Systematic / opportunistic searches	Not stated	N/A	Targeted searches	Targeted searches	Targeted searches	N/A	Systematic / opportunistic searches	241 censuses across 135 sites	Systematic / opportunistic searches
Diurnal searches	Not stated	20 minutes of targeted searching	41.5 km walked (for habitat assessments)	36.7 km walked	500 x 300 m transect	8 hrs	8 hrs	Not stated	8 hrs	8 hrs	6 hrs	8 hrs	Not stated	Opportunistic searches	11 hrs	16 hrs	67.92 hrs	Not stated	Not stated	Not stated	1152 hrs
Nocturnal searches (hrs)	Not stated	0	0	Not stated	0	1	0	0	0	0	0	Not stated	Not stated	0	2	14	33.5	0	Not stated	Not stated	48
Bat survey nights	4	4	0	5	0	0	0	0	0	0	0	1	Not stated	0	0	Unknown	Not stated	0	0	14 mist net nights/ 6 harp net nights	22
Bat survey hours	Not stated	Not stated	0		0	0	0	0	0	0	0	Not stated	Not stated	0	0	1	27.67	0	0	Not stated	264
Bat survey methods	AnaBAT II	ANABAT	N/A	AnaBAT	N/A	N/A	N/A	N/A	AnaBAT	N/A	N/A	AnaBAT	Not stated	N/A	N/A	AnaBATII	AnaBAT	N/A	N/A	Harp/mist net traps; AnaBAT	SM2BAT
Results																					
Mammals (native)	17	17	No field worlk was conducted	5	0	1	0	3	1	0	0	5	2	1	0	9	15	1	0	29	23
Mammals (intro.)	5			2	0	0	1	0	0	0	0	3	3	0	0	2	5	0	0	6	4
Birds	84	40		79	1	6	12	0	10	0	0	25	19	0	9	46	94	0	3	125	64
Reptiles	58	15		20	2	3	1	1	9	1	3	7	15	0	2	7	57	0	1	73	50
Amphibians	6	0		2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	6	7
Total	170	72		108	3	10	14	4	20	1	3	40	39	1	11	64	172	1	4	239	148

Title	FMG Stage A Fauna Survey	Mooka Siding Level 1 / Targeted Fauna Survey	Mooka West Fauna Assessment	Port Hedland Regional Fauna Assessment	Rail Turner River Camp Level One Fauna Assessment	Rapid Growth Project 5: M270SA Fauna Assessment	RGP5 Fauna Survey Nelson Point to Bing Siding	RGP5 Fauna Survey Northern Quoll Wider Area Survey	RGP5 Fauna Survey Quarry 1	RGP5 Fauna Survey Quarry 2	RGP5 Fauna Survey Quarry 4	RGP5 Fauna Survey Turner River Camp Expansion	RGP5 Fauna Survey Walla Siding to Turner Camp & Repeater 2	RGP5 Northern Quoll Monitoring	RGP5 Quarry 6 Fauna Assessment	RGP5 Redmont/Cowra Camp and Borrow Areas Fauna Survey	RGP5 Level 2 Fauna Survey Chichester Deviation	RGP5 Targeted Northern Quoll Survey Quarry 1,2, 4 and East Turner River	Yule River Level 1 Fauna Assessment	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey	Current Survey
Conservation significant species recorded within the Study Area	Mulgara, Peregrine Falcon, *Ramphotyphlops ganei*, Grey Falcon, Fork-tailed Swift, Rainbow Bee-Eater, Bush Stone-curlew, Australian Bustard, Short-tailed mouse, Western Pebble Mound Mouse, Ghost Bat	Northern Quoll, Australian Bustard, Bush Stone-curlew, Western Pebble Mound Mouse, Oriental Plover, Rainbow Bee-eater	N/A	Cattle Egret, Eastern Great Egret, Eastern Reef Egret, White-bellied Sea Eagle, Australian Bustard, Bush Stone Curlew, Eastern Osprey, Grey Plover, Ruddy Turnstone, Red-necked Stint, Bar-tailed Godwit, Whimbrel, Grey-tailed Tattler, Caspian Stern, Rainbow Bee Eater	N/A	N/A	White-bellied Sea Eagle	Northern Quoll	Northern Quoll	N/A	N/A	Bush Stone-Curlew, Western Pebble Mound Mouse, Australian Bustard	N/A	Northern Quoll	N/A	Rainbow Bee-Eater	Ghost Bat, Northern Short-tailed Mouse, Western Pebble Mound Mouse, Australian Bustard, Bush Stone-Curlew, Star Finch, Grey Falcon, Rainbow Bee Eater, Fork-tailed Swift, Wood Sandpiper	Northern Quoll	N/A	Mulgara, Greater Bilby, Peregrine Falcon, Short-tailed Mouse, Western Pebble-Mound Mouse, Australian Bustard, Bush-Stone Curlew, Eastern Curlew, *Ctenotus nigrilineatus*	Fork-tailed Swift, Australian Bustard, Bush Stone-Curlew, Black-necked Stork, Grey Falcon, Peregrine Falcon, Oriental Pratincole, Pictorella Mannikin, Rainbow Bee-Eater, Flock Bronzewing, Common Greenshank, Mulgara, Northern Quoll, Greater Bilby, Pilbara Leaf-nosed Bat, Western Pebble Mound Mouse, *Ctenotus nigrilineatus*
Number of conservation significant species recorded within the Study Area	11	6	0	16	0	0	1	1	1	0	0	3	0	1	0	1	10	1	0	10	17



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Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 1

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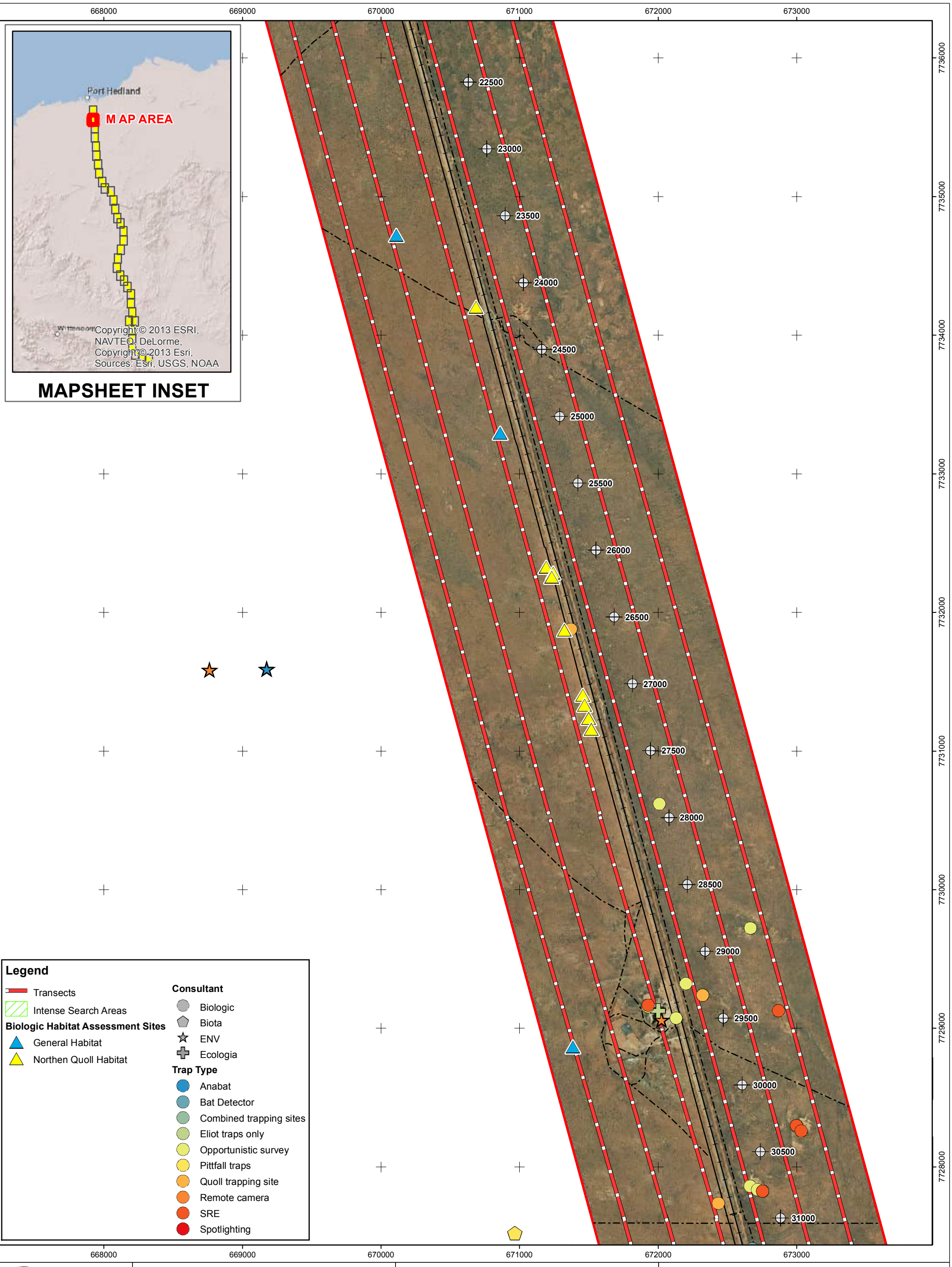

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FIGURE 3.1
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MAPSHEET 2

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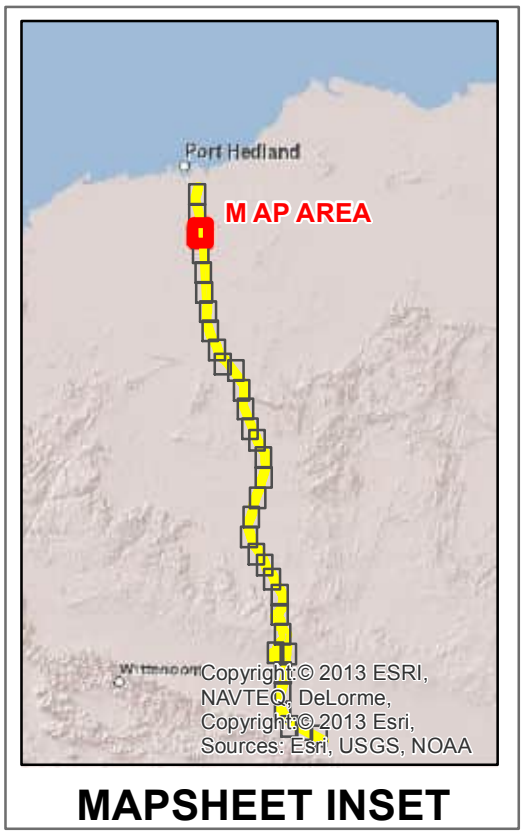

MAPSHEET INSET

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Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

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FIGURE 3.1
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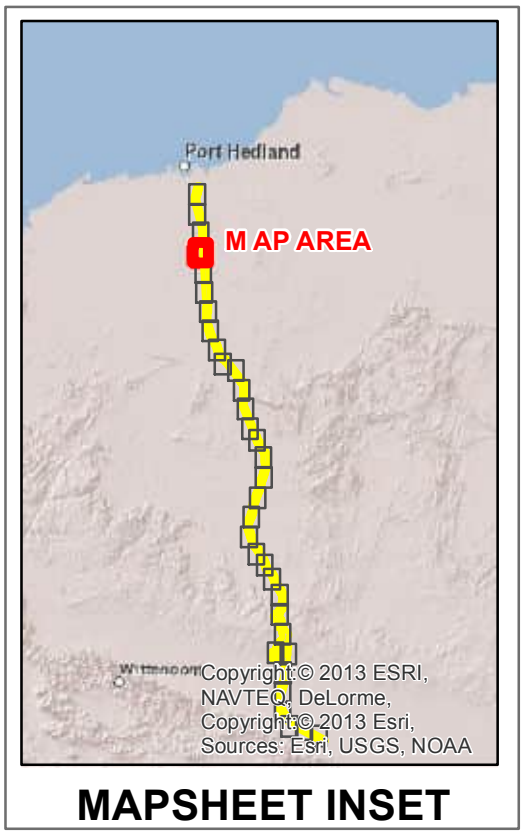

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Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

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FIGURE 3.1
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MAPSHEET 4

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FIGURE 3.1
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MAPSHEET 5

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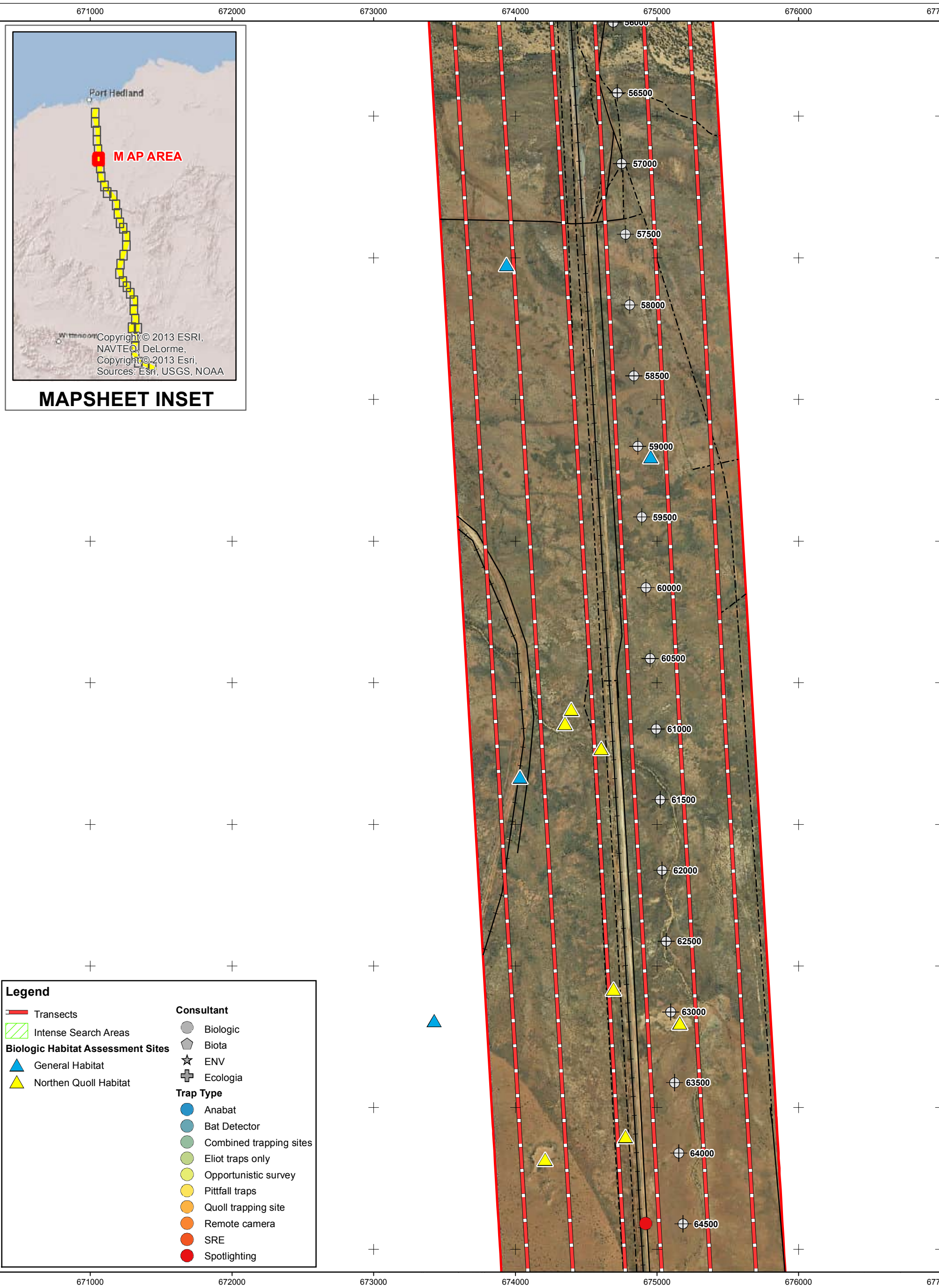

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FIGURE 3.1
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MAPSHEET 6

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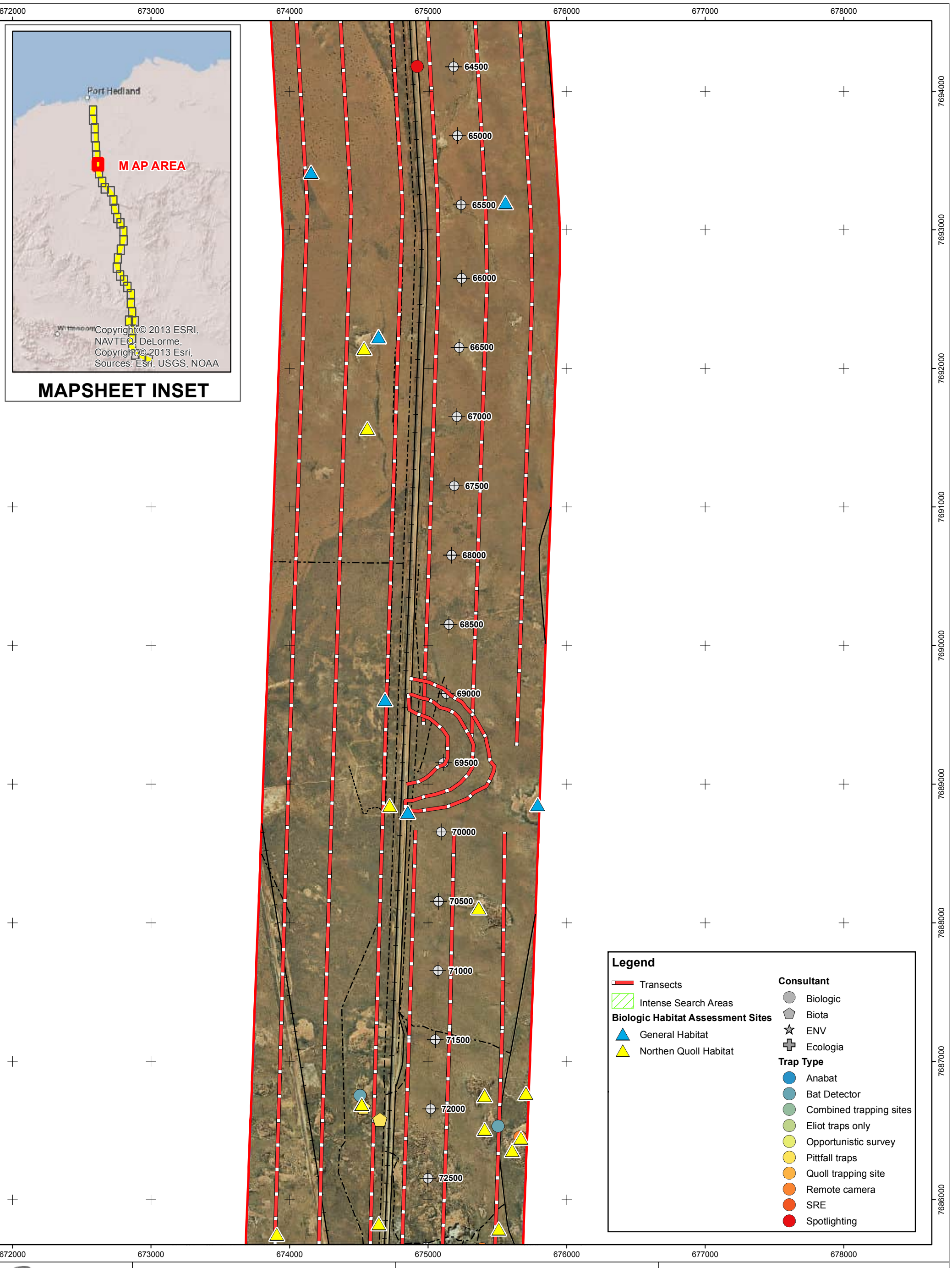

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FIGURE 3.1
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MAPSHEET 7

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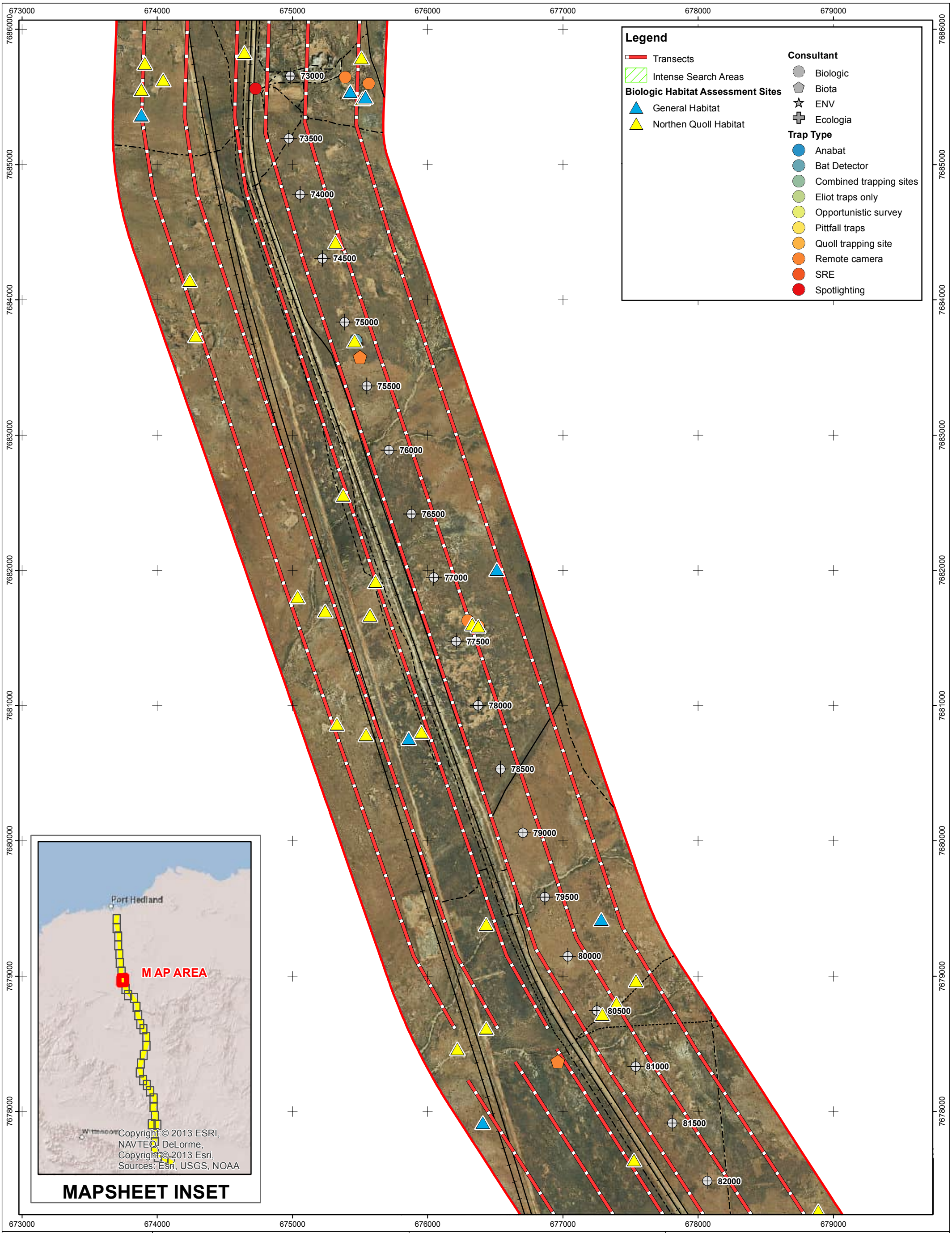

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 8

biologic
ENVIRONMENTAL SCIENCE

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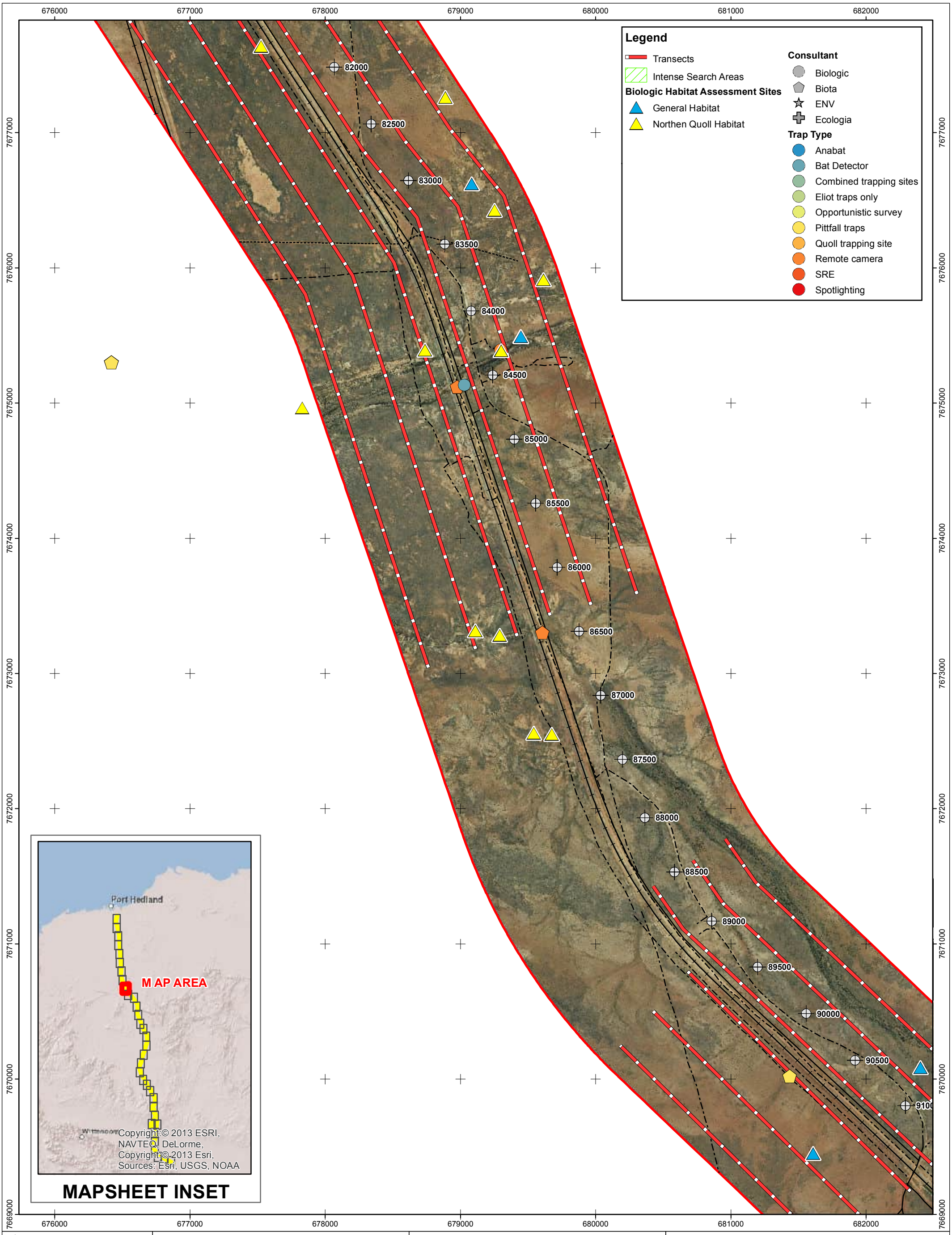

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 9

biologic
ENVIRONMENTAL SCIENCE

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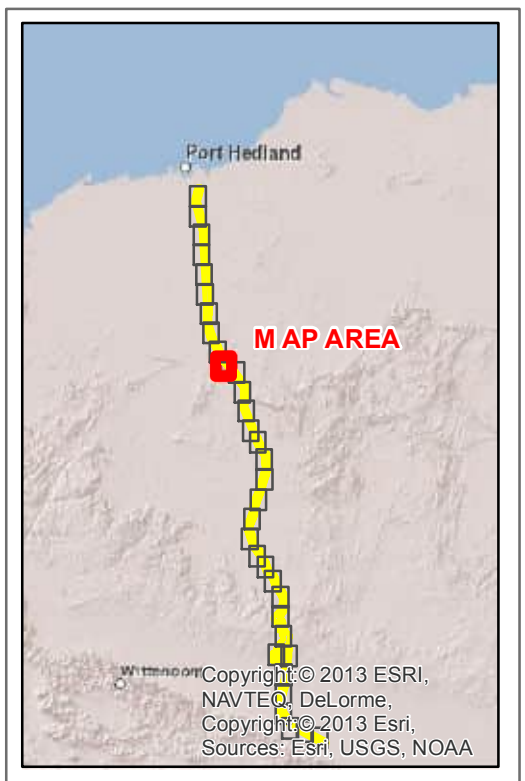

MAPSHEET INSET

Legend

Transects

Intense Search Areas

Biologic Habitat Assessment Sites

General Habitat

Northen Quoll Habitat

Consultant

Biologic

Biota

ENV

Ecologia

Trap Type

Anabat

Bat Detector

Combined trapping sites

Eliot traps only

Opportunistic survey

Pittfall traps

Quoll trapping site

Remote camera

SRE

Spotlighting

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 10

biologic ENVIRONMENTAL SCIENCE

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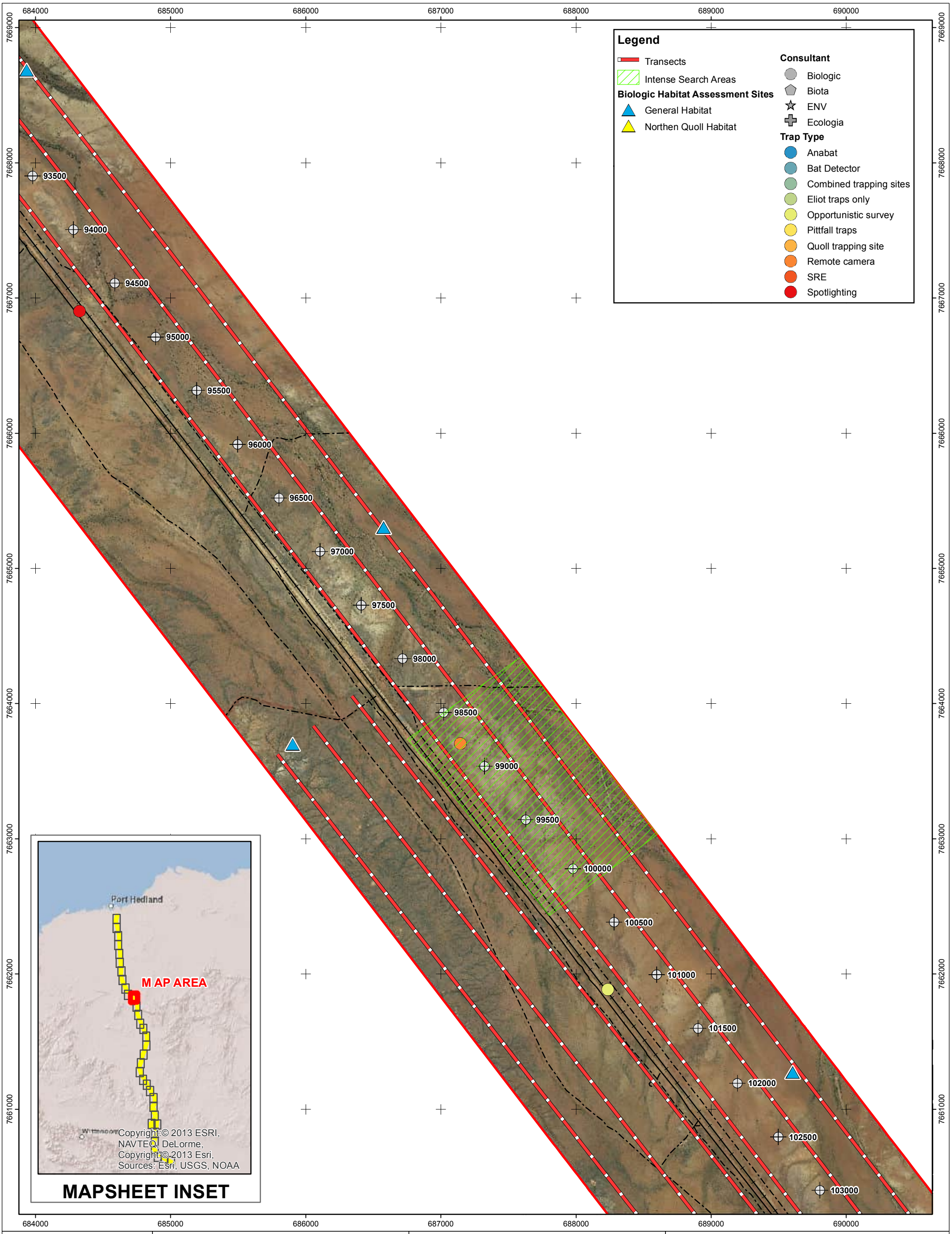

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 11

biologic
ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: RS	Internal Reference: Fig3_1_SampS_Transects	

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

687000 688000 689000 690000 691000 692000 693000

7660000 7659000 7658000 7657000 7656000 7655000 7654000 7653000 7652000

103000 103500 104000 104500 105000 105500 106000 106500 107000 107500 108000 108500 109000 109500 110000 110500 111000 111500

Legend

Transects

Intense Search Areas

Biologic Habitat Assessment Sites

General Habitat

Northen Quoll Habitat

Consultant

Biologic

Biota

ENV

Ecologia

Trap Type

Anabat

Bat Detector

Combined trapping sites

Eliot traps only

Opportunistic survey

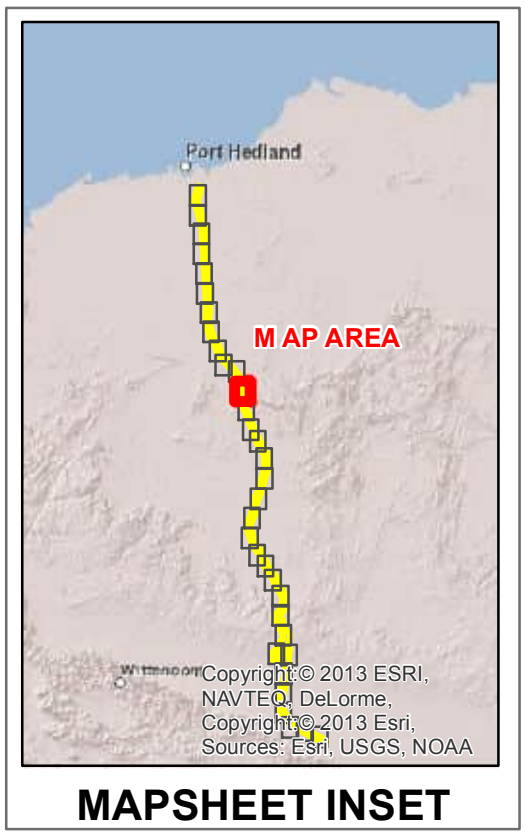
Pittfall traps

Quoll trapping site

Remote camera

SRE

Spotlighting



MAPSHEET INSET

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 12

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by RS	Internal Reference Fig3_1_SampS_Transects	

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

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7652000 7651000 7650000 7649000 7648000 7647000 7646000 7645000 7644000

111500 112000 112500 113000 113500 114000 114500 115000 115500 116000 116500 117000 117500 118000 118500 119000 119500 120000 120500

Legend

Transects

Intense Search Areas

Biologic Habitat Assessment Sites

General Habitat

Northen Quoll Habitat

Consultant

Biologic

Biota

ENV

Ecologia

Trap Type

Anabat

Bat Detector

Combined trapping sites

Eliot traps only

Opportunistic survey

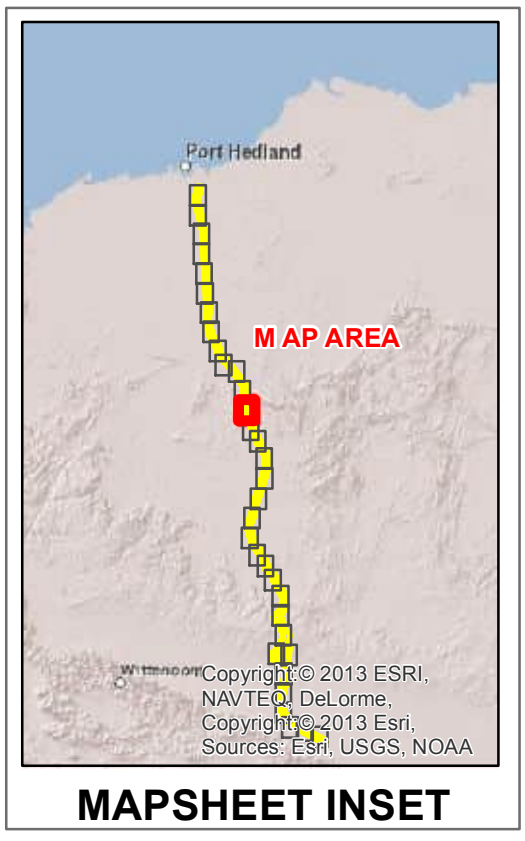
Pittfall traps

Quoll trapping site

Remote camera

SRE

Spotlighting



MAPSHEET INSET

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 13

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by RS	Internal Reference Fig3_1_SampS_Transects	

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

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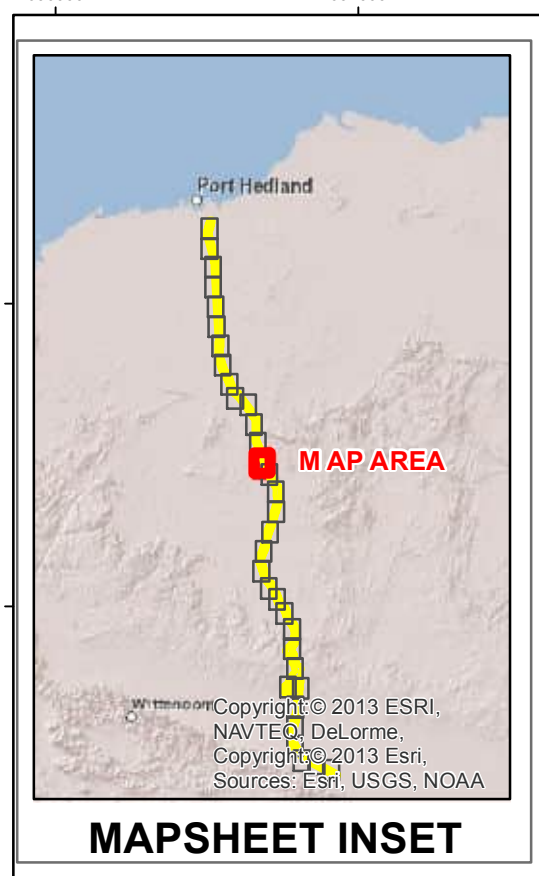

MAPSHEET INSET

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Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 14

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by RS	Internal Reference Fig3_1_SampS_Transects	

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

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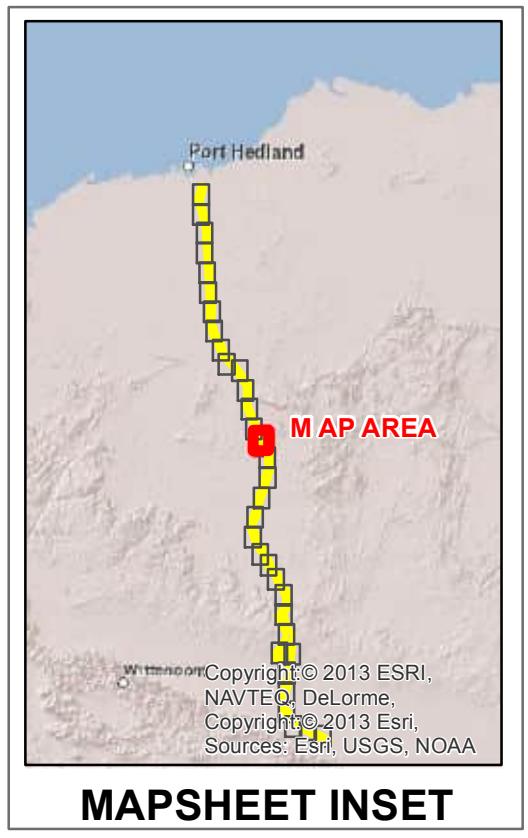
7638000 7637000 7636000 7635000 7634000 7633000 7632000 7631000

126000 126500 127000 127500 128000 128500 129000 129500 130000 130500 131000 131500 132000 132500 133000 133500 134000 134500 135000



MAPSHEET INSET

Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 15

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by RS	Internal Reference Fig3_1_SampS_Transects	

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

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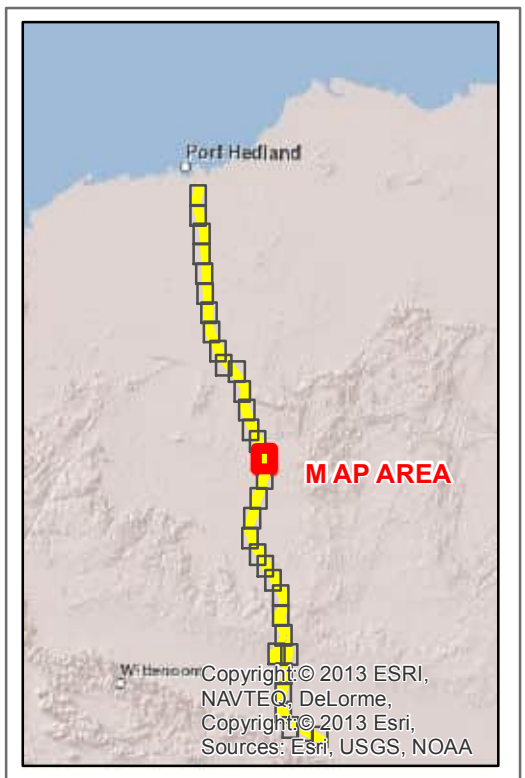
7631000 7630000 7629000 7628000 7627000 7626000 7625000 7624000 7623000

134000 134500 135000 135500 136000 136500 137000 137500 138000 138500 139000 139500 140000 140500 141000 141500 142000 142500



MAPSHEET INSET

Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 16

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by RS	Internal Reference Fig3_1_SampS_Transects	

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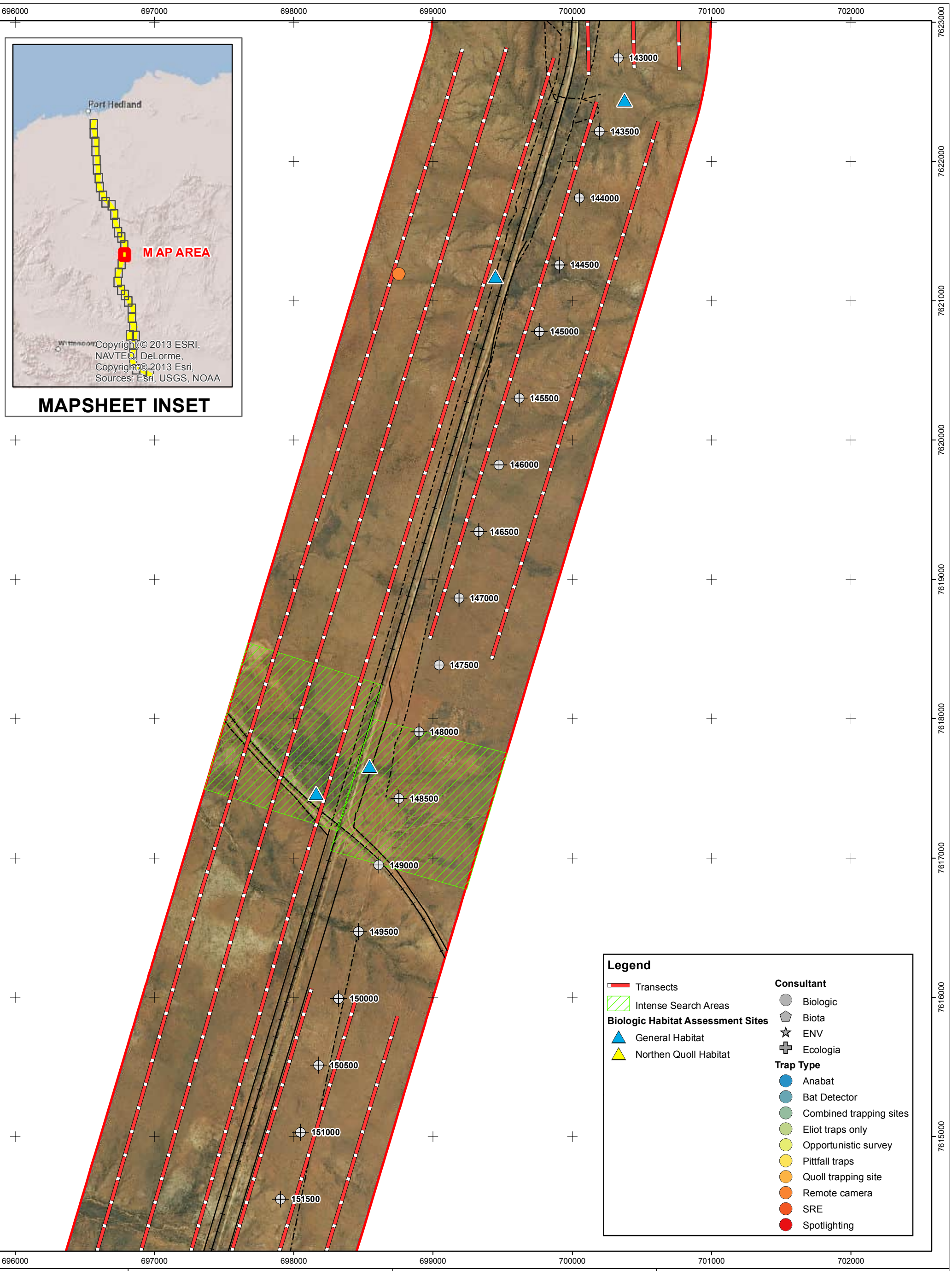

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 17

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
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Projection: MGA Zone 50

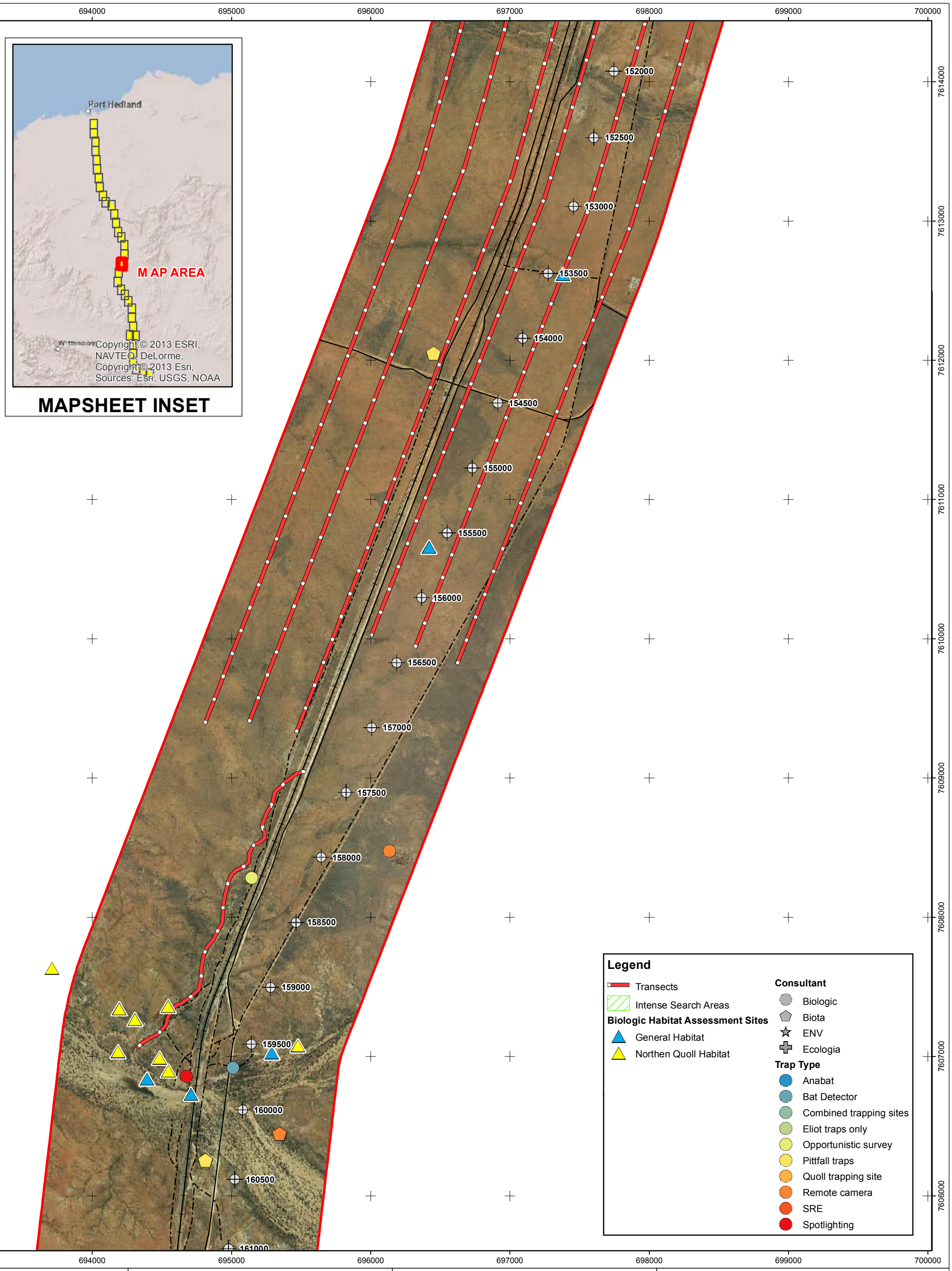

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 18

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by RS	Internal Reference Fig3_1_SampS_Transects	

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Datum: GDA94
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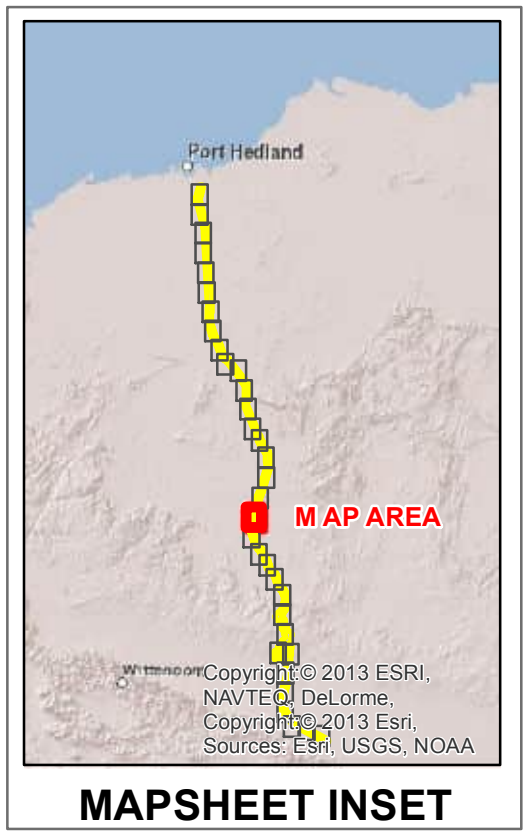

MAPSHEET INSET

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Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 19

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
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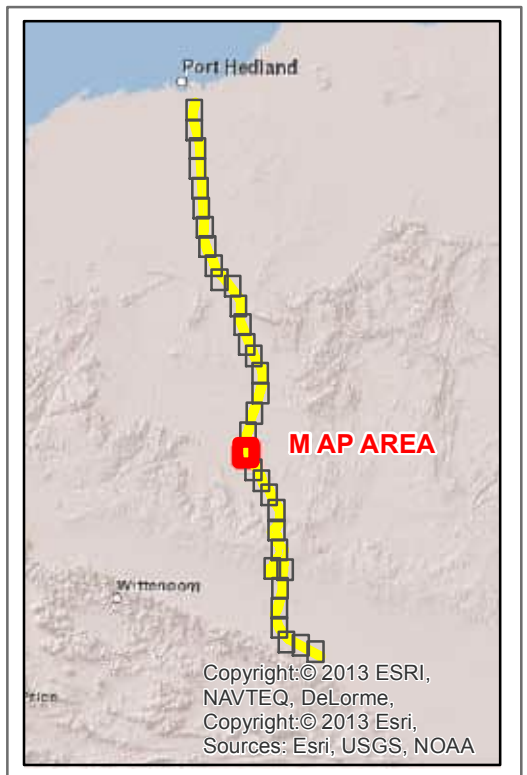

MAPSHEET INSET

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169500 170000 170500 171000 171500 172000 172500 173000 173500 174000 174500 175000 175500 176000 176500 177000 177500 178000 178500

Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 20

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by RS	Internal Reference Fig3_1_SampS_Transects	

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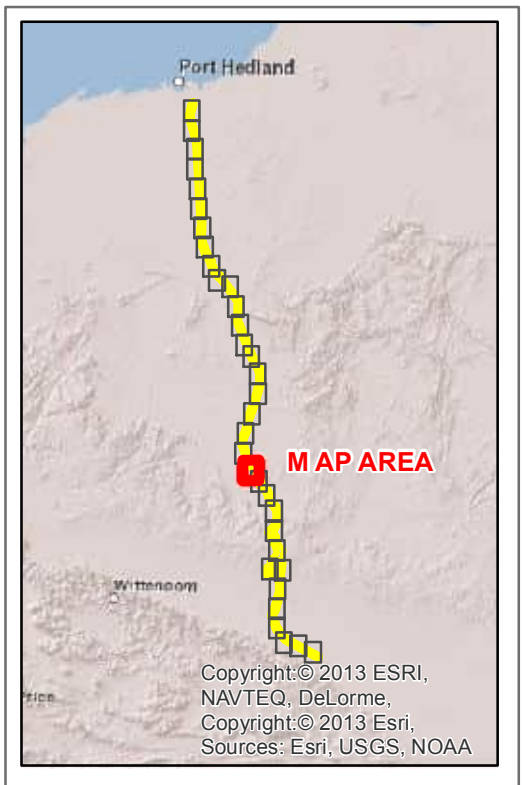
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

693000 694000 695000 696000 697000 698000 699000

7590000 7589000 7588000 7587000 7586000 7585000 7584000 7583000 7582000

177500 178000 178500 179000 179500 180000 180500 181000 181500 182000 182500 183000 183500 184000 184500 185000



MAPSHEET INSET

Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 21

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
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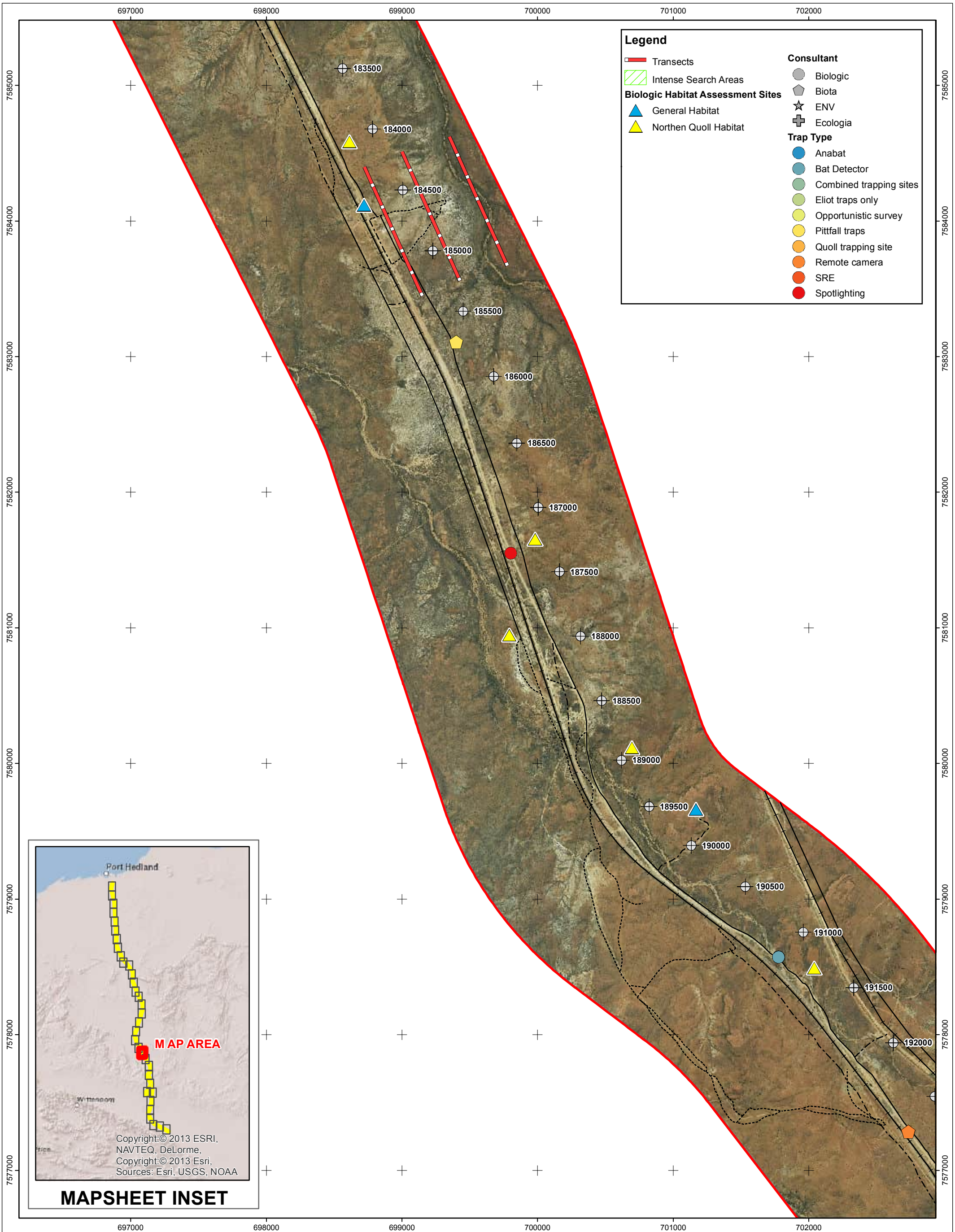

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 22

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
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Projection: MGA Zone 50

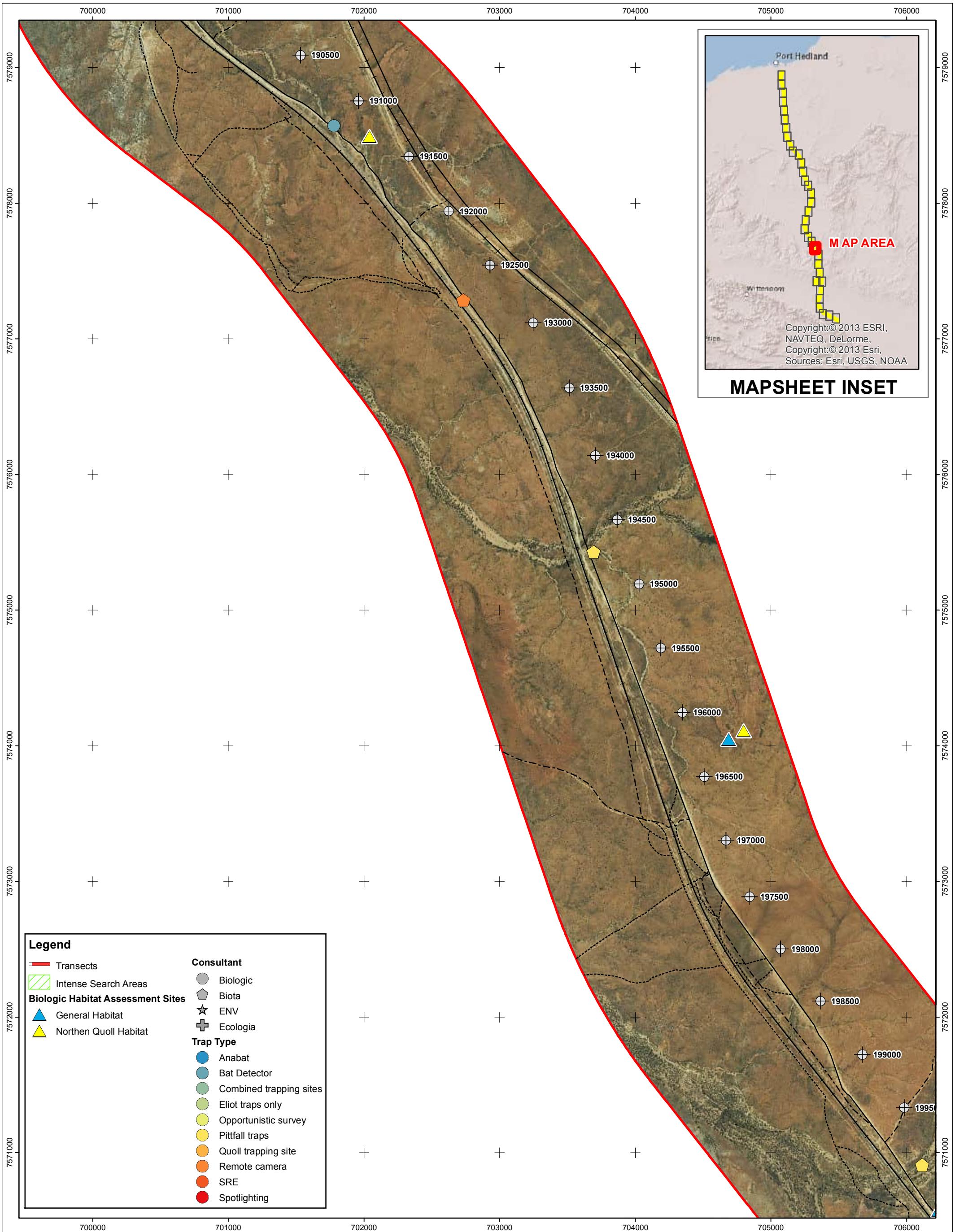

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 23

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

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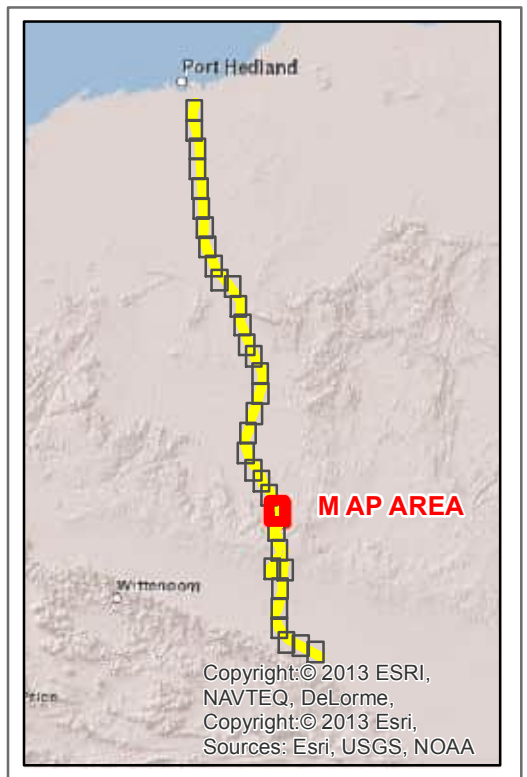
7572000 7571000 7570000 7569000 7568000 7567000 7566000 7565000 7564000

198000 198500 199000 199500 200000 200500 201000 201500 202000 202500 203000 203500 204000 204500 205000 205500 206000 206500 207000



MAPSHEET INSET

Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 24

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by RS	Internal Reference Fig3_1_SampS_Transects	

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

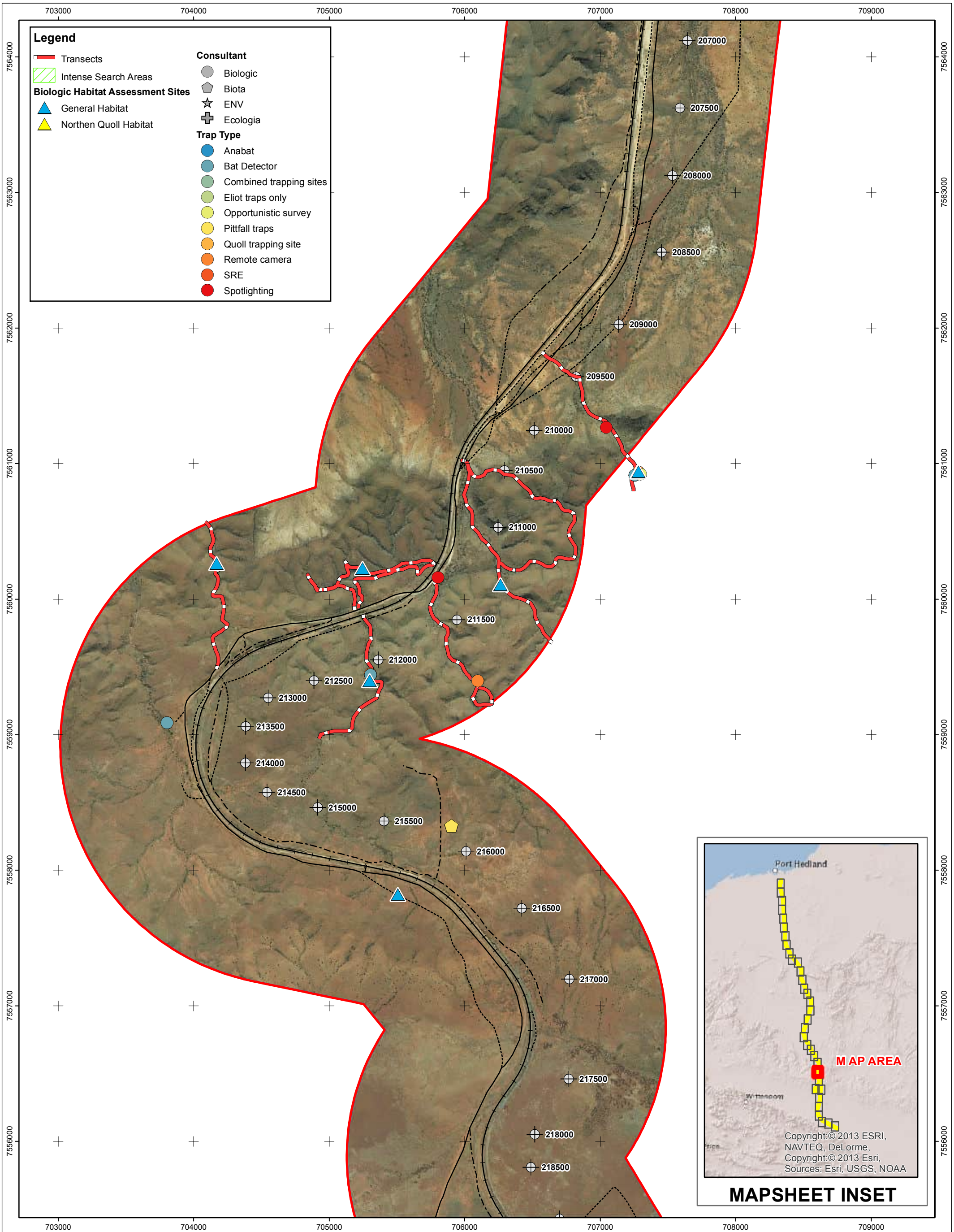

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 25

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by RS	Internal Reference Fig3_1_SampS_Transects	

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

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7555000 7554000 7553000 7552000 7551000 7550000 7549000 7548000 7547000

219000 219500 220000 220500 221000 221500 222000 222500 223000 223500 224000 224500 225000 225500 226000 226500 227000 227500 228000 228500 229000

Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

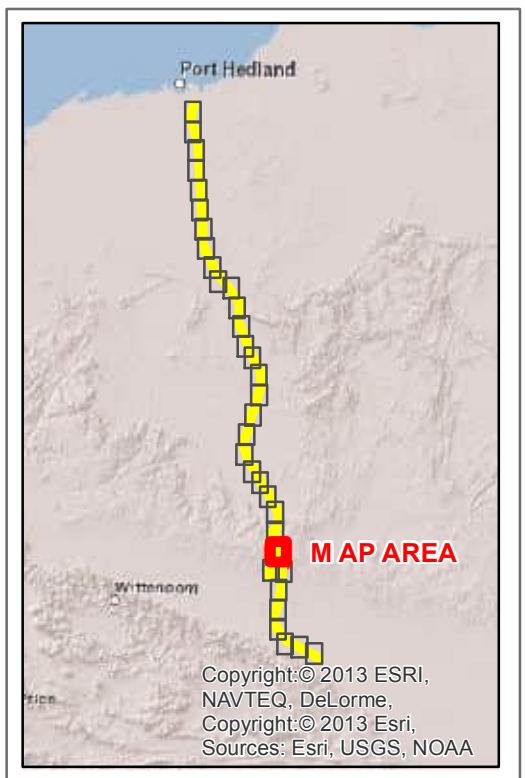
- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting



MAPSHEET INSET

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 26

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by RS	Internal Reference Fig3_1_SampS_Transects	

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Meters

1:25,000
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Projection: MGA Zone 50

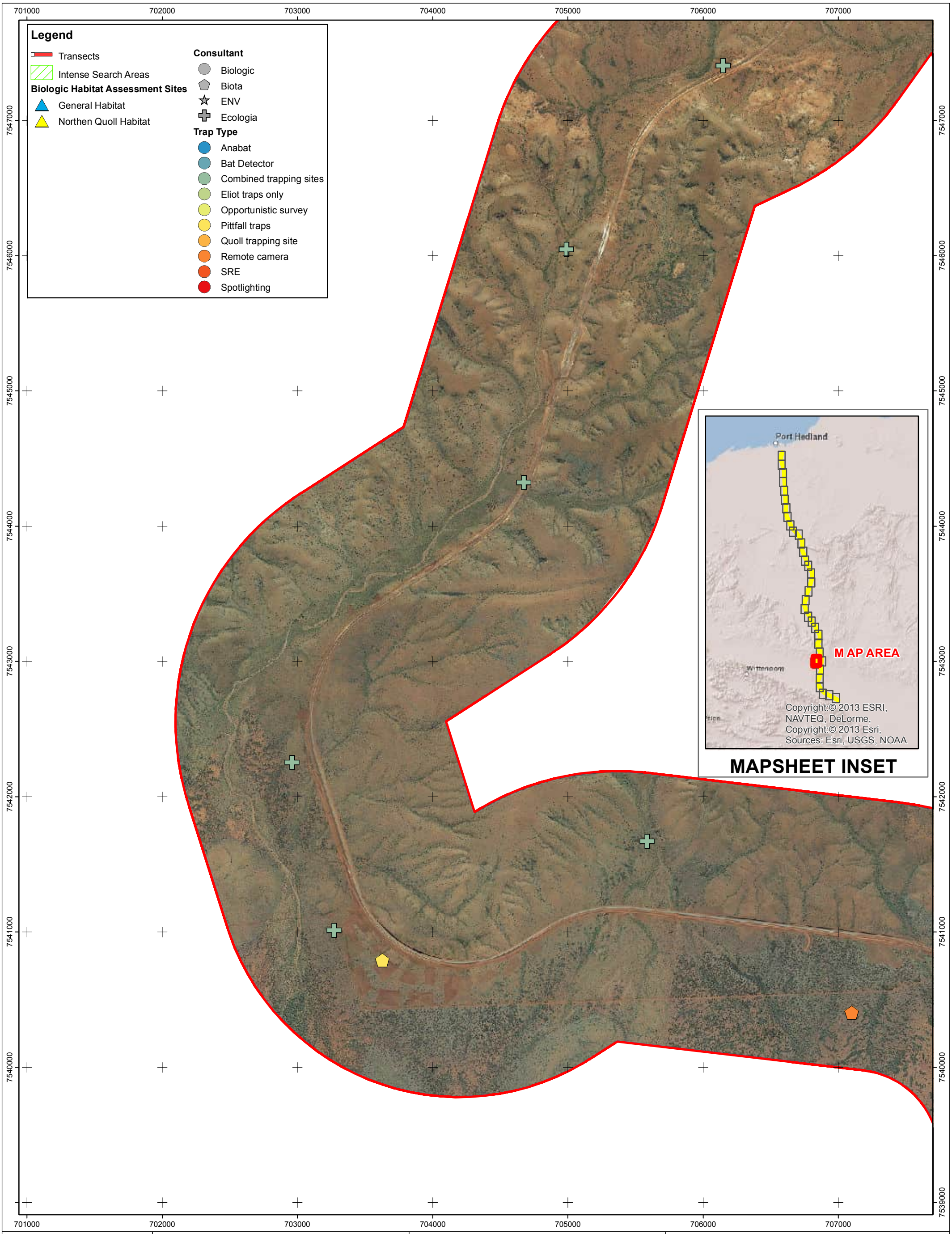

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 27

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: RS	Internal Reference: Fig3_1_SampS_Transects	

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Meters

1:25,000
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Projection: MGA Zone 50

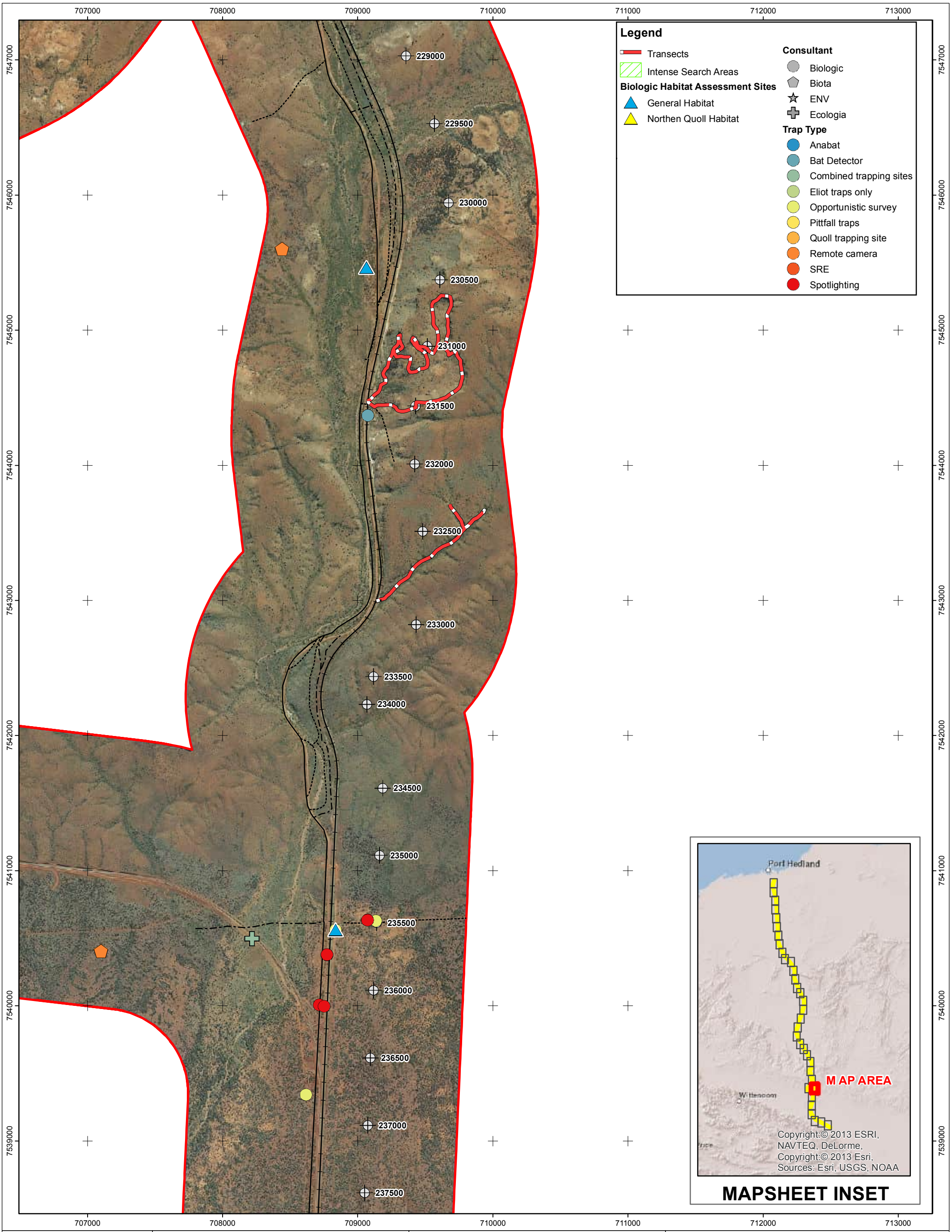

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 28

biologic
ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: RS	Internal Reference: Fig3_1_SampS_Transects	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

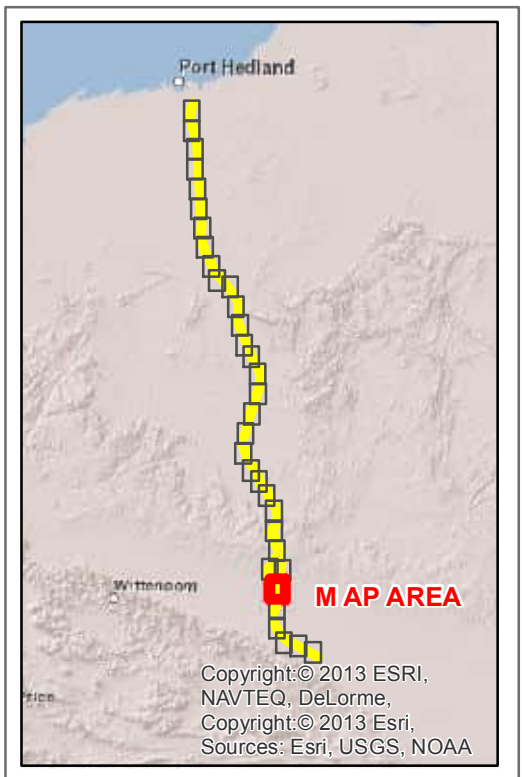
- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting



MAPSHEET INSET

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237500 238000 238500 239000 239500 240000 240500 241000 241500 242000 242500 243000 243500 244000 244500 245000 245500

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 29

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by RS	Internal Reference Fig3_1_SampS_Transects	

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

704000 705000 706000 707000 708000 709000 710000

7530000 7529000 7528000 7527000 7526000 7525000 7524000 7523000 7522000

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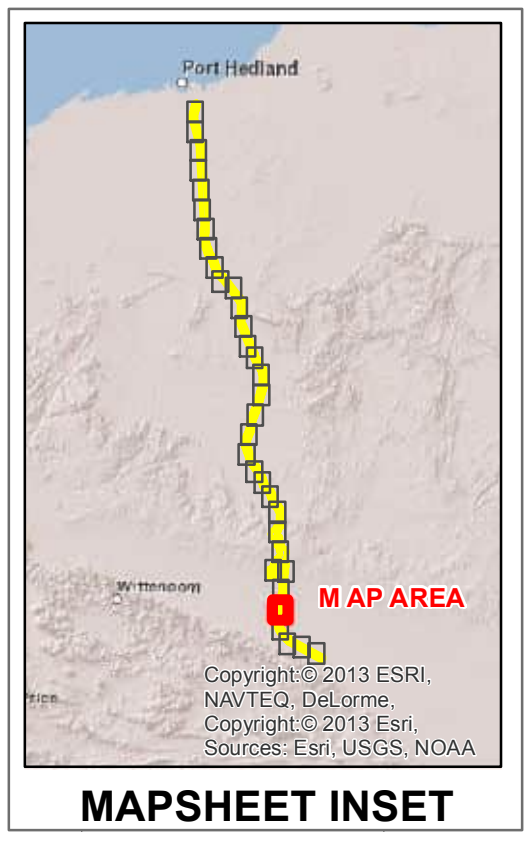

MAPSHEET INSET

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 30

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
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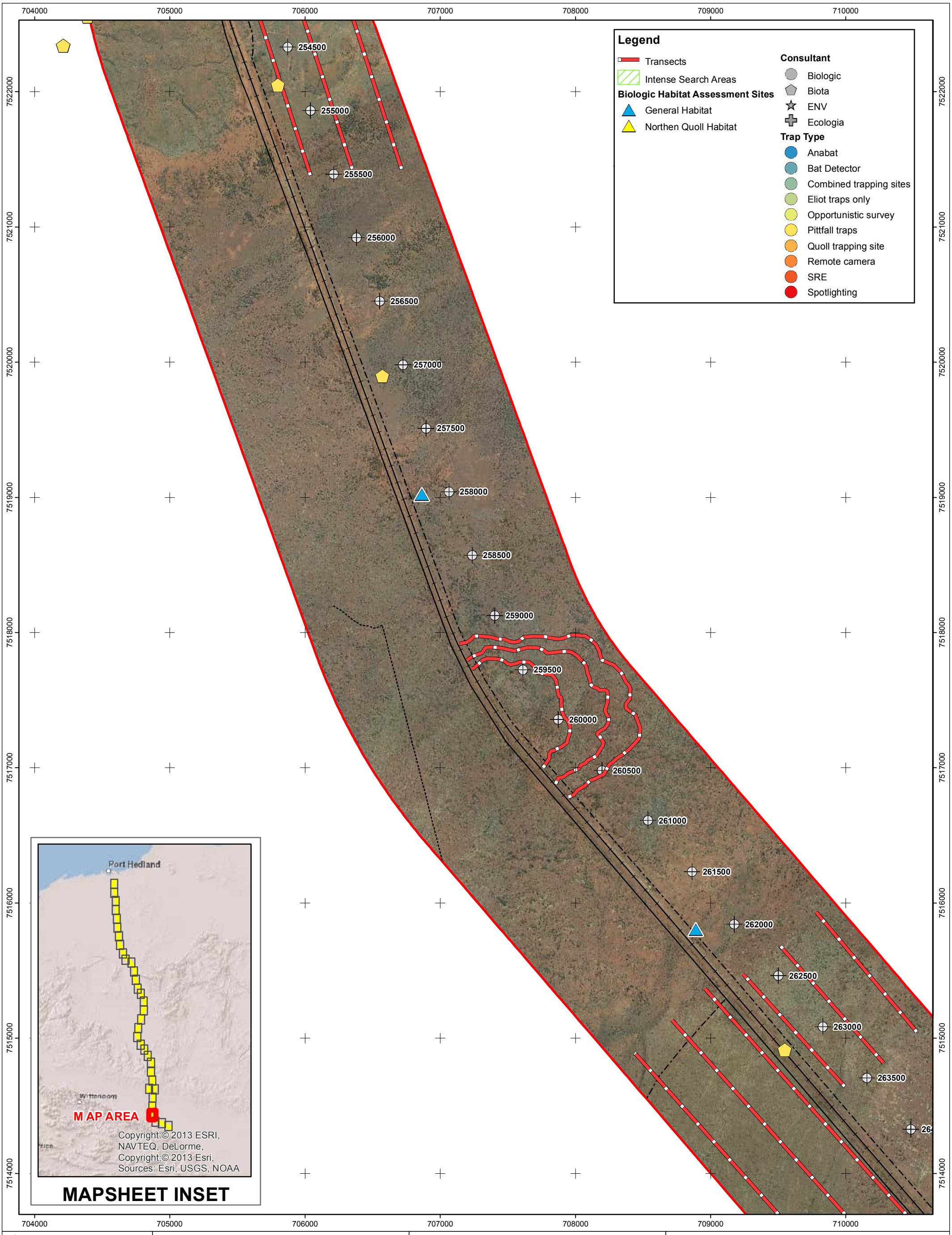

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 31

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: RS	Internal Reference: Fig3_1_SampS_Transects	

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Projection: MGA Zone 50

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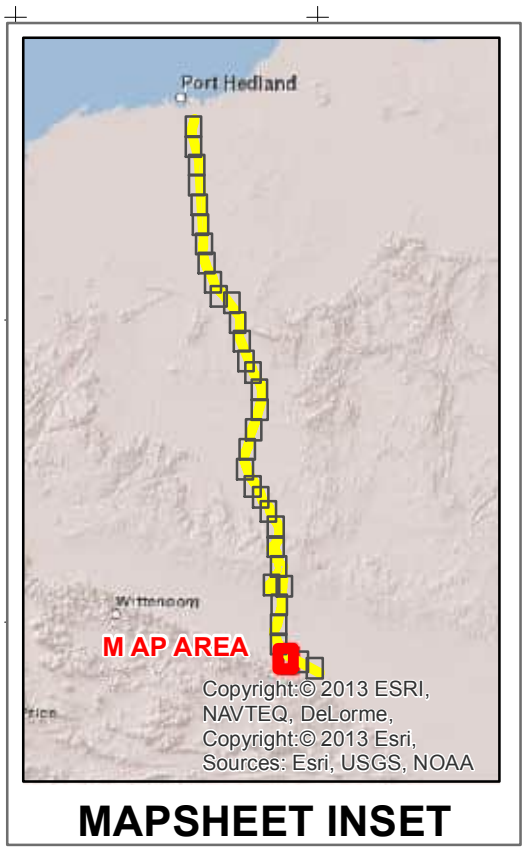

MAPSHEET INSET

Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
- Northen Quoll Habitat

Consultant

- Biologic
- Biota
- ENV
- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 32

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Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
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Projection: MGA Zone 50

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Legend

Transects

Intense Search Areas

Biologic Habitat Assessment Sites

General Habitat

Northen Quoll Habitat

Consultant

Biologic

Biota

ENV

Ecologia

Trap Type

Anabat

Bat Detector

Combined trapping sites

Eliot traps only

Opportunistic survey

Pittfall traps

Quoll trapping site

Remote camera

SRE

Spotlighting

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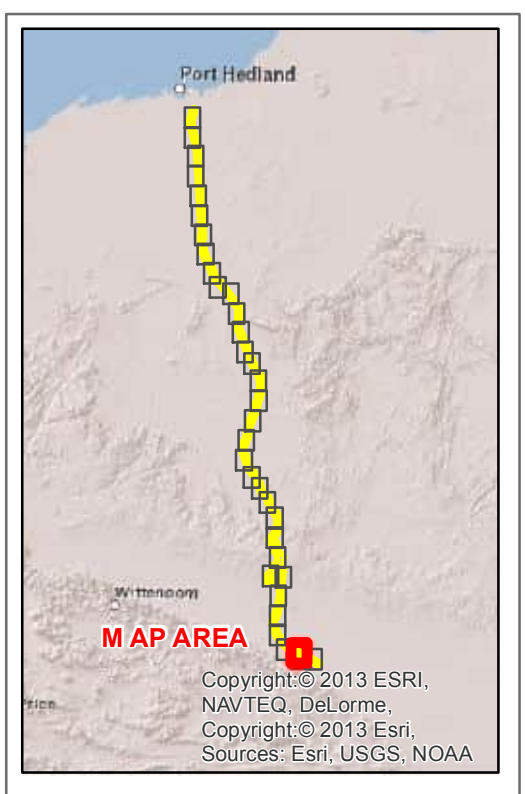

MAPSHEET INSET

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 33

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Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: RS	Internal Reference: Fig3_1_SampS_Transects	

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Projection: MGA Zone 50

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Legend

- Transects
- Intense Search Areas

Biologic Habitat Assessment Sites

- General Habitat
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Consultant

- Biologic
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- Ecologia

Trap Type

- Anabat
- Bat Detector
- Combined trapping sites
- Eliot traps only
- Opportunistic survey
- Pittfall traps
- Quoll trapping site
- Remote camera
- SRE
- Spotlighting

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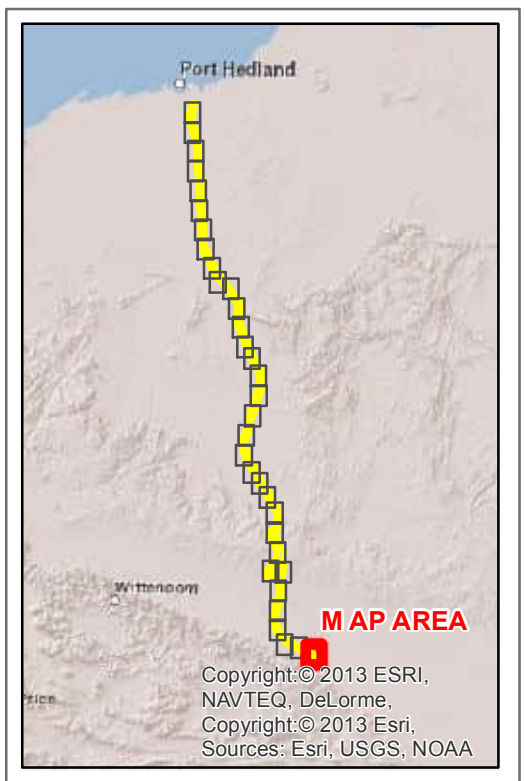

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FIGURE 3.1
SAMPLING SITES & TRANSECTS

MAPSHEET 34

biologic ENVIRONMENTAL SCIENCE

Figure:	3.1	Date:	06/06/13
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: RS	Internal Reference: Fig3_1_SampS_Transects	

N

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

Table 3.4 Overall survey effort from all surveys that overlap, to some degree, the current Study Area.

Survey	All surveys within the Study Area
No. of Trapping Sites	83
Cage (Trapping Nights)	280
Elliott (Trapping Nights)	4403
Funnel (Trapping Nights)	2960
Bucket (Trapping Nights)	3310
PVC Pipe (Trapping Nights)	1400
Total Trap Nights	**12353**
Diurnal Search (hrs)	At least 1292.92
Nocturnal search (hrs)	At least 98.5
Bird surveys (hrs)	At least 101.57
Bat recordings (hrs)	At least 292.67

*Numbers do not include surveys where trapping nights/searching hours are not stated

3.2.1 Native mammals

Of the 42 native mammals identified in the literature and database review, 38 species from 12 families have been recorded to date within the Study Area. The most abundant records (including from secondary evidences such as tracks, diggings, scats etc. recorded during five or more surveys) were that of Northern Quoll (*Dasyurus hallucatus*), Common Sheath-tail Bat (*Taphozous georgianus*), Finlayson's Cave Bat (*Vespadelus finlaysoni*), Little Broad-nosed Bat (*Scotorepens greyii*), Western Pebble-mound Mouse (*Pseudomys chapmani*), Common Rock-rat (*Zyzomys argurus*) and Dingo (*Canis lupus dingo*). The higher number of Northern Quoll records from the area is potentially due to a number of targeted surveys conducted for this species within the Study Area (Table 3.3). Western Pebble-mound Mice have been recorded during most studies probably due to the ease of finding secondary evidence (mounds) for their existence.

Four species have been recorded only once from the Study Area: the Wongai Ningaui (*Ningaui ridei*), Arnhem Land Long-eared Bat (*Nyctophilus arnhemensis*), Lesser Long-eared Bat (*Nyctophilus geoffroyi*) and the Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*). Among them, the Pilbara Leaf-nosed Bat was first recorded during the current survey.

Given the recent taxonomical changes and existing complexity in the nomenclature, the identity of Mulgara (*Dasycercus* spp.) recorded from the Study Area remain uncertain. Some of the previous surveys have placed the encountered specimens under Crest-tailed Mulgara (*Dasycercus cristicauda*). However a specimen collected during the current study was identified as a Brush-tailed Mulgara (*Dasycercus blythi*) through detailed morphological and genetic analysis. Biota (2002) records a specimen of Fat-Tailed Antechinus (*Pseudantechinus macdonnellensis*) from the Study Area. The Pilbara population of this

species is now considered to represent the Rory's Antechinus (*Pseudantechinus roryi*) and thus the name is synonymised herein.

3.2.2 Birds

One hundred and eighty four species of native birds potentially occur in the Study Area, of which 172 species, from 57 families, have been recorded to date. Bird species that have been recorded from five or more surveys conducted in the Study Area to date are: the Diamond Dove (*Geopelia cuneata*), Spinifex Pigeon (*Geophaps plumifera*), Crested Pigeon (*Ocyphaps lophotes*), White-faced Heron (*Egretta novaehollandiae*), Wedge-tailed Eagle (*Aquila audax*), Spotted Harrier (*Circus assimilis*), Black-shouldered Kite (*Elanus axillaris*), Whistling Kite (*Haliastur sphenurus*), Little Eagle (*Hieraaetus morphnoides*), Black Kite (*Milvus migrans*), Brown Falcon (*Falco berigora*), Nankeen Kestrel (*Falco cenchroides*), Bush Stone-curlew (*Burhinus grallarius*), Australian Bustard (*Ardeotis australis*), Black-fronted Dotterel (*Elseyornis melanops*), Black-winged Stilt (*Himantopus himantopus*), Little Button-quail (*Turnix velox*), Galah (*Eolophus roseicapillus*), Little Corella (*Cacatua sanguinea*), Cockatiel (*Nymphicus hollandicus*), Australian Ringneck (*Barnardius zonarius*), Budgerigar (*Melopsittacus undulatus*), Horsfield's Bronze Cuckoo (*Chalcites basalis*), Blue-winged Kookaburra (*Dacelo leachii*), Red-backed Kingfisher (*Todiramphus pyrrhopygius*), Sacred Kingfisher (*Todiramphus sanctus*), Rainbow Bee-eater (*Merops ornatus*), Variegated Fairy-wren (*Malurus lamberti assimilis*), White-winged Fairy-wren (*Malurus leucopterus*), Red-browed Pardalote (*Pardalotus rubricatus*), Crimson Chat (*Epthianura tricolor*), White-plumed Honeyeater (*Lichenostomus penicillatus*), Singing Honeyeater (*Lichenostomus virescens*), Brown Honeyeater (*Lichmera indistincta*), Yellow-throated Miner (*Manorina flavigula*), Black-faced Cuckoo-shrike (*Coracina novaehollandiae*), White-winged Triller (*Lalage sueurii*), Grey Shrike-thrush (*Colluricincla harmonica*), Black-faced Woodswallow (*Artamus cinereus*), Pied Butcherbird (*Cracticus nigrogularis*), Magpie-lark (*Grallina cyanoleuca*), Willie Wagtail (*Rhipidura leucophrys*), Torresian Crow (*Corvus orru*), Horsfield's Bushlark (*Mirafra javanica*), Spinifexbird (*Eremiornis carteri*), Fairy Martin (*Petrochelidon ariel*), Painted Finch (*Emblema pictum*), Zebra Finch (*Taeniopygia guttata*) and Richard's Pipit (*Anthus novaeseelandiae*).

Forty species have been recorded in only one of the surveys within the Study Area (the 13 species marked with a ' $^{+}$ ' are likely to be brief visitors to the study area as they are either migratory shorebirds or mangrove specialists): the Stubble Quail (*Coturnix pectoralis*), Australian Wood Duck (*Chenonetta jubata*), Black Swan (*Cygnus atratus*), Plumed Whistling Duck (*Dendrocygna eytoni*), Spotless Crake (*Porzana tabuensis*), Bar-shouldered Dove (*Geopelia humeralis*), Little Pied Cormorant (*Microcarbo melanoleucos*), Little Black Cormorant (*Phalacrocorax sulcirostris*), Great Egret (*Ardea alba*), Cattle Egret (*Ardea ibis*), Little Egret (*Egretta garzetta*), Nankeen Night Heron (*Nycticorax caledonicus*), Sooty Oystercatcher^{+} (*Haematopus fuliginosus*), Pied Oystercatcher^{+} (*Haematopus longirostris*),

Oriental Plover[+] (*Charadrius veredus*), Red-kneed Dotterel[+] (*Erythrogonys cinctus*), Grey Plover[+] (*Pluvialis squatarola*), Banded Lapwing (*Vanellus tricolor*), Red-necked Stint[+] (*Calidris ruficollis*), Bar-tailed Godwit[+] (*Limosa lapponica*), Eastern Curlew[+] (*Numenius madagascariensis*), Common Sandpiper[+] (*Actitis hypoleucos*), Wood Sandpiper[+] (*Tringa glareola*), Whiskered Tern (*Chlidonias hybrida*), Crested Tern[+] (*Thalasseus bergii*), Banded Stilt (*Cladorhynchus leucocephalus*), Chestnut-breasted Quail-thrush (*Cinclosoma castaneothorax*), Black-eared Cuckoo (*Chalcites osculans*), Eastern Barn Owl (*Tyto javanica*), Dusky Gerygone[+] (*Gerygone tenebrosa*), Striated Pardalote (*Pardalotus striatus*), Australian White Ibis (*Threskiornis molucca*), Grey Honeyeater (*Conopophila whitei*), Varied Sittella (*Daphoenositta chrysoptera*), White-breasted Whistler (*Pachycephala lanioides*), Mangrove Golden Whistler (*Pachycephala melanura*), White-tailed Fantail (*Rhipidura fuliginosa albicauda*)[1], Mangrove Grey Fantail[+] (*Rhipidura phasiana*), Mangrove Robin[+] (*Peneonanthe pulverulenta*) and Star Finch (*Neochmia ruficauda*).

Seven species of birds were recorded for the first time from the Study Area during the current study: Wandering Whistling Duck (*Dendrocygna arcuata*), Oriental Pratincole (*Glareola maldivarum*), Flock Bronzewing (*Phaps histrionica*), Common Greenshank (*Tringa nebularia*), Whiskered Tern (*Chlidonias hybrid*), Pied Honeyeater (*Certhionyx variegatus*) and Pictorella Mannikin (*Heteromunia pectoralis*).

3.2.3 Reptiles

Of the 125 reptiles that are likely to occur within the Study Area, 99 species have been recorded to date. Commonly recorded species (recorded during at least five surveys) include: Long-nosed Water Dragon (*Amphibolurus longirostris*), Ring-tailed Dragon (*Ctenophorus caudicinctus*), Military Dragon (*Ctenophorus isolepis*), Central Netted Dragon (*Ctenophorus nuchalis*), Spotted Dtella (*Gehyra punctata*), Tree Dtella (*Gehyra variegata*), Bynoe's Gecko (*Heteronotia binoei*), Leopard Ctenotus (*Ctenotus pantherinus*), Rainbow Skink (*Carlia munda*) and Rock Ctenotus (*Ctenotus saxatilis*), Ridge-tailed Monitor (*Varanus acanthurus*), Desert Pygmy Monitor (*Varanus eremius*), Large-spotted Monitor (*Varanus panoptes*), Stimson's Python (*Antaresia stimsoni stimsoni*) and Black-headed Python (*Aspidites melanocephalus*).

Twelve species have only been recorded in one of the surveys to date: Pilbara Two-lined Dragon (*Diporiphora valens*), Pebble Dragon (*Tympanocryptis cephala*), *Nephurus levis pilbarensis*, *Ctenotus schomburgkii*, Spinifex Slender Bluetongue (*Cyclodomorphus*

[1] Closely related to the New Zealand or Grey Fantail and possibly only a well marked subspecies. WAM confirmed this taxon in 2013 WAM (2013). "Checklist of the Terrestrial Vertebrate Fauna of Western Australia."

melanops), Mosaic Desert Skink (*Eremiascincus musivus*), *Lerista zietzi*, *Notoscincus ornatus ornatus*, Pilbara Mulga Monitor (*Varanus bushi*), Stripe-tailed Monitor (*Varanus caudolineatus*), Desert Banded Snake (*Simoselaps anomalus*) and Pilbara Bandy Bandy (*Vermicella snelli*). A previous record of the Brown snake *Pseudonaja nuchalis* by Biota (2002) is likely to be that of a *Pseudonaja mengdeni* based on the recent taxonomic revision by Skinner (2009) while that of a *Varanus* aff. *gilleni* by Biota (2002) is probably of a *Varanus bushi* since the Pilbara form is now recognised by the latter name (Aplin, Fitch et al. 2006).

The following 12 species were first recorded from the Study Area during the current study: Blue-lined Dragon (*Diporiphora winneckei*)[2] and an unidentified *Diporiphora* species, *Diplodactylus galaxias*, *Diplodactylus mitchelli*, *Diplodactylus pulcher*, *Egernia epsisolus, Ctenotus nigrilineatus*, *Ctenotus robustus*, Pilbara Rock Monitor (*Varanus pilbarensis*), *Lialis burtonis*, Desert Death Adder (*Acanthophis pyrrhus*) and Hooded Snake (*Parasuta monachus*). *Egernia epsisolus* is a recently described species after a revision of the *Egernia depressa* species-group, thus the earlier records of *E. depressa* from the area could be of *E. epsisolus* (Doughty, Kealley et al. 2011).

3.2.4 Amphibians

Twelve species of amphibians were identified in the literature review as potentially occurring within the Study Area, of which 10 have been recorded to-date. Of these, two species: Glandular Toadlet (*Uperoleia glandulosa*) and Centralian Burrowing Frog (*Platyplectrum spenceri*) were first recorded within the Study Area during the current study.

3.2.5 Introduced fauna

Eight introduced species of mammals have been recorded within the Study Area. Out of these, the Cat (**Felis catus*) and the Cow (**Bos taurus*) have been recorded during more than five surveys. Other introduced mammalian species involve the Dog (**Canis lupus familiaris*), Red Fox (**Vulpes vulpes*), Camel (**Camelus dromedarius*), Donkey (**Equus asinus*), Horse (**Equus caballus*), European Rabbit (**Oryctolagus cuniculus*) and the House Mouse (**Mus musculus*). Note that the Dingo (*Canis lupus dingo*) is regarded as a native species for the purposes of this report, on the basis that its introduction predates the arrival of Europeans, and that mutual adaptation between dingoes and the surrounding ecosystems has occurred. However in the Pilbara there has been hybridisation between dingoes and domestic dogs.

Two introduced birds (*i.e*. the Domestic Pigeon- **Columba livia* and Eurasian Tree Sparrow- **Passer montanus*) have previously been recorded in the general vicinity of the Study Area

[2] Recent work found this species not to occur in WA Doughty, P., L. Kealley, et al. (2012). "Taxonomic assessment of Diporiphora (Reptilia: Agamidae) dragon lizards from the western arid zone of Australia." Zootaxa **3518**: 1-24.

closer to Port Hedland (ENV 2011). However it is unknown whether these species still inhabit the area as they are considered pests and are irradicated.

3.3 Fauna habitats of the Study Area

Twelve major fauna habitats are present within the Study Area (Table 3.5). Data from fauna habitat assessments are presented in Appendix C and the habitat map is presented in Figure 3.2.

The large number of fauna habitats present reflects the large size and the geographical complexity of the Study Area: from those bordering the Hamersley Range in the south, through habitats associated with the Fortescue Valley and then the Chichester subregion in the center, up to near-coastal habitats in the northern Roebourne subregion. The southern part of the Study Area contains the crest/slope and drainage area habitats typical of the Hamersley Range, and Mulga and inland samphire habitats occur in the region leading up to the Fortescue Valley. The Chichester Range located north of Fortescue Marsh is dissected in places to form gorge/gully habitats. Further north in the Chichester subregion, patches of cracking clay habitats as well as granite domes and boulder piles are scattered within a matrix of stony plains and Sandplains. *Melaleuca* forest occurs around the major drainage lines associated with the Turner and Yule rivers that intersect the Study Area. *Triodia* hummock grasslands also exist in this section. The northern-most part of the Study Area is dominated by very open arid sandplain or stony/sandplain areas with sparse low shrubs, and dense spinifex grasslands.

Table 3.5 Fauna habitats of the Study Area

Habitat	Distinguishing habitat characteristics	Occurrence of the habitat within the Study Area	Area (ha)	Extent of the habitat outside Study Area	Significant species associated with habitat	Photo
Sandplain	Sandplain habitat is characterised by relatively deep sandy soils supporting dense spinifex grasslands and sparse shrubs. This habitat transitions into patches of Mulga in places.	This habitat was recorded at the border of the Hamersley and Fortescue subregions in the southern section and then extensively in the northern section within the Chichester subregion. Sand dunes occur just out side the Study Area at the southern end.	23174.52 (44.39%)	Sandplain areas are the predominant habitat type within the Chichester subregion.	Mulgara spp. and Greater Bilby (both recorded) utilise sandy habitats within the Study Area for burrows and foraging. Open sandy areas are also favoured by Australian Bustard (recorded) and the Spectacled Hare Wallaby.	
Mulga	This habitat includes woodlands and other ecosystems in which Mulga (*Acacia aneura*) is dominant, either as the principal acacia or mixed with others. It consists of disintegrating groves on stony soils with spinifex.	In the Study Area this habitat is predominantly associated with the area leading up to Fortescue subregion from south.	1592.497 (3.05%)	The Study Area is near the northern extent of Mulga distribution in Western Australia, but Mulga woodlands cover much of the region and extend south and east across the central arid zone of the continent.	*Ramphotyphlops ganei* and Bush Stone-Curlew may occur in Mulga woodland. Mulga also supports a number of species that are endemic to this habitat type such as *Varanus bushi*.	
Fortescue Marsh samphire	Samphire is generally considered a hostile environment with extreme heat and salinity in waterlogged soils. The vegetation consists of members of the family Chenopodiaceae (genus *Tecticornia*)	In Australia, samphires are most commonly associated with coastal saline environments but inland samphires occur fringing the Fortescue Marshes.	367.2146 (0.7%)	Samphire occurs extensively throughout the Fortescue Marsh. Coastal samphires are wide spread along the coastline of Pilbara.	Only few species of vertebrates (e.g. *Ctenotus uber johnstoni*) permanently inhabit these areas. When inundated a number of migratory listed species may inhabiat this area. Night Parrot records occur at the Fortescue Marsh.	
Crest / slope	These fauna habitats tend to be more open and structurally simple than other fauna habitats, and are dominated by varying species of spinifex. A common feature of these habitats is a rocky substrate, often with exposed bedrock, and skeletal red soils. These are usually dominated by *Eucalyptus* woodlands, *Acacia* and *Grevillea* scrublands and *Triodia* spp. low hummock grasslands.	Crests and slopes of rocky range country are found in the southern part of the Study Area (south of Roy Hill), and also within the Chichester range.	14168.16 (27.14%)	Extensive areas of Crest/Slope habitat occur in the southern-most section of the Study Area closer to the Hamersley Range.	Crest/Slope habitat supports local populations of Western Pebble-mound Mouse. The species is largely restricted to this habitat type. The blind snake *Ramphotyphlops ganei* also occurs in this habitat type.	
Gorges/ Gullies	Gorges and gullies are rugged, steep-sided valleys incised into the surrounding landscape. Gorges tend to be deeply incised, with vertical cliff faces, while gullies are more open (but not as open as Drainage Area). Caves and rock pools are most often encountered in this habitat type. Vegetation can be dense and complex in areas of soil deposition or sparse and simple where erosion has occurred.	Gorges and gullies are not a common feature of the Study Area, but occur occasionally within the Chichester Range.	49.51745 (0.09%)	These are common habitats associated with the ranges. However, because this habitat type is narrow and linear, they only represent a small proportion of the total land area.	The gorge/gully habitats of the Study Area would provide habitat for Pilbara Olive Python and potentially for *Ramphotyphlops ganei*. Different species of bats (including Ghost Bats, Pilbara Leaf-nosed Bats) could utilise gullies for foraging and the caves within the gullies as roosts. Northern Quoll was recorded from this habitat.	

Habitat	Distinguishing habitat characteristics	Occurrence of the habitat within the Study Area	Area (ha)	Extent of the habitat outside Study Area	Significant species associated with habitat	Photo
Cracking clay/ gilgai	Often associated with tussock grasses. Cracking clay soils, often contain weak crabhole (gilgai) microrelief, and which are generally saline at depth. Surface mantles are absent or common to abundant as pebbles and cobbles of ironstone, basalt and other rocks.	Patches of cracking clay occur south of Redmont and north of BHPBIO Roy Hill Exploration lease within the Chichester Range.	816.95 (1.56%)	Cracking clay is not a dominant feature in the local landscape. It is more common towards the northern Pilbara coast.	The Short-tailed Mouse (*Leggadina lakedownensis*) is considered to be more or less restricted to this habitat type. Other near endemic fauna in this habitat include the Pebble Dragon (*Tympanocryptis cephalus*) and Pilbara Stone Gecko (*Diplodactylus mitchelli*).	
Stony plains	These are erosional surfaces of gently undulating plains, ridges and associated footslopes. Mainly support hard spinifex (and occasionally soft spinifex).	This habitat occurs throughout the Study Areas.	3056.23 (5.85%)	Common habitat throughout the Pilbara.	Very stony areas may support local populations of Western Pebble-mound Mouse. The blind snake *Ramphotyphlops ganei* also occurs in this habitat type. Australian Bustard is frequently encountered foraging in this habitat.	
Stony/ Sandplains	These are largely stony plains with localized deposition of sand	This habitat occurs throughout the northern part of the Study Areas.	3954.62 (7.58%)	Common habitat throughout the Pilbara.	This habitat supports a large assemblage of species including Mulgara spp., Greater Bilby, Western Pebble-mound Mouse and Australian Bustard.	
Granite dome & boulder piles	This habitat occurs where the surrounding material has eroded, exposing large domes and boulders. Boulder piles and exfoliating rock on the granite domes provide excellent crevices and cracks for fauna to inhabit. Vegetation is sparse through these areas due to the general lack of soil availability. This habitats are mapped separately in Figure 3.2 but dealt with together in this table.	Granite boulder piles are patchily distributed north from the Chichester Subregion.	Granite Domes:509.21/ Boulder Piles 54.62 (0.12%)	Boulder piles and domes are reasonably common throughout the northern Pilbara.	Boulder piles provide permanent and temporary refuges to an array of species inhabiting an otherwise fairly open matrix. They are known breeding and feeding grounds of Northern Quolls. The skink *Ctenotus nigrilineatus* is known from this habitat type. The Pilbara Olive Python is also known from this habitat.	
Major Drainage Line (MDL)	One type of MDL comprise mature River Red Gums, Coolibahs and stands of Silver Cadjeput over river pools. Open, sandy or gravelly riverbeds characterise this habitat type. In ungrazed areas, the vegetation adjacent to the main channel or channels is denser, taller and more diverse than adjacent terrain and can include reedbeds around pools.	Often found fringing creeks (Coonarrie, Edgina, Gilam) and smaller lotic water bodies.	4125.15 (7.9%)	Major Drainage Line habitats drain large areas of catchment. Several creeks intersect the Study Area within the Chichester subregion and extends beyond. However, because they tend to be relatively narrow, linear features, they only represent a small proportion of the total land area. These water bodies are, however, significant features in the region, by virtue of their water points.	This habitat supports Star Finch, Rainbow Bee-eater, Eastern Great Egret, Black-necked Stork as well as a high diversity of other bird species. These provide potential breeding and/or foraging sites for Grey Falcon and Peregrine Falcon and habitat and dispersal opportunities for Pilbara Olive Pythons and Northern Quolls. The eucalypt species typically contain a number of significant tree hollows used by parrots and owls for roosting and nesting.	
	The other type of MDL is described by Onshore (*in prep*.) as Open Forest. This group comprise *Melaleuca argentea, Eucalyptus camaldulensis* over Low Woodland of *Acacia citrinovirdis, Acacia*	Found along major drainage channels of Turner and Yule Rivers.		*Melaleuca* forest extends south out of the Study Area. *Melaleuca* forest, while not a common habitat in the central Pilbara, also occurs at nearby Upper Weeli Wolli Springs, Coondiner Gorge		

Habitat	Distinguishing habitat characteristics	Occurrence of the habitat within the Study Area	Area (ha)	Extent of the habitat outside Study Area	Significant species associated with habitat	Photo
	coriacea pendens, Acacia ampliceps over open sedges of *Typha domingensis, Cyperus vaginata, Fimbristylis sieberiana* in brown loamy or clayey sand.			System, Marillana Creek and within Karijini National Park		
Drainage Lines	Characterised by low and sparse vegetation compared to Major Drainage Lines. Consisted of *Acacia* low woodland sometimes with scattered *Eucalyptus xerothermica* and *Corymbia hamersleyana*. The understorey generally lack density and often consists solely of sparse tussock grassland, often of *Cenchrus ciliaris* where it has been introduced. The substrate can be sandy in places but generally consists of a loam gravel or stone.	Drainage Areas are low lying, gently sloping areas around minor drainage lines, especially in the Fortescue subregion.	823.38 (1.58%)	A common habitat in the Hamersley Range adjacent to the southern parts of the Study Area.	Drainage Areas provide habitat for a number of conservation significant fauna. Bush Stone-curlew may shelter during the day in areas of thicker vegetation associated with drainage areas and *Ramphotyphlops ganei* are likely to utilise this habitat type.	
Artificial habitats	Anthropogenic habitats that have being altered by humans.	This includes areas such as villages, quarries, rubbish dumps and structures such as culverts.	10.87 (0.02%)	More common to the Northern section where quarries have been created to assist in infrastructure projects. Rail culverts exists along the BHPBIO mainline rail line running through the centre of the Study Area.	Northern Quolls and many species of herpetofauna have found alternative living and feeding grounds in these disturbed habitats. Culverts play an important role as corridors for animal movement and alternative habitats for other species such as Ghost Bats. Important aritificial habitats such as Quarries providing habitat for the Northern Quoll are mapped in Figure 3.2.	

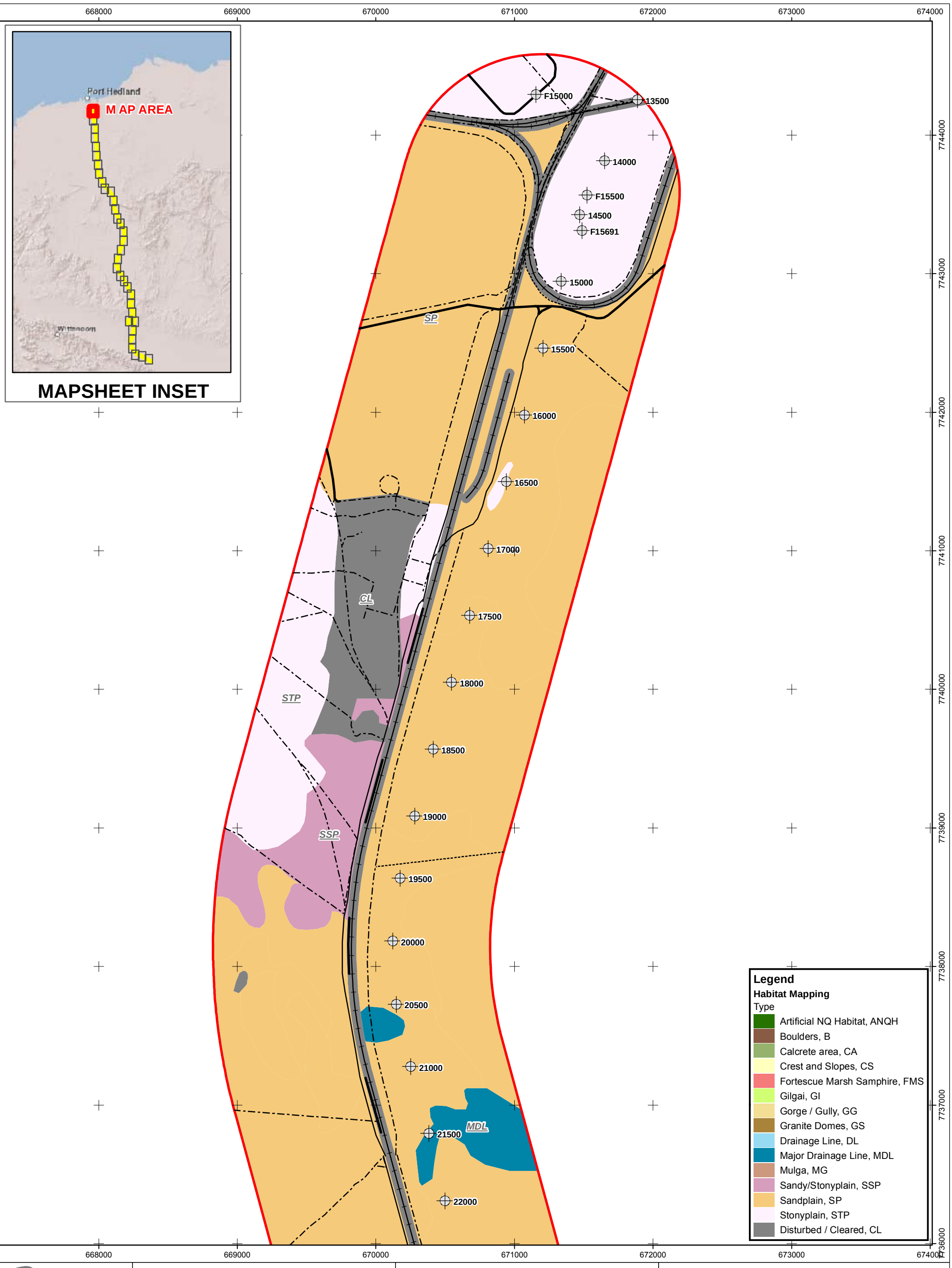

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 1

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Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: MOC	Internal Reference: Fig4_1_Hab_mapping	

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Projection: MGA Zone 50

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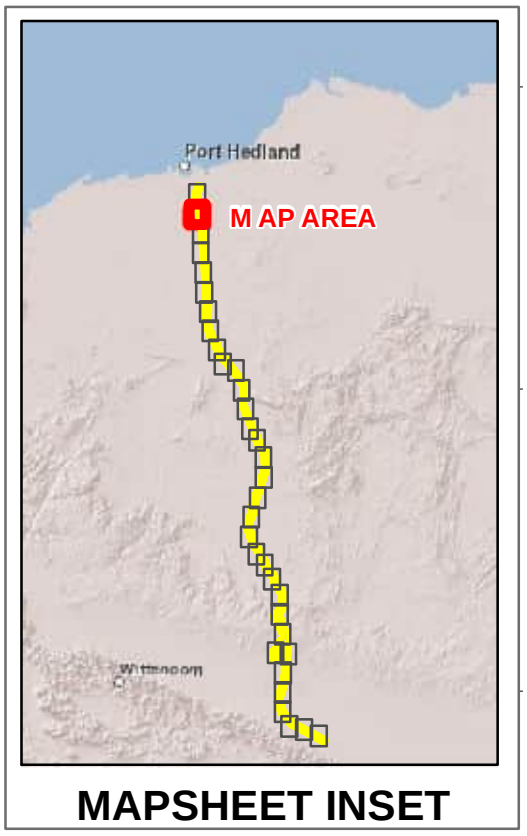

MAPSHEET INSET

22500
23000
23500
24000
24500
25000
25500
26000
26500
CL
27000
27500
SP
28000
28500
29000
ANOH
29500
30000
GS
B
30500
31000

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 2

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

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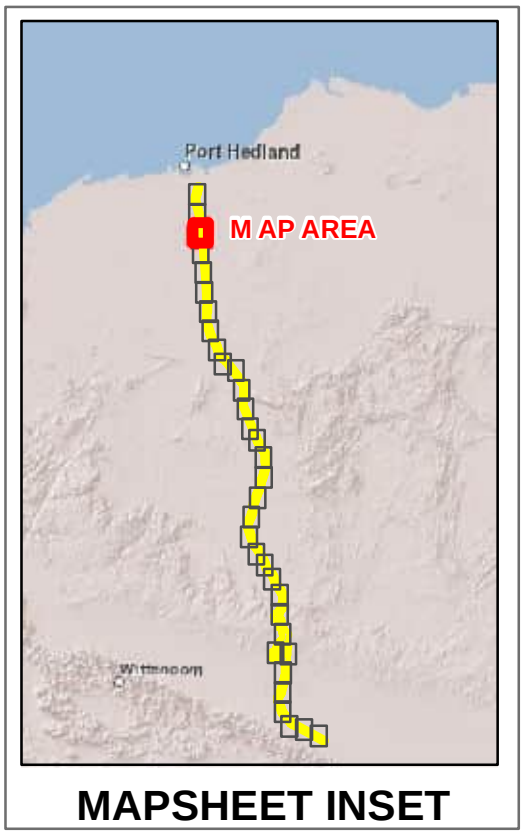

MAPSHEET INSET

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GS CL SP DL

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL

669000 670000 671000 672000 673000 674000 675000

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 3

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Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

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1:25,000
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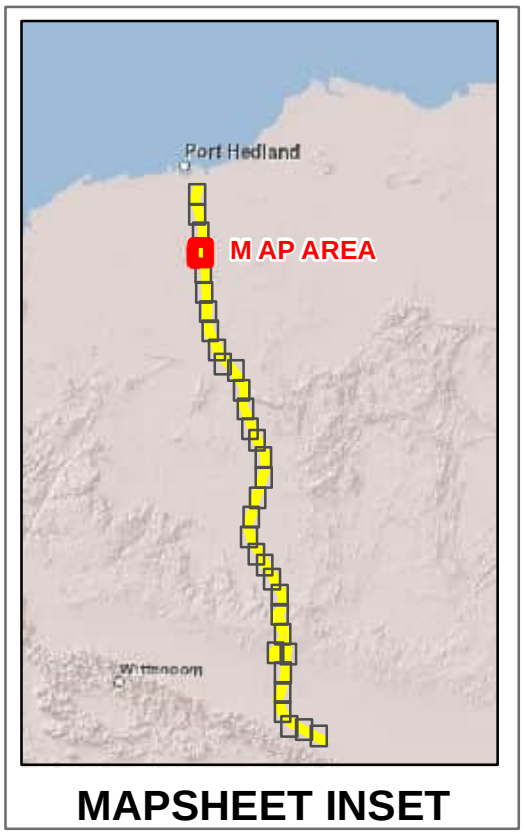

MAPSHEET INSET

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DL GS CL SP

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL

669000 670000 671000 672000 673000 674000 675000

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 4

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Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

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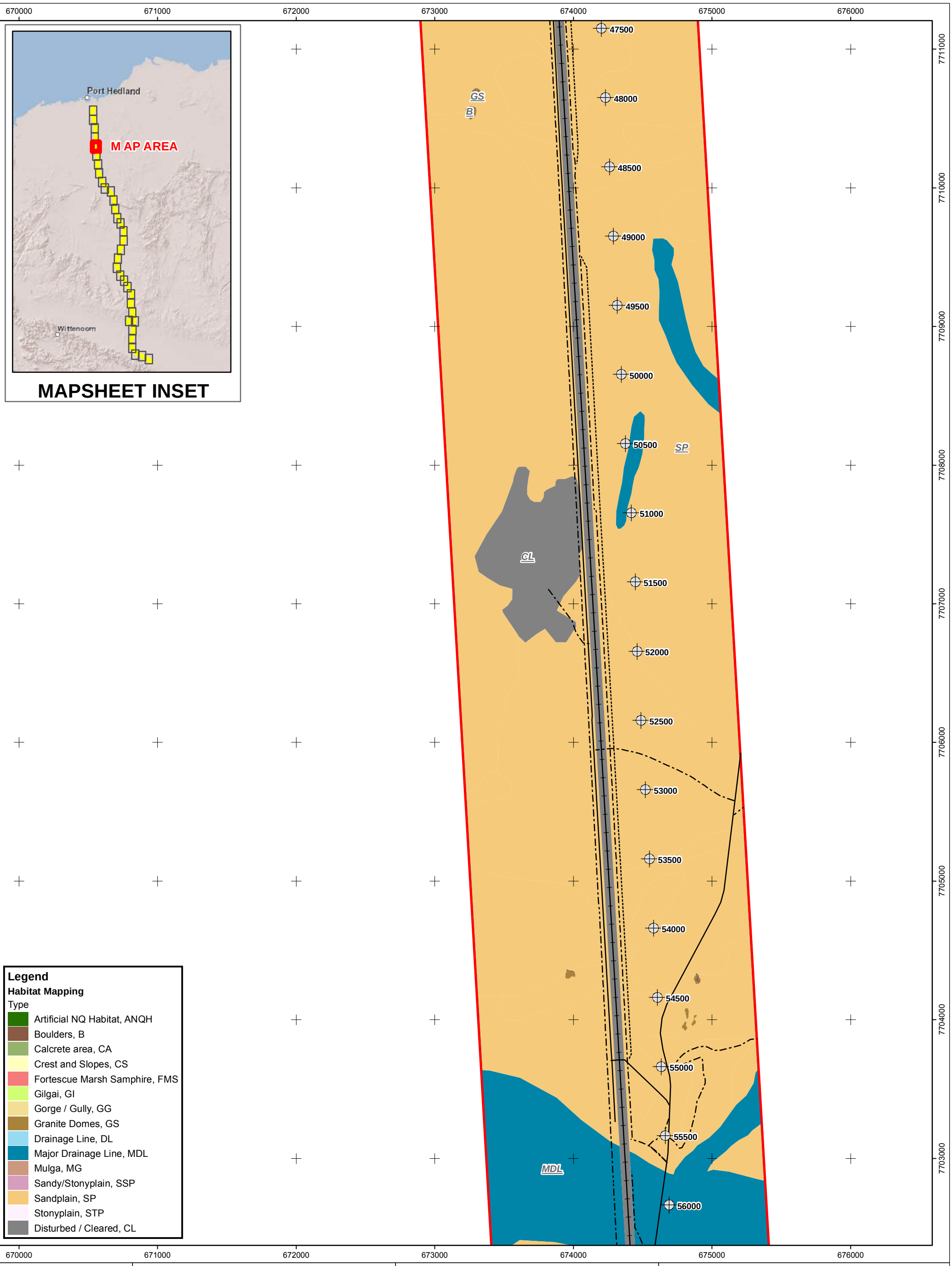

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 5

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Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
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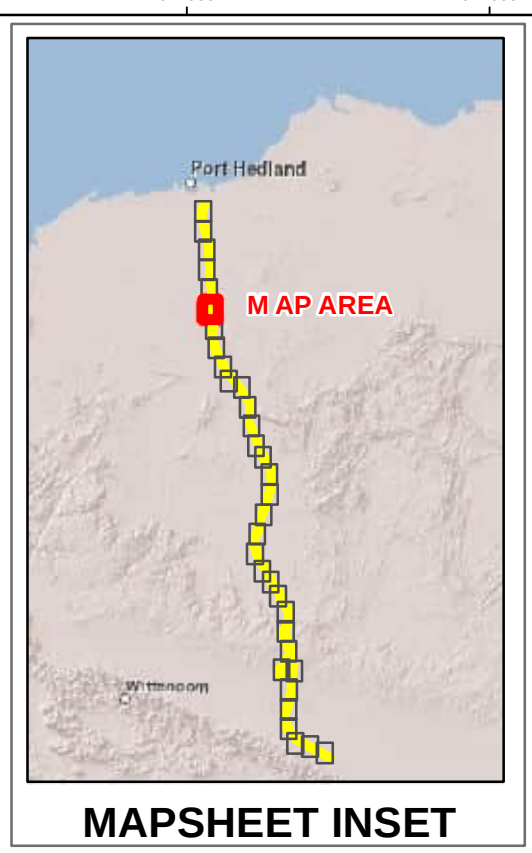

MAPSHEET INSET

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7702000 7701000 7700000 7699000 7698000 7697000 7696000 7695000 7694000

MDL
56500
57000
57500
58000
58500
59000
SP
59500
60000
CL
60500
61000
61500
62000
62500
DL
63000
GS
63500
B
64000
64500

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 6

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Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
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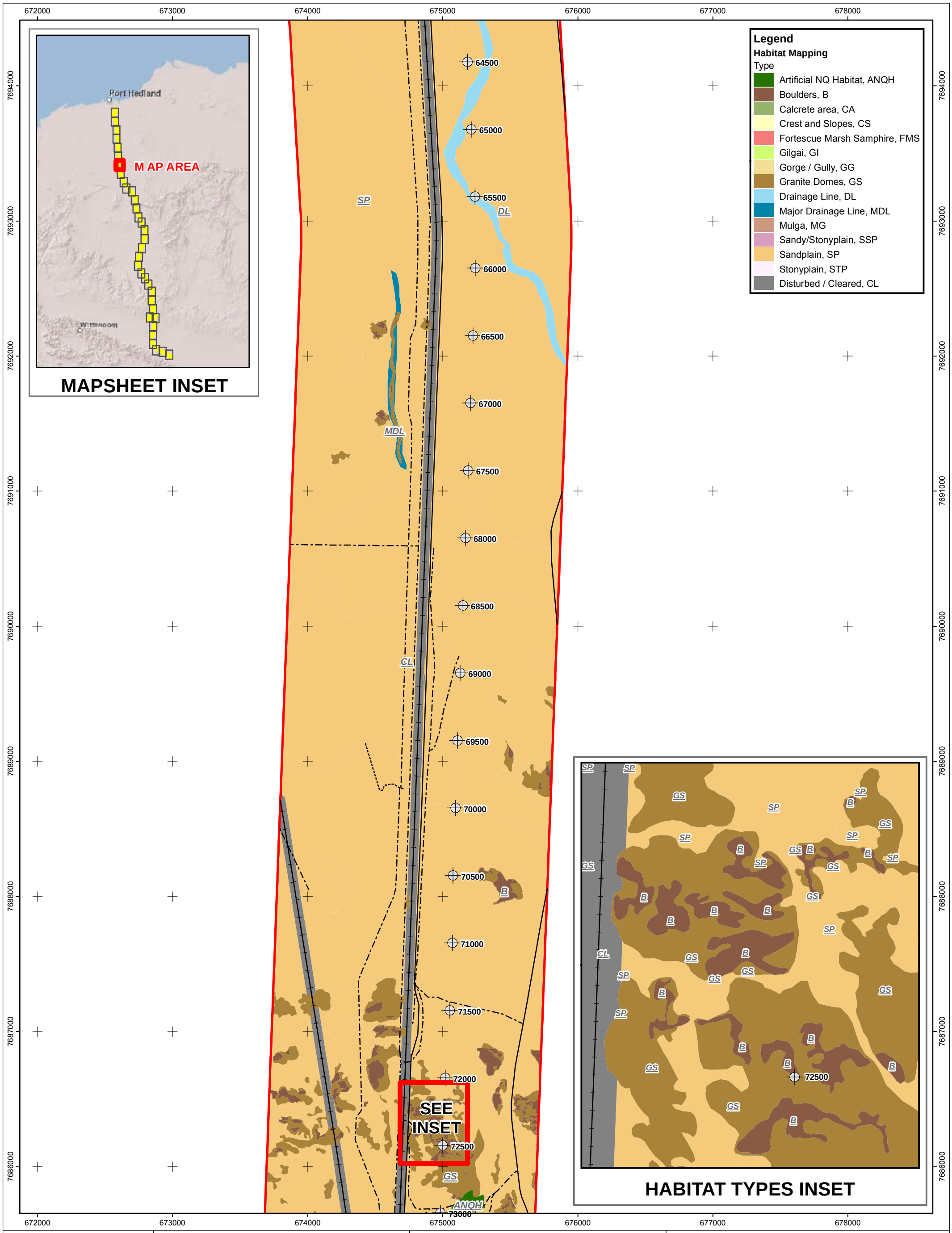

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 7

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Figure:	4.1	Date:	13/07/12
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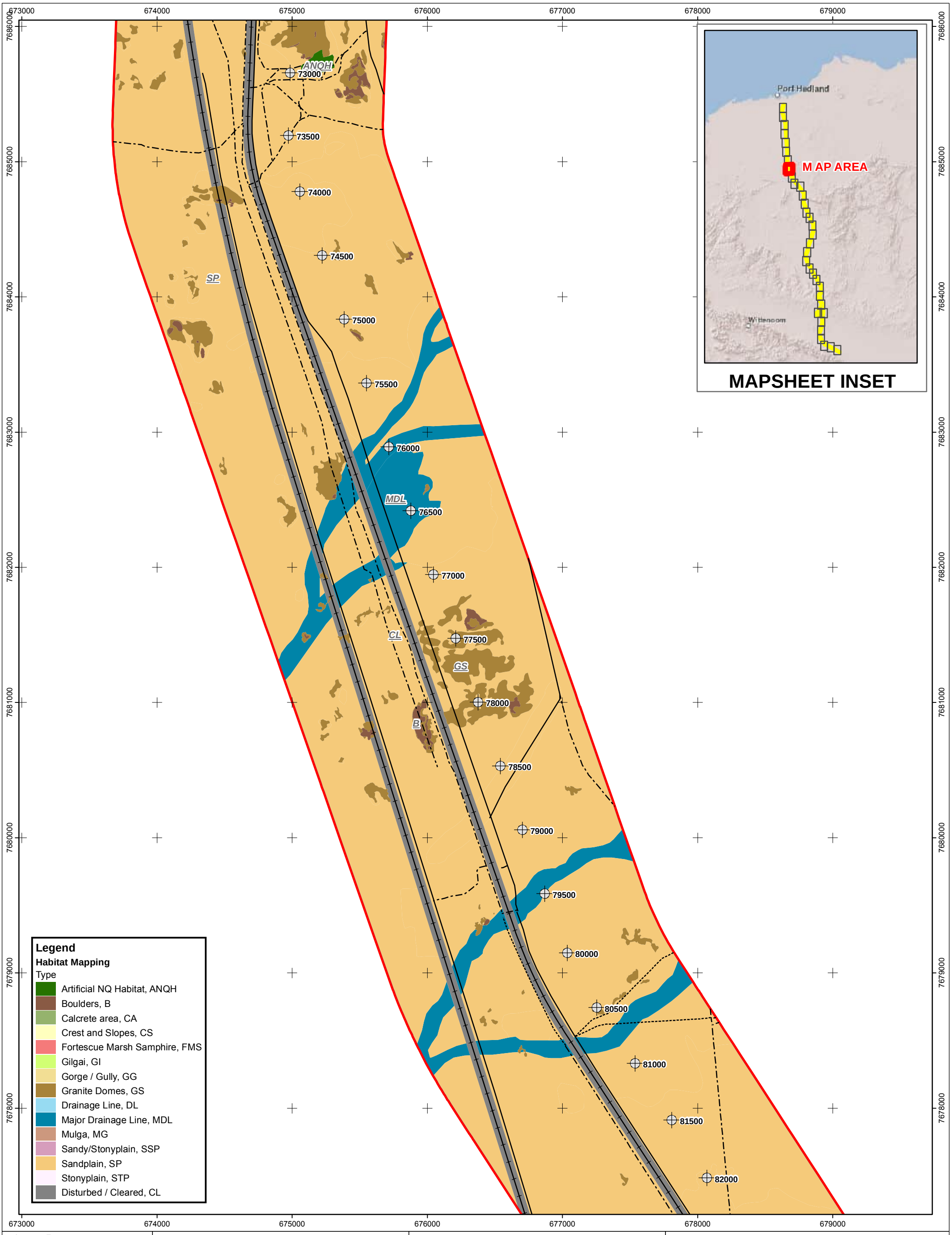

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 8

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Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
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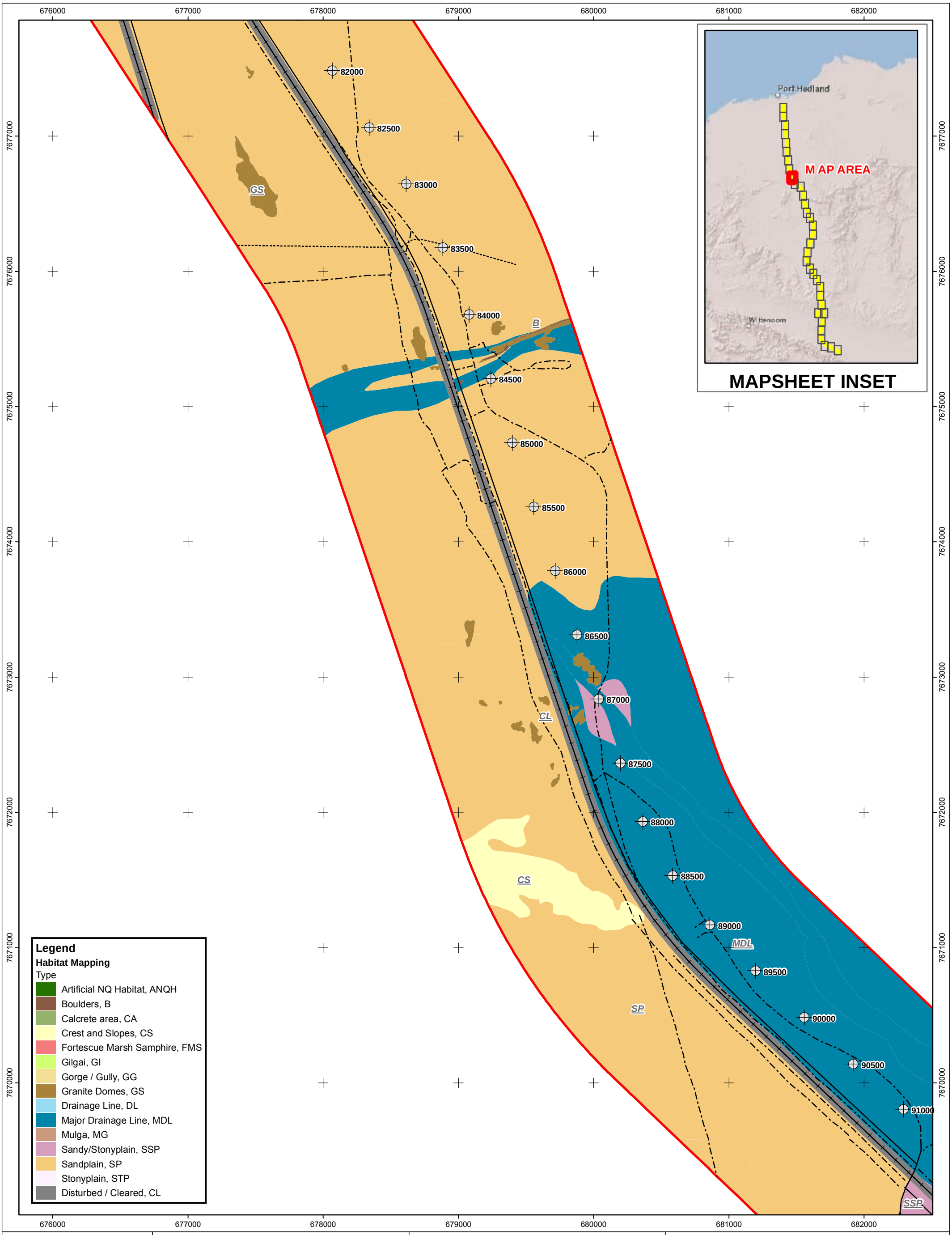

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 9

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Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
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Meters

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88500 89000 89500 90000 90500 91000 91500 92000 92500 93000 93500 94000 94500 95

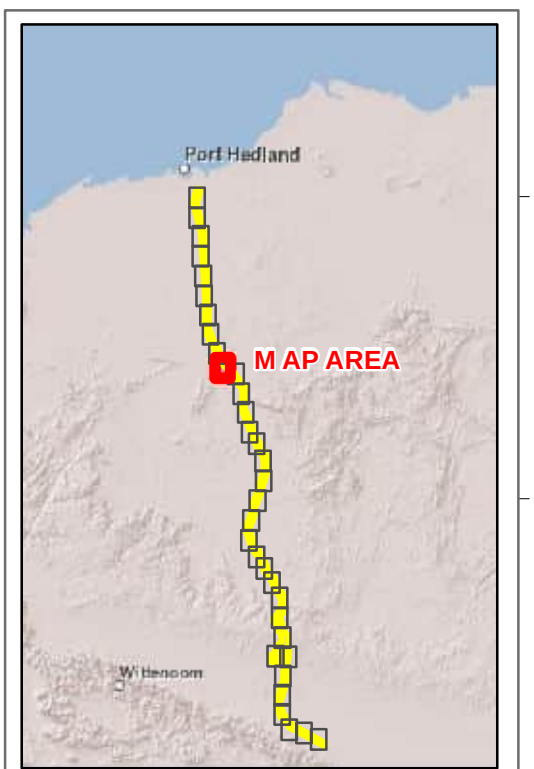
SP MDL SSP CL STP CS

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL



MAPSHEET INSET

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 10

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Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
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Meters

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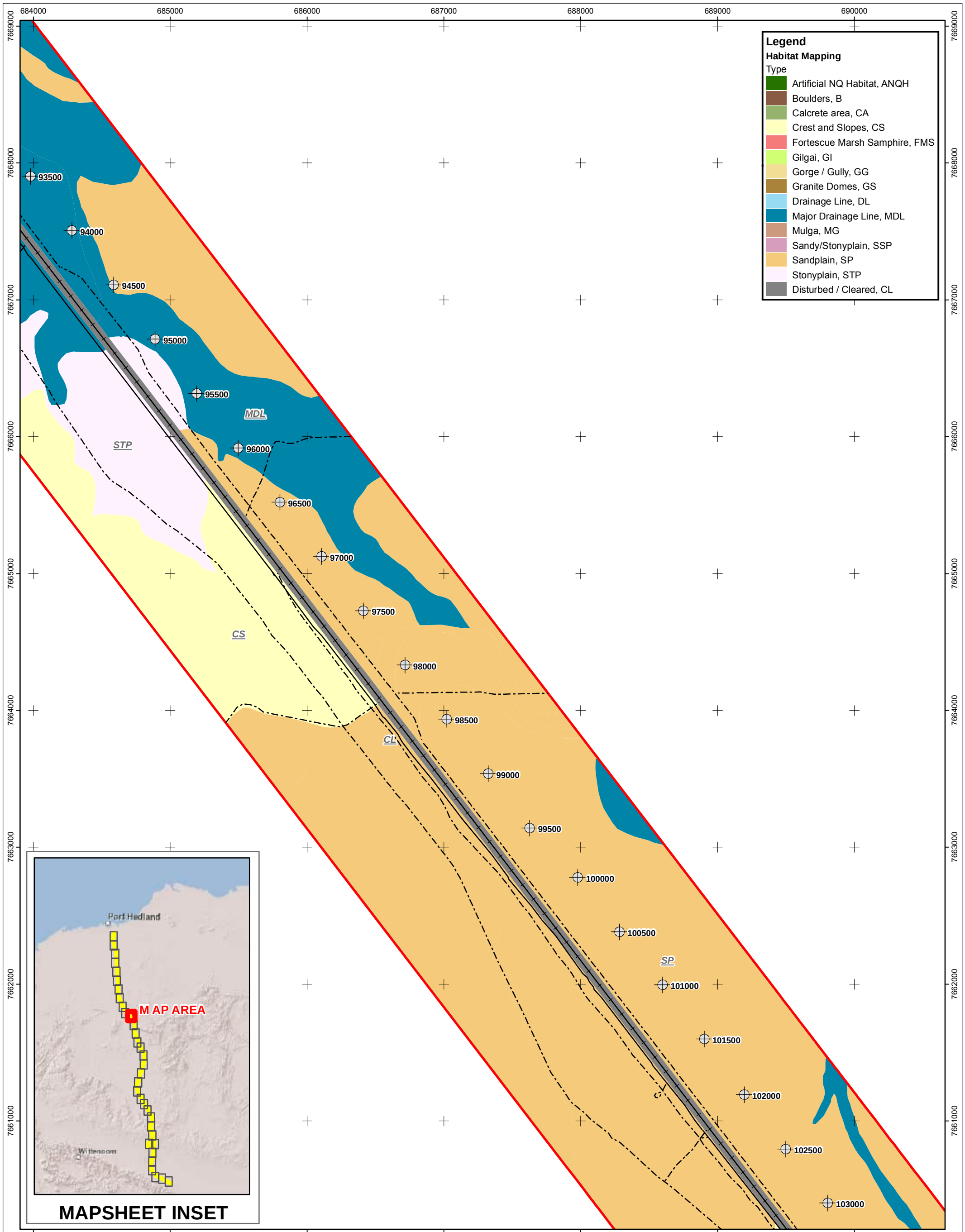

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 11

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Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
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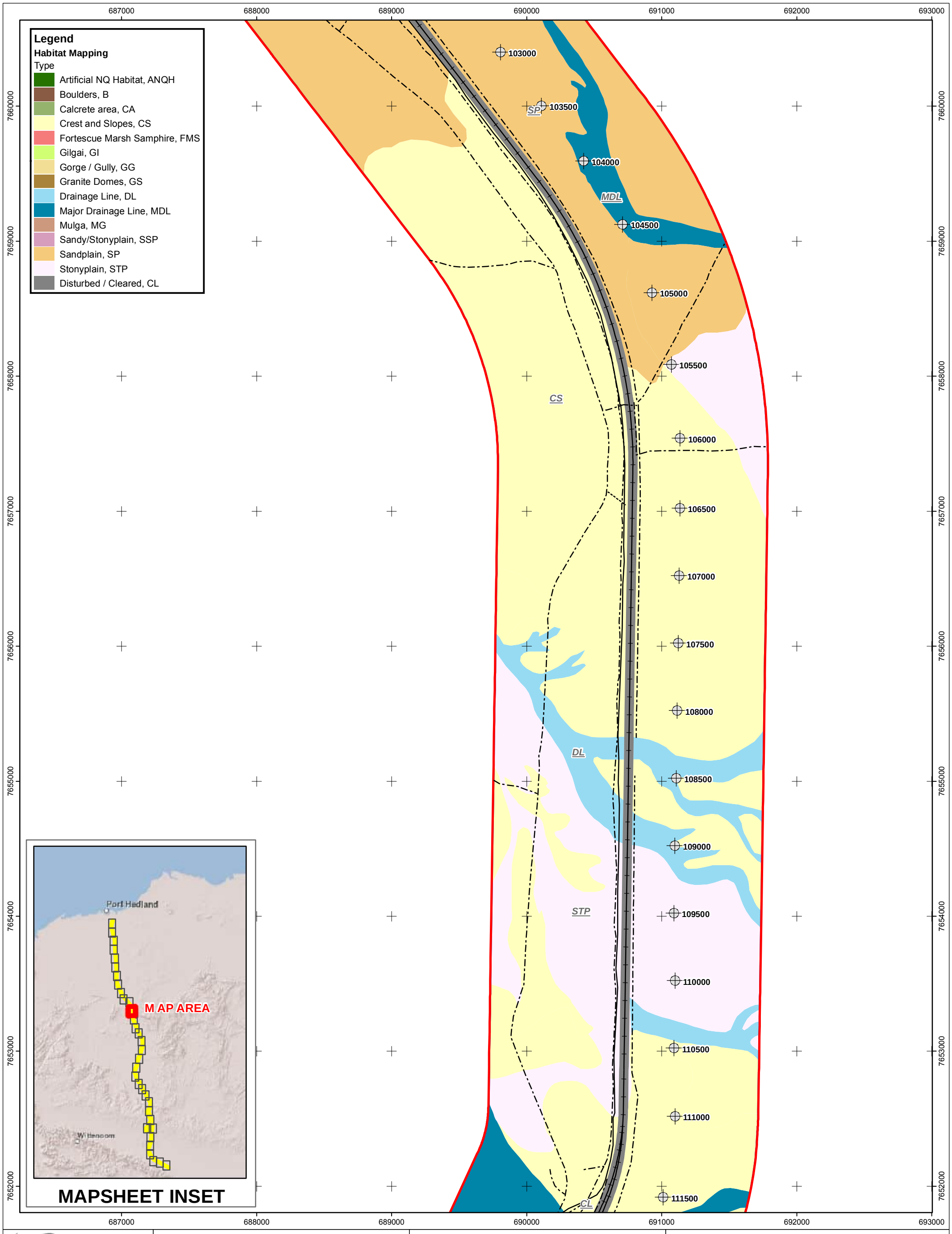

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 12

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
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7652000 7651000 7650000 7649000 7648000 7647000 7646000 7645000 7644000

CS
MDL
SP
GS
STP
B
SSP

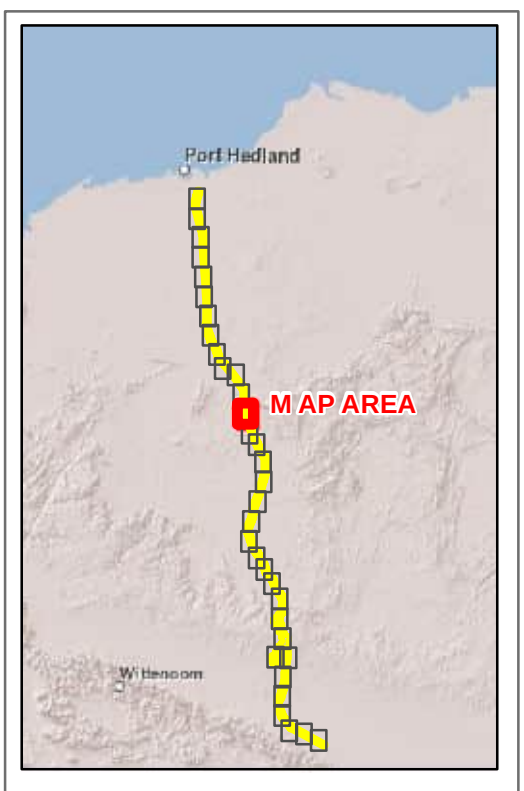
111500 112000 112500 113000 113500 114000 114500 115000 115500 116000 116500 117000 117500 118000 118500 119000 119500 120000 120500

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL



MAPSHEET INSET

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 13

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

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GS
CS
B
STP
SP
CL
MDL
MG
SSP

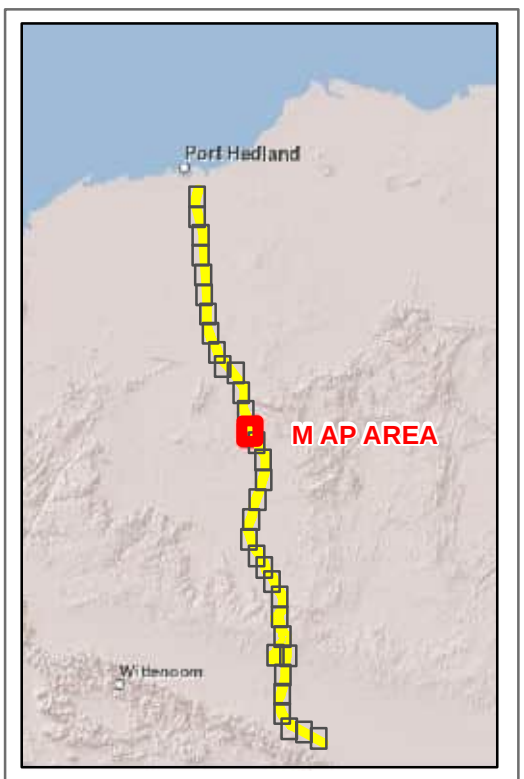
120500 121000 121500 122000 122500 123000 123500 124000 124500 125000 125500 126000 126500 127000 127500 128000 128500 12900

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL



MAPSHEET INSET

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 14

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

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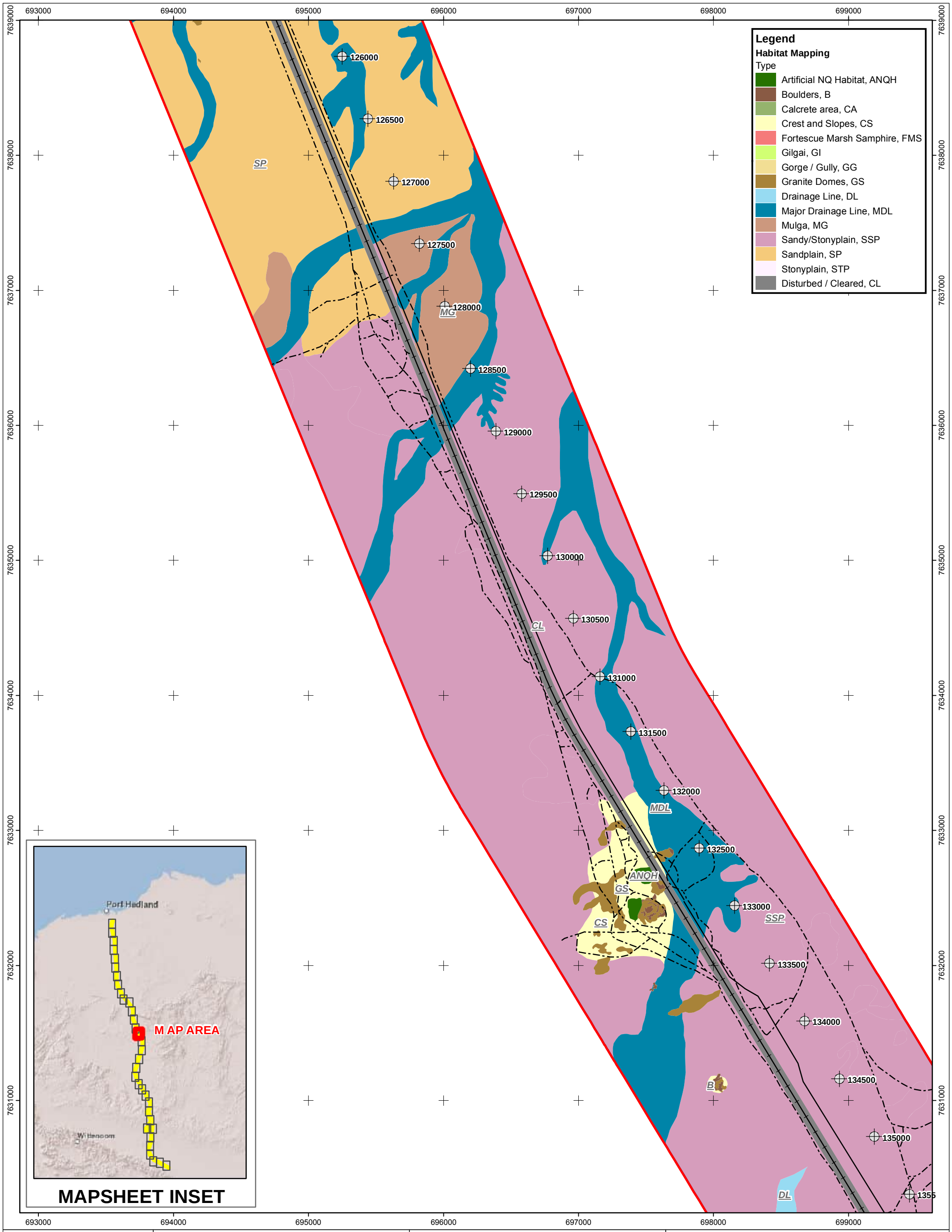

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 15

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
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Meters

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Projection: MGA Zone 50

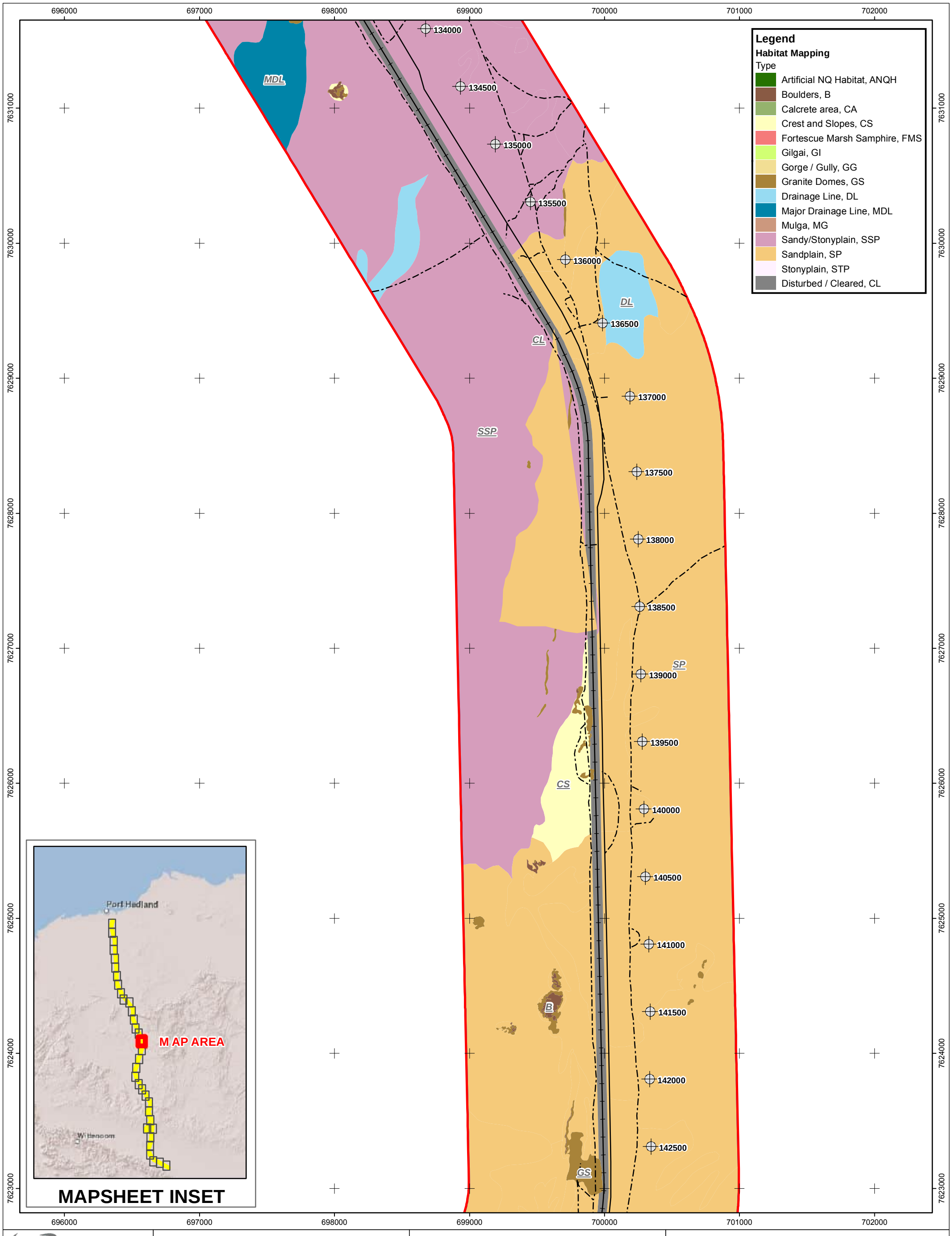

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 16

biologic
ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

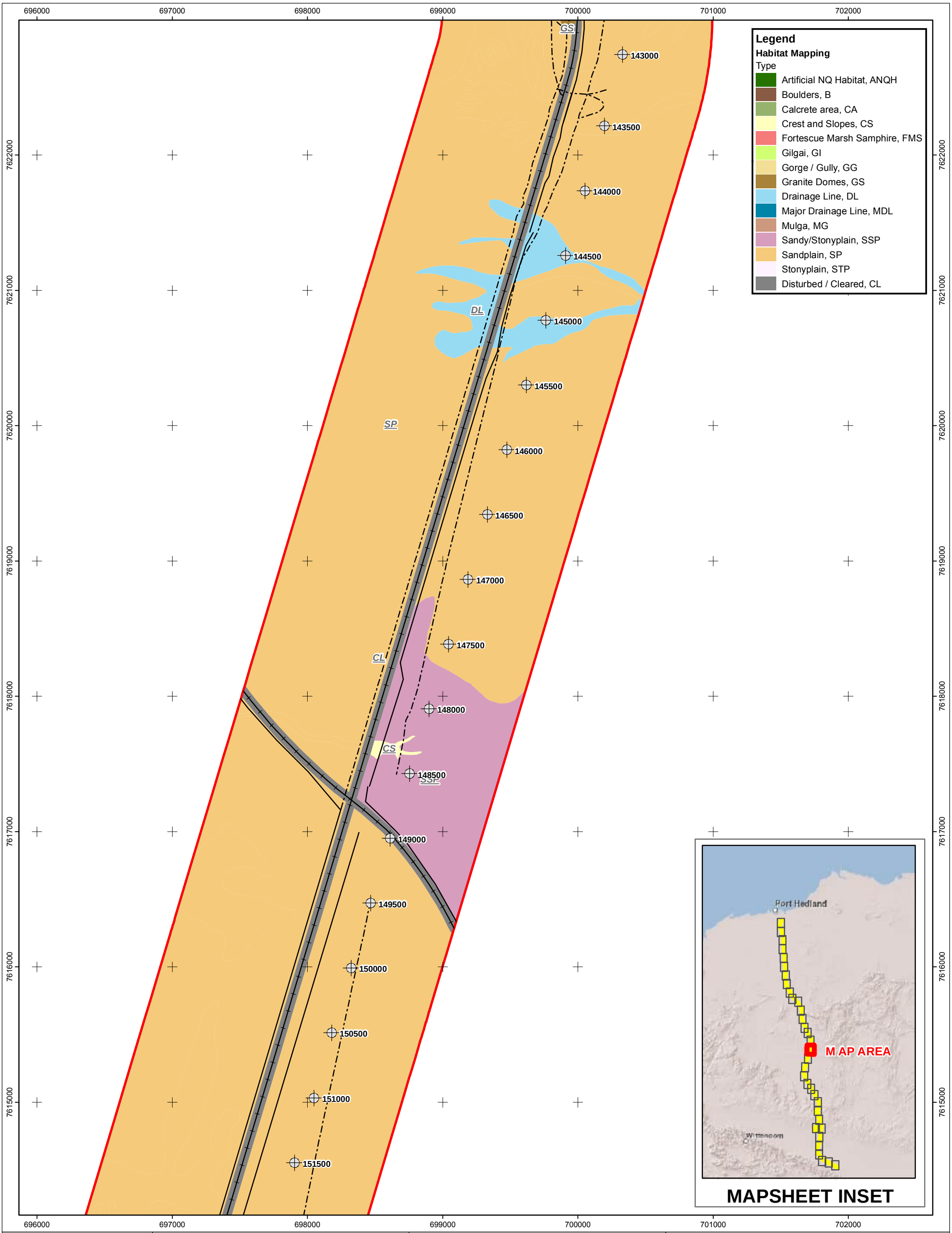

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 17

biologic
ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

694000 695000 696000 697000 698000 699000 700000

7614000 7613000 7612000 7611000 7610000 7609000 7608000 7607000 7606000

Legend

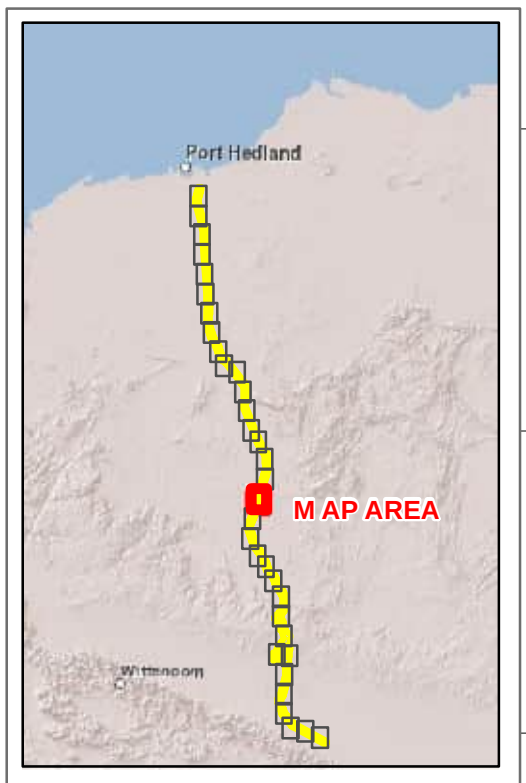
Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL

152000 152500 153000 153500 154000 154500 155000 155500 156000 156500 157000 157500 158000 158500 159000 159500 160000 160500 161000

DL SP CL CS SSP B GS VDL



MAPSHEET INSET

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 18

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: MOC	Internal Reference: Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

691000 692000 693000 694000 695000 696000 697000

7605000 7604000 7603000 7602000 7601000 7600000 7599000 7598000

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL

MDL

161000 161500 162000 162500 163000 163500 164000 164500 165000 165500 166000 166500 167000 167500 168000 168500 169000 169500

SSP

CA

CL

Port Hedland

M AP AREA

Wittenoom

MAPSHEET INSET

691000 692000 693000 694000 695000 696000 697000

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 19

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

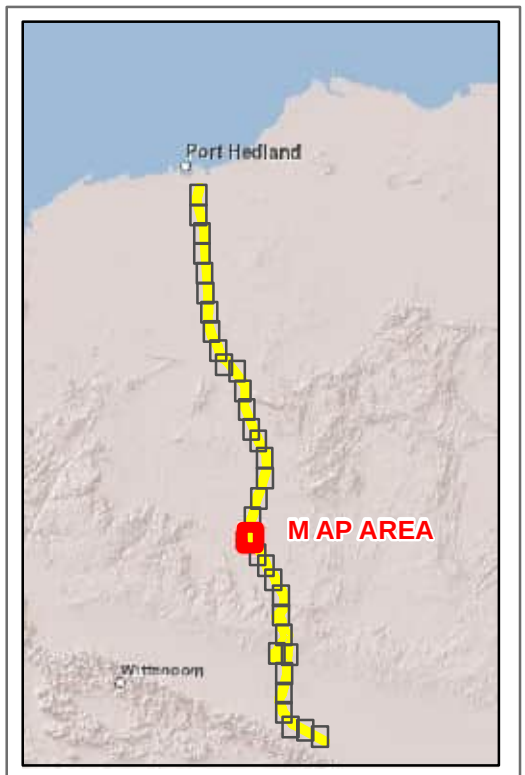
1:25,000
Datum: GDA94
Projection: MGA Zone 50

690000 691000 692000 693000 694000 695000 696000

7597000 7596000 7595000 7594000 7593000 7592000 7591000 7590000 7589000

169500 170000 170500 171000 171500 172000 172500 173000 173500 174000 174500 175000 175500 176000 176500 177000 177500 178000 178500

GS CL SSP MDL CS B



MAPSHEET INSET

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 20

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Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

693000 694000 695000 696000 697000 698000 699000

7590000 7589000 7588000 7587000 7586000 7585000 7584000 7583000 7582000

177500 178000 178500 179000 179500 180000 180500 181000 181500 182000 182500 183000 183500 184000 184500 185000

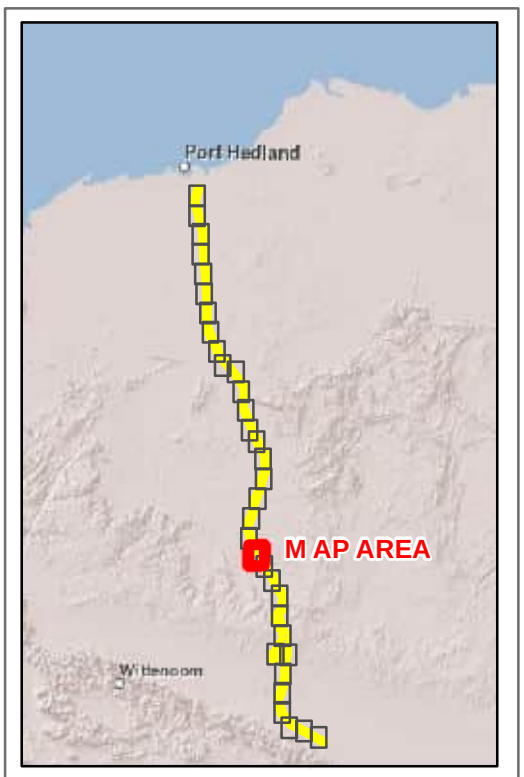
MDL B CS STP SSP CL SP GS

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL



MAPSHEET INSET

693000 694000 695000 696000 697000 698000 699000

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 21

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

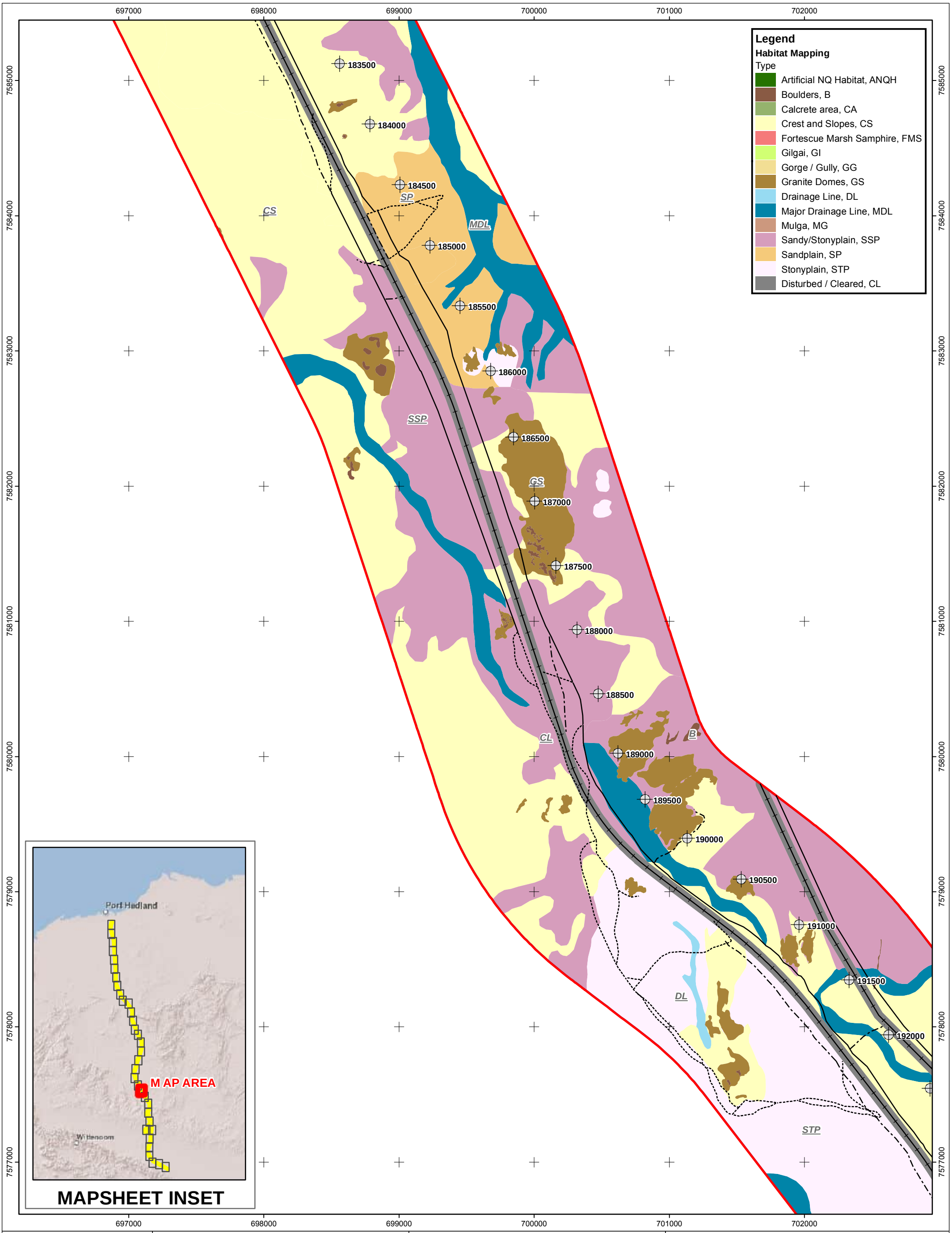

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 22

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

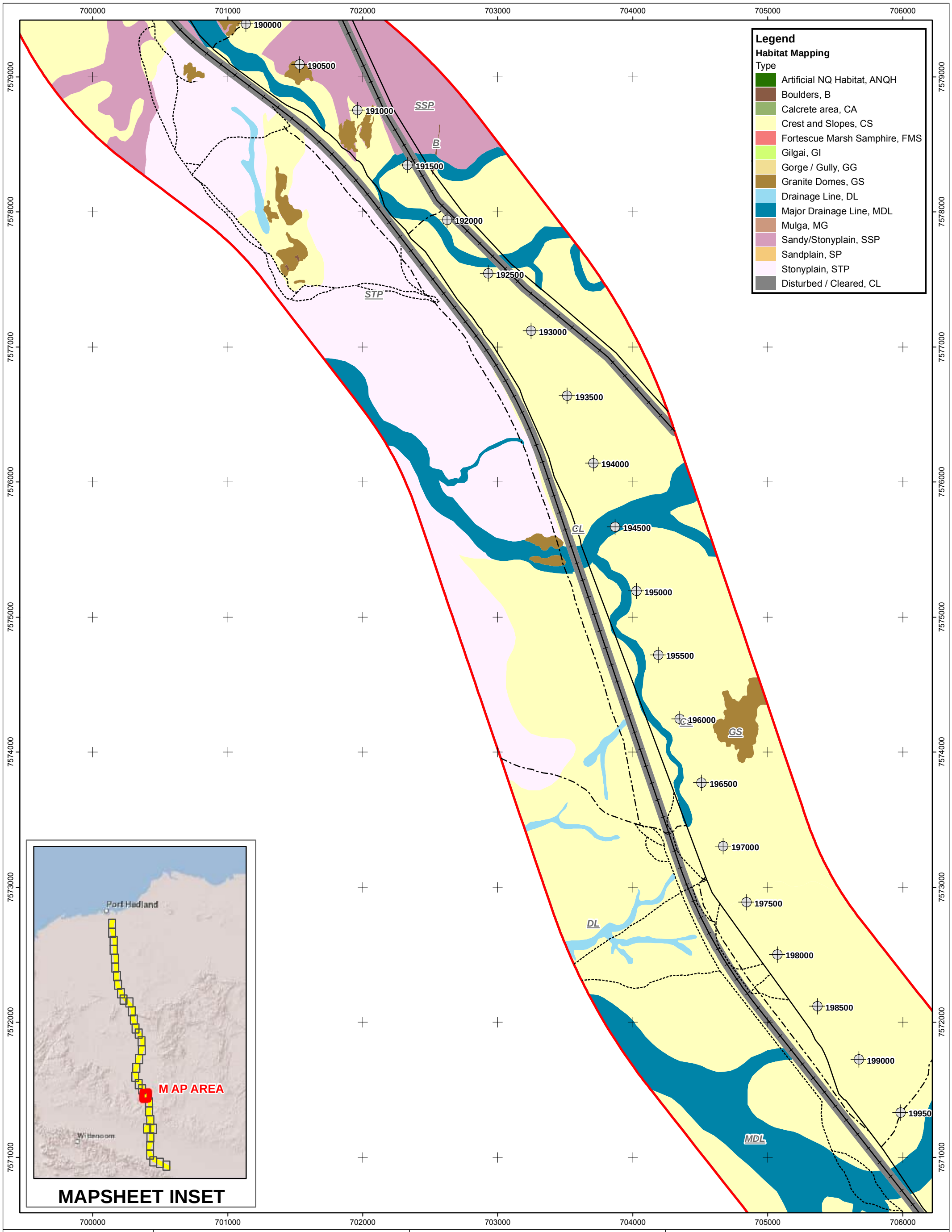

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 23

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

703000 704000 705000 706000 707000 708000 709000

7572000 7571000 7570000 7569000 7568000 7567000 7566000 7565000 7564000

DL CS MDL ANQH CL SP

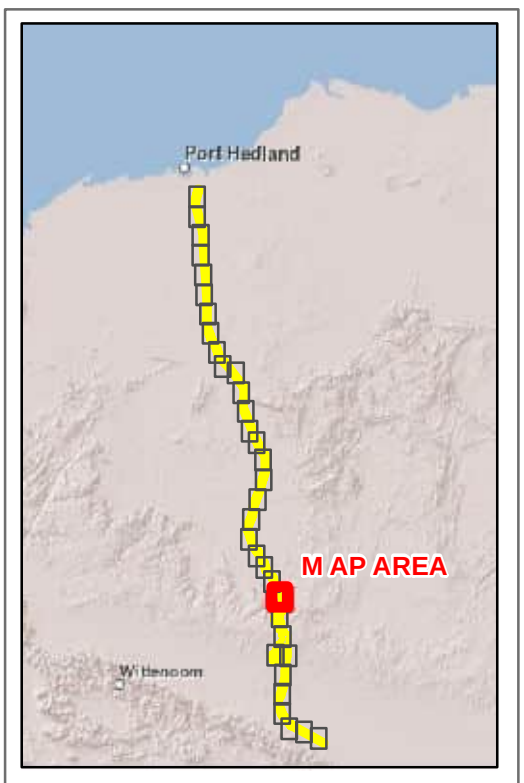
198000 198500 199000 199500 200000 200500 201000 201500 202000 202500 203000 203500 204000 204500 205000 205500 206000 206500 207000

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL



MAPSHEET INSET

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 24

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

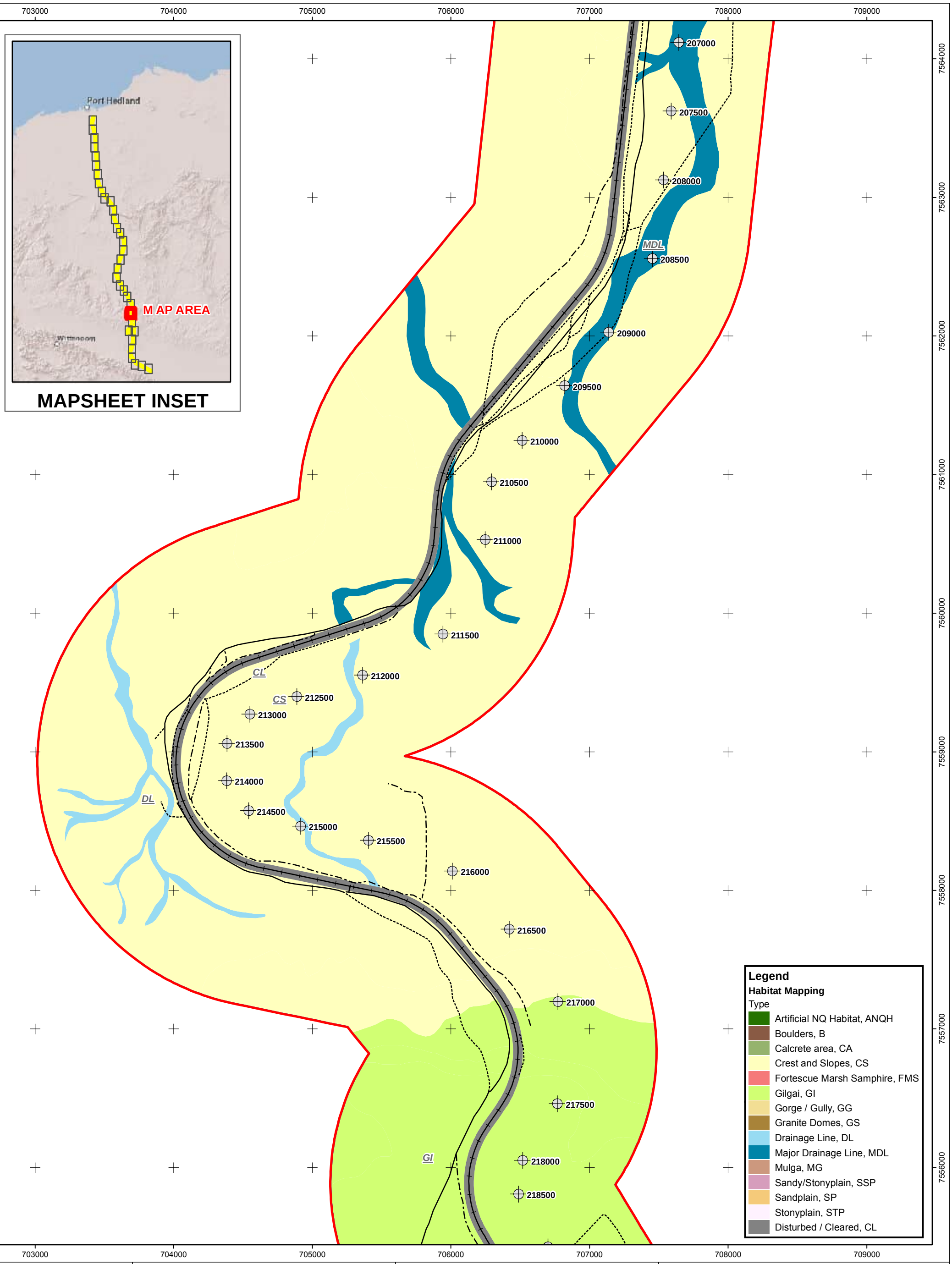

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 25

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

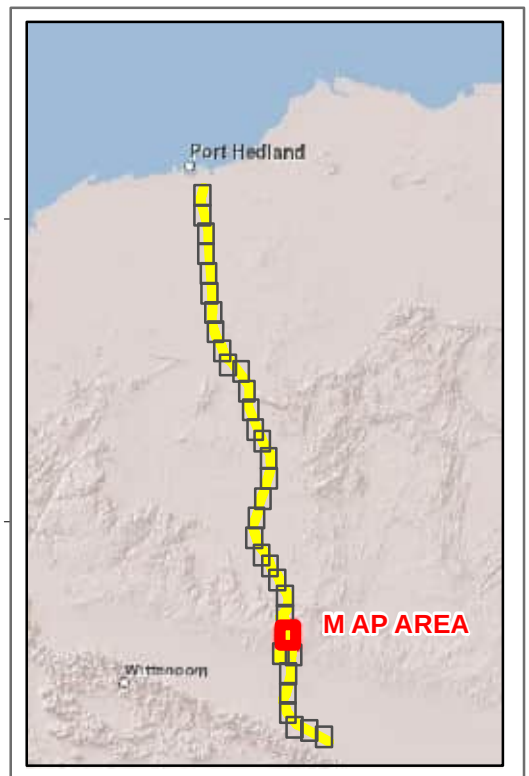
1:25,000
Datum: GDA94
Projection: MGA Zone 50

704000 705000 706000 707000 708000 709000 710000

7555000 7554000 7553000 7552000 7551000 7550000 7549000 7548000 7547000

219000 219500 220000 220500 221000 221500 222000 222500 223000 223500 224000 224500 225000 225500 226000 226500 227000 227500 228000 228500 229000

CL GI SSP MG CS DL MDL



MAPSHEET INSET

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 26

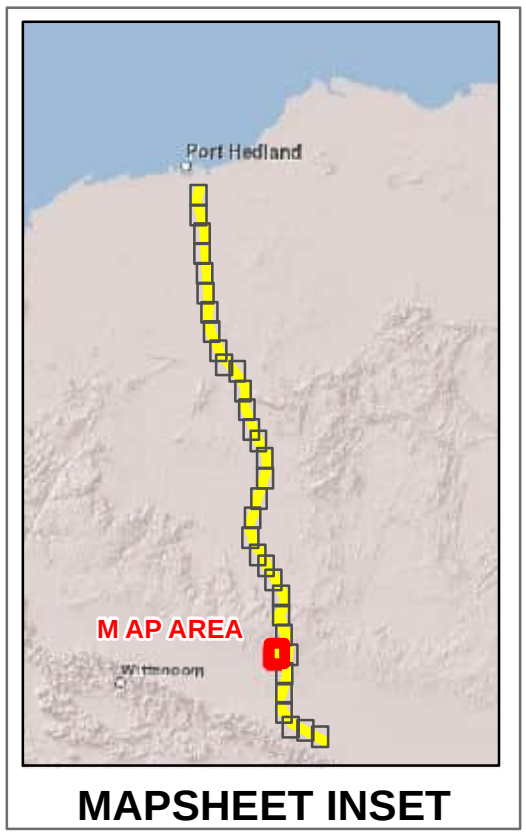
biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: MOC	Internal Reference: Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50



MAPSHEET INSET

701000 702000 703000 704000 705000 706000 707000

7547000 7546000 7545000 7544000 7543000 7542000 7541000 7540000 7539000

CL

DL

CS

STP

MG/G

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 27

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

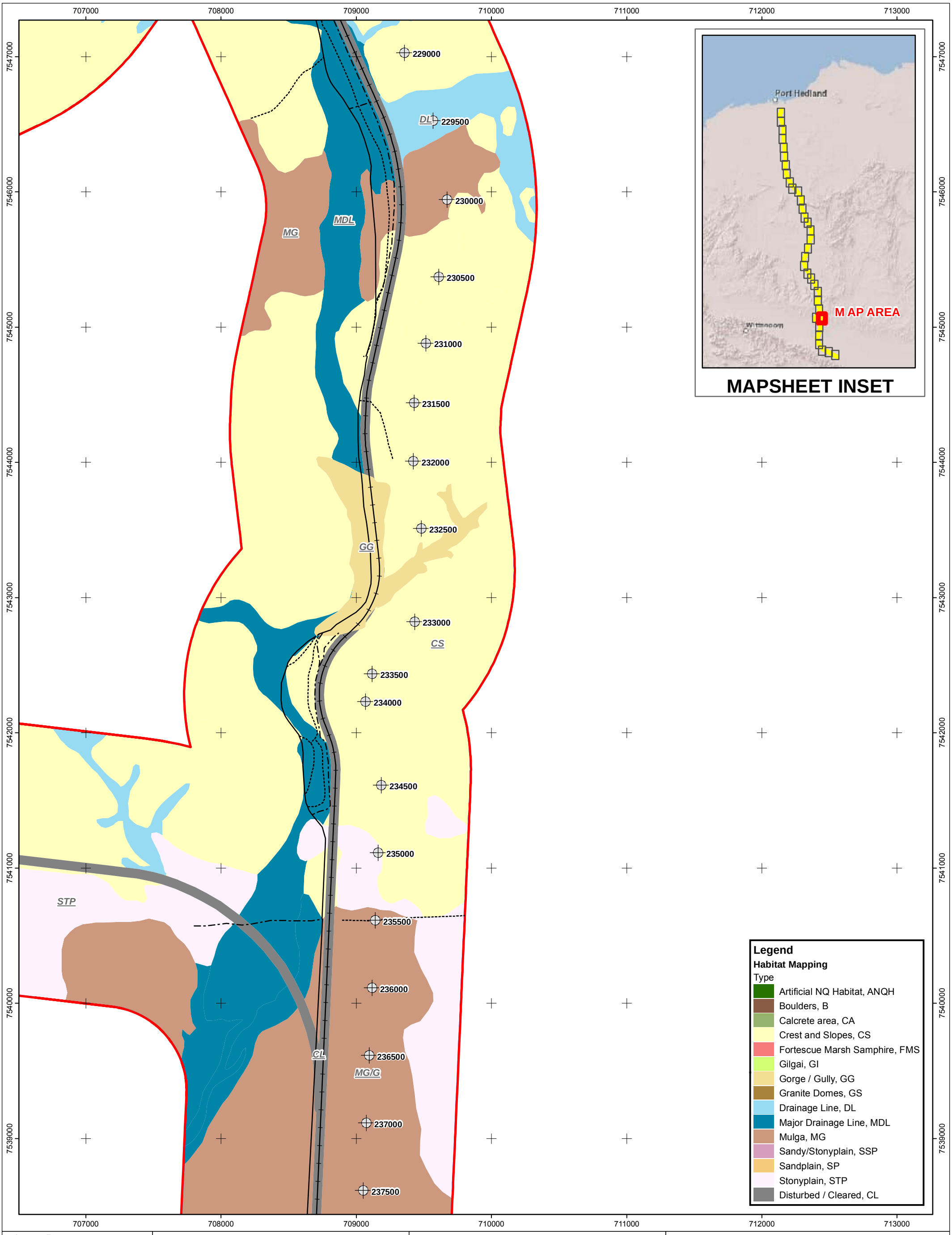

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 28

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

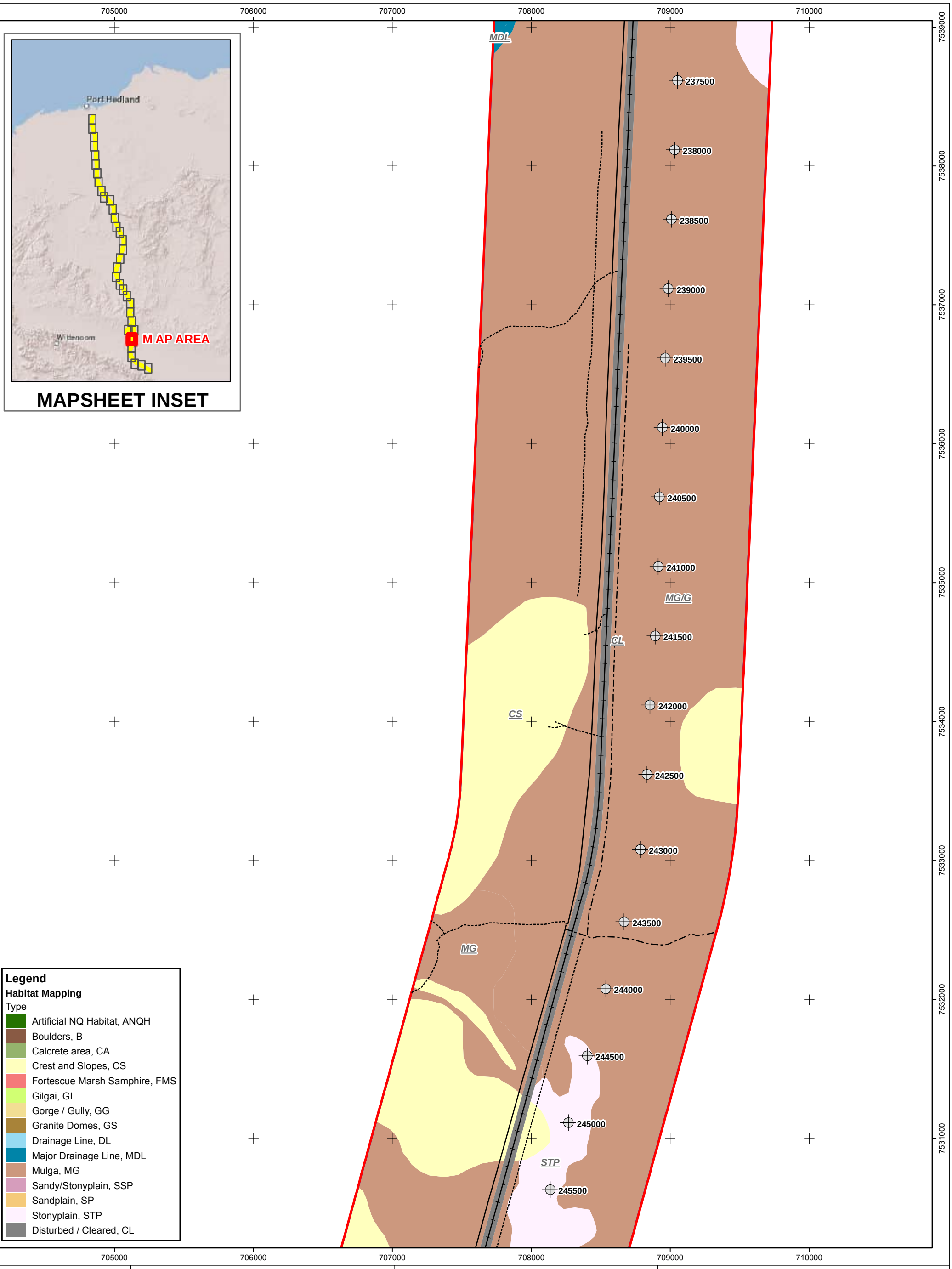

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 29

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: MOC	Internal Reference: Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

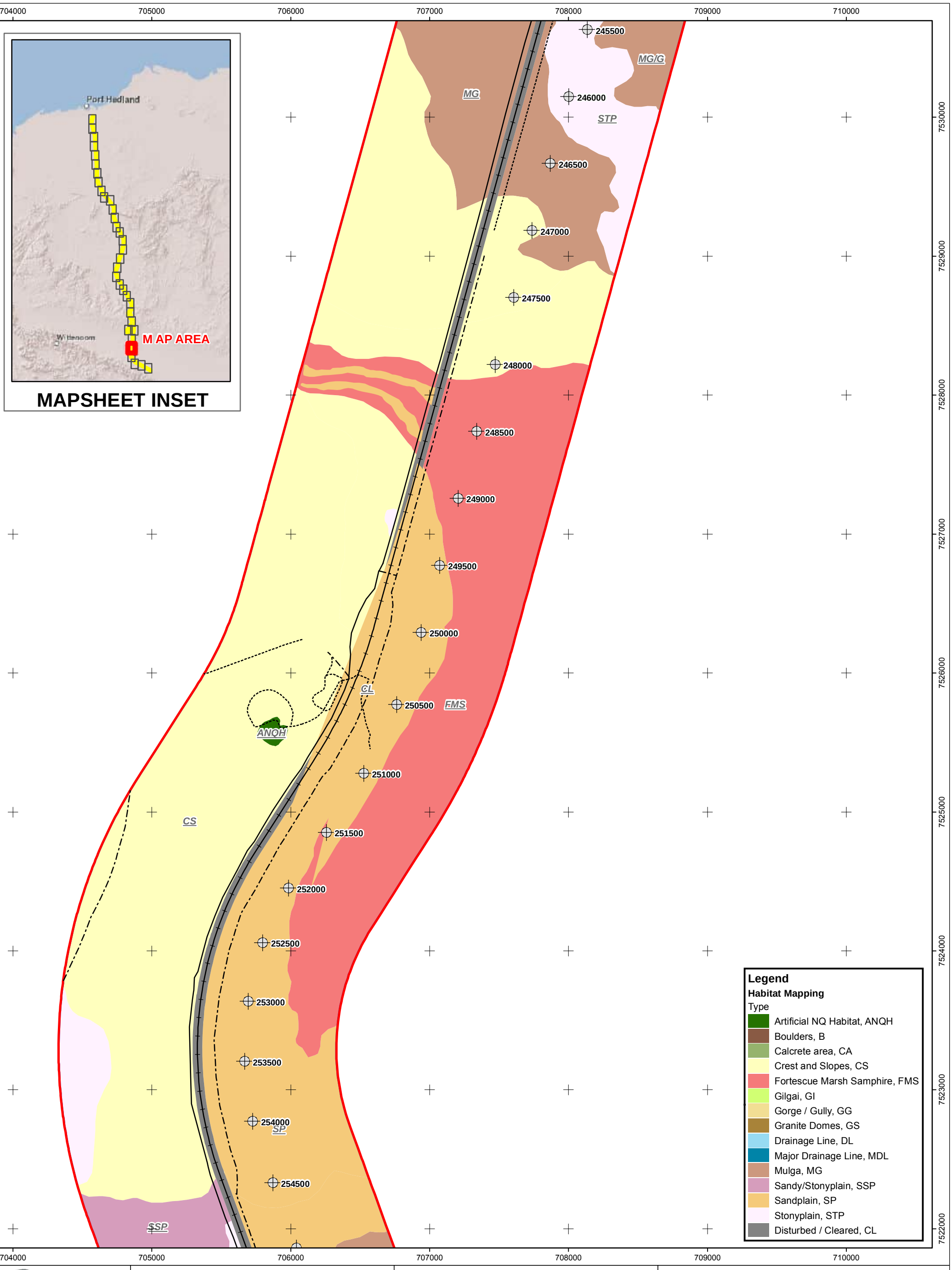

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 30

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

704000 705000 706000 707000 708000 709000 710000

7522000 7521000 7520000 7519000 7518000 7517000 7516000 7515000 7514000

CS

STP

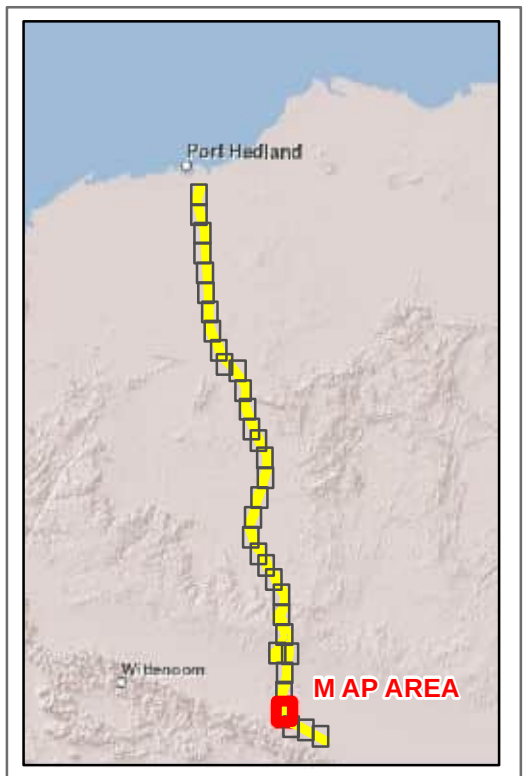
SSP

CL

SP

MG

254500 255000 255500 256000 256500 257000 257500 258000 258500 259000 259500 260000 260500 261000 261500 262000 262500 263000 263500 2640



MAPSHEET INSET

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 31

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

707000 708000 709000 710000 711000 712000 713000

7515000 7514000 7513000 7512000 7511000 7510000 7509000 7508000

262000 262500 263000 263500 264000 264500 265000 265500 266000 266500 267000 267500

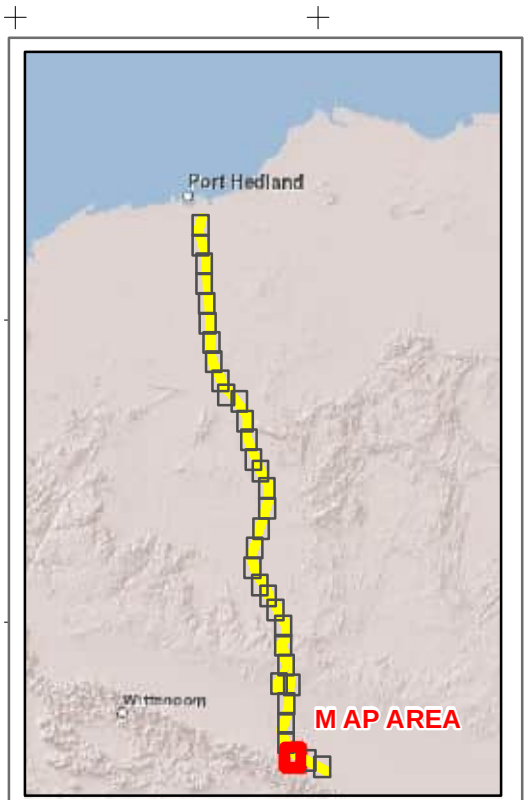
SP MG CL STP SSP

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL



MAPSHEET INSET

707000 708000 709000 710000 711000 712000 713000

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 32

biologic ENVIRONMENTAL SCIENCE

Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig4_1_Hab_mapping	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

714000 715000 716000 717000 718000 719000

7514000 7513000 7512000 7511000 7510000 7509000 7508000 7507000 7506000

Legend

Habitat Mapping

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Calcrete area, CA
- Crest and Slopes, CS
- Fortescue Marsh Samphire, FMS
- Gilgai, GI
- Gorge / Gully, GG
- Granite Domes, GS
- Drainage Line, DL
- Major Drainage Line, MDL
- Mulga, MG
- Sandy/Stonyplain, SSP
- Sandplain, SP
- Stonyplain, STP
- Disturbed / Cleared, CL

267500 268000 268500 269000 269500 270000 270500 271000 271500 272000 272500 273000 273500 274000 274500 275

MG

CL

SP

Port Hedland

Wittenoom

M AP AREA

MAPSHEET INSET

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 33

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Figure:	4.1	Date:	13/07/12
Sheet Size:	A3	Status:	Final
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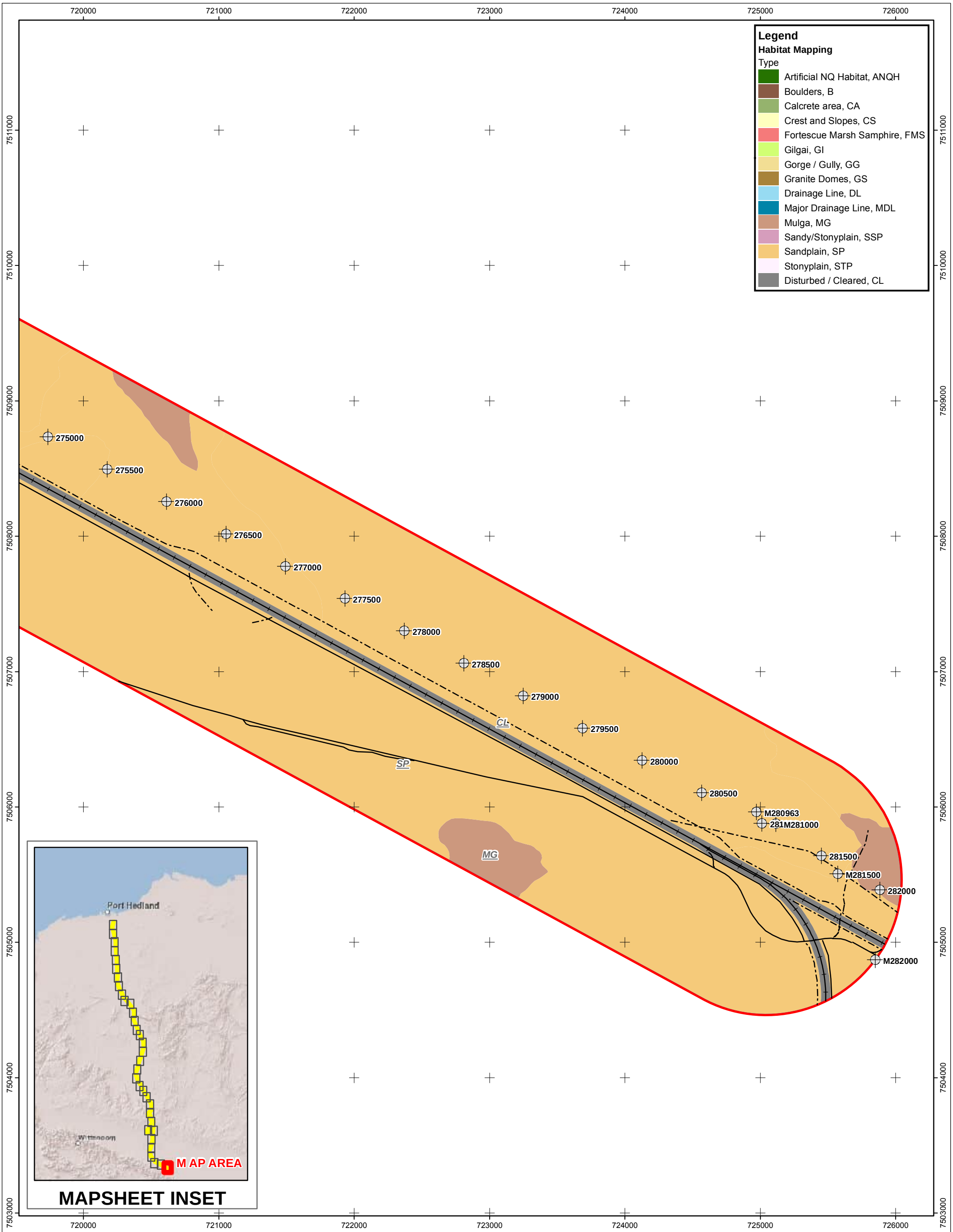

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FIGURE 3.2
HABITAT TYPES WITHIN STUDY AREA

MAPSHEET 34

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Figure:	4.1	Date:	13/07/12
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4 SIGNIFICANT FAUNA AND FAUNA HABITATS

4.1 Significant fauna

Based on database searches and previous surveys in the region, a total of 22 vertebrate fauna species of conservation significance, comprising seven native mammals, 13 birds and two reptiles, have been recorded from the Study Area:

Mammals

- Northern Quoll *Dasyurus hallucatus* – EPBC Endangered, WCA Schedule 1, IUCN Endangered;
- Mulgara *Dasycercus* spp./ *D. cristicauda* – EPBC Vulnerable, WCA Schedule 1, IUCN Least Concern | *D. blythi*: DEC Priority 4, IUCN Least Concern;
- Greater Bilby *Macrotis lagotis* – EPBC Vulnerable, WCA Schedule 1, IUCN Vulnerable;
- Pilbara Leaf-nosed Bat *Rhinonicteris aurantia* – EPBC Vulnerable, WCA Schedule 1, IUCN Least Concern;
- Ghost Bat *Macroderma gigas* – DEC Priority 4, IUCN Vulnerable;
- Western Pebble-mound Mouse *Pseudomys chapmani* – DEC Priority 4, IUCN Least Concern; and
- Short-tailed Mouse *Leggadina lakedownensis* – DEC Priority 4, IUCN Least Concern;

Birds

- Rainbow Bee-eater *Merops ornatus* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Oriental Pratincole *Glareola maldivarum* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Eastern Great Egret *Ardea modesta* – EPBC Migratory, WCA Schedule 3;
- Fork-tailed Swift *Apus pacificus* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Oriental Plover *Charadrius veredus* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Common Greenshank *Tringa nebularia* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Peregrine Falcon *Falco peregrinus* – WCA Schedule 4, IUCN Least Concern;
- Australian Bustard *Ardeotis australis* – DEC Priority 4, IUCN Least Concern;
- Bush Stone-curlew *Burhinus grallarius* – DEC Priority 4, IUCN Least Concern;
- Grey Falcon *Falco hypoleucos* – DEC Priority 4, IUCN Vulnerable;

- Flock Bronzewing *Phaps histrionica* – DEC Priority 4, IUCN Least Concern:
- Pictorella Mannikin *Heteromunia pectoralis* – DEC Priority 4, IUCN Least Concern; and
- Black-necked Stork *Ephippiorhynchus asiaticus* – IUCN Near Threatened;

Reptiles

- Pin-striped Finesnout Ctenotus *Ctenotus nigrilineatus* – DEC Priority 1; and
- *Ctenotus* cf. *uber johnstonei* – DEC Priority 2.

These species are discussed in-detail in Section 4.2. The locations of all conservation significant species records are shown on Figure 4.1 and presented in Appendix E.

Based on records from databases (Nature Map and WAM records) and studies conducted in adjacent areas, the following conservation significant species potentially occur within the Study Area:

Mammals

- Western Little Free-tailed Bat *Mormopterus loriae cobourgiana* – DEC Priority 1;
- Spectacled Hare-wallaby *Lagorchestes conspicillatus leichardti* – DEC Priority 3;

Birds

- Night Parrot *Pezoporus occidentalis* – EPBC Endangered, WCA Schedule 1, IUCN Critically Endangered;
- Eastern Reef Egret *Egretta sacra* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Cattle Egret *Ardea ibis* – EPBC Migratory, WCA Schedule 3;
- White-bellied Sea-eagle *Haliaeetus leucogaster* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Barn Swallow *Hirundo rustica* – EPBC Migratory, WCA Schedule 3, IUCN Least Concern;
- Eastern Osprey *Pandion cristatus* – EPBC Migratory; WCA Schedule 3; and
- Star Finch (western subspecies) *Neochmia ruficauda subclarescens* – DEC Priority 4, IUCN Near Threatened;

Reptiles

- Pilbara Olive Python *Liasis olivaceus barroni* – EPBC Vulnerable, WCA Schedule 1; and,
- Pilbara Flat-headed Blind Snake *Ramphotyphlops ganei* – DEC Priority 1.

The conservation significant fauna species that have the potential to occur within the Study Area are discussed in Section 4.3.

As the search for potential species was conducted in a 5 km radius around the Study Area, a number of EPBC migratory/marine and WCA Schedule 3 listed species associated with coastal marine environments were picked up in database searches, these were:

- Asian Dowitcher *Limnodromus semipalmatus;*
- Australian Painted Snipe *Rostratula australis;*
- Bar-tailed Godwit *Limosa lapponica;*
- Black-tailed Godwit *Limosa limosa;*
- Broad-billed Sandpiper *Limicola falcinellus;*
- Common Sandpiper *Actitis hypoleucos;*
- Curlew Sandpiper *Calidris ferruginea;*
- Eastern Curlew *Numenius madagascariensis;*
- Great Knot *Calidris tenuirostris;*
- Greater Sand Plover *Charadrius leschenaultii;*
- Grey Plover *Pluvialis squatarola;*
- Grey-tailed Tattler *Tringa brevipes*;
- Lesser Sand Plover *Charadrius mongolus;*
- Little Curlew *Numenius minutus;*
- Long-toed Stint *Calidris subminuta;*
- Marsh Sandpiper *Tringa stagnatilis;*
- Pacific Golden Plover *Pluvialis fulva;*
- Pin-tailed Snipe *Gallinago stenura;*
- Red-necked Stint *Calidris ruficollis*;
- Red Knot *Calidris canutus;*
- Ruddy Turnstone *Arenaria interpres;*
- Ruff *Philomachus pugnax;*
- Sanderling *Calidris alba;*
- Sharp-tailed Sandpiper *Calidris acuminata;*
- Terek Sandpiper *Xenus cinereus;*
- Whimbrel *Numenius phaeopus;*
- Wood Sandpiper *Tringa glareola;*
- Caspian Tern *Hydroprogne caspia;*
- Common Tern *Hydroprogne hirundo;*
- Fairy Tern *Hydroprogne nereis;*
- Little Tern *Sternula albifrons;* and
- White-winged Black Tern *Chlidonias leucopterus.*

It is deemed unlikely for these species to occur in the Study Area with any regularity as these species are largely associated with permanent water bodies or near-shore habitats, neither

which are present within the Study Area. However it is feasible for some of these species to be recorded in the very north of the Study Area at smaller waterbodies, both man made and storm/cyclone related, and at the Fortescue Marsh samphire after flooding.

Legend

Consultant

- BHPBIO records
- Biologic
- Biota records
- ENV records
- Ecologia records

Species

- Australian Bustard *(Ardeotis australis)*
- Bar-tailed Godwit *(Limosa lapponica)*
- Bilby *(Macrotis lagotis)*
- Black-necked Stork *(Ephippiorhynchus asiaticus)*
- Bush-Stone Curlew *(Burhinus grallarius)*
- Caspian Tern *(Sterna caspia)*
- Cattle Egret *(Ardea ibis)*
- Common Greenshank *(Tringa nebularia)*
- *Ctenotus nigrilineatus*
- *Ctenotus uber johnstonei*
- Eastern Great Egret *(Ardea modesta)*
- Eastern Osprey *(Pandion haliaetus)*
- Eastern Reef Egret *(Egretta sacra)*
- Flock Bronzewing *(Phaps histrionica)*
- Fork-tailed Swift *(Apus pacifiicus)*
- Ghost Bat *(Macroderma gigas)*
- Grey Falcon *(Falco hypoleucos)*
- Grey Plover *(Pluvialis squatarola)*
- Greytailed Tattler *(Tringa brevipes)*
- Mulgara *(Dasycercus sp)*
- Northern Quoll *(Dasyurus hallucatus)*
- Oriental Plover *(Charadrius veredus)*
- Oriental Pratincole *(Glareola maldivarum)*
- Peregrine Falcon *(Falco peregrinus)*
- Pictorella Mannikin *(Heteromunia pectoralis)*
- Pilbara Leaf-nosed Bat *(Rhinonicteris aurantia)*
- Rainbow Bee-Eater *(Merops ornatus)*
- Red-necked Stint *(Calidris ruficollis)*
- Ruddy Turnstone *(Arenaria interpres)*
- Short-tailed Mouse *(Leggadina lakedownensis)*
- Western Little Free-tailed Bat *(Mormopterus loriae cobourgiana)*
- Western Pebble-Mound Mouse *(Pseudomys chapmani)*
- Whimbrel *(Numenius phaeopus)*
- Whitebellied Sea-eagle *(Haliaeetus leucogaster)*
- Woma *(Aspidites ramsayi)*

DEC Records

- BIRD 4
- BIRD S
- BIRD T
- MAMMAL 3
- MAMMAL 4
- MAMMAL T
- REPTILE 1
- REPTILE 2
- REPTILE S

Significant Fauna Habitats

Type

- Artificial NQ Habitat, ANQH
- Boulders, B
- Fortescue Marsh Samphire, FMS
- Gorge / Gully, GG
- Granite Domes, GS
- Major Drainage Line, MDL
- Sandy/Stonyplain, SSP
- Sandplain, SP

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

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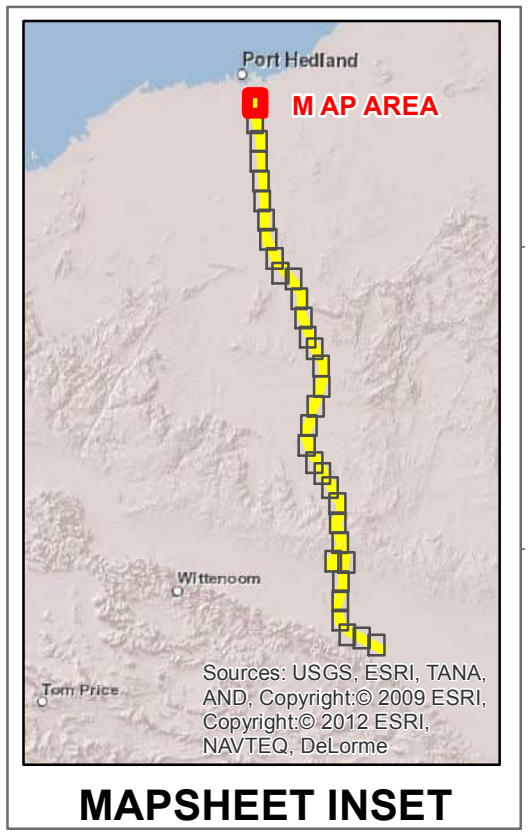

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS & SIGNIFICANT FAUNA HABITATS

MAPSHEET 1

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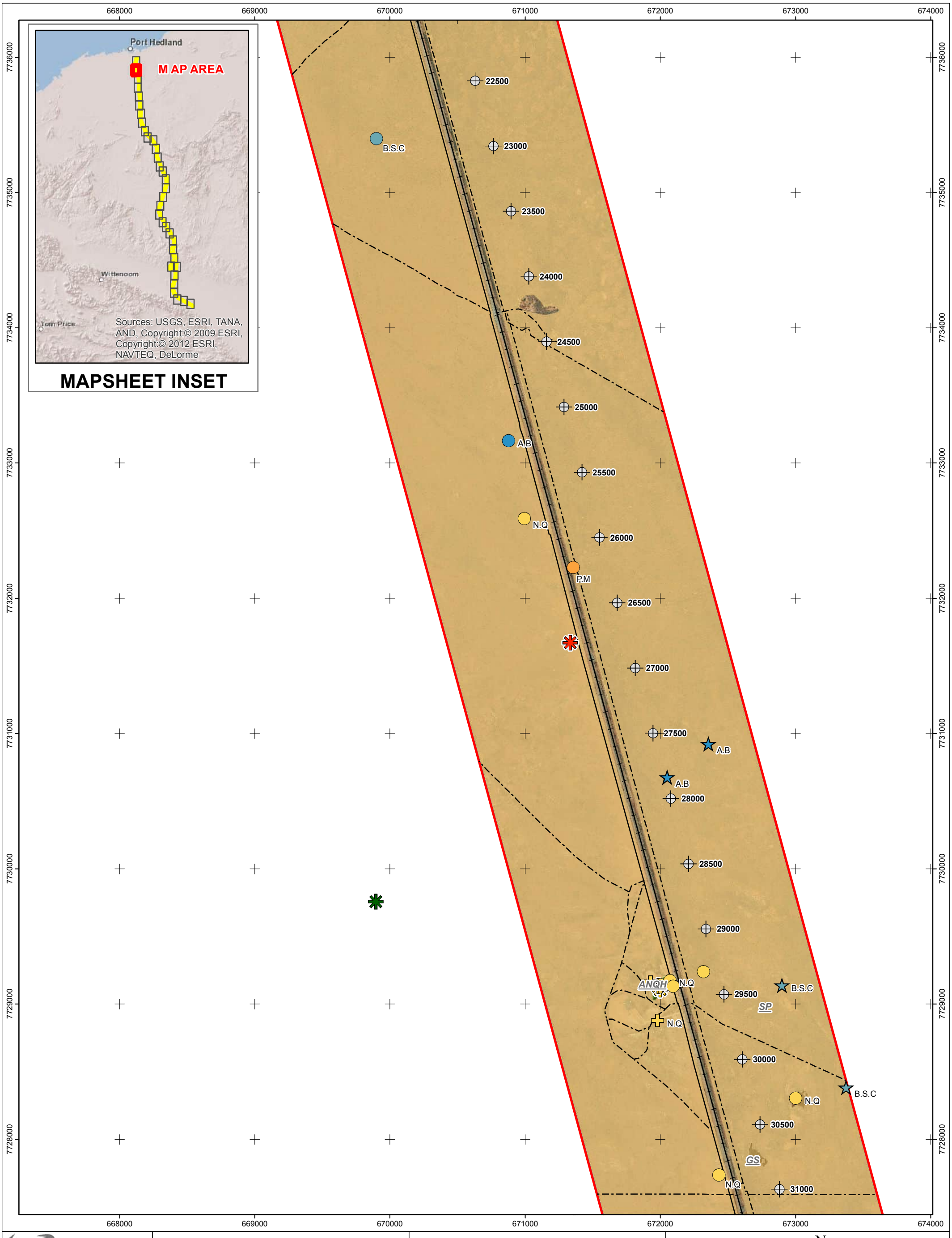

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 2

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ENVIRONMENTAL SCIENCE

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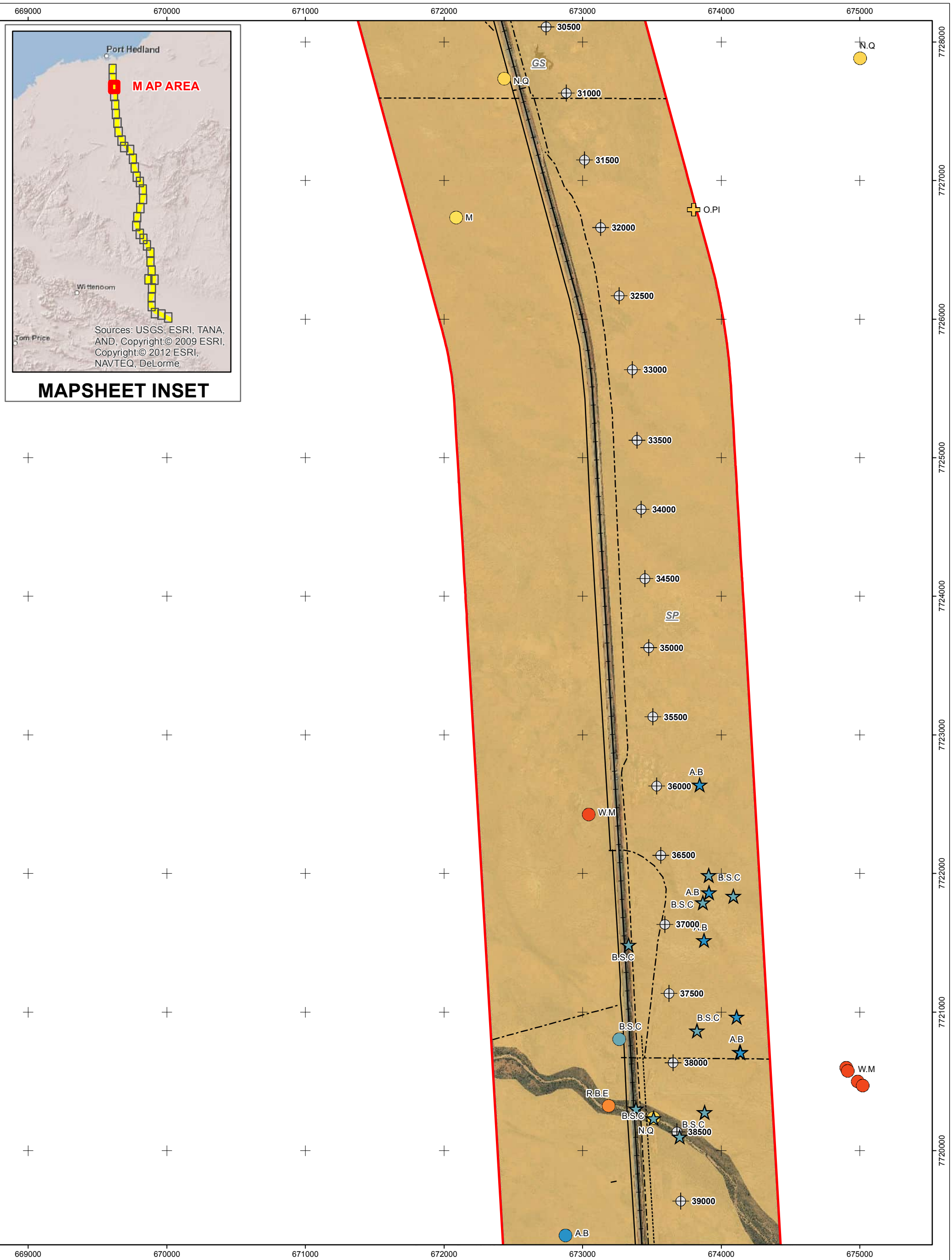

GRIFFIN SPATIAL & MAPPING PO Box 7215 EATON WA 6232 admin@ griffinspatial.com.au +61 8 9725 3213	**BHPBIO MAINLINE** FIGURE 4.1 SIGNIFICANT SPECIES LOCATIONS & SIGNIFICANT FAUNA HABITATS **MAPSHEET 3**	biologic ENVIRONMENTAL SCIENCE Figure: 5.1 Date: 5/03/13 Sheet Size: A3 Status: Final Drawn by GSM · Requested by MOC · Internal Reference Fig5_1_sigfauna	N 0 125 250 500 750 1,000 Meters 1:25,000 Datum: GDA94 Projection: MGA Zone 50

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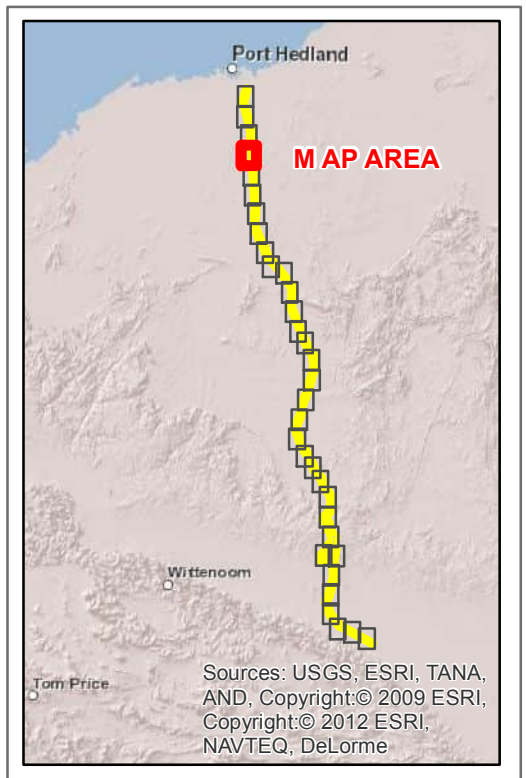

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 4

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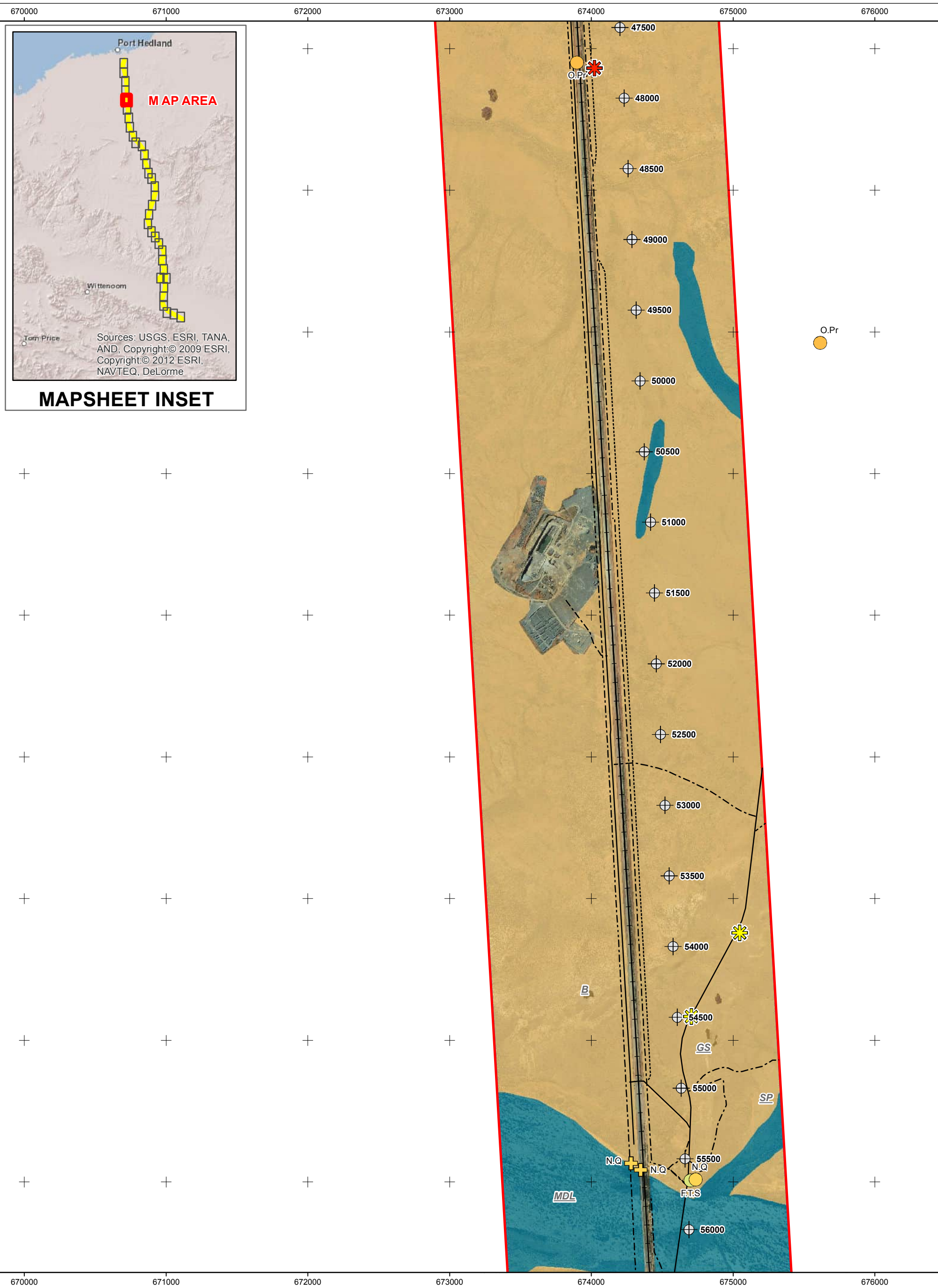

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 5

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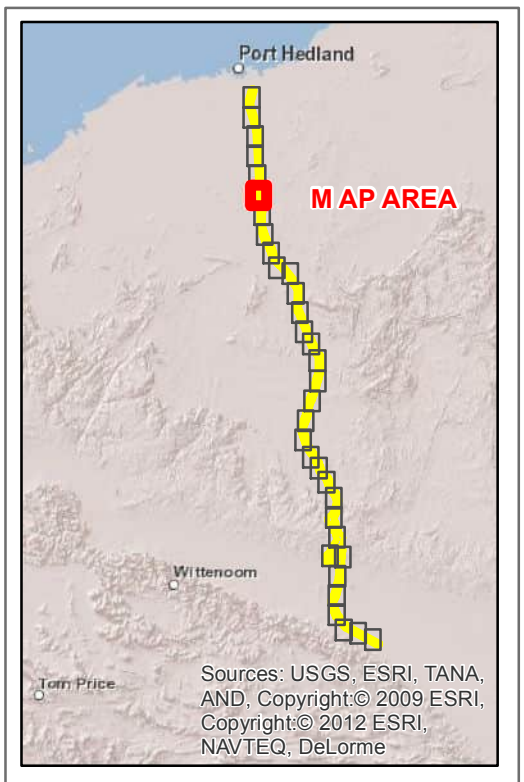

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 6

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MDL SP GS

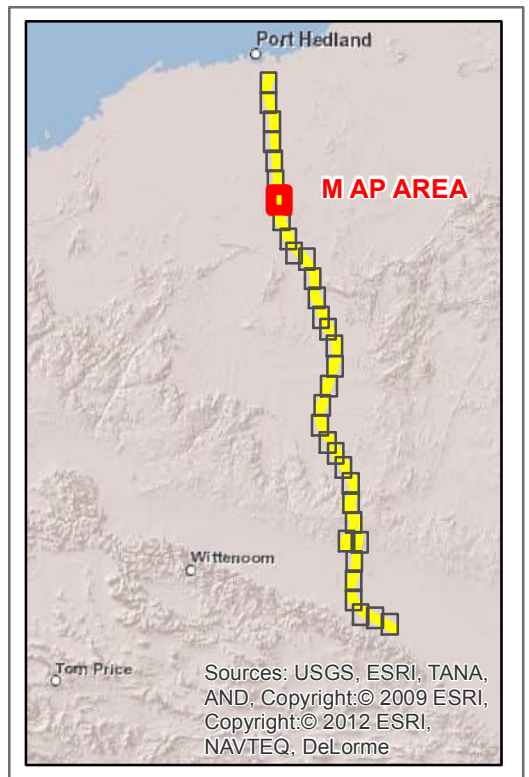

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 7

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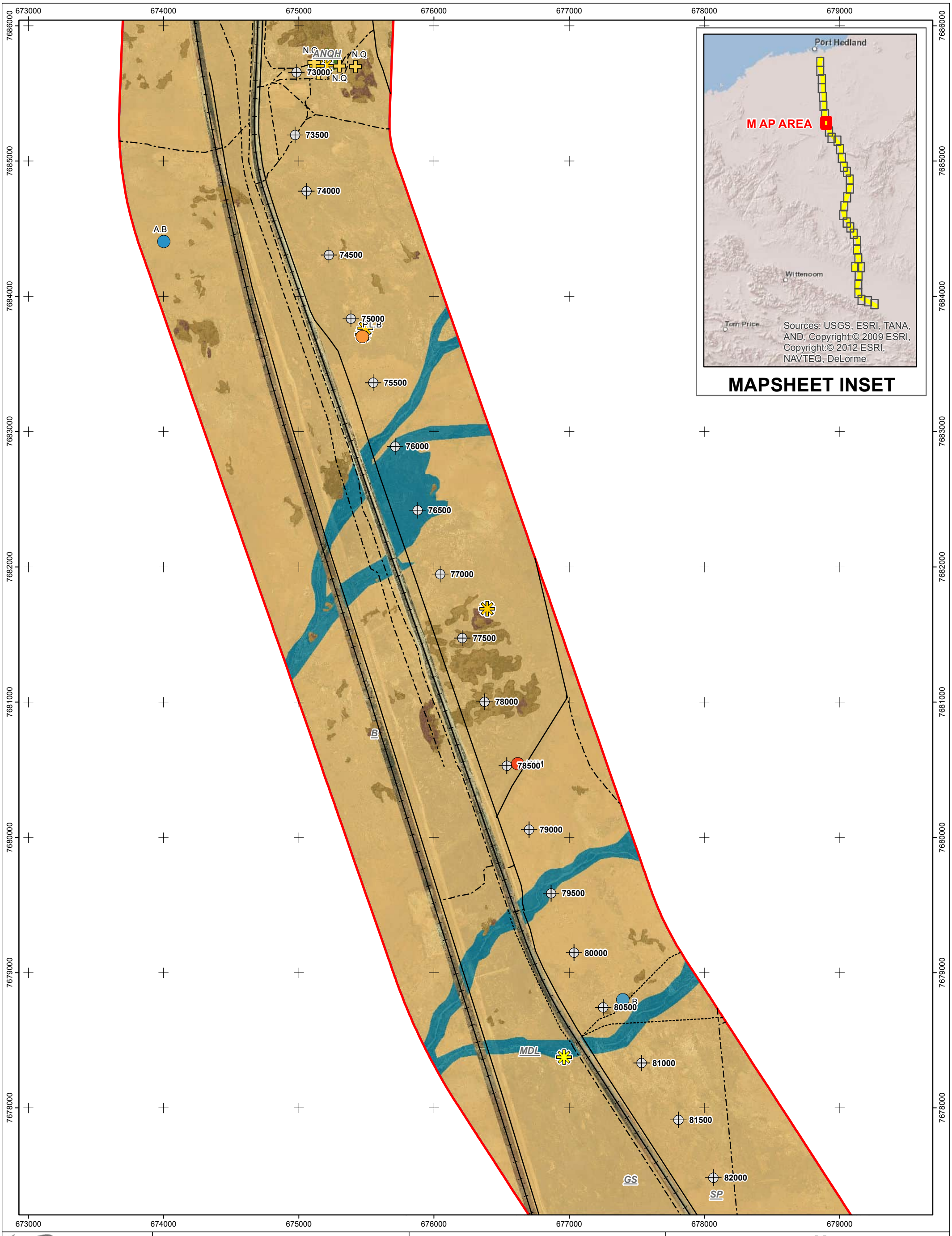

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 8

biologic
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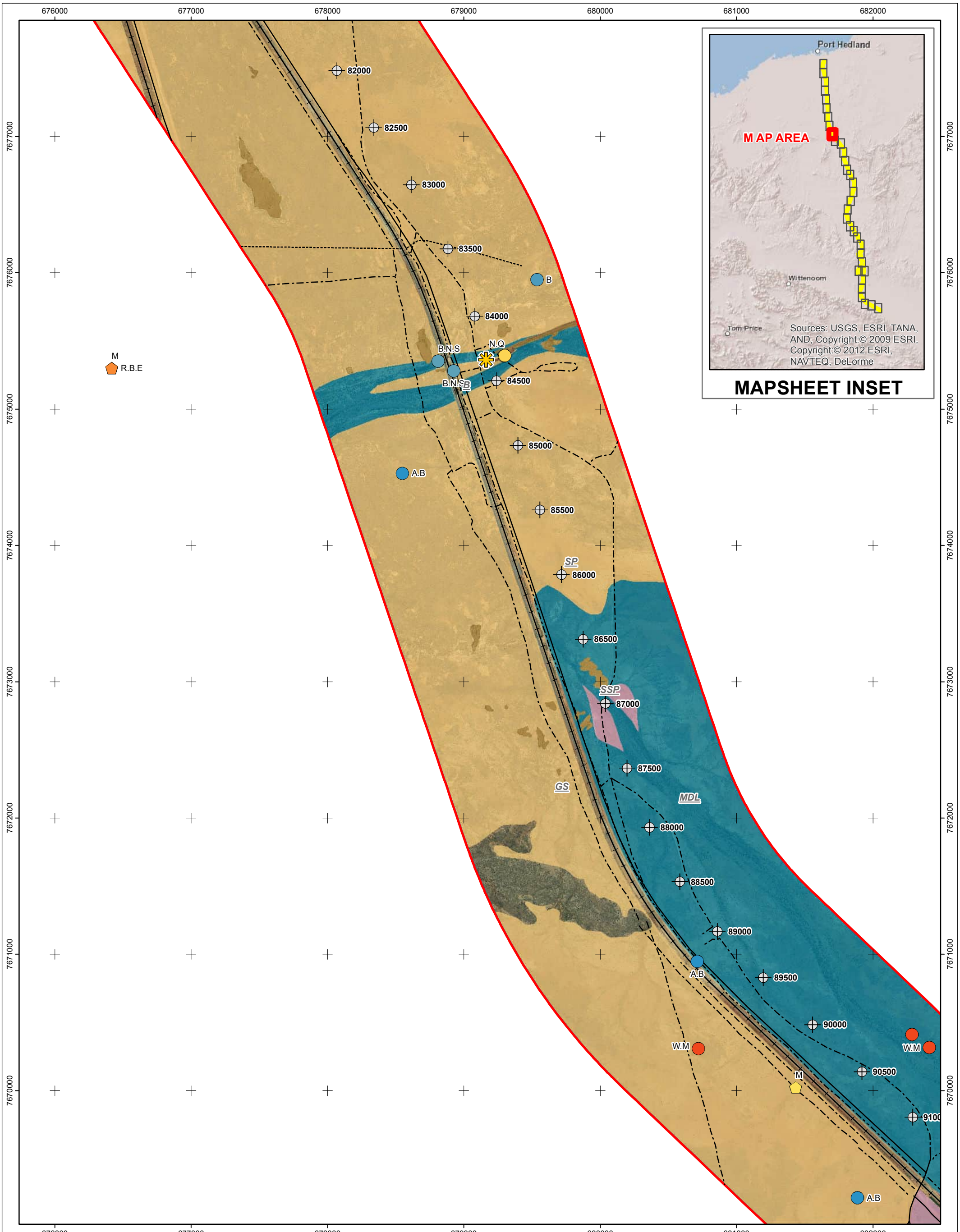

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 9

biologic
ENVIRONMENTAL SCIENCE

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SP

SSP

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M

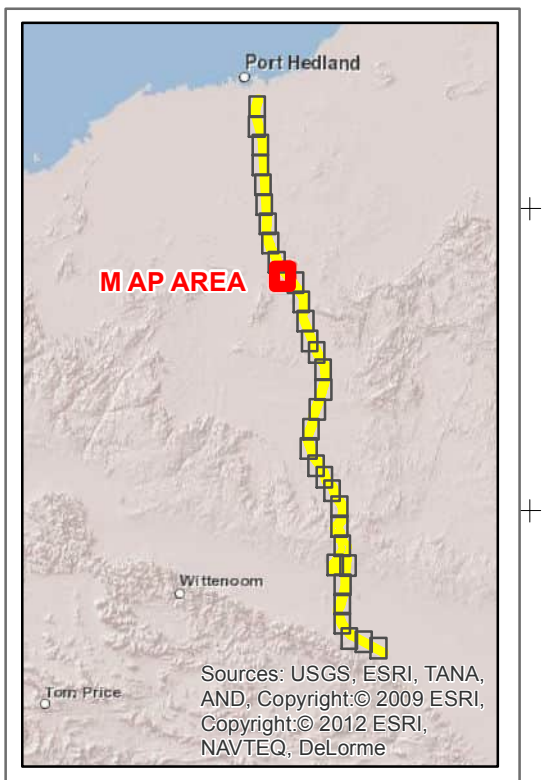

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 10

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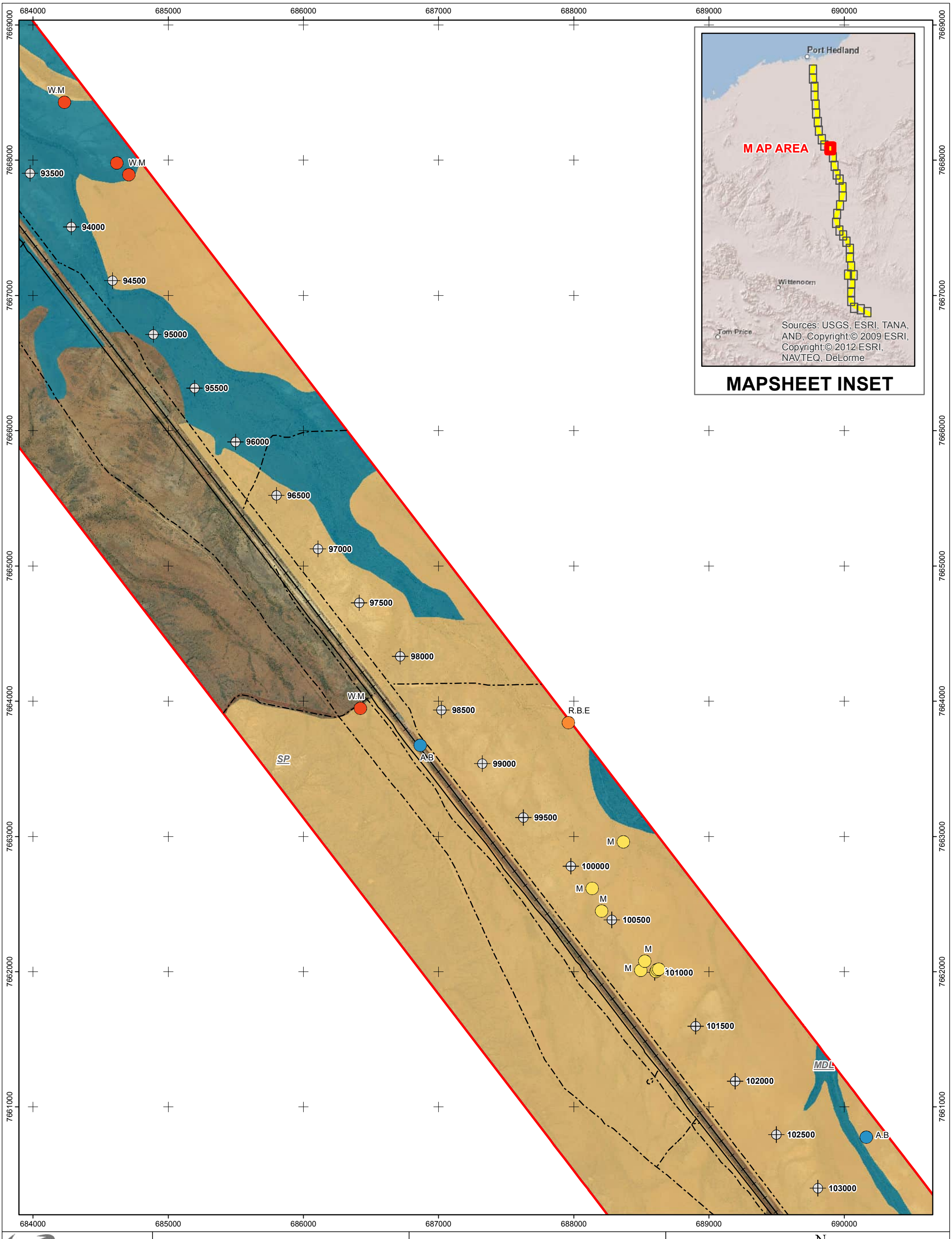

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 11

biologic
ENVIRONMENTAL SCIENCE

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R.B.E

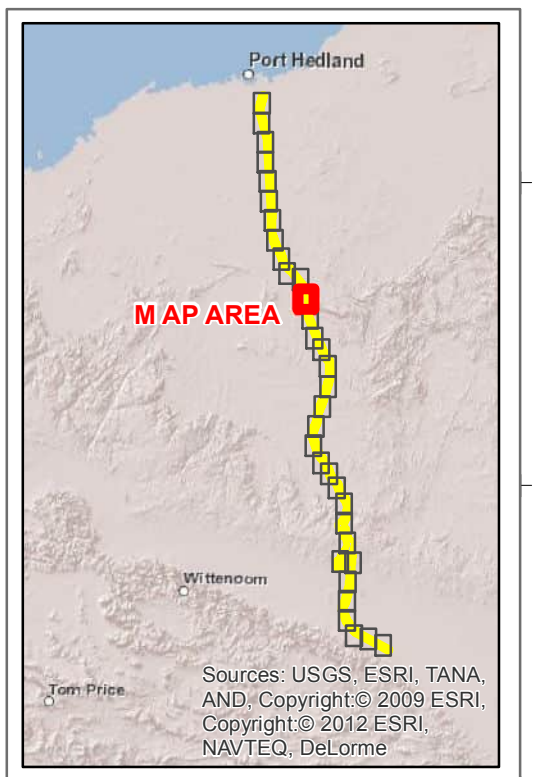

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 12

biologic
ENVIRONMENTAL SCIENCE

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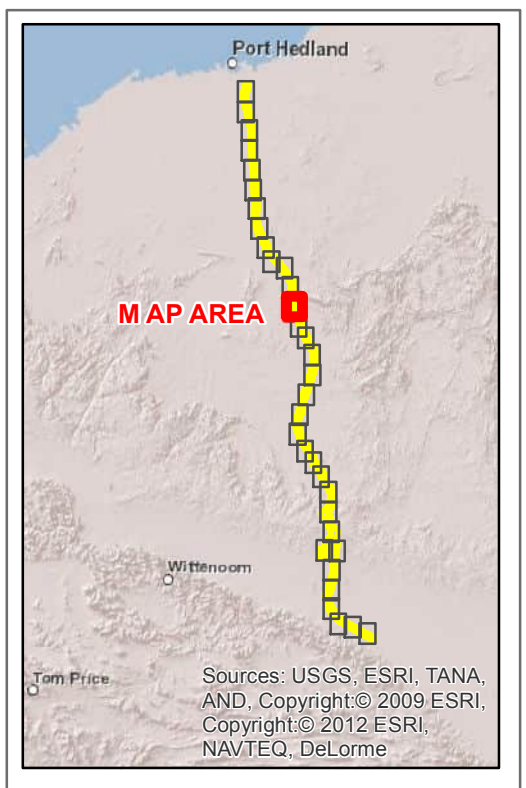
SSP
118500
119000
119500
120000
SP
GS
120500
B
B



MAPSHEET INSET

689000 690000 691000 692000 693000 694000

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 13

biologic
ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: MOC	Internal Reference: Fig5_1_sigfauna	

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

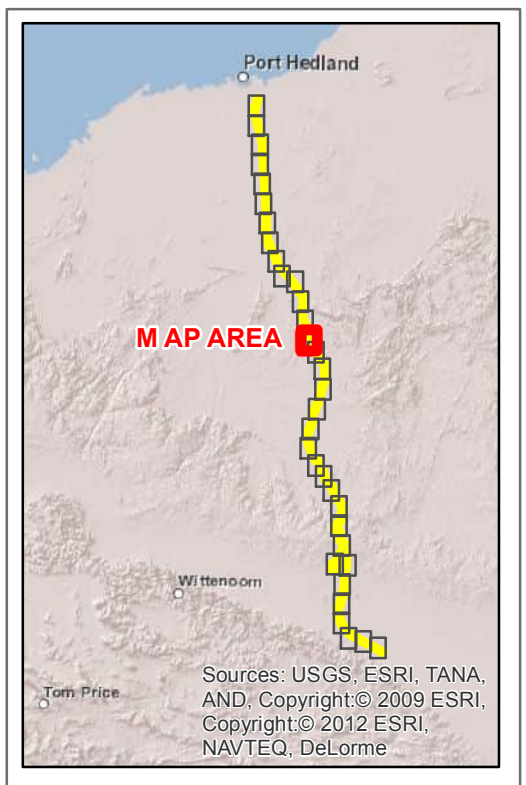
690000 691000 692000 693000 694000 695000 696000

7643000 7642000 7641000 7640000 7639000 7638000 7637000 7636000

120500 121000 121500 122000 122500 123000 123500 124000 124500 125000 125500 126000 126500 127000 127500 128000 128500 129000 129500

B SP GS MDL SSP

W.M A.B B.S.C N.Q G.B



MAPSHEET INSET

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS & SIGNIFICANT FAUNA HABITATS

MAPSHEET 14

biologic ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig5_1_sigfauna	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

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7639000 7638000 7637000 7636000 7635000 7634000 7633000 7632000 7631000

126000 126500 127000 127500 128000 128500 129000 129500 130000 130500 131000 131500 132000 132500 133000 133500 134000 134500 135000 135500

SP MDL GSB SSP

B A.B B.S.C W.M G.B N.Q N.C ANQH

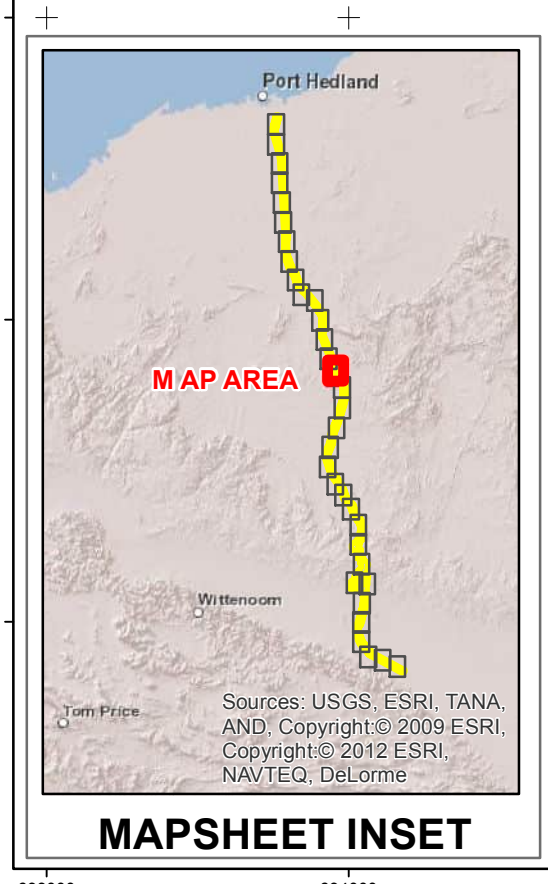

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS & SIGNIFICANT FAUNA HABITATS

MAPSHEET 15

biologic ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig5_1_sigfauna	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

696000 697000 698000 699000 700000 701000 702000

7631000 7630000 7629000 7628000 7627000 7626000 7625000 7624000 7623000

134000 134500 135000 135500 136000 136500 137000 137500 138000 138500 139000 139500 140000 140500 141000 141500 142000 142500

B.S.C N.Q B.S.C B.S.C B.S.C B.S.C N.Q B.S.C W.M

MDL SSP SP B GS

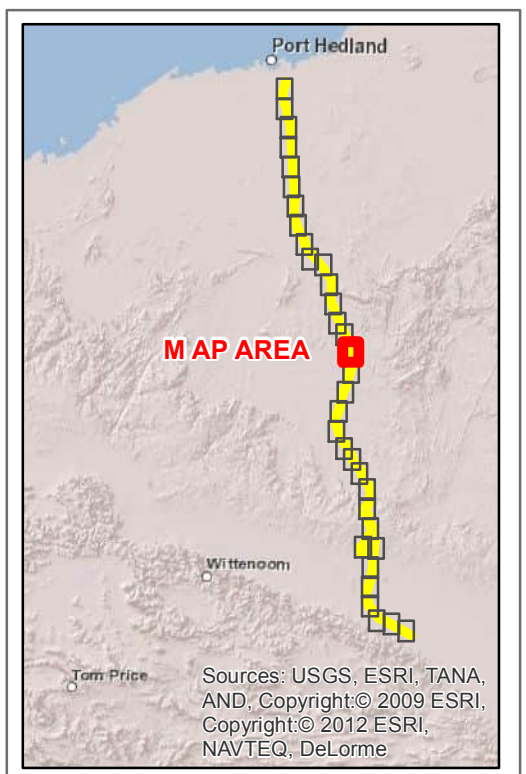

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 16

biologic ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig5_1_sigfauna	

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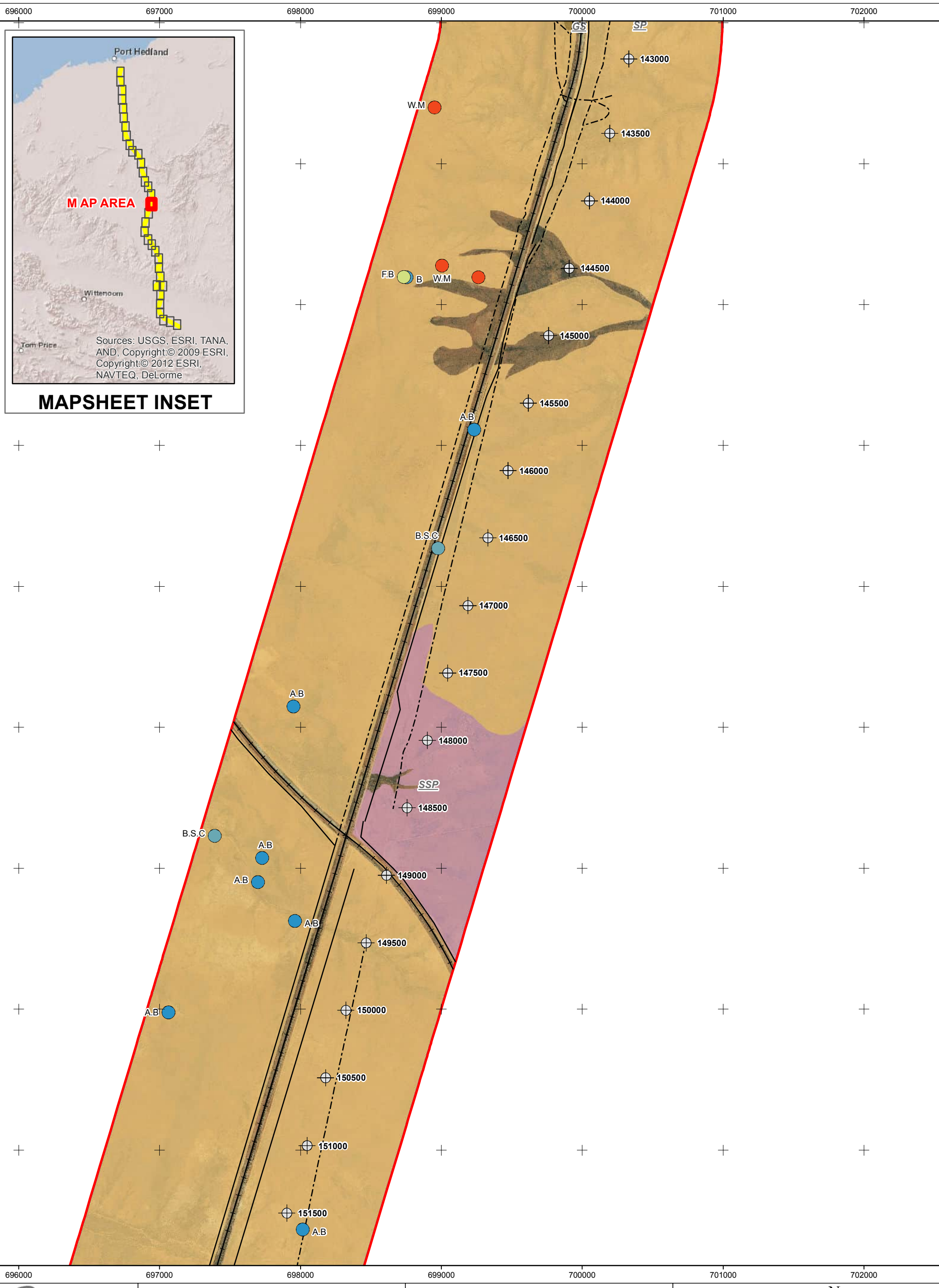
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50



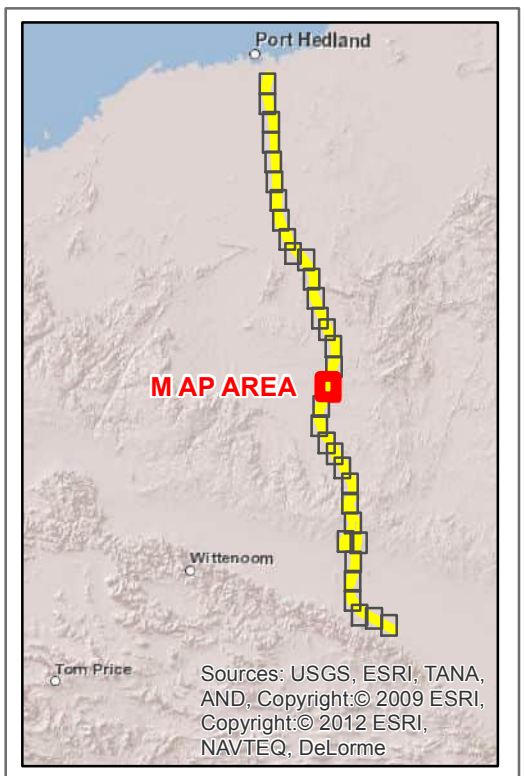
GRIFFIN SPATIAL & MAPPING PO Box 7215 EATON WA 6232 admin@ griffinspatial.com.au +61 8 9725 3213	**BHPBIO MAINLINE** FIGURE 4.1 SIGNIFICANT SPECIES LOCATIONS & SIGNIFICANT FAUNA HABITATS **MAPSHEET 17**
biologic ENVIRONMENTAL SCIENCE	Figure: 5.1 Date: 5/03/13 Sheet Size: A3 Status: Final Drawn by GSM Requested by MOC Internal Reference Fig5_1_sigfauna
N 0 125 250 500 750 1,000 Meters 1:25,000 Datum: GDA94 Projection: MGA Zone 50	

694000 695000 696000 697000 698000 699000

7614000 7613000 7612000 7611000 7610000 7609000 7608000 7607000 7606000

152000 152500 153000 153500 154000 154500 155000 155500 156000 156500 157000 157500 158000 158500 159000 159500 160000 160500 161000

A.B B.S.C M A.B A.B B.S.C A.B B.S.C SP B C.N A.B B.N.S GS R.B.E N.Q MDL



MAPSHEET INSET

694000 695000 696000 697000 698000 699000

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS & SIGNIFICANT FAUNA HABITATS

MAPSHEET 18

biologic ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig5_1_sigfauna	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

691000 692000 693000 694000 695000 696000 697000

7605000 7604000 7603000 7602000 7601000 7600000 7599000 7598000

161000 161500 162000 162500 N.Q 163000 163500 164000 164500 165000 165500 166000 166500 167000 N.Q 167500 168000 168500 169000 169500 170000

MDL SSP

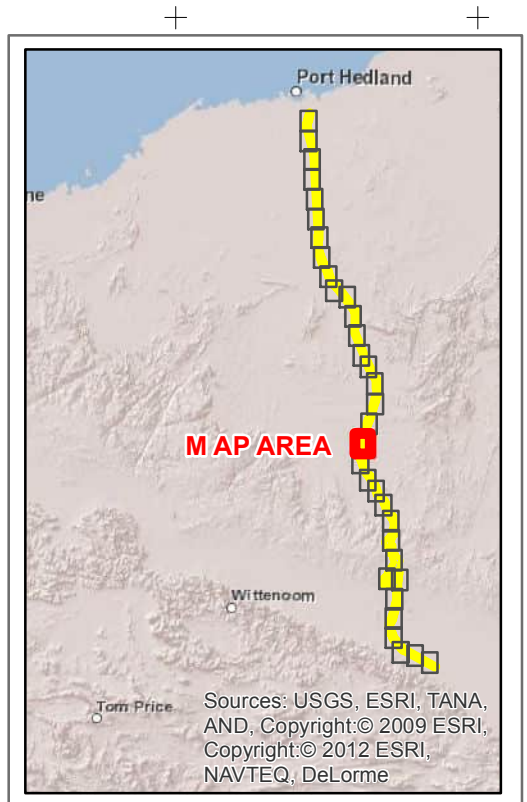

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 19

biologic
ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig5_1_sigfauna	

N

0 125 250 500 750 1,000
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

690000 691000 692000 693000 694000 695000 696000

7597000 7596000 7595000 7594000 7593000 7592000 7591000 7590000 7589000

169500 170000 170500 171000 B.N.S 171500 172000 172500 173000 173500 174000 174500 175000 175500 176000 176500 177000 177500 178000 178500 179000

MDL SSP B GS

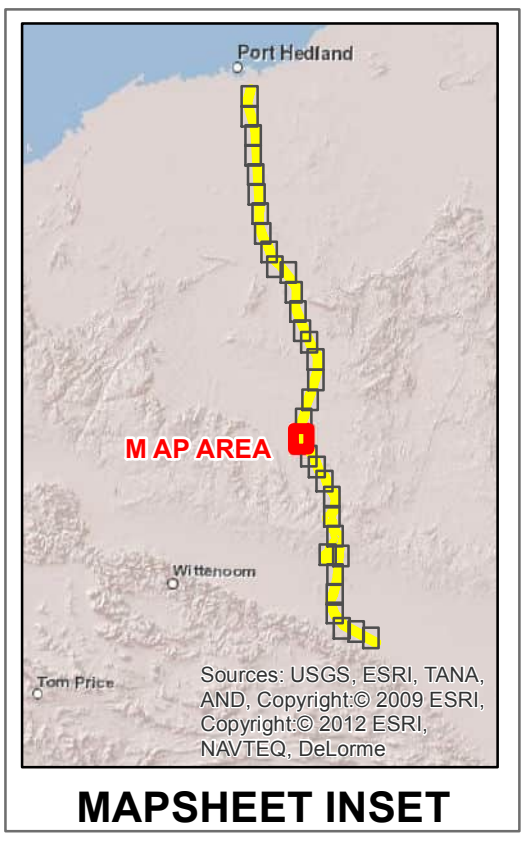

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 20

biologic ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
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Drawn by: GSM	Requested by: MOC	Internal Reference: Fig5_1_sigfauna	

N

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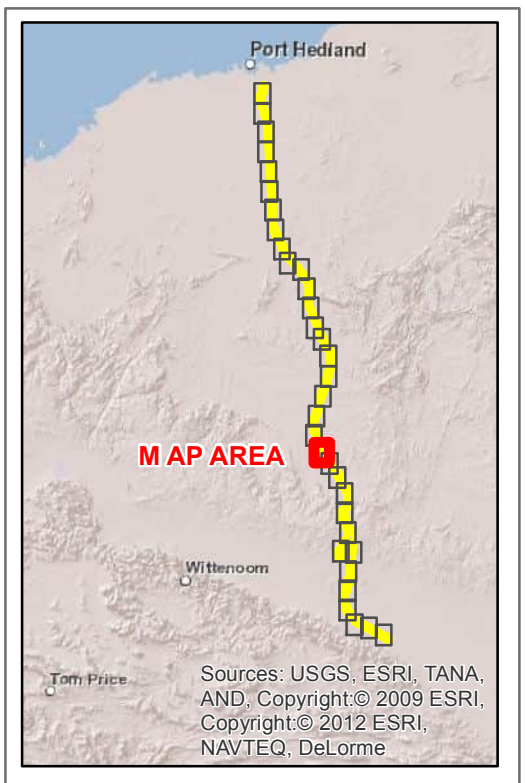
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

693000 694000 695000 696000 697000 698000 699000

7590000 7589000 7588000 7587000 7586000 7585000 7584000 7583000 7582000

177500
178000
178500
179000
179500
N.Q
180000
180500
A.B
A.B
181000
181500
182000
182500
A.B
183000
SSP
183500
184000
184500
185000
SP
MDL
GS
B



MAPSHEET INSET

693000 694000 695000 696000 697000 698000 699000

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 21

biologic
ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig5_1_sigfauna	

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Meters
1:25,000
Datum: GDA94
Projection: MGA Zone 50

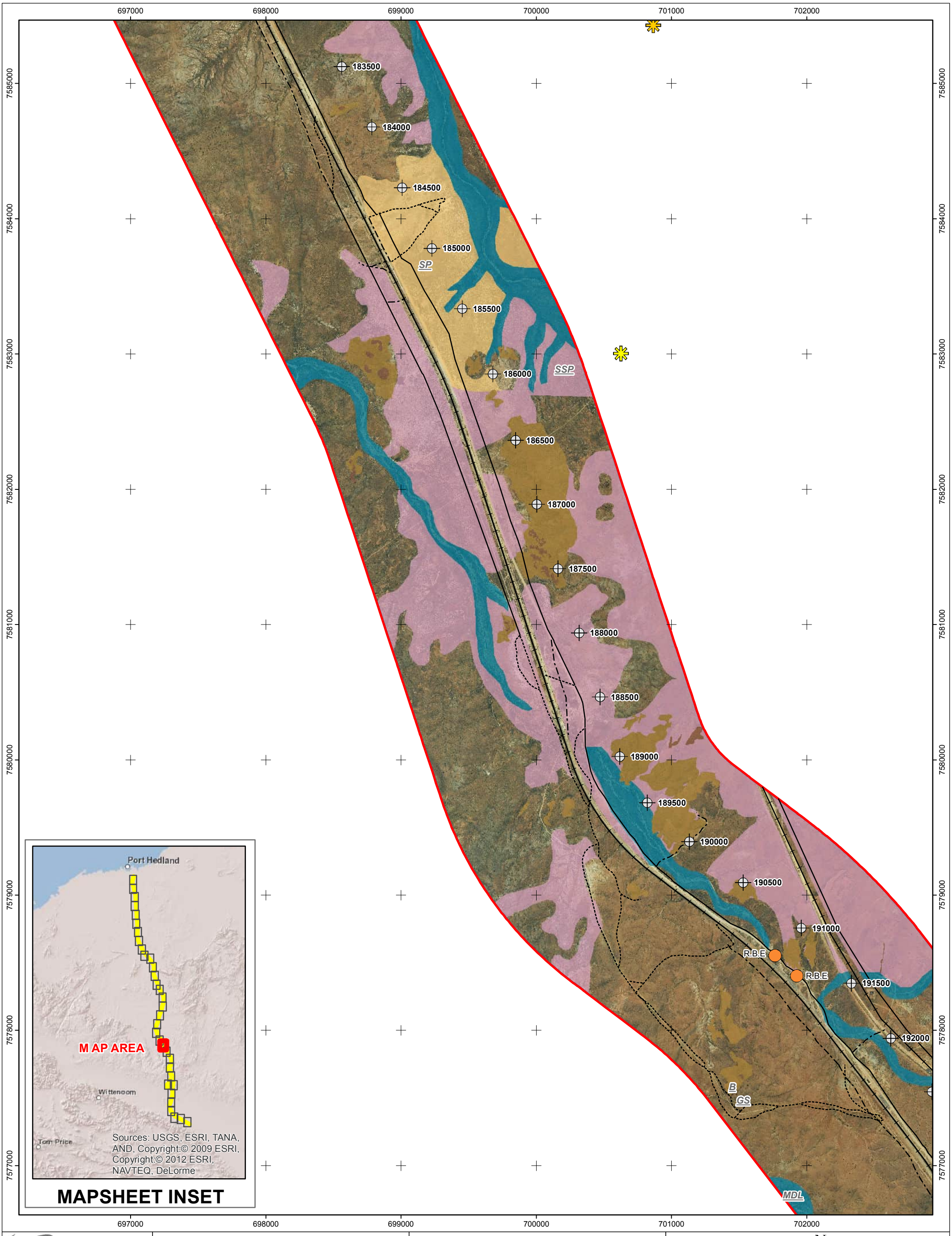

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 22

biologic
ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
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Drawn by GSM	Requested by MOC	Internal Reference Fig5_1_sigfauna	

N

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

700000 701000 702000 703000 704000 705000 706000

7579000 7578000 7577000 7576000 7575000 7574000 7573000 7572000 7571000

190000 190500 191000 191500 192000 192500 193000 193500 194000 194500 195000 195500 196000 196500 197000 197500 198000 198500 199000 199500

SSP

B

GS

R.B.E

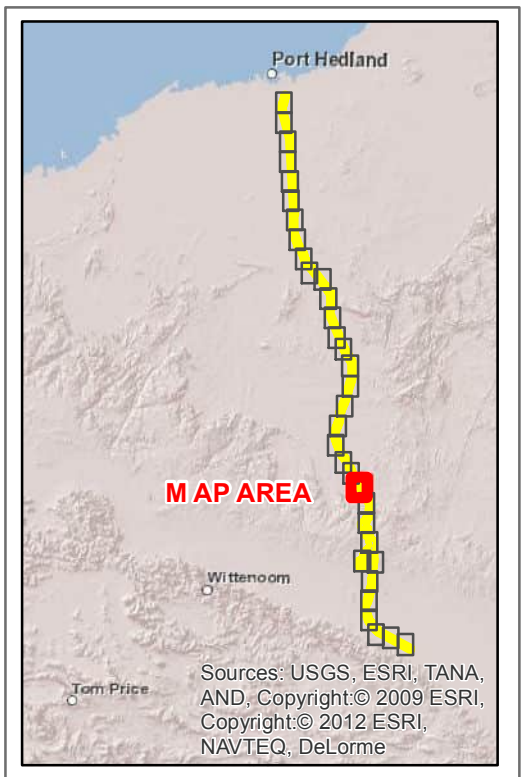
R.B.E

R.B.E

F.T.S

R.B.E

MDL



MAPSHEET INSET

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 23

biologic
ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

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7572000 7571000 7570000 7569000 7568000 7567000 7566000 7565000 7564000

198000 198500 199000 199500 200000 200500 201000 201500 202000 202500 203000 203500 204000 204500 205000 205500 206000 206500 207000

R.B.E
F.T.S

N.Q

ANQH

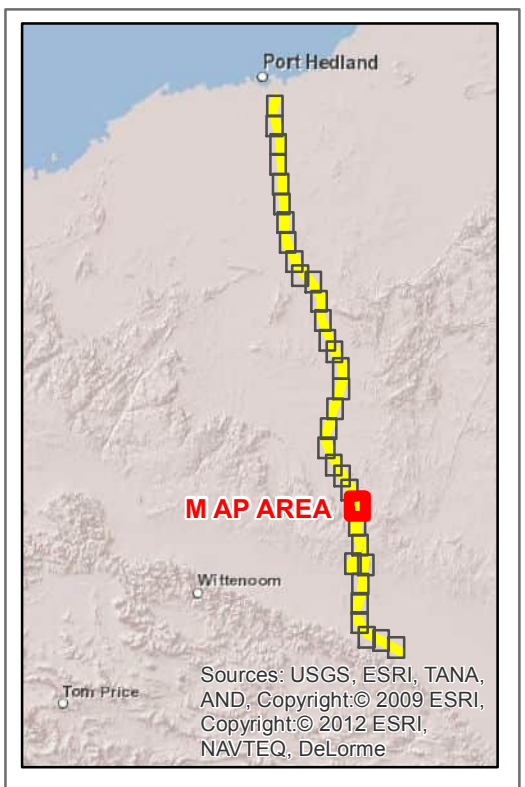
N.Q

P.F

MDL

SP

B.S.C



MAPSHEET INSET

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 24

biologic
ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
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N

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

703000 704000 705000 706000 707000 708000 709000

7564000 7563000 7562000 7561000 7560000 7559000 7558000 7557000 7556000

207000
207500
208000
208500
209000
209500
210000
210500
211000
211500
212000
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213000
213500
214000
214500
215000
215500
216000
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217000
217500
218000
218500
219000

MDL

B.S.C

R.B.E

R.B.E

F.B

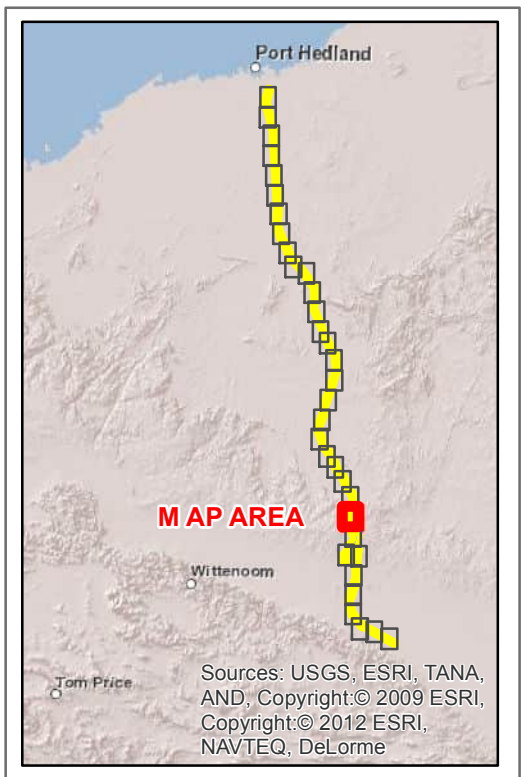

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 25

biologic
ENVIRONMENTAL SCIENCE

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

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7555000 7554000 7553000 7552000 7551000 7550000 7549000 7548000 7547000

219000 219500 220000 220500 221000 221500 222000 222500 223000 223500 224000 224500 225000 225500 226000 226500 227000 227500 228000 228500 229000

P.F S.T.E

B.S.C

G.F

F.T.S S.T.E

A.B

B.S.C

R.B.E S.T.E

R.B.E

A.B W.M R.B.E

SSP

MDL

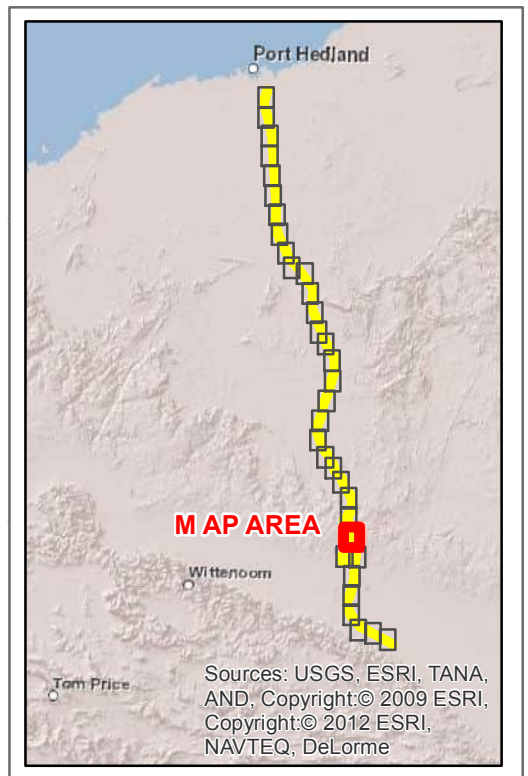

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 26

biologic
ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
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Meters

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Projection: MGA Zone 50

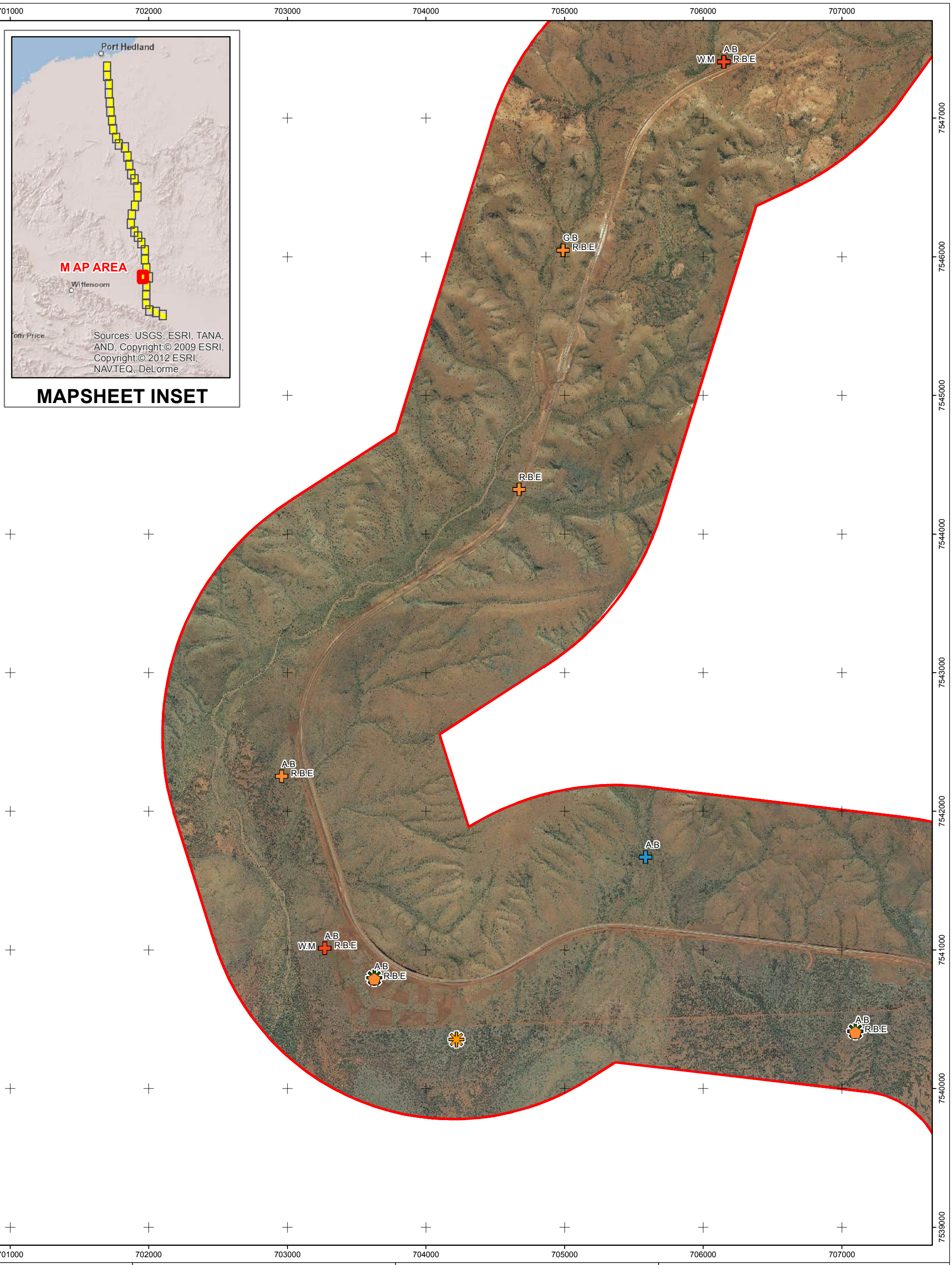

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 27

biologic
ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

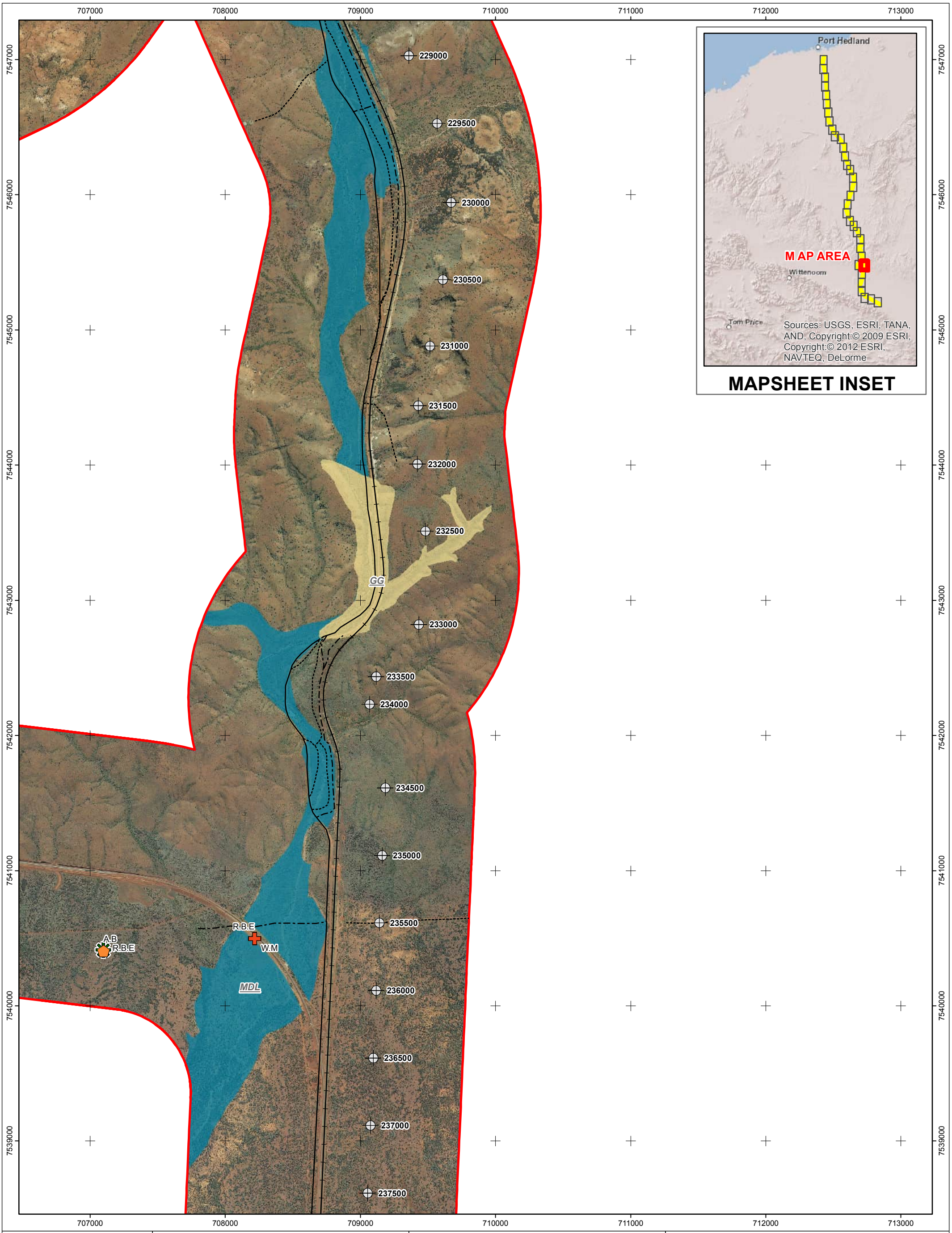

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 28

biologic
ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: MOC	Internal Reference: Fig5_1_sigfauna	

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

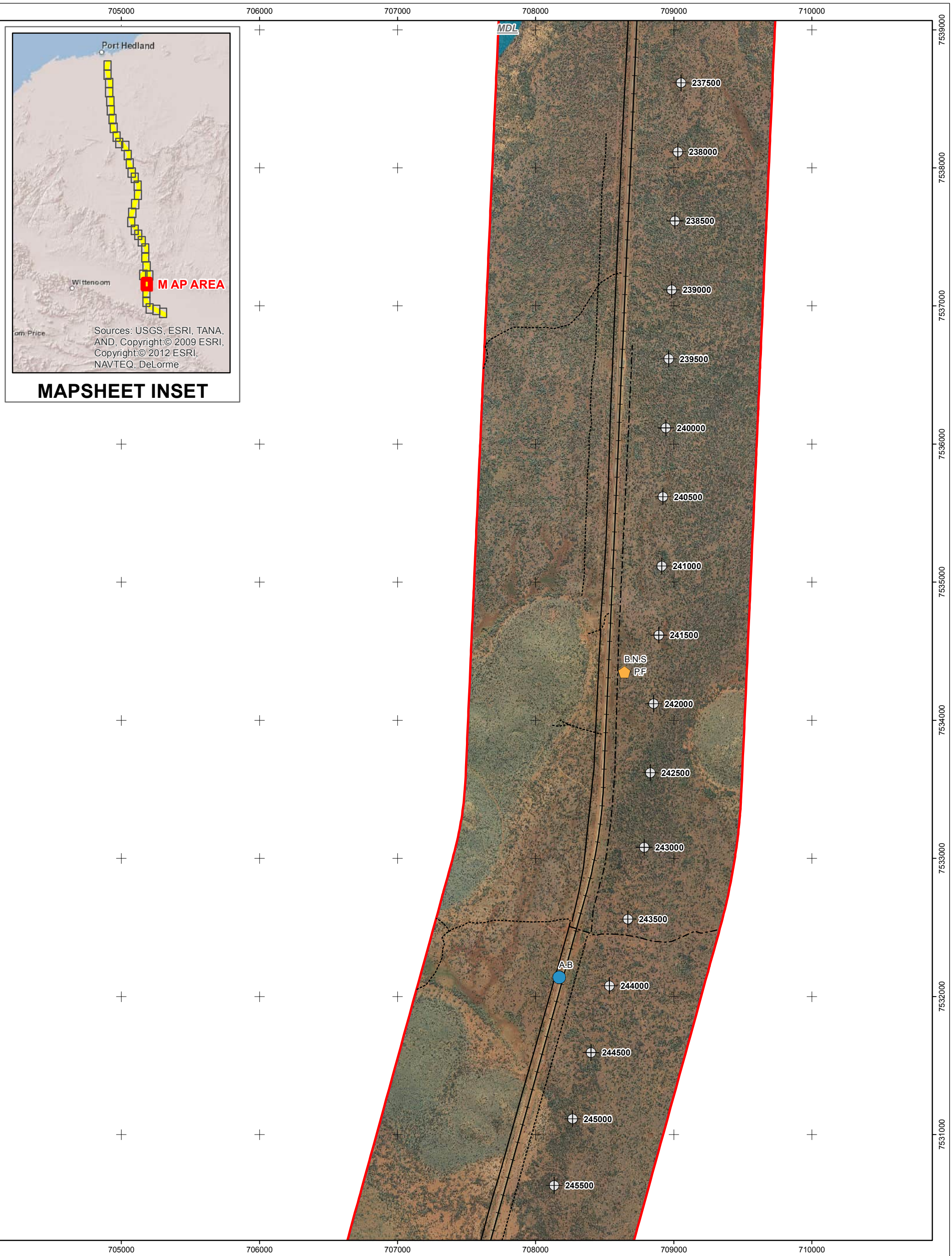

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 29

biologic
ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by MOC	Internal Reference Fig5_1_sigfauna	

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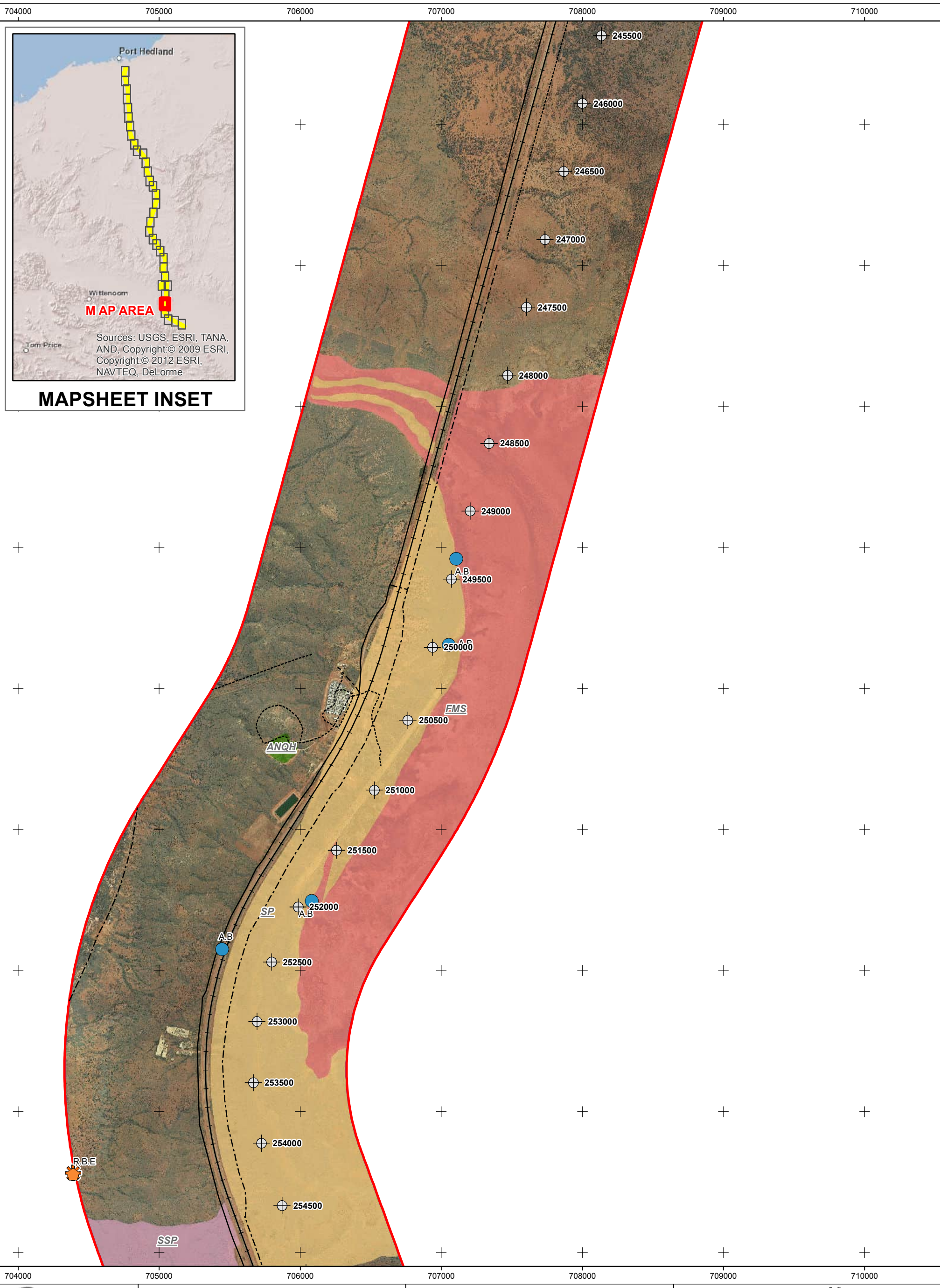
Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50



GRIFFIN SPATIAL & MAPPING PO Box 7215 EATON WA 6232 admin@ griffinspatial.com.au +61 8 9725 3213	**BHPBIO MAINLINE** FIGURE 4.1 SIGNIFICANT SPECIES LOCATIONS & SIGNIFICANT FAUNA HABITATS **MAPSHEET 30**	biologic ENVIRONMENTAL SCIENCE Figure: 5.1 Date: 5/03/13 Sheet Size: A3 Status: Final Drawn by GSM · Requested by MOC · Internal Reference Fig5_1_sigfauna	N 0 125 250 500 750 1,000 Meters 1:25,000 Datum: GDA94 Projection: MGA Zone 50

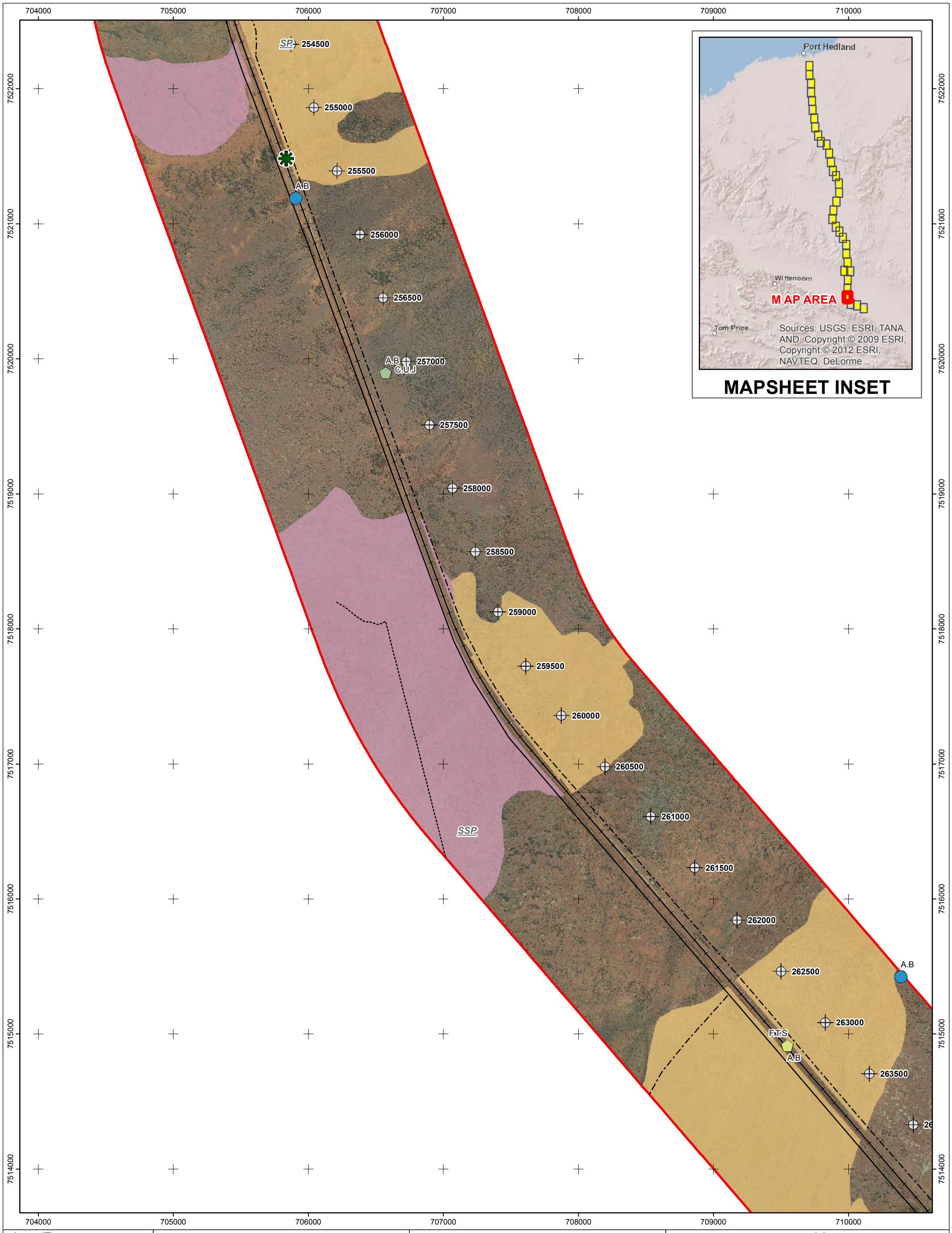


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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 31

biologic
ENVIRONMENTAL SCIENCE

Figure:	5.1	Date:	5/03/13
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: MOC	Internal Reference: Fig5_1_sigfauna	

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Meters

1:25,000
Datum: GDA94
Projection: MGA Zone 50

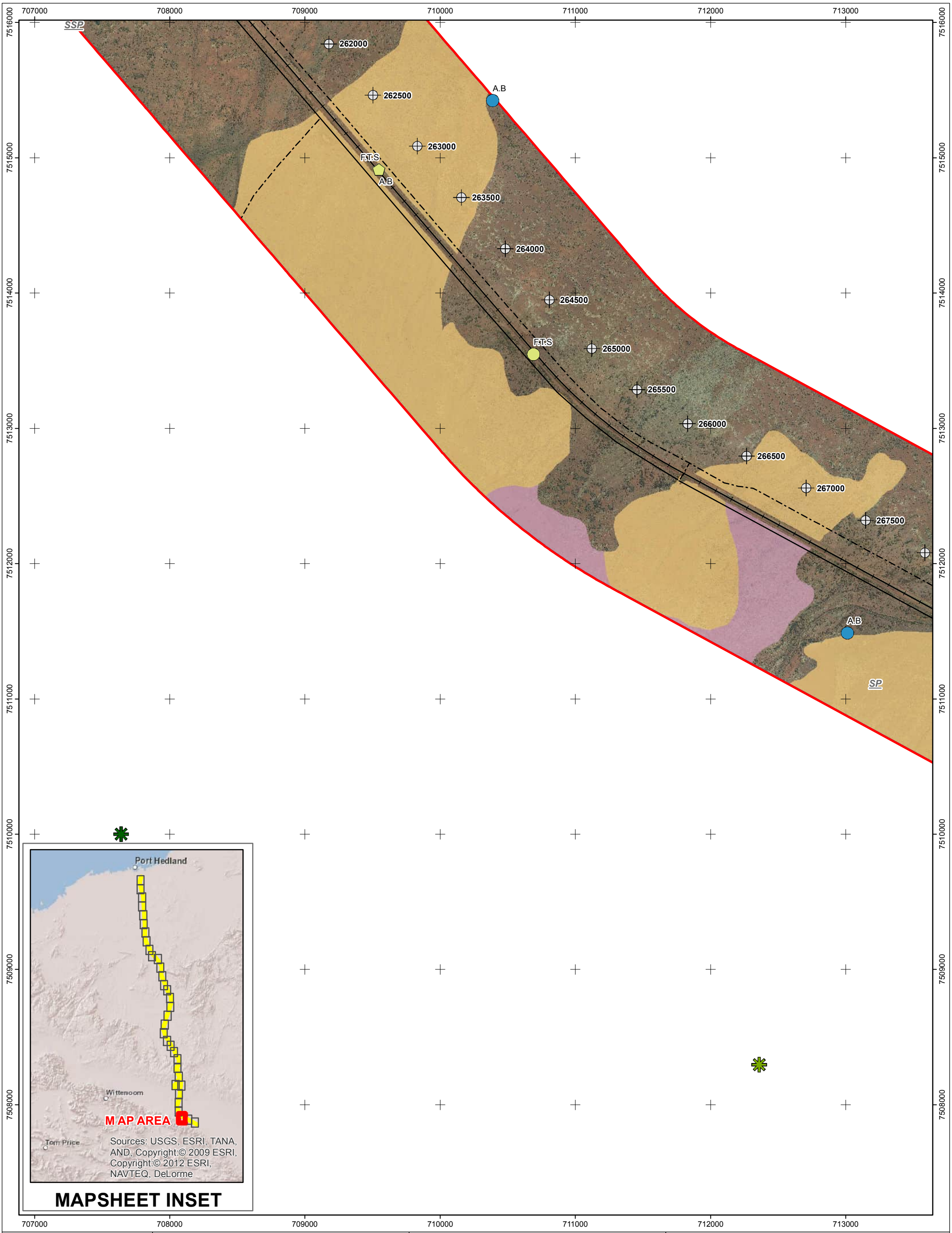

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 32

biologic
ENVIRONMENTAL SCIENCE

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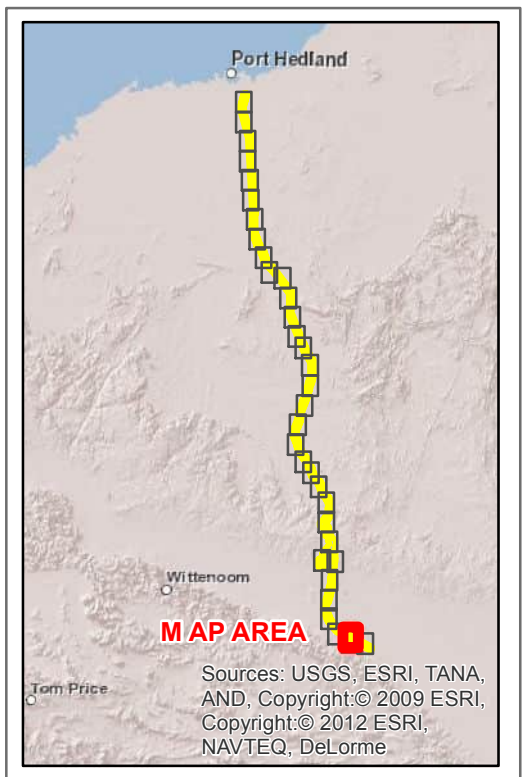

MAPSHEET INSET

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BHPBIO MAINLINE

FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 33

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Figure:	5.1	Date:	5/03/13
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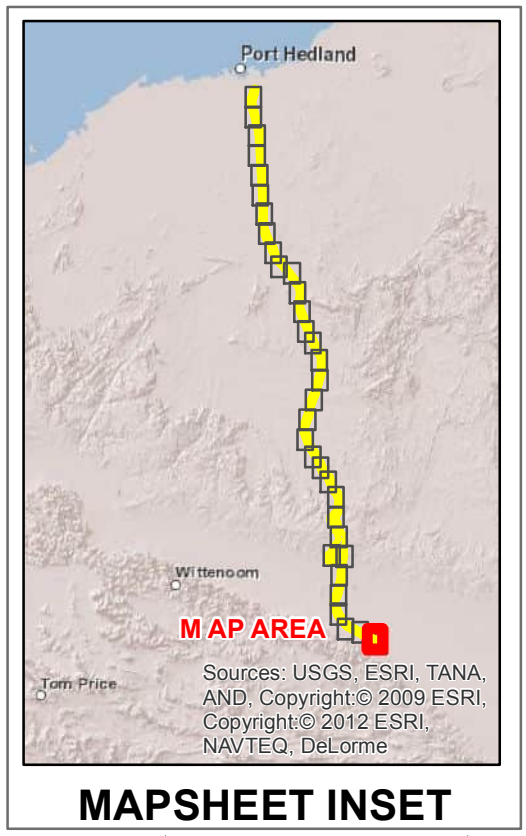

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FIGURE 4.1
SIGNIFICANT SPECIES LOCATIONS &
SIGNIFICANT FAUNA HABITATS

MAPSHEET 34

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Figure:	5.1	Date:	5/03/13
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4.2 Conservation significant fauna recorded

A total of 22 species of conservation significant fauna have been recorded in the Study Area to date (Biota 2002, 2004; Biologic 2010, current study; ecologia 2007, 2008a-g, 2009a-c; ENV 2008a-d, 2011a,b). The locations at which they were recorded are shown on Figure 4.1. Each of the species recorded is presented in taxonomic order and discussed below, with a summary provided in Table 4.1.

Mammals

4.2.1 Northern Quoll (*Dasyurus hallucatus*)

The Northern Quoll is listed as Endangered by the IUCN, Endangered under the EPBC Act and as Schedule 1 under the WCA. This species has experienced significant declines in eastern and northern Australia due to the toxic ingestion of the Cane Toad (DSEWPaC 2011). Local populations may also experience decline if the distribution of the Cane Toad extends into the Pilbara. The species can be considered locally common in the northern section of the Pilbara (within 150 km of the coast), but they are generally less common further south, with records extending as far south as Karijini National Park (How, Spencer et al. 2009).

Northern Quolls mostly favour rocky habitats (e.g. escarpments, mesas, gorges, breakaways, boulder fields, major drainage lines and treed creek lines) as denning/shelter habitat, and foraging occurs in the vegetated areas surrounding their dens (DSEWPaC 2011).

The ecology of Northern Quolls is complex and they use habitats in a variety of ways for denning and foraging. An individual can use multiple den sites. Northern Quolls will den during the day and leave den sites to forage during the night. Northern Quolls are generally considered to be solitary, with females having mutually exclusive denning areas, but can have overlapping foraging areas with populations fluctuating annually which is likely to be related to the abundance, dispersion and renewability of food (Oakwood 2002). Both sexes usually change dens every night, with females each using up to 55 dens (Oakwood 2008).

Northern Quolls may den in small rocky areas occasionally if they are travelling long distances to find food or males are dispersing during the breeding season. Alternatively Northern Quolls can occupy core denning areas which are large and complex enough to provide enough denning habitat to support a population of Northern Quolls.

Below is the estimated timing of Northern Quoll breeding season in the Pilbara based on current knowledge.

Month	Breeding Stage
August - September	Mating
September – October (but up to February)	Young born, remain in pouch
October– December (but up to March)	Young deposited in a den where they remain

Month	Breeding Stage
	until Juveniles are weened and able to disperse
Late December - Early March	Juveniles weaned and leaving dens

Northern quolls have been reported within Study Area and in immediate vicinity during previous studies as well as the current study (Figure 4.1). Previous studies indicated their presence within the leases of Quarries 1, 2, 3, and 4 (ecologia, 2008a,e,f, 2009c) and Mooka Siding (Biologic, 2010). A wide range of methods including Elliot trapping, remotely-triggered motion cameras, scat analysis and track signs have being used to confirm their presence (e.g. Plate 4.1). Potentially suitable denning habitats are present, predominantly in the northern part of the Study Area in the form of boulder piles, gorge/gully and major drainage line habitats. Detailed mapping of boulder piles (potential Northern Quoll denning habitat) can be seen in Figure 4.1.

Plate 4.1 Northern Quoll recorded on motion camera from the Mooka area in the Northern section of the Study Area.

4.2.2 Mulgara (*Dasycercus* spp.)

The Crest-tailed Mulgara is listed as Vulnerable under the EPBC Act and Schedule 1 under the WCA. Biota (2002) reported several specimens of Mulgara from the Study Area that were then assigned to *D. cristicauda*. Uncertainty over the taxonomy and nomenclature of *Dasycercus* existed for a considerable time until it was revised using molecular and morphological characters by Adams *et al*. (2000). More recently, Woolley (2005) re-assigned the *D. cristicauda* to a species *D. blythi*, and the taxon then known as *D. hillieri* to the current name *D. cristicauda. Dasycercus blythi* is currently listed as Priority 4 by the DEC; however the DSEWPaC (2012) is currently considering this species for listing under the EPBC Act.

The two current species appear to have largely non-overlapping ranges and habitat parameters: *D. blythi* is closely associated with *Triodia* sandplain and swales between low dunes from south-western Queensland across the Simpson, Tanami, and Great Sandy Deserts of southern and central Northern Territory and central Western Australia, including parts of the Pilbara (Woolley, 2008), while *D. cristicauda* is known from salt lakes, southern

Simpson, Tirari and Strzelecki Deserts in southern Northern Territory and northern South Australia (Masters 2008), Canning Stock route in central Western Australia and from Ooldea and along the Nullarbor Plain at Fisher and Rawlinna (Woolley, 2008). However there is a zone of sympatry in central Australia and the latter is also likely to occur in the Pilbara region, but this requires confirmation (Pavey, Nano et al. 2011).

Given the recent taxonomical changes and existing complexity in the nomenclature, the identity of Mulgara (*Dasycercus* spp.) recorded from the Study Area remain questionable. Previous surveys have placed the encountered specimens under Crest-tailed Mulgara (*Dasycercus cristicauda*). However considering that there is no existing reference material, it is impossible to verify these previous records. A specimen collected during the current study was identified as a Brush-tailed Mulgara (*Dasycercus blythi*) through detailed morphological and genetical analysis (Plate 4.2). This species occurs across wider habitat types than its congener and is very likely to be the species identified during the previous surveys. The Study Area contains extensive areas of Sandplain habitat, preferred by this species.

Biota (2002) mentions that evidence (burrows, diggings, scat and tracks) for the existence of Mulgara within the adjoining FMG railine site is widespread and common. While during the current survey many records of Mulgara burrows were recorded, the signs of this species was not common. We suspect this was due to heavy rain before and during the survey which would have eroded the signs therefore reducing the chances of detection. The erosion caused by rain on the signs of Mulgara activity was observed on one occasion where zoologists visited an active burrow before and after heavy rain. After rain, the characteristic burrow spoil heap was significantly reduced in profile and tracks were completely removed. The effect of heavy rain on burrow appearance may also lead to some burrows being deemed inactive as all signs of the animals current presence are removed.

Plate 4.2 Male Brush-tailed Mulgara (*Dasycercus blythi*) and an active Mulgara burrow near Gillam Siding 1 (March 2012).

4.2.3 Greater Bilby (*Macrotis lagotis*)

The Greater Bilby is listed as Vulnerable under the EPBC Act, Schedule 1 under the WCA and as Vulnerable by the IUCN due to range reduction; it now occupies less than 20% of its

original range (Southgate 1990), inhabiting arid and semi-arid regions throughout most of the Australian mainland in disjunct populations (Johnson 2008). The Greater Bilby utilises a variety of habitats, usually on landforms with level to slow slope topography and light to medium soils (DSEWPaC 2011). Three major vegetation types associated with the Greater Bilby are listed by Southgate (1990) including: open tussock grassland on uplands and hills, Mulga woodland/scrubland on ridges and rises and hummock grassland in plains and alluvial areas. Other habitats used by the species include stony downs, cracking clays, desert Sandplains and dune fields, spinifex grassland and *Acacia* spp. scrublands on red earths (Johnson, 2008). Home ranges may be temporary, and there is some suggestion that bilbies are nomadic, following food availability (Johnson, 2008).

Previously, three burrows of this species were recorded from Vegetation Site 266 within Section F of the proposed Hope Downs rail corridor (Biota 2002). Vegetation at these sites comprised a mixed *Triodia angusta*/ *T. basedowii* steppe. How *et al*. (1991) reports active burrow systems of this species in the vicinity of drainage tributaries of the Yule and Turner Rivers. Areas of Sandplain (mapped as Sandplain and stony/ Sandplain on Figure 3.2) within the Study Area are considered potentially suitable habitats for this species. Remote camera footage (Plate 4.3) as well as numerous signs of fresh digging and tracks scattered within the Study Area were reported during the current study (Figure 4.1).

Plate 4.3 Greater Bilby recorded on motion camera from near Turner River within the Northern section of the Study Area.

4.2.4 Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*)

The Pilbara Leaf-nosed Bat is classified as Vulnerable under the EPBC Act and Schedule 1 under the WCA. The few known roosts of this species are concentrated in five disused mines in the eastern Pilbara, and one gorge system in Barlee Range Nature Reserve (DEWHA 2010a), which are thought to contain most of the region's population. The Pilbara Leaf-nosed Bat has a very limited ability to conserve heat and water and requires very hot (28–32ºC) and humid (96–100%) roost sites in caves and/or abandoned mines (Armstrong 2001). Such caves are relatively uncommon in the Pilbara (Armstrong and Anstee 2000; Armstrong 2001; Armstrong 2006), which limits the availability of diurnal roosts for this species.

None of the caves visited during the current study were deemed to be suitable roosting locations for the Pilbara Leaf-nosed Bats but calls of this species were recorded at two

instances, once near Wodgina and subsequently at a cave entrance in granite outcrop ~17.5 km southeast of Indee (eight calls). These where new records of this species to the Study Area. Temporal pattern of calls recorded at the site indicates that the bats are foraging at the cave entrance during the night and not using it as a daytime roost. This species is often observed in flight foraging in gorges and gullies and along watercourses well away from disused underground mines (Armstrong, 2001, 2006). It is considered likely that this species occur in some parts of the Study Area as a transient rather than a resident.

4.2.5 Ghost Bat (*Macroderma gigas*)

The Ghost Bat is listed as Vulnerable by the IUCN and as Priority 4 by the DEC. The Ghost Bat formerly occurred over a wide area of central, northern and southern Australia but has declined significantly in the southern parts of its range in the last 200 years (DEWHA 2010). It now occurs in only a few highly disjunct sites across northern Australia and in Western Australia is now confined to the Kimberly and Pilbara. The distribution of Ghost Bats is influenced by the availability of suitable caves and abandoned mine shafts for roost sites. Ghost Bats in the Pilbara roost in deep, complex caves beneath bluffs of low rounded hills composed of Marra Mamba or BIF, granite rock piles and abandoned mines (Armstrong and Anstee, 2000). They roost either individually or in colonies up to 1500 (Churchill 2008) and move between a number of caves, both seasonally and as dictated by weather changes (Richards, Hand et al. 2008).

The Ghost bat uses three types of roost regularly, these being night roosts or feeding sites, day roosts and maternity roosts. Night roosts or feeding sites are only used at night, either habitually or for transitory visits. They are typically shallow caves and shelters/overhangs that can be well lit during the day and contain guano piles and middens of various sizes. Day roosts include caves and mine adits that are deeper and more complex in structure. They typically contain multiple middens of guano and food remains that include feathers and skeletal material. Maternity roosts are day roosts that provide additional features that are able to support a reproducing population. These features are both natural high temperature (over 27°C) and humidity levels greater than 75 % relative humidity. These roosts where they exist are considered regionally significant (R. Bullen *pers. comm.*).

Biota (2002) reports several granite rock piles along the Hope Downs rail corridor and three culverts beneath the BHPB rail line where scat material and feeding remains of Ghost Bats were found. Several additional culverts with feeding remains (mainly Budgerigar-*Melopsittacus undulates*) and scats have being recorded in culverts along the rail line (S. Creese *pers. comm.*). One additional observation record of a Ghost Bat closer to the Chichester Deviation exists (ecologia 2008h).

4.2.6 Western Pebble-mound Mouse (*Pseudomys chapmani*)

The Western Pebble-mound Mouse is currently listed as Priority 4 by the DEC. This species has experienced a significant decline in its range through the Gascoyne and Murchison, and is now considered endemic to the Pilbara (Van Dyck and Strahan 2008). This species almost exclusively occurs on the gentler slopes of rocky ranges where the ground is covered with a stony mantle and vegetated by hard spinifex, often with a sparse overstorey of eucalypts and scattered shrubs (Van Dyck and Strahan, 2008).

Vast areas of suitable habitat for this species are present within the crest/slope habitats and stony plains within the section of the Study Area through Chichester subregion. The characteristic mounds constructed by colonies of these mice were recorded in several previous surveys (Biota 2002; ecologia 2008; Biologic 2010) and also in the current study.

4.2.7 Short-tailed Mouse (*Leggadina lakedownensis*)

The short-tailed mouse is listed as Priority 4 by DEC. This species is endemic to northern Australia, where it occurs from Cape York in the east to the Pilbara, in Western Australia, although the distribution is discontinuous (Moro and Kutt 2008). There are populations present on Thevenard Island and Serrurier Island (the latter is a translocated population-intentionally introduced for conservation purposes), both in Western Australia (Lee 1995; Moro and Kutt 2008). It is a nocturnal species found in areas of open tussock and hummock grassland, acacia scrubland, and savanna woodland, on alluvial clay or sandy soils (Lee 1995). Among the habitat types found within the Study Area, cracking clay is the most likely habitat to support this species (Gibson and McKenzie 2009).

Two individuals were caught in dry pitfall traps set in *Astrebla pectinata* and *Aristida latifolia* tussock grassland on the self-mulching clays immediately north of Chichester Deviation in 2002 (Biota 2002). No records of this species were made during the current study.

Birds

4.2.8 Rainbow Bee-eater (*Merops ornatus*)

The Rainbow Bee-eater is listed as Migratory under the EPBC Act and Schedule 3 under the WCA. It is a common and widespread species in Western Australia, except in the drier interior of the State and the far south-west. The demographics of the species are complex, with populations in WA being resident, breeding visitors, post-nuptial nomads, passage migrants and winter visitors (Johnstone and Storr 1998). Many individuals move northwards to overwinter in Indonesia. The Rainbow Bee-eater prefers lightly wooded, preferably sandy habitat near water (Johnstone and Storr 1998).

These habitat requirements are met along much of the length of the extensive areas of sandplain habitat in the north of the Study Area. Consequently, there are numerous previous

records of Rainbow Bee-eaters within the Study Area (Biota 2002; ecologia 2008; Biologic 2010; ENV 2011) and it was commonly recorded during the current survey along the sandplain areas.

4.2.9 Oriental Pratincole (*Glareola maldivarum*)

This species is listed as Migratory under the EPBC Act and Schedule 3 under the WCA. They are migratory, wintering in India and Pakistan, Indonesia and Australasia. They are rare north or west of the breeding range, but have occurred as far away as Great Britain. Within Australia it is more common in the northern part, with the largest concentrations found in the northwest. The Oriental Pratincole inhabits an array of habitats close to water ranging from muddy flood plains to open inland plains and tussock grasslands to stony plains. It also visits anthropogenic water bodies and open fields.

Over 300 individuals (sometimes in >100 flocks) were observed between East Turner River and Port Headland-Wittenoom road, closer to the northern end of the Study Area during the current study.

4.2.10 Eastern Great Egret (*Ardea modesta*)

The Eastern Great Egret is listed as Migratory under the EPBC Act and Schedule 3 under the WCA, and is described as dispersive and migratory in parts of its range (DEWHA 2010), with some regular seasonal movements. Non-breeding birds have been recorded across most of Australia, but avoid the driest regions of the western and central deserts (Marchant and Higgins 1990).

This species occurs in shallows of rivers and freshwater wetlands (Pizzey and Knight 2006), breeding in wooded swamps and river pools with *Eucalyptus camaldulensis* and *Melaleuca argentea* (Johnstone and Storr 1998).

There are few records of this species in the immediate vicinity in the northern and central parts of the Study Area and one record in the upper section of the Yule River within the Study Area (Biota 2002). It is also known from the riverine, mangrove and tidal flats habitats around Port Hedland (ENV 2009, 2011). It is very likely that the Eastern Great Egret will occasionally utilise the other aquatic habitats within the Study Area. No records of this species were made during the current study.

4.2.11 Fork-tailed Swift (*Apus pacificus*)

The Fork-tailed Swift is listed as Migratory under the EPBC Act because it breeds in north-east and east Asia, wintering in Australia and southern New Guinea (Johnstone and Storr, 1998). It is also listed under the WCA as Schedule 3. It is entirely aerial within the Pilbara. Fork-tailed Swifts may forage above the Study Area sporadically in the summer months, associated with thunderstorms and cyclonic systems (Johnstone and Storr, 1998).

Four individuals were recorded during the current study at the southern end of the Study Area bordered by the Fortescue and Hamersley subregions.

4.2.12 Oriental Plover (*Charadrius veredus*)

The Oriental Plover is listed as Migratory under the EPBC Act and Schedule 3 under the WCA. They are gregarious, occurring in small parties or large flocks on dry grassland and thinly vegetated plains with much hard bare ground in inland areas of northern Australia (Marchant and Higgins 1993). This includes areas that have been recently burnt, and areas of hard, stony, bare ground.

The sparsely-vegetated open stony plains in the northern section of the Study Area are suitable for this species and a single individual was observed closer to Beebingarra Creek in the Northern section of the Study Area during a Level 1 Fauna Survey at Mooka Siding (Biologic 2010). Suitable habitat may further occur in the southern part of the Study Area associated with more open areas surrounding the Fortescue Marsh. No records of this species were made during the current study.

4.2.13 Common Greenshank (*Tringa nebularia*)

The Common Greenshank is listed as Migratory under the EPBC Act and Schedule 3 under the WCA.

The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity (Australia 2012). The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores.

One individual was observed towards the northern section of the Study Area, between Turner River and Beebingarra Creek during the current study.

4.2.14 Peregrine Falcon (*Falco peregrinus*)

The Peregrine Falcon is listed as Schedule 4 under the WCA, and is considered rare or scarce over much of its range, including the Pilbara (Johnstone and Storr 1998). Inland it is most often encountered along cliffs above rivers, ranges and wooded watercourses and lakes, where it hunts birds (Johnstone and Storr, 1998). It nests on rocky ledges in tall, vertical cliff faces and tall trees associated with drainage lines.

One previous observation record within the Study Area exists in the southern part of the Chichester Range (Biota, 2002). A single animal was observed in the vicinity of the Redmont camp (central part of the Study Area) during the current study. However, several other sections of the Study Area contains suitable hunting habitat for Peregrine Falcon, primarily

associated with wooded water courses and major drainage line habitats. Potential breeding habitats may occur in the granite outcrops.

4.2.15 Australian Bustard (*Ardeotis australis*)

The Australian Bustard is listed as Priority 4 by the DEC. It occurs across most of mainland Australia, but is listed in WA primarily due to a decline in its range in the south of the State. It is a nomadic species, occurring in open or lightly wooded grasslands, including spinifex plains (Johnstone and Storr, 1998).

Suitable habitats, including drainage areas, Sandplains and dunes are common in the Study Area and in the surrounding region. The Australian Bustard has been recorded in several locations in more open habitats (e.g. alluvial floodplains and Sandplains) of the Study Area (Biota, 2002; ecologia, 2008; Biologic, 2010; ENV, 2011), including this survey.

4.2.16 Bush Stone-curlew (*Burhinus grallarius*)

The Bush Stone-curlew is listed as Priority 4 by DEC. It is patchily distributed across much of mainland Australia, inhabiting areas of open forest and woodland with open areas, fallen dead timber or leaf litter (del Hoyo, Elliott et al. 1996). Inland, this species is associated with watercourses. Bush Stone-curlews are nocturnal and often difficult to detect, being highly cryptic.

Suitable habitat in the Study Area includes drainage areas and open areas fringed by denser woodland, such as the grooved Mulga woodlands in the central and southern parts of the Study Area. This species is an uncommon resident in the region but has been observed on several occasions during previous studies within the Study Area (Biologic, 2010; ENV, 2011) and numerous tracks were observed during the current survey.

4.2.17 Grey Falcon (*Falco hypoleucos*)

The Grey Falcon is classified as Priority 4 by the DEC and as Vulnerable by the IUCN. This species appears to have a distribution centred on ephemeral or permanent drainage lines (Garnett and G.M. 2000) with numerous records from the Fortescue Marsh region. Grey Falcons prefer sparsely-treed, open plains and drainage lines for hunting (Slater, Slater et al. 2009). They typically nest in the abandoned nest of a raptor or corvid (Slater, Slater et al. 2009) in trees or man-made structures, most notably repeater towers.

Two Grey Falcons were observed closer to a Cracking clay habitat in the southern part of the Chichester Range during this survey. This is a breeding pair that has bred successfully at the communications tower for three consecutive years (ecologia 2008h; M. O'Connell *pers. comm.*) Much of the Study Area represents suitable hunting territory, in particular close to the open, sparsely vegetated plains of the northern Study Area.

4.2.18 Flock Bronzewing (*Phaps histrionica*)

This species is listed as Priority 4 by the DEC. They often breed, within a broad sweep from Western Australia, north of 25°S, through Northern Territory and north-east South Australia, to eastern Queensland and western New South Wales, as far south as Booligal (Higgins and Davies 1996; Schodde and Mason 1997). Flock Bronzewings are mainly found in open Mitchell Grass *Astrebla pectinata* grasslands on black soil plains, but also frequent saltbush *Atriplex*, bluebush *Maireana* and *Triodia* hummock grasslands, grassy woodlands, recently burnt areas, roadsides and agricultural land, particularly favouring run-on areas (Higgins and Davies 1996; McAllan 1996). They are also often associated with permanent water (Frith, Wolfe et al. 1976).

There has been a significant contraction in range and decrease in reporting rate of the Flock Bronzewing but it is still periodically and patchily common in the semi-arid tropics and subtropics. However it is only rarely recorded in Pilbara (Pizzey and Knight, 2003). Three individuals were recorded in two locations in the central and southern sections of the Study Area during the current study.

4.2.19 Pictorella Mannikin (*Heteromunia pectoralis*)

This species is listed as Priority 4 by the DEC. Its present distribution runs from Fitzroy River Valley, WA, to upper Burdekin, Qld, and central-western Cape York Peninsula (Blakers, Davies et al. 1984). Pictorella Mannikins are found near water in *Acacia* shrublands that have a grassy understorey and in *Triodia* hummock grassland, where they feed on seeds on the ground, as well as insects (Blakers, Davies et al. 1984). They appear to be highly mobile, sometimes breeding in eucalypt woodland well north of their usual range (Woinarski and Tidemann 1991).

This species rarely occurs in the Pilbara (Pizzey and Knight, 2003) however very few records exist around Yarrie and Port Hedland (G. Swan *pers. comm*.). Three individuals were observed in sandplain habitat close to the northern tip of the Study Area during the current study. It is likely that these records represent some of the southern-most records of this species.

4.2.20 Black-necked Stork (*Ephippiorhynchus asiaticus*)

This species is listed under Near Threatened in the IUCN.

This large species is restricted mainly to coastal and near-coastal monsoonal areas of northern and eastern Australia, but could occur near permanent water further interior of the country. The Black-necked Stork inhabits wetlands, such as floodplains of rivers with large shallow swamps and pools, and deeper permanent bodies of water. Occasionally individuals will stray into open grass, woodland areas or flooded paddocks in search of food.

Two records occur in the upper sections of the Yule River within the Study Area (Biota 2002; current study).

Reptiles

4.2.21 Pin-striped Finesnout Ctenotus (*Ctenotus nigrilineatus*)

This species is listed as Priority 1 by the DEC. It shows a patchy distribution in spinifex at the base of granite outcrops around the Woodstock area in the Abydos Plain, Hamersley Range and Meethena, and is only known from few records (Storr, Smith et al. 1999; Coffey Environments 2011).

One specimen was observed in similar habitat during the current survey.

4.2.22 *Ctenotus* cf. *uber johnstonei*

Little is known of this species and its taxonomic status is uncertain. It may belong with *Ctenotus uber johnstonei*, which is a DEC Priority 2 species, or it may belong to an undescribed taxon, in which case it would have no official conservation status. The taxon is only currently known from a few localities on the western plains surrounding the Fortescue Marshes. Individuals have previously been recorded from *Triodia* growing on dolerite hillslopes, *Acacia xiphophylla* over chenopods and *Acacia xiphophylla* scattered tall shrubs to high open shrubland over *Sclerolaena cuneata* herbland (Environ Australia Pty Ltd 2004). An individuals was observed in Mulga habitat during the current study.

Table 4.1 Conservation significant fauna recorded within the Study Area

Name	Conservation Status	Preferred Habitat	Extent of habitat in the Study Area and region	Records in the Study Area
Mammals				
Northern Quoll *Dasyurus hallucatus*	EPBC Act: Endangered WCA: Schedule 1 IUCN: Endangered	Mostly favour rocky habitats (e.g. escarpments, mesas, gorges, breakaways, boulder fields, major drainage lines and treed creek lines) as denningr habitat, and foraging occurs in the vegetated areas surrounding their dens (DSEWPaC 2011a).	Potentially suitable denning habitats are present, predominantly in the northern part of the Study Area in the form of boulder piles, gorge/gully and major drainage line habitats. These habitats are widespread in the Chichester and Hamersley sub regions. The size and complexity of these potential denning habitats will determine if a northern quolls utilise these habitats as core denning habitats (supporting a resident population of Northern Quolls) or occasional denning habitats whilst dispersing or foraging over wide areas.	Northern quolls have been reported within Study Area and in immediate vicinity during previous studies (e.g. within the leases of Quarries 1, 2, 3, and 4 (ecologia, 2008a,e,f, 2009c) and Mooka Siding (Biologic, 2010)) as well as the current study. A wide range of methods including Elliot trapping, remotely-triggered motion cameras, scat analysis and track signs have being used to confirm their presence during the current study where 14 records were made.
Mulgara sp. *Dasycercus* sp.	**Crest-tailed Mulgara** EPBC Act: Vulnerable WCA: Schedule 1 *- or -* **Brush-tailed Mulgara** DEC: Priority 4	Arid, sandy areas, preferring mature spinifex on sandy soils (Biota 2002). Brush-tailed Mulgara are said to inhabit spinifex grasslands with medium to dense cover, while Crest-tailed Mulgara inhabit more sparsely-vegetated areas (Masters 2008).	Sandplain habitats of the Study Area represent suitable habitat for this species. Sandplains are present on either side of the Study Area in gently-sloped plains between the Hamersley Range and the Fortescue Marsh.	Biota (2002) placed a specimen they encountered under Crest-tailed Mulgara (*Dasycercus cristicauda*). A specimen collected during the current study was identified as a Brush-tailed Mulgara (*Dasycercus blythi*) through detailed morphological and genetical analysis. This species occurs across a wider habitat types than its congener and is very likely to be the species identified during the previous surveys. Biota (2002) further mentions that evidence (burrows, diggings, scat and tracks) for the existence of Mulgara within the Study Area is widespread and common.

Name	Conservation Status	Preferred Habitat	Extent of habitat in the Study Area and region	Records in the Study Area
Greater Bilby *Macrotis lagotis*	EPBC Act: Vulnerable WCA: Schedule 1 IUCN: Vulnerable	Three major vegetation types associated with the Greater Bilby are listed by Southgate (1990b) including: open tussock grassland on uplands and hills, Mulga woodland/shrubland on ridges and rises and hummock grassland in plains and alluvial areas. Other habitats used by the species include stony downs, cracking clays, desert sandplains and dune fields, spinifex grassland and *Acacia* spp. shrublands on red earths (Johnson 2008).	Areas of dune, sandplain and stony plain interspersed with Mulga woodland within the Study Area are considered potentially suitable habitats for this species. Such habitat are widespread in the Chichester sub region.	Previously, three burrows of this species were recorded from Vegetation Site 266 within Section F of the proposed Hope Downs rail corridor (Biota 2002). Vegetation at these sites comprised a mixed *Triodia angusta*/ *T. basedowii* steppe. How et al. (1991) reported active burrow systems of this species in the vicinity of drainage tributaries of the Yule and Turner Rivers. A remote camera footage as well as numerous signs of fresh digging and tracks scattered near Turner River within the Study Area were reported during the current study.
Pilbara Leaf-nosed Bat *Rhinonicteris aurantia*	EPBC Act: Vulnerable WCA: Schedule 1	Hot, humid roost caves. Forages in gorge/gully habitat and along watercourses, particularly where water is present.	None of the caves visited during the current study were deemed to be suitable roosting locations for the Pilbara Leaf-nosed Bat. However, caves with the preferred characteristics are widespread north of Marble Bar and within the Hamersley Range.	Calls of this species were recorded at two instances, once near Wogina and subsequently at a cave entrance in granite outcrop ~17.5 km southeast of Indee.
Ghost Bat *Macroderma gigas*	DEC: Priority 4 IUCN: Vulnerable	Roosts in deep, complex caves beneath bluffs of low, rounded hills of BIF or Marra Mamba formation, granite rock piles and abandoned mines (Armstrong and Anstee 2000). However, this species have successfully adapted to utilise anthropogenic habitats, especially mine shafts and culverts, throughout its range.	Only small amounts of gorge/gully habitats were present within the Study Area and none of the caves visited during the current study were deemed to be suitable roosting locations for this species. However many alternative habitats exists in man-made structures, especially culverts. Potential Ghost Bat habitats (in the forms above) are widespread in the Chichester, Hamersley and Roebourne sub regions.	Biota (2002) reports several granite rock piles along the Hope Downs rail corridor and three culverts beneath the BHPB rail line where scat material and feeding remains of Ghost Bats were found. Several additional culverts with feeding remains (mainly Budgerigar-*Melopsittacus undulates*) and scats have been recorded in culverts along the rail line (S. Creese *pers. comm*.). One additional observation record of a Ghost Bat closer to the Chichester Deviation exists (ecologia 2008h).

Name	Conservation Status	Preferred Habitat	Extent of habitat in the Study Area and region	Records in the Study Area
Western Pebble-mound Mouse *Pseudomys chapmani*	DEC: Priority 4	Gentler slopes of rocky ranges where ground is covered with a stony mantle and vegetated by spinifex, often with sparse overstorey of eucalypts and scattered shrubs (Van Dyck and Strahan 2008).	Suitable habitat for this species is located in the central section of the Study Area where crest/slope habitat occurs; this is also a common habitat type in the region.	Numerous records throughout the Study Area from the current survey and a previous survey (Biota 2002; ecologia 2008; Biologic 2010).
Short-tailed Mouse *Leggadina lakedownensis*	DEC: Priority 4	Areas of open tussock and hummock grassland, acacia shrubland, and savanna woodland, on alluvial clay or sandy soils (Lee 1995; Moro and Kutt 2008).	Generally restricted to cracking clays in the region (Gibson and McKenzie 2009). The band of cracking clay habitat in the Study Area extends tens of kilometres either side.	Two individuals were caught in dry pitfall traps set in *Astrebla pectinata* and *Aristida latifolia* tussock grassland on the self-mulching clays immediately north of Chichester Deviation in 2002 (Biota 2002).
Birds				
Rainbow Bee-eater *Merops ornatus*	EPBC Act: Migratory WCA: Schedule 3	Lightly wooded, preferably sandy country near water (Johnstone and Storr 1998).	These habitat requirements are met along much of the length of the extensive areas of sandplain habitat in the north of the Study Area.	There are numerous previous records of Rainbow Bee-eater within the Study Area (Biota 2002; ecologia 2008; Biologic 2010; ENV 2011) and it was commonly recorded during the current survey along the sandplain areas.
Oriental Pratincole *Glareola maldivarum*	EPBC Act: Migratory WCA: Schedule 3	Inhabits an array of habitats close to water ranging from muddy flood plains to open inland plains and tussock grasslands to stony plains. It also visit anthropogenic water bodies and open fields.	Most aquatic habitats such as creeks, rivers, marshes, ponds, man-made dams etc. within the Study Area and in the region would provide viable habitats for this species.	Over 300 individuals (sometimes in >100 flocks) were observed between East Turner River and Port Headland-Wittenoom road, closer to the northern end of the Study Area during the current survey.
Eastern Great Egret *Ardea modesta*	EPBC Act: Migratory WCA: Schedule 3	Occurs in shallows of rivers and freshwater wetlands (Pizzey and Knight 2006); breeding habitat includes wooded swamps and river pools with *Eucalyptus camaldulensis* and *Melaleuca argentea* (Johnstone and Storr 1998).	Most aquatic habitats such as creeks, rivers, marshes, ponds, man-made dams etc. within the Study Area and in the region would provide viable habitats for this species.	There are few records of this species in the immediate vicinity in the northern and central parts of the Study Area and one record in the upper section of the Yule River within the Study Area (Biota 2002). It is also known from the riverine, mangrove and tidal flats habitats around Port Hedland (ENV 2009, 2011).

Name	Conservation Status	Preferred Habitat	Extent of habitat in the Study Area and region	Records in the Study Area
Fork-tailed Swift *Apus pacificus*	EPBC Act: Migratory WCA: Schedule 3	Species is entirely aerial in the region and does not utilise fauna habitats directly.	Species will fly over all areas of the Study Area and surrounding region.	Four individuals were recorded during the current study at the southern end of the Study Area bordered by the Fortescue and Hamersley subregions.
Oriental Plover *Charadrius veredus*	EPBC Act: Migratory WCA: Schedule 3	Inhabits areas of dry grassland and thinly vegetated plains with much hard bare ground in inland areas of northern Australia (Marchant and Higgins 1993). This includes areas that have been recently burnt, and areas of hard, stony, bare ground.	The sparsely-vegetated open stony plains of the northern Study Area are suitable habitat for this species extending either side of the Study Area. Regionally, the species would most likely be associated with these more open areas bounding the Fortescue Marsh and it is unlikely to occur in the habitats such as the rocky ranges further south of the Study Area because the habitat is generally not open enough.	A single individual was observed closer to Beebingarra Creek in the Northern section of the Study Area during a Level 1 Fauna Survey at Mooka Siding (Biologic 2010)
Common Greenshank *Tringa nebularia*	EPBC Act: Migratory WCA: Schedule 3	The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats.	Most aquatic habitats towards the northern section of the Study Area would provide viable habitats for this species. Such habitat are more common in the Roebourne sub region.	One individual was observed during the current survey towards the northern section of the Study Area, between Turner River and Beebingarra creek.
Peregrine Falcon *Falco peregrinus*	WCA: Schedule 4	Cosmopolitan, will hunt in any habitat, soaring at height or from a perch; often near cliffs (Slater *et al*. 2009). Nests on rocky ledges in tall, vertical cliff faces and tall trees associated with drainage lines.	The Study Area contains suitable hunting habitat for Peregrine Falcon, primarily associated with wooded water courses and major drainage line habitats. Potential breeding habitats may occur in the granite outcrops that are widespread in the Chichester sub region.	One observation record within the Study Area exists in the southern part of the Chichester Range (Biota 2002).
Australian Bustard *Ardeotis australis*	DEC: Priority 4	Open or lightly wooded grasslands (Johnstone and Storr 1998).	Suitable habitat is common in the Study Area and in the surrounding region.	The species has been recorded several times within the Study Area (Biota 2002; ecologia 2008; Biologic 2010; ENV 2011), including during the current survey.

Name	Conservation Status	Preferred Habitat	Extent of habitat in the Study Area and region	Records in the Study Area
Bush Stone-curlew *Burhinus grallarius*	DEC: Priority 4	Inhabits areas of open forest and woodland with open areas, fallen dead timber or leaf litter. Inland, it is associated with watercourses.	Suitable habitat in the Study Area includes drainage areas and open areas fringed by denser woodland, such as the grooved Mulga woodlands in the central and northern parts of the Study Area. These habitats are locally common and abundant.	This species is an uncommon resident in the region and have being observed in several occasions during previous studies within the Study Area (Biologic 2010; ENV 2011) and numerous tracks were observed during the current survey.
Grey Falcon *Falco hypoleucos*	DEC: Priority 4 IUCN: Vulnerable	This species appears to have a distribution centred on ephemeral or permanent drainage lines (Garnett and Crowley 2000). Grey Falcons prefer sparsely-treed, open plains and drainage lines for hunting (Slater *et al*. 2009). They nest in the abandoned nest of a raptor or corvid (Slater *et al.* 2009) in trees or man-made structures, most notably repeater towers.	Suitable breeding habitat occurs in the Study Area, consisting of tall eucalypt trees associated with creeks. Much of the Study Area represents suitable hunting territory, in particular close to the open, sparsely vegetated plains of the northern Study Area.	Two Grey Falcons were nesting during the current survey and are known to have raised young (M. O'Connell pers. comm.) in a communications tower overlooking cracking clay habitat in the Chichester Range.
Flock Bronzewing *Phaps histrionica*	DEC: Priority 4	Mainly inhabit open Mitchell Grass *Astrebla pectinata* grasslands on black soil plains, but also frequent saltbush *Atriplex*, bluebush *Maireana* and *Triodia* hummock grasslands, grassy woodlands, recently burnt areas, roadsides and agricultural land, particularly favouring run-on areas (Higgins and Davies 1996; McAllan 1996). They are also often associated with permanent water (Frith *et al*. 1976).	*Triodia* hummock grasslands are common in the Study Area and in the surrounding region.	Three individuals were recorded in two locations in the central and southern sections of the Study Area during the current survey.

Name	Conservation Status	Preferred Habitat	Extent of habitat in the Study Area and region	Records in the Study Area
Pictorella Mannikin *Heteromunia pectoralis*	DEC: Priority 4	Found near water in *Acacia* shrublands that have a grassy understorey and in *Triodia* hummock grassland, where they feed on seeds on the ground, as well as insects (Blakers *et al*. 1984).	The preferred habitats are common closer to water bodies in the Study Area and in the surrounding region.	Three individuals were observed in Cracking clay habitat during the current survey.
Black-necked Stork *Ephippiorhynchus asiaticus*	IUCN: Near Threatened	Inhabits wetlands, such as floodplains of rivers with large shallow swamps and pools, and deeper permanent bodies of water. Occasionally individuals will stray into open grass, woodland areas or flooded paddocks in search of food (Pringle 1985).	Most aquatic habitats within the Study Area and the surrounds would provide viable habitats for this species.	Two records occur in the upper sections of the Yule River within the Study Area (Biota 2002; current survey).
Reptiles				
Pin-striped Finesnout Ctenotus *Ctenotus nigrilineatus*	DEC: Priority 1	It shows a patchy distribution in spinifex at the base of granite outcrops around the Woodstock area in the Abydos Plain, Hamersley Range and Meethena, and only known from few records.	These preferred habitats (spinifex at the base of granite outcrops) are common in the Study Area (especially within the section in Chichester sub region) and in the surrounding region.	One specimen was observed in similar habitat during the current survey.
Ctenotus cf. *uber johnstonei*	***Ctenotus uber johnstonei*** DEC: Priority 2 *- or -* **Undescribed taxon** no official conservation status	Associated with *Triodia* growing on dolerite hillslopes, *Acacia xiphophylla* over chenopods and *Acacia xiphophylla* scattered tall shrubs to high open shrubland over *Sclerolaena cuneata* (Environ Australia Pty Ltd 2004).	The known habitats of this species (see preferred habitat) occur around the Fortescue Marshes.	Individuals have previously been recorded by Biota (2005). One animal was observed in Mulga habitat during the current survey.

4.3 Conservation significant fauna potentially occurring within the Study Area

Based on known distribution ranges of the species and the fauna habitats present within the Study Area, at least an additional 43 conservation significant species (two mammals, 39 birds and two reptiles) have the potential to occur within the Study Area. These species are discussed below and in the summary table following (Table 4.2).

Mammals

4.3.1 Western Little Free-tailed Bat (*Mormopterus loriae cobourgiana*)

This genus is under taxonomic revision, but the particular species is listed as Priority 1 by the DEC. This species inhabits coastal and sub-coastal areas of the top-end of the Northern Territory and the semi-arid part of the tropical coastline of Western Australia. Within its range, it is restricted to a few localised habitats (mainly mangrove stands with Grey Mangroves-*Avicennia marina*), and can appear to be locally common because it aggregates.

It is considered unlikely that this species roosts in the Study Area, however, it may possibly occur as a transient in the northern sections since since records exists in the vicinity of the Study Area at Port Hedland and East Turner River further south (Biota 2002).

4.3.2 Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardti*)

The mainland subspecies of the Spectacled Hare-wallaby is listed under Priority 3 by the DEC. The Spectacled Hare-wallaby population within the Pilbara has declined drastically (Menkhorst and Knight 2004) and the remaining populations inhabit tussock and hummock grasslands with mid-dense or sparse tree and shrub cover.

Several records of this species are known from the vicinity of Chinnamon Creek adjacent to the central part of the Study Area (Biota 2002). It is likely that this species is present in similar habitats within the Study Area.

Birds

4.3.3 Night Parrot (*Pezoporus occidentalis*)

The Night Parrot is listed as Endangered and Migratory under the EPBC Act, Schedule 1 under the WCA and Endangered by the IUCN. It is one of Australia's rarest birds, with very few confirmed sightings in recent years. Night Parrots are nocturnal and inhabit arid and semi-arid zones. Night Parrots occur in spinifex grasslands in stony or sandy areas (including sandplains, hills and escarpments), shrubby samphire and chenopod associations (including *Atriplex* spp., *Maireana* spp. and *Sclerolaena* spp.), on floodplains, claypans or at the edges of salt lakes, creeks and other watercourses (Higgins 1999). A common feature of the habitats in which they have been recorded is dense, low vegetation. Night Parrots have been reported nesting in spinifex and samphire, and feed on seeding spinifex and chenopods (Higgins 1999).

The Study Area contains fauna habitats suitable for this species, notably the open stony or sandy spinifex plains fringing the Fortescue Marsh north of the Hamersley Range. This habitat extends outside of the Study Area and is common in the region. Because of their rarity, and extremely cryptic behaviour, they are very difficult to detect. No recent searches for Night Parrot have been successful. There is one (April 2005) record from the Pilbara region, from Minga Well approximately 25 km east of the Study Area, on the northern side of the Fortescue Marsh (Davis and Metcalf 2008). Other records in Western Australia occur over a wide area of the arid zone (Davis and Metcalf 2008). The proximity of the Study Area to suitable chenopod habitat associated with the Fortescue Marsh, the presence of suitable spinifex habitat and the recent, relatively nearby record suggests that Night Parrots may possibly occur in the Study Area and surrounds.

4.3.4 Eastern Reef Egret (*Egretta sacra*)

The Eastern Reef Egret is listed as Migratory under the EPBC Act, and Schedule 3 under the WCA. It occurs in coastal areas along the entire West Australian coast, although it is more abundant in the warmer regions to the north. This egret inhabits a wide array of semi-aquatic habitats including beaches, rocky shores, tidal rivers and inlets, mangroves, and exposed coral reefs. Despite being listed as Migratory, the Eastern Reef Egret is largely sedentary in nature (Johnstone and Storr, 1998).

It is highly likely that this species is present in the northern section of the Study Area (closer to Port Hedland). It has been previously recorded from the mud flats in the vicinity (12 km to the north-west) of the Study Area (ENV 2009, 2011).

4.3.5 Cattle Egret (*Ardea ibis*)

The Cattle Egret is listed as Migratory under the EPBC Act, and Schedule 3 under the WCA. It occasionally occurs singly, but is usually gregarious, in small parties or flocks of several hundred birds (Marchant and Higgins 1990). It is distributed in the better-watered parts of the state (Johnstone and Storr, 1998). This species prefers inundated grasslands and wetlands, and is uncommon in arid and semi-arid regions (Marchant and Higgins, 1990). Cattle Egrets occasionally use swamps with tall emergent vegetation, e.g. *Typha* sp. or wooded swamps.

There are only sporadic records of vagrant Cattle Egrets in the inland Pilbara, with few around the Fortescue River, approximately 50 km to the east of the Study Area (Birds Australia 2011). ENV (2011) records a single individual from the Tidal Flats in Port Hedland, closer to the northern section of the Study Area. However this is not the typical habitat for this species.

4.3.6 White-bellied Sea-eagle (*Haliaeetus leucogaster*)

This large raptor is listed as Migratory under the EPBC Act and Schedule 3 under the WCA. It is considered to be moderately common in Pilbara islands and casual on Pilbara rivers and in

other near-coastal wetlands. White-bellied Sea-Eagles are known to breed almost wholly on islands or near coastal areas (Johnstone and Storr, 1998).

The coastal and near-coastal habitats (beach, dunes, tidal flats, riverine and mangroves) further north to the Study Area provide suitable habitat for this species. Several previous studies record this species from areas adjacent to the Study Area (Mattiske 1994; ENV 2009, 2011; DEC 2012).

4.3.7 Barn Swallow (*Hirundo rustica*)

The Barn Swallow is listed as Migratory under the EPBC Act, and as Schedule 3 under the WCA. It is an annual winter visitor from the Northern Hemisphere. Barn Swallows inhabit open country and agricultural lands, especially near water (Schodde and Mason 1997).

Given its known range within Australia, it is likely that this species visits the northern regions of the Study Area during the migratory period, mostly September to March.

4.3.8 Eastern Osprey (*Pandion cristatus*)

The Eastern Osprey is listed as Migratory under the EPBC Act, and as Schedule 3 under the WCA. The breeding range of the Eastern Osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in New South Wales (Barrett, Silcocks et al. 2003). In the Pilbara region, the Eastern Osprey inhabits coastal areas, islands and larger rivers inland (Johnstone and Storr, 1998). Inland range extensions in the north-west WA have been noted and may be an area of dispersal for first-year birds (Marchant and Higgins, 1993).

The coastal and near-coastal habitats (beach, dunes, tidal flats, riverine and mangroves) further north to the Study Area provide suitable habitat for this species. Several previous studies record this species from areas adjacent to the Study Area (Mattiske 1994; ENV 2008, 2009, 2011; DEC 2012). It has also been observed nesting in lighting towers within the vicinity of the Port Headland townsite (ENV 2011).

4.3.9 Star Finch (western subspecies) (*Neochmia ruficauda subclarescens*)

The ‘western’ population of the Star Finch (called the western subspecies here) is considered by the DEC to represent a separate subspecies (*N. r. subclarescens*), distinct from Kimberley and Northern Territory birds (*N. r. clarescens*). These birds are generally uncommon and patchily distributed in the Pilbara and are listed as Priority 4 by the DEC. The Star Finch prefers areas of dense vegetation, such as reed beds (Johnstone and Storr, 2004) and woodlands near water (Slater *et al*., 2009).

A number of individuals of this subspecies have being recorded at the reed-lined Coonarrie Creek, immediately adjacent to the central part of the Study Area (Biota, 2002). Like most other finches, the Star Finch requires regular access to water, so is more likely to inhabit

habitats near permanent water for most of the season. However they can disperse out to a wider area during build-up to and the wet season when water is commonly available.

4.3.10 Other Migratory Species

Given that the northern tip of the Study Area extends to near-coast habitats close to Port Hedland, an array of coastal waders and terns listed as Migratory under the EPBC Act and Schedule 3 under the WCA have the potential to occur within the northern section of the Study Area (NatureMap, 2012). It is also likely that some of the species would inhabit or visit the edge of sheltered freshwaters in the interior parts of the Study Area.

Migratory bird species that could potentially occur in the Study Area include:

- Asian Dowitcher (*Limnodromus semipalmatus*);
- Australian Painted Snipe (*Rostratula australis*);
- Bar-tailed Godwit (*Limosa lapponica*);
- Black-tailed Godwit (*Limosa limosa*);
- Broad-billed Sandpiper (*Limicola falcinellus*);
- Common Sandpiper (*Actitis hypoleucos*);
- Curlew Sandpiper (*Calidris ferruginea*);
- Eastern Curlew (*Numenius madagascariensis*);
- Great Knot (*Calidris tenuirostris*);
- Greater Sand Plover (*Charadrius leschenaultii*);
- Grey Plover (*Pluvialis squatarola*);
- Grey-tailed Tattler (*Tringa brevipes*) ;
- Lesser Sand Plover (*Charadrius mongolus*);
- Little Curlew (*Numenius minutus*);
- Long-toed Stint (*Calidris subminuta*);
- Marsh Sandpiper (*Tringa stagnatilis*);
- Pacific Golden Plover (*Pluvialis fulva*);
- Pin-tailed Snipe (*Gallinago stenura*);
- Red-necked Stint (*Calidris ruficollis*) ;
- Red Knot (*Calidris canutus*);
- Ruddy Turnstone (*Arenaria interpres*);
- Ruff (*Philomachus pugnax*);
- Sanderling (*Calidris alba*);
- Sharp-tailed Sandpiper (*Calidris acuminata*);
- Terek Sandpiper (*Xenus cinereus*);
- Whimbrel (*Numenius phaeopus*); and
- Wood Sandpiper (*Tringa glareola*);

Terns that could potentially occur in the Study Area include:

- Caspian Tern (*Hydroprogne caspia*);
- Common Tern (*Hydroprogne hirundo*);
- Fairy Tern (*Hydroprogne nereis*);
- Little Tern (*Hydroprogne albifrons*); and
- White-winged Black Tern (*Chlidonias leucoptera*).

Reptiles

4.3.11 Pilbara Olive Python (*Liasis olivaceus barroni*)

The Pilbara Olive Python is listed as Vulnerable under the EPBC Act and Schedule 1 under the WCA. This species is primarily nocturnal and tends to shelter in small caves or under vegetation during the day, although it is occasionally active after sunrise, particularly in the warmer summer months (DSEWPaC 2011). The Pilbara Olive Python is known from a number of sites throughout the Pilbara and is associated with drainage systems, including areas with localised drainage and semi-permanent watercourses (DSEWPaC 2011a). In the Hamersley subregion, the Pilbara Olive Python is most often encountered in the vicinity of permanent waterholes in rocky ranges or among riverine vegetation (Pearson 1993; Pearson 2006).

This species occurs throughout the Pilbara (Bush and Maryan 2011), thus is very likely to occur within the Study Area. Suitable habitat for the Pilbara Olive Python such as deep rocky gullies are present but not common in the Study Area. This species is also known to occur in boulder and rock piles (Pearson 2006).

4.3.12 Pilbara Flat-headed Blind Snake (*Ramphotyphlops ganei*)

The blind snake *Ramphotyphlops ganei* is listed as Priority 1 by the DEC and is endemic to the Pilbara. Given its cryptic fossorial habit, this species is rarely encountered. Little is known of this species' ecology but like most other blind snakes, it is insectivorous, feeding on termites and their eggs, and larvae and pupae of ants (Wilson and Swan 2010). *Ramphotyphlops ganei* is associated with moist gorges and gullies (Wilson and Swan 2010) and potentially with a wide range of other stony habitats.

Based on the known habitat characteristics and distribution, *Ramphotyphlops ganei* has the potential to occur within gorge and Mulga association habitats, as well as habitats with open drainage channels within the Study Area. Few records of this species exists in the Chichester and Hamersley sub regions (Aplin K.P. 1998)

Table 4.2 Conservation significant fauna potentially occurring within the Study Area

Name	Significance	Preferred habitat	Extent of habitat in the Study Area	Records	Likelihood of occurrence in the Study Area
Mammals					
Western Little Free-tailed Bat *Mormopterus loriae cobourgiana*	DEC: Priority 1	Mangrove stands, especially those with Grey Mangroves (*Avicennia marina*)	None	Based on the distribution range of the species, may possibly occur as a transient in the northern section of the Study Area.	**Low**
Spectacled Hare-wallaby *Lagorchestes conspicillatus leichardti*	DEC: Priority 3	Inhabit tussock and hummock grasslands with mid-dense or sparse tree and shrub cover.	Preferred habitat types are well represented within the Study Area.	Several records of this species are known from the vicinity of Chinnamon Creek adjacent to the central part of the Study Area (Biota 2002).	**High**
Birds					

Name	Significance	Preferred habitat	Extent of habitat in the Study Area	Records	Likelihood of occurrence in the Study Area
Night Parrot *Pezoporus occidentalis*	EPBC Act: Endangered and Migratory WCA: Schedule 1 IUCN: Endangered	Inhabit arid and semi-arid zones, occurring in spinifex grasslands in stony or sandy areas including sandplains, hills and escarpments, and shrubby samphire and chenopod associations including *Atriplex* spp., *Maireana* spp. and *Bassia* spp., on floodplains, claypans or at the edges of salt lakes, creeks and other watercourses (Higgins, 1999). The species tends to prefer habitats with dense, low vegetation (DSEWPaC, 2011e). Night Parrots have been reported elsewhere in Australia nesting in spinifex and samphire.	The Study Area contains fauna habitats suitable for this species, notably the open stony or sandy spinifex plains fringing the Fortescue Marsh north of the Hamersley Range. This habitat extends outside of the Study Area and is common in the region.	There is a 2005 record of this species from the Pilbara region, at the Minga Well, approximately 25km east of the Study Area (Davis and Metcalf, 2008). Other records in Western Australia occur over a wide area of the arid zone (Davis and Metcalf, 2008).	**Possible**
Eastern Reef Egret *Egretta sacra*	EPBC Act: Migratory WCA: Schedule 3	Inhabits a wide array of semi-aquatic habitats including beaches, rocky shores, tidal rivers and inlets, mangroves, and exposed coral reefs.	Suitable habitats may exist in the northern section of the Study Area (closer to Port Hedland).	It has been previously recorded from the mud flats in the vicinity of the Study Area (ENV 2009, 2011).	**High**
Cattle Egret *Ardea ibis*	EPBC Act: Migratory WCA: Schedule 3	Cattle Egrets prefer inundated grasslands and wetlands, and are uncommon in arid and semi-arid regions (Marchant and Higgins 1990). This species occasionally uses swamps with tall emergent vegetation, e.g. *Typha* sp. or wooded swamps.	Marginally suitable habitat is available associated with the wetlands of Fortescue Marsh. Suitable habitats may exist in the northern section of the Study Area (closer to Port Hedland).	There are only sporadic records of vagrant Cattle Egrets in the inland Pilbara, with few in the Fortescue River, approximately 50 km to the east of the Study Area (Birds Australia 2011). ENV (2011) recorded a single individual from the Tidal Flats in Port Hedland, closer (~12 km) to the northern section of the Study Area.	**High**

Name	Significance	Preferred habitat	Extent of habitat in the Study Area	Records	Likelihood of occurrence in the Study Area
White-bellied Sea-eagle *Haliaeetus leucogaster*	EPBC Act: Migratory WCA: Schedule 3	Lentic water bodies, both freshwater and marine.	The coastal and near-coastal habitats (beach, dunes, tidal flats, riverine and mangroves) further north to the Study Area provide suitable habitat for this species.	Several previous studies record this species from areas adjacent to the Study Area (Mattiske 1994; ENV 2009, 2011; DEC 2012).	**Medium**
Barn Swallow *Hirundo rustica*	EPBC Act: Migratory WCA: Schedule 3	Open country and agricultural lands, especially near water.	Similar habitats occur within the northern section of the Study Area	Given its known range within Australia, it is likely that this species visits the northern regions of the Study Area during the migratory period, mostly September to March.	**Medium**
Eastern Osprey *Pandion cristatus*	EPBC Act: Migratory WCA: Schedule 3	Lentic water bodies, both freshwater and marine.	The coastal and near-coastal habitats (beach, dunes, tidal flats, riverine and mangroves) further north to the Study Area provide suitable habitat for this species.	Several previous studies record this species from areas adjacent to the Study Area (Mattiske 1994; ENV 2008, 2009, 2011; DEC 2012). It has also been observed nesting in lighting towers within the vicinity of the Port Headland townsite (ENV 2011).	**Medium**
Star Finch (western subspecies) *Neochmia ruficauda subclarescens*	DEC: Priority 4	Prefers areas of dense vegetation, such as reed beds (Johnstone and Storr 2004) and woodlands near water (Slater *et al*. 2009).	Suitable habitats exists bordering creeks within the Study Area.	A number of individuals of this subspecies have being recorded at the reed-lined Coonarrie Creek, immediately adjacent to the central part of the Study Area (Biota 2002).	**High**
Shorebirds • Asian Dowitcher (*Limnodromus semipalmatus*); • Australian Painted Snipe (*Rostratula australis*); • Bar-tailed Godwit (*Limosa lapponica*); • Black-tailed Godwit (*Limosa limosa*); • Broad-billed Sandpiper (*Limicola falcinellus*);	EPBC Act: Migratory WCA: Schedule 3	Predominantly coastal and near-coastal habitats	Near coast habitats in the northern section of the Study Area may provide suitable habitats for these species. It is also likely that some of the species would inhabit or visit the edge of sheltered freshwaters in the interior parts of the Study Area.	Several previous studies record these species from areas adjacent to the Study Area (e.g. Mattiske 1994; ENV 2009, 2011; Bennelongia 2011; DEC 2012).	**Low**

Name	Significance	Preferred habitat	Extent of habitat in the Study Area	Records	Likelihood of occurrence in the Study Area
• Common Sandpiper (*Actitis hypoleucos*); • Curlew Sandpiper (*Calidris ferruginea*); • Eastern Curlew (*Numenius madagascariensis*); • Great Knot (*Calidris tenuirostris*); • Greater Sand Plover (*Charadrius leschenaultii*); • Grey Plover (*Pluvialis squatarola*); • Grey-tailed Tattler (*Tringa brevipes*); • Lesser Sand Plover (*Charadrius mongolus*); • Little Curlew (*Numenius minutus*); • Long-toed Stint (*Calidris subminuta*); • Marsh Sandpiper (*Tringa stagnatilis*); • Pacific Golden Plover (*Pluvialis fulva*); • Pin-tailed Snipe (*Gallinago stenura*); • Red-necked Stint (*Calidris ruficollis*); • Red Knot (*Calidris canutus*); • Ruddy Turnstone (*Arenaria interpres*); • Ruff (*Philomachus pugnax*); • Sanderling (*Calidris alba*); • Sharp-tailed Sandpiper (*Calidris acuminata*); • Terek Sandpiper (*Xenus cinereus*); • Whimbrel (*Numenius phaeopus*); • Wood Sandpiper (*Tringa glareola*)					

Name	Significance	Preferred habitat	Extent of habitat in the Study Area	Records	Likelihood of occurrence in the Study Area
Terns • Caspian Tern (*Hydroprogne caspia*); • Common Tern (*Hydroprogne hirundo*); • Fairy Tern (*Hydroprogne nereis*); • Little Tern (*Hydroprogne albifrons*); • White-winged Black Tern (*Chlidonias leucoptera*)	EPBC Act: Migratory WCA: Schedule 3	Predominantly coastal and near-coastal habitats	Near coast habitats in the northern section of the Study Area may provide suitable habitats for these species. It is also likely that some of the species would inhabit or visit the edge of sheltered freshwaters in the interior parts of the Study Area.	Several previous studies record these species from areas adjacent to the Study Area	**Low**
Reptiles					
Pilbara Olive Python *Liasis olivaceus barroni*	EPBC Act: Vulnerable WCA: Schedule 1	Associated with drainage systems, including areas with localised drainage and semi-permanent watercourses (DSEWPaC 2011a).	Deep rocky gullies are present but not common in the Study Area. However they are a common feature in mountain ranges within Pilbara.	Several previous studies record this species from areas adjacent to the Study Area	**High**
Pilbara Flat-headed Blind Snake *Ramphotyphlops ganei*	DEC: Priority 1	Associated with moist gorges and gullies (Wilson and Swan 2010) and potentially with a wide range of other stony habitats.	Has the potential to occur within gorge and Mulga association habitats within the Study Area, as well as habitats with open drainage channels.	Few records of this species exists in the Chichester and Hamersley sub regions (Aplin 1998)	**High**

4.4 Pilbara endemics

Species that are only known or predominantly known from the Pilbara bioregion are also noteworthy for consideration of cumulative impacts of development in the Pilbara. Table 4.3 details species regarded as Pilbara endemics (Kendrick 2001; Kendrick and McKenzie 2001) and near-endemics (taxa that mainly occur in the Pilbara with few outlying populations on adjacent sites) that have been recorded in the Study Area along with comments on their status as Pilbara endemics when compared with their current distribution (DEC 2011).

Table 4.3 Pilbara endemics and their current distribution

Species	Comments on endemic status
Pilbara endemics	
Western Pebble-mound Mouse *Pseudomys chapmani*	Currently restricted to the Pilbara region, but formerly more widespread (Menkhorst and Knight 2001).
Delma pax	Current records indicate this species is a true Pilbara endemic.
Lerista muelleri	Considered to be a true Pilbara endemic after taxonomic revision by Smith and Adams (2007)
Pilbara Rock Monitor *Varanus pilbarensis*	Current records indicate this species is a true Pilbara endemic.
Near-endemics	
Little Red Kaluta *Dasykaluta rosamondae*	Common in the Pilbara, but also extends eastwards into the Great and Little Sandy Deserts.
Yellow-spotted Pilbara Gecko *Diplodactylus savagei*	Most records of this species are from the Pilbara but it has also been collected from the Gascoyne.
Rufous Whipsnake *Demansia rufescens*	Isolated population located in the North West Cape (B. Maryan *pers. comm.*).

4.5 Species of interest

A number of reptilian taxa inhabiting the area could be considered locally significant or at least of interest either in a conservation or a taxonomic perspective. The little-known gecko *Diplodactylus mitchelli* occurs in much localised populations restricted to cracking clay habitat along with the skink, *Ctenotus* aff. *robustus*, which may represent a yet undescribed taxa. Among unresolved species complexes are *Lerista* aff. *bipes/hemilineata* confined to the coastal Pilbara/northern Abydos area, *Eremiascincus* sp., *Delma butleri/haroldi* and *Diporiphora winneckei/ valens.* Further taxonomical complexities exist within species such as *Crenadactylus ocellatus, Lucasium stenodactylum, Heternotia spelea, Tympanocryptis cephalus, Menetia greyii, Ctenotus duricola, C. schomburgkii* and several small varanids including *Varanus acanthurus, V. brevicauda* and *V. pilbarensis.*

4.6 Important fauna habitats

The expected faunal richness in an area is proportional to the amount of habitat variation and floristic diversity, since both of these influences the number of different habitats available for fauna. Accordingly, an area with high variation of habitat types could harbour a higher diversity of fauna and vice versa.

Across the Study Area, 12 different habitats were encountered out of which sandplains, gorge/gully, Fortescue Marsh samphire, major drainage lines and boulder piles/granite domes were identified as being most likely to harbour and support a larger assemblage of conservation significant fauna. The relative importance of each fauna habitat type is considered in Table 4.4. Table 4.4 Fauna habitat importance scores

4.6.1 Sandplains

The sandplain habitats of the central and northern Study Area provides habitat for Mulgara and Greater Bilby (both recorded during the current study) and potential habitat for Night Parrot. This sandplain habitat extends well outside of the Study Area.

4.6.2 Fortescue Marsh samphire

This unique habitat bordering the Fortescue Marsh may harbour many migratory bird species particularly in periods of innundation after heavy rains. It is likely that *Ctenotus* cf. *uber johnstonei* may also occur in this habitat. The Night Parrot has been recorded north of Fortescue Marsh near to similar samphire habitat (Davis and Metcalf 2008).

4.6.3 Gorge/Gully habitat

Large gorge and gully systems within the Chichester Range would provide potential habitat for several conservation significant species including the Ghost Bat and Pilbara Olive Python. However, the overall representation of suitable gorge/gully habitat for these species within the Study Area is low (0.09%). Gorge/gully habitat is well represented outside of the Study Area and more common in areas of the Hamersley Range (~10 km south of the Study Area).

4.6.4 Major Drainage Line habitat

Permanent water in the Pilbara is a very important habitat for fauna, as there are few locations where water is available year round. Major drainage lines with water and shade provide important foraging and living grounds for an array of conservation significant fauna including (but not limited to) Star Finch (western subspecies), Peregrine Falcon, Grey Falcon, Black-necked Stork, and attract EPBC-listed migratory species such as Eastern Great Egret, Eastern Osprey, Common Greenshank, Oriental Plover, etc. Drainage lines also provide important feeding habitats for several species of bats. However, the creek and river systems

occupy only a small area relative (7.9%) to other fauna habitats in the Study Area but extend well into the adjacent areas.

4.6.5 Boulder piles/Granite domes

Boulder piles/granite domes are well spread among many habitats, especially the Sandplains and stony plains within the Study Area. These provide important habitats for several conservation significant species including Northern Quolls, Ghost Bats (caves in granite boulders) and the skink *Ctenotus nigrilineatus*, where the latter is known only from similar types of habitats. Boulder piles also provide permanent and temporary denning habitat for Northern Quolls depending on their size and complexity and provide refuges to an array of species inhabiting an otherwise fairly open matrix. Granite domes provide important foraging areas for Northern Quolls.

4.7 Priority Ecological Communities

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are classified as Priority Ecological Communities (DEC, 2012). Three Prority Ecological Communities (PECs) occur within or adjacent to the Study Area: the Fortescue Valley Sand Dunes, the Fortescue Marsh and the Wona Land System.

The Fortescue Valley Sand Dunes exist approximately 50m from the Study Area in the very south. These red linear sand dune communities lie on the Divide Land system at the junction of the Hamersley Range and Fortescue Valley, between Weeli Wolli Creek and the low hills to the west. A small number are vegetated with scattered *Acacia dictyophleba* tall shrubs over *Crotalaria cunninghamii*, *Trichodesma zeylanicum* var. *grandiflorum* open shrubland. They are regionally rare, small and fragile and highly susceptible to threatening processes.

The Study Area crosses the Fortescue Marsh between the Hamersley and Chichester Ranges. Fortescue Marsh is an extensive, episodically inundated samphire marsh at the upper terminus of the Fortescue River and the western end of Goodiadarrie Hills. It is regarded as the largest ephemeral wetland in the Pilbara. It is a highly diverse ecosystem with fringing Mulga woodlands (on the northern side), samphire shrublands and groundwater dependant riparian ecosystems. It is an arid wetland utilized by waterbirds and supports a rich diversity of restricted aquatic and terrestrial invertebrates. Endemic *Eremophila* species, populations of priority flora and several near endemic and new-to-science samphires occur here.

The Wona Land System is to the west of the Study Area. This system of basalt upland gilgai plains with tussock grasslands occurs throughout the Chichester Range in the Chichester-Millstream National Park, Mungaroona Range Nature Reserve and on adjacent pastoral leases. There are a series of community types (*i.e.* Cracking clays of the Chichester and Mungaroona Range, Annual Sorghum grasslands on self mulching clays, Mitchell grass

plains on gilgai, Mitchell grass and Roebourne Plain grass plain on gilgai) identified within the Wona Land System gilgai plains that are considered susceptible to known threats such as grazing or have constituent rare/restricted species of flora (DEC 2012).

4.8 Significant Wetlands

The most prominent watercourse in close proximity to the Study Area is the Fortescue Marsh. The Marshes are listed on the Australian Heritage Commission Register of the National Estate as an "Indicative Place", and in the Directory of the Important Wetlands in Australia (Environment Australia 2001). It is recognised as being of national significance due to it *1*) representing an example for a wetland type in Australia, *2*) having an important ecological and a hydrological role, *3*) providing important habitats/refuges for animal taxa, and *4*) having outstanding historical or cultural significance. This inland floodplain system has the second largest recorded populations of wetland birds in WA (after Lake Gregory at Kumarina, ~350 km south of the Study Area).

Table 4.4 Fauna habitat importance scores

Fauna habitat	Score	Rationale
Sandplain	High	Mulgara and Greater Bilby were recorded in this habitat type during the current survey. The large, mature spinifex grasslands that characterise some of the sandplain areas within the Study Area also provide potential habitat for Night Parrot. Sandplains are also used extensively by Australian Bustard.
Mulga	Medium	Mulga provides habitat for the blindsnake *Ramphotyphlops ganei*, which is not restricted to this habitat type. Mulga also supports a relatively unique and diverse faunal assemblage, with numerous species restricted to this habitat type. Bush Stone-curlews were recorded within Mulga habitats in the Study Area. However, this species is not likely to be dependent on this habitat type and is likely to use additional habitats such as Major Drainage Line and Drainage Areas. The Study Area lies within the northern-most distribution limit of Mulga.
Crest/slope	Low	Western Pebble-mound Mouse is largely restricted to this habitat type within the Study Area. The blindsnake *Ramphotyphlops ganei* also could occur in this habitat type, but is not restricted to it. This habitat is common in the region.
Fortescue Marsh Samphire	High	Many migratory bird species may occur in this habitat type after heavy rains. *Ctenotus cf. uber johnstonei* may also occur. The Night Parrot has been recorded north of Fortescue Marsh near to similar samphire habitat.
Gorge/ Gully	High	Gorge/Gully habitat provides potential breeding, shelter and foraging sites for Pilbara Olive Python and Ghost Bat and possibly Pilbara Leaf-nosed Bat. They could also provide temporary roosts and transitional habitats for other bats. Gorge/Gully areas provide habitat for the blindsnake, *Ramphotyphlops ganei* and Rainbow Bee-eater, although

Fauna habitat	Score	Rationale
		neither of these species is restricted to this habitat type. Furthermore gorges and gullies could be day time retreats for other larger mammals and reptiles. However, Gorge/Gully habitats represent a small proportion of the Study Area.
Cracking clay/ gilgai	Medium	The Short-tailed Mouse is considered to be more or less restricted to this habitat type. Other unique fauna in this habitat include the Pebble Dragon (*Tympanocryptis cephalus*) and Pilbara Stone Gecko (*Diplodactylus mitchelli*). Cracking Clay habitat occurs in a number of locations throughout the Pilbara. However, it is generally isolated and of small size (in relation to the size of the Pillbara).
Stony plains	Low	Apart from potential foraging habitat for Grey Falcon, there are few species of conservation significance that may utilise this habitat type. The exception is the EPBC-listed Migratory species, Oriental Plover, which prefers such sparsely-vegetated areas.
Stony / Sandplains	Medium to High	Mulgara were recorded in this habitat type during the current survey, and it also provides potential habitat for Greater Bilby.
Granite dome & boulder piles	High	Boulder piles provide permanent and temporary refuges to an array of species inhabiting an otherwise fairly open matrix. Granite boulder piles provide either temporary/ occassional denning habitat or core denning habitat supporting resident Northern Quoll populations depending on their size and complexity. Granite Domes provide important foraging habitat for the Northern Quoll. The skink *Ctenotus nigrilineatus* is known from this habitat type. The Pilbara Olive Python is also known from this habitat.
Major Drainage Line	High	Major drainage lines represents an area of high local abundance and diversity for birds, and may provide nesting and foraging habitat for Peregrine Falcon, Grey Falcon, Bush Stone-curlew and Rainbow Bee-eater. Pilbara Olive Python may use this habitat as a corridor during dispersal. Reed-lined river pools provided potential breeding sites for Star Finch (western subspecies). River pools may also attract EPBC-listed Migratory birds such as Eastern Osprey and Eastern Great Egret.
Drainage Lines	Medium	Drainage Lines have the potential to provide habitat for a number of conservation significant fauna, such as the blindsnake *Ramphotyphlops ganei* and Australian Bustard, but these species are not restricted to this habitat type. Pilbara Olive Python is likely to utilise Drainage Lines transiently, as corridors during dispersal. Drainage Lines may be used by Rainbow Bee-eater as well, but this species is widespread and not restricted to this habitat type.
Artificial habitats	Low to High (due to use by Northern Quoll)	Anthropogenic habitats such as quarries, camp sites, mine sites etc. provide alternative living and foraging spaces for several conservation significant species, especially the Northern Quoll. Several bird species (including migratory species) may use man-made water bodies. Culverts play an important role as corridors for animal movement and alternative habitats for other species such as Ghost Bats.

CONCLUSIONS

Twenty previous fauna surveys have been undertaken within or overlapping the Study Area between Yandi junction and Port Hedland since 2002. These include 17 Level 1 or Target surveys (Biologic 2010; ecologia 2007, 2008a-f, 2009a-c; ENV 2008a-d, 2011a,b), a single one-season Level 2 survey (Biota 2004) and two two-season Level 2 surveys (Biota 2002; ecologia 2008). An additional six surveys of areas adjacent to the Study Area have taken place. A total of 325 vertebrate fauna species have been recorded within the Study Area to date, consisting of 38 native and eight introduced mammal species, 170 native and two introduced bird species, 99 reptile species and eight amphibian species. During the current survey a total of 148 species were recorded, comprising 23 native and four introduced mammal species, 64 bird species, 50 reptile species and seven amphibian species.

Twenty two conservation significant species have been recorded from the Study Area to date: Mulgara, Northern Quoll, Greater Bilby, Ghost Bat, Western Pebble-mound Mouse, Short-tailed Mouse, Australian Bustard, Bush Stone-curlew, Rainbow Bee-eater, Peregrine Falcon, Grey Falcon, Eastern Great Egret, Fork-tailed Swift, Oriental Plover, Flock Bronzewing, Pictorella Mannikin, Black-necked Stork, Oriental Pratincole, Common Greenshank, Pin-striped Finesnout Ctenotus and *Ctenotus* cf. *uber johnstonei.* At least another 43 species of conservation significant species have the potential to occur in the Study Area.

Twelve broad fauna habitats were identified within the Study Area: sandplains, Mulga, Fortescue Marsh samphire, crest/slope, gorge/gully, cracking clay or gilgai, stony plains, stony/sandplains, granite domes/boulder piles, major drainage lines, drainage lines and artificial habitats. Five of these fauna habitats; gorge/gully, Fortescue Marsh samphire, major drainage line, sandplain and granite domes/boulder piles were considered to be important habitat based on their ability to support conservation significant species.

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Appendix A Conservation status codes

International Union for Conservation of Nature

Category	Definition
Extinct (EX)	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Extinct in the Wild (EW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Critically Endangered (CE)	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.
Vulnerable (VU)	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future
Data Deficient (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

Environment Protection and Biodiversity Conservation Act 1999

Category	Definition
Extinct (EX)	Taxa not definitely located in the wild during the past 50 years.
Extinct in the Wild (EW)	Taxa known to survive only in captivity.
Critically Endangered (CE)	Taxa facing an extremely high risk of extinction in the wild in the immediate future.
Endangered (EN)	Taxa facing a very high risk of extinction in the wild in the near future.
Vulnerable (VU)	Taxa facing a high risk of extinction in the wild in the medium-term future.
Migratory (MG)	Consists of species listed under the following International Conventions: • Japan-Australia Migratory Bird Agreement (JAMBA) • China-Australia Migratory Bird Agreement (CAMBA) • Convention on the Conservation of Migratory Species of Wild animals (Bonn Convention)

Schedules of the *Wildlife Conservation Act 1950*

Category	Definition
Schedule 1 (S1)	Rare and Likely to become Extinct.
Schedule 2 (S2)	Extinct.
Schedule 3 (S3)	Migratory species listed under international treaties.
Schedule 4 (S4)	Other Specially Protected Fauna.

Department of Environment and Conservation Priority codes

Category	Definition
Priority 1 (P1)	Taxa with few, poorly known populations on threatened lands.
Priority 2 (P2)	Taxa with few, poorly known populations on conservation lands; or taxa with several, poorly known populations not on conservation lands.
Priority 3 (P3)	Taxa with several, poorly known populations, some on conservation lands.
Priority 4 (P4)	Taxa in need of monitoring. 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 be if present circumstances change.
Priority 5 (P5)	Taxa in need of monitoring. 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.

Appendix B Fauna recorded in the Study Area and identified in database searches

Mammals

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Turner River Camp Expansion (ecologia 2008)	RGP5 Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp &Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																				
DASYURIDAE																													
Dasycercus blythi	Brush-tailed Mulgara			P4			•																						•
Dasycercus cristicauda	Crest-tailed Mulgara	VU	S1				•			•																		•	•
Dasyurus hallucatus	Northern Quoll	EN	S1		EN		•			•	•					•	•					•				•		•	•
Dasykaluta rosamondae	Little Red Kaluta						•			•	•															•		•	•
Ningaui ridei	Wongai Ningaui									•																			
Ningaui timealeyi	Pilbara Ningaui							•		•																•		•	
Planigale ingrami	Long-tailed Planigale						•																					•	
Planigale sp.										•																•		•	
Pseudantechinus roryi	Rory's Antechinus							•																				•	•
Sminthopsis hirtipes	Hairy-footed Dunnart						•																						
Sminthopsis macroura	Stripe-faced Dunnart						•			•																•		•	•
Sminthopsis ooldea	Ooldea Dunnart						•																						
Sminthopsis youngsoni	Lesser Hairy-Footed Dunnart						•			•																		•	
TACHYGLOSSIDAE																													
Tachyglossus aculeatus	Echidna						•			•						•												•	•
THYLACOMYIDAE																													
Macrotis lagotis	Greater Bilby	VU	S1		S1			•																				•	•
MACROPODIDAE																													
Lagorchestes conspicillatus leichardti	Spectacled Hare-Wallaby			P3				•																					
Macropus robustus	Common Wallaroo/ Euro						•	•		•	•															•	•	•	•
Macropus rufus	Red Kangaroo						•						•													•		•	•
Petrogale rothschildi	Rothschild Rock Wallaby							•		•																•		•	•
EMBALLONURIDAE																													
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat						•				•	•														•	•		
Taphozous georgianus	Common Sheathtail-bat						•				•	•														•	•	•	•
Taphozous hilli	Hill's Sheathtail-bat																									•			
MEGADERMATIDAE																													

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Turner River Camp Expansion (ecologia 2008)	RGP5 Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp &Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																				
Macroderma gigas	Ghost Bat			P4	VU		•																		•			•	•
HIPPOSIDERIDAE																													
Rhinonicteris aurantius	Pilbara leaf-nosed bat	VU	S1				•																						•
VESPERTILIONIDAE																													
Chalinolobus gouldii	Gould's Wattled Bat						•				•	•												•	•			•	•
Nyctophilus arnhemensis	Arnhem Land Long Eared Bat																											•	
Nyctophilus geoffroyi	Lesser Long eared Bat																								•				
Nyctophilus gouldi	Gould's Long-eared Bat							•																					
Scotorepens greyii	Little Broad-nosed Bat						•				•	•													•	•		•	•
Vespadelus finlaysoni	Finlayson's Cave Bat						•				•	•										•			•	•		•	•
MOLOSSIDAE																													
Chaerephon jobensis	Northern Free-tailed Bat						•																		•			•	•
Mormopterus beccarii	Beccaris Free-tailed bat																				•				•			•	•
Mormopterus loriae cobourgiana	Western Little Free-tailed Bat																											•	
Tadarida australis	White-striped Free-tailed Bat							•																				•	
MURIDAE																													
**Mus musculus*	House Mouse						•			•														•	•			•	
Leggadina lakedownensis	Short-tailed Mouse			P4				•		•															•			•	
Notomys alexis	Spinifex Hopping-mouse						•																		•			•	•
Pseudomys chapmani	Western Pebble-mound Mouse			P4			•			•	•										•				•			•	•
Pseudomys delicatulus	Delicate Mouse						•			•																		•	
Pseudomys desertor	Desert Mouse						•			•															•			•	•
Pseudomys hermannsburgensis	Sandy Inland Mouse						•			•															•			•	
Zyzomys argurus	Common Rock-rat							•		•	•					•									•			•	
CANIDAE																													
Canis lupus dingo	Dingo									•	•				•					•					•			•	•
**Canis lupus*	Dog						•					•																	
**Vulpes vulpes*	Red Fox																											•	
CAMELIDAE																													
**Camelus dromedarius*	Camel						•			•	•									•									•
FELIDAE																													

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Turner River Camp Expansion (ecologia 2008)	RGP5 Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp &Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																				
**Felis catus*	Cat						•			•	•	•														•			•	•
LEPORIDAE																														
**Oryctolagus cuniculus*	European Rabbit																									•				•
EQUIDAE																														
**Equus asinus*	Donkey						•			•																			•	
BOVIDAE																														
**Bos taurus*	Cow						•			•	•									•					•	•			•	•

*Database search codes: I) DEC NatureMap; II) WA Museum; III) Bird Atlas Australia. * = Introduced Species*
Other symbols used: M) pebble mound; Conservation status codes as per Appendix A.

Birds

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Turner River Camp Expansion (ecologia 2008)	RGP5 Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp &Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																				
CASUARIIDAE																													
Dromaius novaehollandiae	Emu						•			•																•		•	•
PHASINIANIDAE																													
Coturnix ypsilophora	Brown Quail								•																	•			•
Coturnix novaezelandiae	Stubble Quail									•																			
ANATIDAE																													
Anas gracilis	Grey Teal								•			•																•	•
Anas superciliosa	Pacific Black Duck								•	•							•									•		•	•
Aythya australis	Hardhead								•																				
Chenonetta jubata	Australian Wood Duck								•																			•	
Cygnus atratus	Black Swan								•													•							
Dendrocygna arcuata	Wandering Whistling Duck																												•
Dendrocygna eytoni	Plumed Whistling Duck											•																	
Malacorhynchus membranaceus	Pink-eared Duck								•																				
RALLIDAE																													
Fulica atra	Eurasian coot								•																				
Porzana tabuensis	Spotless Crake																									•			
GLAREOLIDAE																													
Glareola maldivarum	Oriental Pratincole	MI	S3						•																				•
PODICIPEDIDAE																													
Poliocephalus poliocephalus	Hoary-headed Grebe								•																				
Tachybaptus novaehollandiae	Australasian Grebe								•			•														•		•	•
COLUMBIDAE																													
* *Columba livia*	Domestic Pigeon								•			•																	
Geopelia cuneata	Diamond Dove						•			•	•											•			•	•		•	•
Geopelia humeralis	Bar-shouldered Dove																											•	
Geopelia striata	Peaceful Dove								•			•			•											•		•	
Geopelia plumifera	Spinifex Pigeon						•			•	•									•	•	•			•	•	•	•	•
Ocyphaps lophotes	Crested Pigeon						•			•	•	•									•				•	•		•	

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Turner River Camp Expansion (ecologia 2008)	RGP5 Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp &Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																					
Phaps chalcoptera	Common Bronzewing						•					•								•				•				•		
Phaps histronica	Flock Bronzewing			P4																										•
PODARGIDAE																														
Podargus strigoides	Tawny Frogmouth									•																•	•			•	
EUROSTOPODIDAE																														
Eurostopodus argus	Spotted Nightjar						•			•																•	•			•	
AEGOTHELIDAE																														
Aegotheles cristatus	Australian Owlet-Nightjar								•	•																	•			•	
APODIDAE																														
Apus pacificus	Fork tailed Swift	MG	S3							•																	•				•
PHALACROCORACIDAE																														
Microcarbo melanoleucos	Little Pied Cormorant								•													•								•	
Phalacrocorax sulcirostris	Little Black Cormorant								•																					•	
Phalacrocorax varius hypoleucos	Pied Cormorant											•																		•	
PELECANIDAE																														
Pelecanus conspicillatus	Australian Pelican								•			•																		•	
ANHINGIDAE																														
Anhinga novaehollandiae	Australasian Darter								•	•																				•	
ARDEIDAE																														
Ardea alba	Great Egret	MG	S3																											•	
Ardea ibis	Cattle Egret	MG	S3									•																			
Ardea modesta	Eastern Great Egret	MG	S3						•			•																			
Ardea pacifica	White-necked Heron								•			•																•		•	
Egretta garzetta	Little Egret								•																					•	
Egretta sacra	Eastern Reef Egret								•			•																			
Butorides striatus	Striated Heron											•																		•	
Egretta novaehollandiae	White-faced Heron						•		•	•								•				•					•			•	
Nycticorax caledonicus	Nankeen Night Heron								•																					•	
CICONIIDAE																														
Ephippiorhynchus asiaticus australis	Black-necked Stork				NT				•	•		•																		•	•
ACCIPITRIDAE																														

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Turner River Camp Expansion (ecologia 2008)	RGP5 Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp &Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																					
Accipiter cirrhocephalus	Collared Sparrowhawk						•			•														•				•	
Accipiter fasciatus	Brown Goshawk								•	•										•					•			•	
Aquila audax	Wedge-tailed Eagle						•			•	•														•			•	•
Circus assimilis	Spotted Harrier						•			•		•													•			•	•
Circus approximans	Swamp Harrier						•			•		•																	
Elanus axillaris	Black-shouldered Kite								•	•														•	•			•	•
Haliaeetus leucogaster	White-bellied Sea-eagle	MI	S3						•			•			•														
Haliastur indus	Brahminy Kite								•			•																•	
Haliastur sphenurus	Whistling Kite						•			•		•			•		•			•				•	•			•	•
Hamirostra isura	Square-tailed Kite						•			•																•			
Hamirostra melanonsternon	Black-breasted Buzzard									•																		•	
Hieraaetus morphnoides	Little Eagle								•	•		•														•		•	•
Lophoictinia isura	Square-tailed Kite								•																				
Milvus migrans	Black Kite						•			•	•	•																•	•
Pandion haliaetus	Eastern Osprey											•																	
FALCONIDAE																														
Falco berigora	Brown Falcon						•			•	•	•								•				•	•			•	
Falco cenchroides	Nankeen Kestrel						•			•	•	•			•					•				•	•			•	
Falco hypoleucos	Grey Falcon			P4	NT					•															•				
Falco longipennis	Australian Hobby						•			•		•																•	
Falco peregrinus	Peregrine Falcon		S4				•		•	•																		•	
BURHINIDAE																														
Burhinus grallarius	Bush Stone-curlew			P4	NT		•			•	•	•								•					•			•	
HAEMATOPODIDAE																														
Haematopus fuliginosus	Sooty Oystercatcher								•			•																	
Haematopus longirostris	Pied Oystercatcher								•																			•	
OTIDIDAE																														
Ardeotis australis	Australian Bustard			P4	NT		•			•	•	•								•					•			•	
CHARADRIIDAE																														
Charadrius ruficapillus	Red-capped Plover											•																•	
Charadrius veredus	Oriental Plover	MG									•																		

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Turner River Camp Expansion (ecologia 2008)	RGP5 Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp &Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																				
Erythrogonys cinctus	Red-kneed Dotterel								•			•																•	
Elseyornis melanops	Black-fronted Dotterel						•		•	•		•									•					•		•	•
Pluvialis squatarola	Grey Plover								•			•																	
Vanellus tricolor	Banded Lapwing											•																	
SCOLOPACIDAE																													
Arenaria interpres	Ruddy Turnstone								•			•																	
Calidris ruficollis	Red-necked Stint											•																	
Limosa lapponica	Bar-tailed Godwit								•			•																	
Numenius phaeopus	Whimbrel								•			•																•	
Numenius madagascariensis	Eastern Curlew	MI	S3	P4	VU				•																			•	
Tringa brevipes	Grey-tailed tattler								•			•																•	
Tringa hypoleucos	Common Sandpiper																											•	
Tringa glareola	Wood Sandpiper	MI	S3						•																	•			
Tringa nebularia	Common Greenshank	MI	S3						•																				•
LARIDAE																													
Chlidonias hybrida	Whiskered Tern																												•
Chlidonias leucopterus	White-winged Black Tern	MG	S3						•																				
Gelochelidon nilotica	Gull-billed Tern								•																				
Larus novaehollandiae	Silver Gull								•			•																•	
Larus pacificus	Pacific Gull								•																				
Hydroprogne caspia	Caspian Tern	MG	S3						•			•																•	
Hydroprogne nilotica affinis	Gull-billed Tern											•																•	•
Thalasseus bergii	Crested Gull								•																			•	
RECURVIROSTRIDAE																													
Cladorhynchus leucocephalus	Banded Stilt											•																	
Himantopus himantopus leucocephalus	Black-winged Stilt								•	•		•					•										•	•	•
Recurvirostra novaehollidae	Red-necked Avocet								•																				
TURNICIDAE																													
Turnix velox	Little Button-quail						•			•										•					•		•	•
CINCLOSOMATIDAE																													
Cinclosoma castaneothorax	Chestnut-breasted Quail-thrush						•			•																			

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Turner River Camp Expansion (ecologia 2008)	RGP5 Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp &Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																					
CACATUIDAE																														
Eolophus roseicapillus	Galah						•		•	•	•	•													•	•			•	•
Cacatua sanguinea	Little Corella						•			•	•	•									•			•	•			•	•
Nymphicus hollandicus	Cockatiel						•			•		•									•				•			•	•
PSITTACIDAE																														
Barnardius zonarius	Australian Ringneck						•		•			•													•	•			•	•
Melopsittacus undulatus	Budgerigar						•			•		•		•							•			•	•			•	
CUCULIDAE																														
Centropus phasianinus highami	Pheasant Coucal																									•			•	•
Chrysococcyx basalis	Horsfield's Bronze Cuckoo						•		•	•	•	•														•			•	•
Chrysococcyx osculans	Black-eared Cuckoo																												•	
Cacomantis pallidus	Pallid Cuckoo								•	•																•			•	•
STRIGIDAE																														
Ninox novaeseelandiae	Southern Boobook								•	•																•			•	•
TYTONIDAE																														
Tyto alba	Barn Owl						•	•																						
Tyto javanica	Eastern Barn Owl								•																	•				
HALCYONIDAE																														
Dacelo leachii	Blue-winged Kookaburra								•	•		•								•						•			•	•
Todiramphus chloris	Collared Kingfisher								•																					
Todiramphus pyrrhopygia	Red-backed Kingfisher						•		•	•	•	•													•	•			•	•
Todiramphus sanctus	Sacred Kingfisher								•	•		•														•			•	•
MEROPIDAE																														
Merops ornatus	Rainbow Bee-eater	MG	S3				•			•	•	•													•	•			•	•
MALURIDAE																														
Amytornis striatus	Striated Grasswren						•																		•					•
Malurus lamberti assimilis	Variegated Fairy-wren						•			•	•	•		•											•	•			•	
Malurus leucopterus	White-winged Fairy-wren						•			•	•	•			•		•			•					•	•			•	
Stipiturus ruficeps ruficeps	Rufous-crowned Emu-wren						•			•																			•	•
PARDALOTIDAE																														
Acanthiza apicalis	Broad-tailed Thornbill								•																	•			•	

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Turner River Camp Expansion (ecologia 2008)	RGP5 Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp &Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																					
Acanthiza robustirostris	Slaty-backed Thornbill									•																•			•	
Acanthiza uropygialis	Chestnut-rumped Thornbill						•			•																•			•	
Gerygone fusca	Western Gerygone						•		•																	•			•	
Gergoyne tenebrosa	Dusky Gergoyne																												•	
Pardalotus rubricatus	Red-browed Pardalote						•			•		•								•				•	•			•	
Pardalotus striatus	Striated Pardalote						•																			•				
Smicrornis brevirostris	Weebill						•			•														•	•			•	
THRESKIOMITHIDAE																														
Threskiornis molucca	Australian White Ibis								•																				•	
Threskiornis spinicollis	Straw-necked Ibis								•			•									•							•	•
MELIPHAGIDAE																														
Acanthagenys rufogularis	Spiny-cheeked Honeyeater						•			•														•		•			•	
Certhionyx niger	Black Honeyeater									•											•								•	•
Certhionyx variegates	Pied Honeyeater																													•
Epthianura tricolor	Crimson Chat						•			•															•	•			•	•
Conopophila whitei	Grey Honeyeater																									•				
Lichenostomus keartlandi	Grey-headed Honeyeater						•																		•	•			•	•
Lichenostomus penicillatus	White-plumed Honeyeater						•			•	•	•									•		•	•	•			•	•
Lichenostomus plumulus	Grey-fronted Honeyeater						•																							
Lichenostomus virescens	Singing Honeyeater						•			•	•	•		•	•					•	•		•	•	•			•	•
Lichmera indistincta	Brown Honeyeater						•			•		•								•	•		•		•			•	
Manorina flavigula	Yellow-throated Miner						•			•	•	•		•						•	•			•	•			•	•
Melithreptus gularis	Black-chinned Honeyeater						•																		•				•
POMATOSTOMIDAE																														
Pomatostomus superciliosus	White-browed Babbler									•															•			•	
Pomatostomus temporalis	Grey-crowned Babbler						•																		•			•	•
NEOSITTIDAE																														
Daphoenositta chrysoptera	Varied Sittella									•																				
CAMPEPHAGIDAE																														
Coracina maxima	Ground Cuckoo-shrike																								•	•				
Coracina novaehollandiae	Black-faced Cuckoo-shrike						•			•	•	•			•					•			•	•	•			•	

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Turner River Camp Expansion (ecologia 2008)	RGP5 Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp &Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																					
Lalage sueurii	White-winged Triller						•		•	•		•													•			•	•
PACHYCEPHALIDAE																														
Colluricincla harmonica	Grey Shrike-thrush						•					•													•	•			•	•
Oreoica gutturalis	Crested Bellbird						•			•							•									•			•	•
Pachycephala lanioides	White-breasted Whistler											•																		
Pachycephala melanura melanura	Mangrove Golden Whistler																												•	
Pachycephala rufiventris	Rufous Whistler						•			•	•															•	•			•	
ARTAMIDAE																														
Artamus cinereus	Black-faced Woodswallow						•			•	•	•		•			•								•	•			•	•
Artamus leucorynchus	White-breasted Woodswallow								•			•			•														•	
Artamus minor	Little Woodswallow						•																		•	•			•	•
Artamus personatus	Masked Woodswallow						•			•																			•	•
Cracticus nigrogularis	Pied Butcherbird						•			•		•					•			•					•	•			•	
Cracticus torquatus	Grey Butcherbird								•	•																	•			•	
Cracticus tibicen	Australian Magpie						•			•																•	•			•	•
DICRURIDAE																														
Grallina cyanoleuca	Magpie-lark						•			•	•	•			•					•					•	•			•	•
Rhipidura albicauda	White-tailed Fantail																												•	
Rhipidura phasiana	Mangrove Grey Fantail																												•	
Rhipidura leucophrys	Willie Wagtail						•			•	•	•					•			•	•		•	•	•	•			•	•
CORVIDAE																														
Corvus bennetti	Little Crow								•														•			•			•	
Corvus orru	Torresian Crow						•			•	•	•								•					•	•			•	
PETROICIDAE																														
Eopsaltria pulverulenta	Mangrove Robin																												•	
Melanodryas cucullata	Hooded Robin						•		•	•															•	•			•	
Petroica goodenovii	Red-capped Robin						•			•															•	•			•	
ALAUDIDAE																														
Mirafra javanica	Horsfield's Bushlark						•	•		•	•				•					•					•	•			•	
ACROCEPHALIDAE																														
Acrocephalus australis	Australian Reed-Warbler								•																	•			•	

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Turner River Camp Expansion (ecologia 2008)	RGP5 Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp &Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																					
MEGALURIDAE																														
Cincloramphus cruralis	Brown Songlark						•			•		•																	•	
Cincloramphus mathewsi	Rufous Songlark						•			•		•															•		•	
Eremiornis carteri	Spinifexbird						•			•	•	•								•				•	•			•	
TIMALIIDAE																														
Zosterops luteus	Yellow White-eye								•			•																	•	
CLIMACTERIDAE																														
Climacteris melanura	Black-tailed Treecreeper								•																					
HIRUNDINIDAE																														
Cheramoeca leucosterna	White-backed Swallow											•												•					
Hirundo ariel	Fairy Martin						•		•	•	•	•					•								•	•		•	•
Hirundo nigricans	Tree Martin						•		•			•														•		•	•
Hirundo neoxena	Welcome Swallow								•																	•				
NECTARINIDAE																														
Dicaeum hirundinaceum	Mistletoebird							•																	•			•	•
ESTRILIDIDAE																														
Heteromunia pectoralis	Pictorella Mannikin			P4																										•
PASSERIDAE																														
Emblema pictum	Painted Finch						•													•	•				•			•	•
Neochmia ruficauda	Star Finch			P4	NT		•																		•				
Taeniopygia guttata	Zebra Finch						•				•	•	•	•	•					•	•		•		•	•		•	•	•
Taeniopygia guttata castanotis							•																							
** Passer montanus*	Eurasian Tree Sparrow											•																		
PTILONORHYNCHIDAE																														
Ptilonorhynchus guttatus	Western Bowerbird								•																•	•			•	•
MOTACILLIDAE																														
Anthus novaeseelandiae	Richard's Pipit						•		•		•									•					•	•			•	

Database search codes: I) DEC NatureMap; II) WA Museum; III) Bird Atlas Australia
Conservation status codes as per Appendix A.
**signifies introduced species*

Reptiles

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Fauna Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Fauna Survey Turner River Camp Expansion (ecologia 2008)	RGP5 Fauna Survey Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp and Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																				
CHELIDAE																													
Chelodina steindachneri	Flat-shelled Turtle						•			•																		•	•
AGAMIDAE																													
Amphibolurus longirostris	Long-nosed Dragon						•				•	•			•		•	•	•		•					•			•
Caimanops amphiboluroides	Mulga Dragon							•		•																•		•	
Ctenophorus caudicinctus	Ring-tailed Dragon						•			•	•	•	•				•		•	•	•			•	•		•	•	•
Ctenophorus isolepis	Military Dragon						•			•	•	•		•			•			•	•		•		•			•	•
Ctenophorus nuchalis	Central Netted Dragon						•				•	•								•					•			•	•
Ctenophorus reticulates	Western Netted Dragon						•																		•			•	
Diporiphora valens	Pilbara Two-lined Dragon							•																				•	
Diporiphora sp.																													•
Diporiphora winneckei	Blue-lined Dragon																												•
Lophognathus longirostris							•			•															•			•	
Pogona minor	Dwarf Bearded Dragon						•	•			•															•			•	•
Typanocryptis cephala	Pebble Dragon						•	•		•																			
GEKKONIDAE																													
Diplodactylus conspicillatus	Fat-tailed Gecko						•			•	•																	•	
Diplodactylus galaxius																													•
Diplodactylus mitchelli								•																					•
Diplodactylus pulcher																													•
Diplodactylus savagei							•																			•			
Lucasium stenodactylum	Pale-snouted Ground Gecko						•			•																•		•	•
Lucasium wombeyi	Pilbara Ground Gecko						•			•																•			•
Gehyra pilbara	Pilbara Dtella						•																						
Gehyra punctata	Spotted Dtella						•			•	•	•		•			•					•			•	•		•	•
Gehyra purpurascens							•																						
Gehyra variegata	Tree Dtella						•					•		•								•			•	•		•	•
Heteronotia binoei	Bynoe's Gecko						•			•		•												•		•		•	•
Heteronotia spelea	Desert Cave Gecko							•																		•		•	

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Fauna Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Fauna Survey Turner River Camp Expansion (ecologia 2008)	RGP5 Fauna Survey Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp and Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																				
Nephurus levis pilbarensis							•	•		•																			
Nephrurus wheeleri cinctus	Banded Knob-tailed Gecko						•																			•		•	•
Oedura marmorata	Marbled Velvet Gecko						•																			•		•	•
Rhynchoedura ornata	Beaked Gecko						•																			•		•	•
Strophurus ciliaris aberrans								•																				•	
Strophurus elderi	Jewelled Gecko						•			•																•		•	
Strophurus jeanae							•			•																			•
Strophurus wellingtonae	Spiny-tailed Gecko							•		•																•		•	•
PYGOPODIDAE																													
Delma elegans	Pilbara Elegant Delma							•		•																•			
Delma haroldi								•				•																•	
Delma nasuta	Long-nosed Delma						•			•																•			
Delma pax	Peace Delma						•			•												•				•		•	
Delma tincta	Excitable Delma						•			•																•		•	
Lialis burtonis	Burton's Snake Lizard						•			•																•		•	
Pygopus nigriceps	Western Hooded Scaly-Foot						•																			•		•	
SCINCIDAE																													
Carlia munda								•		•		•										•				•		•	
Carlia triacantha								•		•																		•	
Cryptoblepharus plagiocephalus																						•				•		•	
Cryptoblepharus buchananii								•																					
Cryptoblepharus ustulatus	Russet snake-eyed Skink						•																						
Ctenotus ariadnae								•		•																			
Ctenotus duricola	Pilbara Striped Ctenotus						•			•	•															•		•	
Ctenotus grandis							•	•		•																•		•	•
Ctenotus hanloni							•																						
Ctenotus helenae							•			•																•		•	•
Ctenotus leonhardii							•																						
Ctenotus nigrilineatus					P1		•																						•
Ctenotus pantherinus	Leopard Ctenotus						•	•		•	•	•					•			•		•				•			•

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Fauna Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Fauna Survey Turner River Camp Expansion (ecologia 2008)	RGP5 Fauna Survey Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp and Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																				
Ctenotus piankai							•																						
Ctenotus quattuordecimlineatus							•																						
Ctenotus robustus								•																					•
Ctenotus rubicundus	Pilbara Rock Ctenotus						•			•																	•		
Ctenotus rufescens								•																					
Ctenotus rutilans	Pilbara Rusty Ctenotus						•																						
Ctenotus saxatilis							•			•	•	•					•		•		•					•		•	•
Ctenotus schomburgkii							•			•																			
Ctenotus serventyi							•																						
Ctenotus uber								•																			•		•
Ctenotus uber johnstonei				P2			•			•																			
Cyclodomorphus melanops	Spinifex Slender Bluetongue						•	•		•																	•		•	
Egernia depressa	Pygmy Spiny Tailed Skink							•			•	•																	•	•
Egernia epsisolus	Spiny-tailed Skink																													•
Egernia formosa	Goldfields Crevice Skink							•																						
Egernia pilbarensis	Pilbara Skink							•																						
Egernia striata	Night Skink						•																							
Eremiascincus fasciolatus	Narrow banded Sand Swimmer						•																							
Eremiascincus musivus	Mosaic Desert Skink											•																		
Eremiascincus richardsonii								•																					•	
Lerista bipes							•			•		•																	•	•
Lerista clara							•																							
Lerista gerrardii							•																							
Lerista jacksoni							•																							
Lerista labialis							•																							
Lerista muelleri	Pilbara Litter Lerista						•			•																	•		•	•
Lerista verhmens							•																							
Lerista zietzi							•			•																				
Menetia greyii	Common Dwarf Skink						•			•																	•		•	
Menetia surda							•																							

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Fauna Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Fauna Survey Turner River Camp Expansion (ecologia 2008)	RGP5 Fauna Survey Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp and Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																					
Morethia ruficauda							•				•	•														•			•	•
Notoscincus ornatus							•	•																						
Proablepharus reginae								•		•												•				•			•	
Notoscincus ornatus ornatus										•																				
Tiliqua multifasciata							•			•																•			•	
VARANIDAE																														
Varanus acanthurus	Ridge-tailed Monitor						•			•		•				•						•			•	•			•	•
Varanus brevicauda	Short-tailed Monitor						•			•																				•	
Varanus bushi	Pilbara Mulga Monitor						•																			•				
Varanus caudolineatus	Stripe-tailed Monitor																									•				
Varanus eremius	Desert Pygmy Monitor						•			•	•						•									•			•	•
Varanus aff. *gilleni*																													•	
Varanus gouldii	Gould's Monitor							•		•							•												•	•
Varanus giganteus	Perentie						•															•							•	•
Varanus panoptes	Large-spotted Monitor						•			•											•	•			•	•			•	•
Varanus pilbarensis	Pilbara Rock Monitor							•																						•
Varanus tristis	Black-headed Monitor												•								•	•			•	•			•	
TYPHLOPIDAE																														
Ramphotyphlops ammodytes	Pilbara Blind Snake							•		•																•			•	
Ramphotyphlops ganei								•																						
Ramphotyphlops grypus	Black-tailed Blind Snake						•			•																•			•	
Ramphotyphlops hamatus	Northern Hooked Blind Snake						•																							
Ramphotyphlops pilbarensis								•																						
Ramphotyphlops waitii								•																						
PYTHONIDAE																														
Antaresia perthensis	Pygmy Python							•		•																			•	•
Antaresia stimsoni stimsoni	Stimson's Python						•			•							•			•					•			•	•
Aspidites melanocephalus	Black-headed Python									•		•														•			•	•
Aspidites ramsayi	Woma						•					•																	•	
Liasis olivaceus barroni	Pilbara olive python																													•

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Fauna Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Fauna Survey Turner River Camp Expansion (ecologia 2008)	RGP5 Fauna Survey Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp and Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																				
ELAPIDAE																													
Acanthophis pyrrhus	Desert Death Adder																												•
Acanthophis wellsi	Pilbara Death Adder							•																	•			•	
Brachyurophis approximans	Shovel-nosed Snake						•			•															•				
Demansia rufescens	Rufous Whipsnake						•			•															•				
Demansia psammophis	Yellow-Faced Whipsnake						•																		•				•
Demansia psammophis cupreiceps								•		•																		•	
Furina ornata	Moon Snake						•			•		•																•	
Parasuta monachus	Hooded Snake						•																						•
Pseudechis australis	Mulga Snake						•			•															•			•	•
Pseudonaja modesta	Ringed Brown Snake							•																	•				
Pseudonaja mengdeni	Gwardar/Western Brown Snake							•				•													•			•	•
Simoselaps anomalus	Desert Banded Snake							•																				•	
Suta fasciata	Rosen's Snake							•		•																		•	•
Suta punctata								•		•																		•	•
Vermicella snelli	Pilbara Bandy Bandy						•																					•	

Database search codes: I) DEC NatureMap; II) WA Museum; III) Bird Atlas Australia
 # Species name no longer current. Conservation status codes as per Appendix A.

Amphibians

Scientific Name	Common Name	Conservation Status					Database Searches			FMG Stage A Fauna Survey (Biota 2004)	Mooka Siding Level 1/ Targeted Fauna Survey (Biologic 2010);	Port Hedland Regional Fauna Assessment (ENV 2011)	Rail Turner River Camp Level One Fauna Assessment (ENV 2008)	Rapid Growth Project 5: M270SA Fauna Assessment (ENV 2008)	RGP5 Fauna Survey Nelson Point to Bing Siding (ecologia 2009)	RGP5 Survey Northern Quoll Wider Area Survey (ecologia 2009)	RGP5 Fauna Survey Quarry 1 (ecologia 2008)	RGP5 Fauna Survey Quarry 2 (ecologia 2008)	RGP5 Fauna Survey Quarry 4 (ecologia 2008)	RGP5 Fauna Survey Turner River Camp Expansion (ecologia 2008)	RGP5 Survey Walla Siding to Turner Camp & Repeater 2 (ecologia 2008)	RGP5 Northern Quoll Monitoring (ecologia 2009)	RGP5 Quarry 6 Fauna Assessment (ENV 2008)	RGP5 Redmont/Cowra Camp and Borrow Areas Fauna Survey (ecologia 2007)	RGP5 Level 2 Fauna Survey Chichester Deviation (ecologia 2008)	RGP5 Northern Quoll Survey Quarry 1,2, 4 and East Turner River (ecologia 2008)	Yule River Level 1 Fauna Assessment (ENV 2008)	Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland- Vertebrate Fauna Survey (Biota 2002)	Current Survey
		EPBC	WCA	DEC	IUCN	Other	I	II	III																					
HYLIDAE																														
Cyclorana australis	Giant Frog						•			•																		•	•
Cyclorana maini	Sheep Frog						•			•																		•	•
Litoria caerulea	Green Tree Frog											•																	
Litoria rubella	Desert Tree frog						•			•		•														•		•	•
MYOBATRACHIDAE																														
Neobatrachus aquilonius	Northern Burrowing Frog							•																						
Neobatrachus sutor	Shoemaker Frog						•																							
Notaden nichollsi	Desert Spadefoot							•		•																		•	•
Uperoleia russelli	Russell's Toadlet							•		•																		•	•
Uperoleia glandulosa	Glandular Toadlet						•																						•
LIMNODYNASTIDAE																														
Platyplectrum spenceri	Centralian Burrowing Frog						•	•		•																		•	•

Database search codes: I) DEC NatureMap; II) WA Museum; III) Bird Atlas Australia

Appendix C Habitat assessment data

TRIP A																		
Unit ID	BioNomad1	BioNomad1	BioNomad1	Getac1	Getac1	Getac1	Getac123	Getac123	Getac123	Getac123	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	Getac1	BioNomad1	BioNomad1
Date	2/17/2012	2/18/2012	2/18/2012	2/17/2012	2/19/2012	2/19/2012	2/17/2012	2/19/2012	2/19/2012	2/22/2012	2/21/2012	2/21/2012	2/21/2012	2/21/2012	2/22/2012	2/22/2012	2/21/2012	2/22/2012
Recorder	M. O'Connell;	M. O'Connell;	M. O'Connell;	T. Rasmussen;	T. Rasmussen;	T. Rasmussen;		J. Turpin;	J. Turpin;	A. Griffiths;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	M. O'Connell;	M. O'Connell;
	50K 0706211 7554130 514.6 0.9	50K 0714205 7510274 432.4 1.1	50K 0710605 7513220 441.5 0.9	50K 0718858 7507859 426.5 0.8	50K 0706284 7523884 411.5 1.0	50K 0706285 7523582 409.1 1.0	50K 0721932 7508120 415.8 0.9	50K 0706120 7524260 410.6 1.1	50K 0708263 7565888 388.1 1.0	50K 0699447 7621174 275.2 1.0	50K 0695992 7589024 279.8 0.8	50K 0693262 7595478 256.1 1.1	50K 0695289 7607026 251.5 0.8	50K 0696418 7610659 269.4 1.0	50K 0697380 7612617 278.1 1.0	50K 0698545 7617658 265.1 1.0	50K 0694393 7606839 252.0 0.9	50K 0694708 7606730 -2.0 3.0
Slope	Very gently inclined	Level	Level	Level	Level	Level	Level	Level	Level	Level	Very gently inclined	Very gently inclined	Very gently inclined	Very gently inclined	Very gently inclined	Level	Level	Level
Relative inclination of slope	Waxing	Not required for flats	Not required for flats				Not required for flats		Not required for flats	Not required for flats	Waning	Waning	Waning	Maximal	Maximal	Not required for flats	Not required for flats	Not required for flats
Morphology	Flat	Flat	Flat				Flat	Flat	Open depression	Flat	Hillock	Open depression	Flat	Simple slope	Flat	Flat	Open depression	Crest
Landform	Plain	Plain	Plain	Plain	Plain	Plain	Plain		Plain	Plain	Rock platform	Channel	Channel	Plain	Terrace plain	Plain	Channel	Embankment
Landform comments							sand plain			slight minimal incline over last few hundred metres.								
Disturbance	Heavy grazing by hoofed mammals; Limited clearing;	No disturbance;	Light grazing by hoofed mammals; Limited clearing;	No disturbance;			No disturbance;	Light grazing by hoofed mammals;	Light grazing by hoofed mammals;	Light grazing by hoofed mammals;	Light grazing by hoofed mammals; Limited clearing;	Light grazing by hoofed mammals;	Heavy grazing by hoofed mammals;	Light grazing by hoofed mammals; Fire damage (5-10 years ago);	Light grazing by hoofed mammals; Fire damage (5-10 years ago);	Light grazing by hoofed mammals; Fire damage (5-10 years ago);	Heavy grazing by hoofed mammals;	Light grazing by hoofed mammals;
Vegetation condition	Mature phase	Mature phase	Uneven age	Advanced regeneration			Mature phase		Advanced regeneration	Mature phase	Mature phase	Mature phase	Mature phase	Advanced regeneration	Advanced regeneration	Advanced regeneration	Mature phase	Mature phase
Leaf litter	0-2%	0-2%	0-2%	0-2%			2-10%		2-10%	0-2%	2-10%	2-10%	0-2%	0-2%	0-2%	2-10%	0-2%	0-2%
Wood litter	0-2%	2-10%	2-10%	0-2%			2-10%		0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	2-10%
Dead stags				2					2	3	1	5	6				4	1
Hollow bearing Trees							1					20	24				7	
Broad floristic formation	open tussock grass	triodia open hummock	tri open hummock	Spinifex grassland					spinexln		acacia / spinifex	euc vitrix / melaleuca drainage	euc vitrix melaleuca	spinifex grassland	spinifex sandplain	a\acia tumida drzinage	melaleuca open low trees	triodia open hummock
Tree structure Tall									None	None								
Tree structure Mid							Isolated trees			Isolated trees		Open woodland	Woodland					
Tree structure Low			Isolated clumps of trees	Isolated trees			Isolated trees		Isolated trees	Isolated trees					Isolated trees		Open woodland	
Shrub structure Tall				Isolated shrubs						isolated clumps of shrubs								
Shrub structure Mid		Sparse shrubland	Sparse shrubland	None			Isolated shrubs			isolated clumps of shrubs		Open shrubland	Sparse shrubland	Sparse shrubland	Isolated shrubs	Open shrubland		
Shrub structure Low		Isolated shrubs	Isolated shrubs	Isolated shrubs			Isolated shrubs		Sparse shrubland	Isolated shrubs	isolated clumps of shrubs							
Grass structure Tall										None								
Grass structure Mid	Open grassland	Open grassland	Open grassland	Grassland			Grassland			Open grassland	Sparse grassland	Isolated clumps of grasses	Open grassland	Open grassland	Open grassland	Open grassland		Open grassland
Grass structure Low				Grassland			Isolated grasses		Grassland	Open grassland	Grassland			Open grassland			Isolated clumps of grasses	
Dominant tree species			cor ham	Corymbia sp			euc & corymbia		hakea	acacia inequilatera		euc vitrix / melaleuca	euc vitrix melaleuca	hakea	acacia inequalatera		melal	
Dominant shrub species		hak lor	aca pruino	Hakea sp			hakea & acacia		acacia		acacia tumida	acacia	acacia citrino	acacia inequalatera	acacia inequalatera	acacia tumida		acacia sp
Dominant grass species	eulalia	tri	tri pun	Triodia sp			triodia		tiodia	trodia sp	triodia pungens	buffel	buffel	triodia pungens	triodia hummock	mixed		triodia sp
Dominant herb species	-many																	
Herb Cover	2-10%		0-2%				0-2%		2-10%	0-2%		0-2%		0-2%		0-2%	2-10%	
Microrelief	Gilgai microrelief	No microrelief	No microrelief	No microrelief			No microrelief		No microrelief	Biotic microrelief	No microrelief	No microrelief	No microrelief		No microrelief	No microrelief	No microrelief	No microrelief
Sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion			No sheet erosion		Minor sheet erosion	No sheet erosion	Minor sheet erosion	Minor sheet erosion	Minor sheet erosion		Minor sheet erosion	Minor sheet erosion	Moderate sheet erosion	No sheet erosion

Rill erosion	Minor rill erosion	Minor rill erosion	Minor rill erosion	No rill erosion			No rill erosion		Minor rill erosion		No rill erosion	Minor rill erosion	No rill erosion		Minor rill erosion	No rill erosion	Moderate rill erosion	Minor rill erosion
Gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion			No gully erosion		Minor gully erosion		No gully erosion	Moderate gully erosion	Minor gully erosion		No gully erosion	No gully erosion	Minor gully erosion	No gully erosion
Gully depth	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies					<1.5m			<1.5m	<1.5m				1.5-3.0 m	N/A No gullies
Water bodies	nil	nil	nil									small waterbodies in creek	small seasonal pools				large pools for some part of the year	seasonal
Soil texture	Silty clay loam	Sand	Sand	Sandy loam			Sandy loam		Sand		Sandy clay loam	Sand	Sand	Sand	Sand	Clay loam	Course Sand	Sand
Soil colour	Brown	Red	Red	Orange			Brown		Pale		Pale	Pale		Orange	Orange	Brown	Grey	Orange
Soil strength	Firm	Very weak	Very weak	Very weak			Weak		Loose		Strong	Weak		Weak	Weak	Firm	Very weak	Very weak
Soil comments																		
Existence of substrate form	Course fragments (Boulders, etc);	Course fragments (Boulders, etc);	Course fragments (Boulders, etc);	Course fragments (Boulders, etc);			No surface exposure;		No surface exposure;		Vertical exposure (Outcropping); Course fragments (Boulders, etc);	Vertical exposure (Outcropping);	Vertical exposure (Outcropping);	Vertical exposure (Outcropping);	No surface exposure;	No surface exposure;	No surface exposure;	Vertical exposure (Outcropping); Course fragments (Boulders, etc);
Abundance of coarse fragments	Moderate or many	Very slightly or very few	Very slightly or very few	Slight or few			No coarse fragments		Very slightly or very few		Extremely or very abundant	Slight or few	Slight or few	Slight or few	Slight or few	Very slightly or very few	No coarse fragments	Very or abundant
Size of course fragments	Stony or stones	Coarse gravelly or large pebbles	Medium gravelly or large pebbles	Fine gravelly or small pebbles;					Coarse gravelly or large pebbles		Large boulders	Fine gravelly or small pebbles	Cobbly or cobbles	Coarse gravelly or large pebbles	Medium gravelly or large pebbles	Medium gravelly or large pebbles		Large boulders
Abundance of rockoutcrop	No rock outcrop	No rock outcrop	No rock outcrop				No rock outcrop		No rock outcrop		Rockland	Very slightly rocky	Very slightly rocky	Very slightly rocky	No rock outcrop	No rock outcrop	No rock outcrop	Rocky
Rock type	basalt	ironstone	ironstone											granite			quartz, calcrete	granite
Geology comments																	boulder piles nearby	
TRIP A (CONTD.)																		
Unit ID	BioNomad1	Getac1	Getac1	Getac1	JeffsPDA	Getac123	Getac123	Getac123	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	Getac123	Getac3	Getac1	BioNomad1
Date	2/22/2012	2/24/2012	2/24/2012	2/24/2012	2/26/2012	2/24/2012	2/24/2012	2/25/2012	2/27/2012	2/27/2012	2/27/2012	2/27/2012	2/27/2012	2/28/2012	2/27/2012	2/27/2012	2/28/2012	2/17/2012
Recorder	M. O'Connell;	B. Maryan;	B. Maryan;	B. Maryan;	J. Turpin;	A. Griffiths; R. Loyd;	A. Griffiths; R. Loyd;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	R. Loyd;	M. O'Connell;
	50K 0698160 7617463 272.2 0.9	50K 0707282 7560938 436.6 1.3	50K 0705299 7559399 459.1 1.5	50K 0706264 7560105 435.0 1.0	50K 0674852 7688796 109.2 0.8	50K 0705246 7560226 465.1 1.5	50K 0704169 7560262 483.2 1.2	50K 0675427 7685539 154.4 0.9	50K 0700375 7622441 263.8 1.1	50K 0700320 7625184 259.7 0.8	50K 0700483 7625992 248.4 0.8	50K 0699949 7629959 227.1 0.9	50K 0695042 7638366 207.9 0.8	50K 0694316 7637393 217.2 0.9	50K 0696517 7636097 214.2 1.8	50K 0699924 7629931 230.9 0.9	50K 0689153 7659897 158.6 1.0	50K 0706211 7554130 514.6 0.9
Slope	Level	Very steep			Level	Cliffed	Cliffed	Steep	Very gently inclined		Very gently inclined		Level		Very gently inclined	Level	Level	
Relative inclination of slope	Not required for flats	Maximal	Maximal	Maximal	Not required for flats	Waning	Waning	Maximal	Waning		Not required for flats		Not required for flats		Maximal	Not required for flats	Not required for flats	
Morphology	Flat	Open depression	Open depression	Open depression	Flat	Simple slope	Simple slope	Hillock	Lower slope		Flat		Flat		Flat	Flat	Flat	
Landform	Plain	Gully	Gully	Gully	Plain	Cliff	Cliff	Hillcrest	Plain		Plain		Plain		Plain	Plain	Plain	Plain
Landform comments	sandy, some patches of gravel	gorge with flowing water	rockpools in gorge			cliff/talus/gorge & riverbed			good sandplain suitable for mulgara				sandy stony plain undulating		spinifex stony undulating plain	spinifex gravely plain		
Disturbance	Light grazing by hoofed mammals;	Light grazing by hoofed mammals;		Light grazing by hoofed mammals;	Light grazing by hoofed mammals;	No disturbance;	No disturbance;	Light grazing by hoofed mammals;	Light grazing by hoofed mammals; Fire damage (5-10 years ago);		Light grazing by hoofed mammals; Fire damage (5-10 years ago);		Light grazing by hoofed mammals; Fire damage (5-10 years ago);		Light grazing by hoofed mammals; Fire damage (5-10 years ago);	Heavy grazing by hoofed mammals; Fire damage (5-10 years ago);	No disturbance;	Heavy grazing by hoofed mammals; Limited clearing;
Vegetation condition	Uneven age	Mature phase	Mature phase	Advanced regeneration	Mature phase	Mature phase	Mature phase	Mature phase	Advanced regeneration		Advanced regeneration		Uneven age		Advanced regeneration	Uneven age		
Leaf litter	0-2%	2-10%	0-2%	2-10%	0-2%	0-2%	2-10%	0-2%	0-2%		2-10%		0-2%		0-2%	0-2%	0-2%	0-2%
Wood litter	2-10%	10-30%	0-2%	2-10%	0-2%	0-2%	0-2%	0-2%	0-2%		0-2%		0-2%		0-2%	0-2%	0-2%	0-2%
Dead stags	2	5	2	2		5		1										
Hollow bearing Trees		8		8		1	1											
Broad floristic formation	tri mod dense hummocks	victrix watercourse	victrix and figs	eucalypt woodland	triodia secunda / pungens			a. tumda	triodia hummock		triodia hummock		triodia hummock		triodia secunda plain	trodia secunda hummock grasland	acacia spinifex sandplain	open tussock grass
Tree structure Tall			Isolated trees	Open woodland		Isolated trees	None										None	
Tree structure Mid	Isolated trees	Open woodland				Isolated trees	Isolated clumps of trees										None	
Tree structure Low	Isolated trees					None	Isolated trees										None	

Shrub structure Tall		Open shrubland	Isolated shrubs	Open shrubland		None	None									None	
Shrub structure Mid	Isolated shrubs				Isolated shrubs	Isolated shrubs	Isolated shrubs		Isolated shrubs		Isolated shrubs		Isolated shrubs		Isolated shrubs		None	
Shrub structure Low	Isolated shrubs				Isolated shrubs	isolated clumps of shrubs	Isolated shrubs	isolated clumps of shrubs	Isolated shrubs		Sparse shrubland		isolated clumps of shrubs		Isolated shrubs	Isolated shrubs	Sparse shrubland	
Grass structure Tall		Open grassland	Isolated clumps of grasses	Open grassland		None	None											
Grass structure Mid	Grassland				Grassland	Isolated grasses	Open grassland		Open grassland		Open grassland		Open grassland			Open grassland		
Grass structure Low					Grassland	Sparse grassland	Isolated clumps of grasses	Isolated clumps of grasses	Open grassland		Open grassland		Open grassland		Grassland	Open grassland	Open grassland	
Dominant tree species		victrix	victrix and figs	vlctrix		eucalyptus vitrix	E. vitrix, snakewood and bloodwoods									none		
Dominant shrub species	acacia, hakea, grev	acacia			acacia inequalatera	mixed acacia	mixed acacia spp	a tmida	acacia		acacia inequalatera		mixed acacia		acacia inequalatera	acacia	mixed acacia	
Dominant grass species	triodia	sedges			triodia pungens	mixed grass spp	mixed grasses and sedges	triodia	triodia hummock		triodia pungens		triodia pungens / secunda		triodia secunda	triodia secunda	triodia	
Dominant herb species						mixed herb spp	mixed herbs and bidans											
Herb Cover		0-2%			0-2%	2-10%	2-10%	0-2%			0-2%							
Vegetation Comments			good pop habitat		spinifex sandplain													
Microrelief	No microrelief				No microrelief		No microrelief	No microrelief	No microrelief		No microrelief		No microrelief		No microrelief	No microrelief	No microrelief	
Sheet erosion	No sheet erosion					No sheet erosion	No sheet erosion		No sheet erosion		Minor sheet erosion		No sheet erosion		No sheet erosion	No sheet erosion	No sheet erosion	
Rill erosion	Minor rill erosion					No rill erosion	No rill erosion		No rill erosion		No rill erosion		No rill erosion		No rill erosion	Minor rill erosion	No rill erosion	
Gully erosion	No gully erosion					No gully erosion	No gully erosion		No gully erosion		No gully erosion				No gully erosion	Minor gully erosion	No gully erosion	
Gully depth	N/A No gullies					<1.5m	<1.5m									<1.5m	N/A No gullies	
Water bodies	nil				seasonal on flats	dry river bed	ephemeral and slowly flowing stream.	several seasonal rock holes								seasonal in drainage		
Soil texture	Sand					Silty loam	Clayey sand		Sand		Sand		Sandy loam		Course Sand	Sand	Sandy loam	Silty clay loam
Soil colour	Orange					Brown	Brown		Orange		Orange		Orange		Pale	Pale	Orange	Brown
Soil strength	Very weak					Weak	Weak		Weak		Weak				Weak	Weak	Firm	
Soil comments							varies from gravelly sand in creek bed to clayey sand amongst cliff.											
Existence of substrate form	No surface exposure;				No surface exposure;	Vertical exposure (Outcropping); Course fragments (Boulders, etc);	Vertical exposure (Outcropping); Course fragments (Boulders, etc);	Vertical exposure (Outcropping); Course fragments (Boulders, etc);	No surface exposure;		No surface exposure;		No surface exposure;			No surface exposure;	No surface exposure;	
Abundance of coarse fragments	Very slightly or very few				Very slightly or very few	Very or abundant	Very or abundant	Very or abundant	Very slightly or very few		No coarse fragments		Moderate or many		Very or abundant	Slight or few	Slight or few	
Size of course fragments	Medium gravelly or large pebbles				Fine gravelly or small pebbles	Bouldery or boulders	Bouldery or boulders	Bouldery or boulders	Fine gravelly or small pebbles				Coarse gravelly or large pebbles		Medium gravelly or large pebbles	Coarse gravelly or large pebbles	Coarse gravelly or large pebbles	
Abundance of rockoutcrop	No rock outcrop				No rock outcrop	Very rocky	Very rocky	Rockland	No rock outcrop				No rock outcrop		No rock outcrop		No rock outcrop	
Rock type	granite					basalt	iron stone	granite										basalt
TRIP A (CONTD.)																		
Unit ID	BioNomad1	BioNomad1	Getac1	Getac1	Getac1	Getac123	Getac123	Getac123	Getac123	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	Getac1	BioNomad1	BioNomad1	BioNomad1
Date	2/18/2012	2/18/2012	2/17/2012	2/19/2012	2/19/2012	2/17/2012	2/19/2012	2/19/2012	2/22/2012	2/21/2012	2/21/2012	2/21/2012	2/21/2012	2/22/2012	2/22/2012	2/21/2012	2/22/2012	2/22/2012
Recorder	M. O'Connell;	M. O'Connell;	T. Rasmussen;	T. Rasmussen;	T. Rasmussen;		J. Turpin;	J. Turpin;	A. Griffiths;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	M. O'Connell;	M. O'Connell;	M. O'Connell;
	50K 0714205 7510274 432.4 1.1	50K 0710605 7513220 441.5 0.9	50K 0718858 7507859 426.5 0.8	50K 0706284 7523884 411.5 1.0	50K 0706285 7523582 409.1 1.0	50K 0721932 7508120 415.8 0.9	50K 0706120 7524260 410.6 1.1	50K 0708263 7565888 388.1 1.0	50K 0699447 7621174 275.2 1.0	50K 0695992 7589024 279.8 0.8	50K 0693262 7595478 256.1 1.1	50K 0695289 7607026 251.5 0.8	50K 0696418 7610659 269.4 1.0	50K 0697380 7612617 278.1 1.0	50K 0698545 7617658 265.1 1.0	50K 0694393 7606839 252.0 0.9	50K 0694708 7606730 -2.0 3.0	50K 0698160 7617463 272.2 0.9
Morphology																		

Landform	Plain	Plain	Plain	Plain	Plain	Plain		Plain	Plain	Rock platform	Channel	Channel	Plain	Terrace plain	Plain	Channel	Embankment	Plain
Disturbance	No disturbance;	Light grazing by hoofed mammals; Limited clearing;	No disturbance;			No disturbance;	Light grazing by hoofed mammals;	Light grazing by hoofed mammals;	Light grazing by hoofed mammals;	Light grazing by hoofed mammals; Limited clearing;	Light grazing by hoofed mammals;	Heavy grazing by hoofed mammals;	Light grazing by hoofed mammals; Fire damage (5-10 years ago);	Light grazing by hoofed mammals; Fire damage (5-10 years ago);	Light grazing by hoofed mammals; Fire damage (5-10 years ago);	Heavy grazing by hoofed mammals;	Light grazing by hoofed mammals;	Light grazing by hoofed mammals;
Leaf litter	0-2%	0-2%	0-2%			2-10%		2-10%	0-2%	2-10%	2-10%	0-2%	0-2%	0-2%	2-10%	0-2%	0-2%	0-2%
Wood litter	2-10%	2-10%	0-2%			2-10%		0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	2-10%	2-10%
Dead stags																		
Broad floristic formation	triodia open hummock	tri open hummock	Spinifex grassland					spinexln		acacia / spinifex	euc vitrix / melaleuca drainage	euc vitrix melaleuca	spinifex grassland	spinifex sandplain	a\acia tumida drzinage	melaleuca open low trees	triodia open hummock	tri mod dense hummocks
Soil texture	Sand	Sand	Sandy loam			Sandy loam		Sand		Sandy clay loam	Sand	Sand	Sand	Sand	Clay loam	Course Sand	Sand	Sand
Soil colour	Red	Red	Orange			Brown		Pale		Pale	Pale		Orange	Orange	Brown	Grey	Orange	Orange
Rock type	ironstone	ironstone											granite			quartz, calcrete	granite	granite

TRIP A (CONTD.)

Unit ID	Getac1	Getac1	Getac1	JeffsPDA	Getac123	Getac123	Getac123	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	Getac123	Getac3	Getac1
Date	2/24/2012	2/24/2012	2/24/2012	2/26/2012	2/24/2012	2/24/2012	2/25/2012	2/27/2012	2/27/2012	2/27/2012	2/27/2012	2/27/2012	2/28/2012	2/27/2012	2/27/2012	2/28/2012
Recorder	B. Maryan;	B. Maryan;	B. Maryan;	J. Turpin;	A. Griffiths; R. Loyd;	A. Griffiths; R. Loyd;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	R. Loyd;
	50K 0707282 7560938 436.6 1.3	50K 0705299 7559399 459.1 1.5	50K 0706264 7560105 435.0 1.0	50K 0674852 7688796 109.2 0.8	50K 0705246 7560226 465.1 1.5	50K 0704169 7560262 483.2 1.2	50K 0675427 7685539 154.4 0.9	50K 0700375 7622441 263.8 1.1	50K 0700320 7625184 259.7 0.8	50K 0700483 7625992 248.4 0.8	50K 0699949 7629959 227.1 0.9	50K 0695042 7638366 207.9 0.8	50K 0694316 7637393 217.2 0.9	50K 0696517 7636097 214.2 1.8	50K 0699924 7629931 230.9 0.9	50K 0689153 7659897 158.6 1.0
Landform	Gully	Gully	Gully	Plain	Cliff	Cliff	Hillcrest	Plain		Plain		Plain		Plain	Plain	Plain
Landform comments																
Disturbance	Light grazing by hoofed mammals;		Light grazing by hoofed mammals;	Light grazing by hoofed mammals;	No disturbance;	No disturbance;	Light grazing by hoofed mammals;	Light grazing by hoofed mammals; Fire damage (5-10 years ago);		Light grazing by hoofed mammals; Fire damage (5-10 years ago);		Light grazing by hoofed mammals; Fire damage (5-10 years ago);		Light grazing by hoofed mammals; Fire damage (5-10 years ago);	Heavy grazing by hoofed mammals; Fire damage (5-10 years ago);	No disturbance;
Leaf litter	2-10%	0-2%	2-10%	0-2%	0-2%	2-10%	0-2%	0-2%		2-10%		0-2%		0-2%	0-2%	0-2%
Wood litter	10-30%	0-2%	2-10%	0-2%	0-2%	0-2%	0-2%	0-2%		0-2%		0-2%		0-2%	0-2%	0-2%
Broad floristic formation	victrix watercourse	victrix and figs	eucalypt woodland	triodia secunda / pungens			a. tumda	triodia hummock		triodia hummock		triodia hummock		triodia secunda plain	trodia secunda hummock grasland	acacia spinifex sandplain
Soil texture					Silty loam	Clayey sand		Sand		Sand		Sandy loam		Course Sand	Sand	Sandy loam
Soil colour					Brown	Brown		Orange		Orange		Orange		Pale	Pale	Orange
Rock type					basalt	iron stone	granite									

TRIP B

Unit ID	Getac123	Getac123	Getac1	Getac3	Getac3	Getac3	Getac3	Getac3	Getac3	Getac3	Getac3	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA
Date	3/11/2012	3/11/2012	3/15/2012	3/9/2012	3/9/2012	3/10/2012	3/10/2012	3/13/2012	3/14/2012	3/14/2012	3/14/2012	9/1/2007	9/1/2007	3/9/2012	3/10/2012	3/10/2012	3/10/2012	3/11/2012
Recorder	R. Loyd;	R. Loyd;	R. Loyd;	A. Griffiths;	A. Griffiths;	A. Griffiths;	A. Griffiths;	J. Turpin;	B. Maryan;	B. Maryan;	B. Maryan;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;
	50K 0674154 7693415 94.3 0.8	50K 0674033 7697334 74.7 1.0	50K 0670566 7741775 12.2 0.9	50K 0691060 7658820 162.8 0.9	50K 0686576 7665303 144.1 1.0	50K 0682403 7670085 134.3 1.1	50K 0679447 7675492 116.5 0.8	50K 0674956 7699597 74.9 0.9	50K 0674090 7709870 61.1 1.1	50K 0673864 7713703 53.9 0.9	50K 0673669 7717413 49.1 1.0	50K 0694781 7640429 199.7 0.8	50K 0695096 7640924 193.7 0.9	50K 0689603 7661272 157.6 1.0	50K 0683935 7668685 135.7 0.8	50K 0683336 7669408 132.4 0.8	50K 0679083 7676621 126.8 1.0	50K 0677283 7679417 124.6 0.8
Slope	Level	Level	Gently inclined	Level	Level	Gently inclined	Cliffed	Level	Level		Level	Very gently inclined		Level	Very gently inclined	Level	Very gently inclined	Level
Relative inclination of slope	Not required for flats	Not required for flats	Minimal		Not required for flats	Maximal	Maximal	Not required for flats	Minimal	Minimal	Minimal	Waning		Not required for flats	Waning	Not required for flats	Waning	Not required for flats
Morphology	Flat	Flat	Simple slope	Flat	Flat	Mid-slope	Ridge	Flat	Flat	Flat	Flat	Flat		Flat	Flat	Flat	Simple slope	Flat
Landform	Plain	Plain	Dune	Plain	Plain	Bank	Cliff	Plain	Plain	Plain	Plain	Plain		Plain	Plain	Plain	Plain	Plain
Landform comments						beside drainage line	granite ridge adjacent to water body	"spinife sandpl n										
Disturbance	Fire damage (less than 1 year ago);	Limited clearing;	Limited clearing;	Light grazing by hoofed mammals;	Light grazing by hoofed mammals; Fire damage (5-10 years ago);	Light grazing by hoofed mammals; Fire damage (more than 10 years ago);	Light grazing by hoofed mammals;	Light grazing by hoofed mammals; Fire damage (more than 10 years ago);	Light grazing by hoofed mammals;		Light grazing by hoofed mammals;	Light grazing by hoofed mammals; Fire damage (5-10 years ago);		Light grazing by hoofed mammals; Fire damage (1-5 years ago);	Light grazing by hoofed mammals; Fire damage (1-5 years ago);	Heavy grazing by hoofed mammals; Fire damage (1-5 years ago);	Light grazing by hoofed mammals;	Light grazing by hoofed mammals; Fire damage (5-10 years ago);
Vegetation condition	Early regeneration	Mature phase	Mature phase	Mature phase	Advanced regeneration	Mature phase	Mature phase	Mature phase	Uneven age	Mature phase	Mature phase	Advanced regeneration		Early regeneration	Advanced regeneration	Advanced regeneration	Mature phase	Advanced regeneration
Leaf litter	0-2%	0-2%	2-10%	2-10%	0-2%	2-10%	0-2%	2-10%	0-2%	0-2%	0-2%	0-2%		0-2%	0-2%	0-2%	0-2%	0-2%
Wood litter	0-2%	0-2%	2-10%	0-2%	0-2%	2-10%	2-10%	0-2%	0-2%	0-2%	0-2%	0-2%		0-2%	0-2%	0-2%	0-2%	0-2%
Dead stags				3		1	2								5			

Hollow bearing Trees						1	1								6			
Broad floristic formation				triodia with sparse shrubs and medium trees	low triodia with low, sparse mixed shrubs	tall trees along bed, triodia with sparse shrubs beyond	melaleuca forest fringing drainage line	spinifex sandplain	triodia sandplain with sparse shrubs	triodia plain with sparse shrubs	triodia plain with sparse shrubs	triodia hummock		triodia pungens hummock grssslanf	corymbia hammerslyana / corymbia aspera drainage	melaleuca drainage	triodia hummock	triodia pungens hummock grassland
Tree structure Tall			None	Isolated trees	None	Isolated clumps of trees	Isolated trees		None	None	None							
Tree structure Mid			None	Isolated clumps of trees	Isolated trees	Isolated clumps of trees	Open woodland				None				Open woodland	Woodland		
Tree structure Low	Open woodland		None	Isolated clumps of trees	Isolated trees	Isolated trees	Woodland				None	Isolated trees			Open woodland	Woodland		
Shrub structure Tall			None	Isolated shrubs	isolated clumps of shrubs	Isolated shrubs	Isolated shrubs		Sparse shrubland	Sparse shrubland	isolated clumps of shrubs							
Shrub structure Mid		Sparse shrubland	None	isolated clumps of shrubs	isolated clumps of shrubs	isolated clumps of shrubs	Open shrubland	Isolated shrubs		Open shrubland	None	Isolated shrubs		Isolated shrubs	Sparse shrubland	Open shrubland	Open shrubland	Isolated shrubs
Shrub structure Low	Isolated shrubs	Isolated shrubs	isolated clumps of shrubs	isolated clumps of shrubs	isolated clumps of shrubs	isolated clumps of shrubs	Sparse shrubland	Sparse shrubland		Sparse shrubland	Isolated shrubs	Isolated shrubs		Isolated shrubs	Open shrubland	Open shrubland	Open shrubland	Isolated shrubs
Grass structure Tall			None	None	None	None	None		Grassland	Grassland	Isolated grasses							
Grass structure Mid		Grassland	Grassland	Open grassland	None	Sparse grassland	Sparse grassland	Open grassland			None	Open grassland		Sparse grassland	Sparse grassland	Open grassland	Sparse grassland	Sparse grassland
Grass structure Low	Open grassland		None	Open grassland	Open grassland	Open grassland	Sparse grassland	Open grassland			None	Open grassland		Sparse grassland	Sparse grassland	Open grassland	Grassland	Open grassland
Dominant tree species	twin leaf bloodwood			eucalyptus sp	eucalypt sp	river redgum and melaleuca	melaleuca argentia					corymbia hammerslyana			corymbia hammerslyana	melaleuca		
Dominant shrub species	acacia	mixed acacia	acacia	mixed accacia spp	acacia spp	acacia and grevilles spp	acacia spp	aca ia			acacia	grevillia wickhamii		hakea caudo	pet lab	acacia	acacia	acacia inequalatera
Dominant grass species	triodia	triodia	triodia (feathertop)	triodia spp	triodia sp	triodia sp	triodia. typha fringing water	triodia	triodia	triodia	triodia	triodia pungens		triodia pungens	triodia pungens	sedge	triodia hummock	triodia pungens
Dominant herb species	mixed		mixed	mixed herbs	mixed	mixed herbs	mixed											
Herb Cover	2-10%	0-2%	10-30%	2-10%	2-10%	2-10%	0-2%			0-2%		0-2%		0-2%		0-2%	0-2%	0-2%
Vegetation Comments									low stony rises evident									
Microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief					No microrelief		No microrelief	No microrelief	No microrelief	No microrelief	No microrelief
Sheet erosion	No sheet erosion	Minor sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion					Minor sheet erosion		No sheet erosion	No sheet erosion	Minor sheet erosion	Minor sheet erosion	No sheet erosion
Rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	Minor rill erosion	No rill erosion					No rill erosion		No rill erosion	Minor rill erosion	No rill erosion	No rill erosion	No rill erosion
Gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	Moderate gully erosion					No gully erosion		No gully erosion	No gully erosion	Minor gully erosion	No gully erosion	No gully erosion
Gully depth	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	>3m									<1.5m	N/A No gullies	
Water bodies						dry drainage line	500m long											
Soil texture	Course Sand	Sandy loam	Sand	Sand	Course Sand	Loamy sand	Loamy sand	Clayey sand				Loamy sand		Sand	Loamy sand	Loamy sand	Sand	Loamy sand
Soil colour	Orange	Brown	Orange	Red	Red	Brown	Brown					Orange		Red	Pale	Pale	Red	Orange
Soil strength	Weak	Firm	Weak	Weak	Very weak	Weak	Loose					Weak		Weak	Weak	Weak	Weak	Weak
Existence of substrate form	No surface exposure;	No surface exposure;	No surface exposure;	No surface exposure;	No surface exposure;		Vertical exposure (Outcropping); Course fragments (Boulders, etc);	No surface exposure;				No surface exposure;		No surface exposure;	No surface exposure;	No surface exposure;	Vertical exposure (Outcropping); Course fragments (Boulders, etc);	No surface exposure;
Abundance of coarse fragments	No coarse fragments	No coarse fragments	No coarse fragments	Very slightly or very few	No coarse fragments	Very or abundant	Very or abundant	Very slightly or very few				Common		Slight or few	Common	Slight or few	Extremely or very abundant	Very slightly or very few
Size of course fragments				Fine gravelly or small pebbles		Coarse gravelly or large pebbles	Large boulders					Medium gravelly or large pebbles		Medium gravelly or large pebbles	Medium gravelly or large pebbles	Medium gravelly or large pebbles	Cobbly or cobbles	Fine gravelly or small pebbles
Abundance of rockoutcrop	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop	Very rocky					No rock outcrop		No rock outcrop	No rock outcrop	No rock outcrop	Rockland	No rock outcrop
Rock type						mixed	granite										granite outcrop	
TRIP B (CONTD.)																		
Unit ID	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	JeffsPDA	BioNomad1	BioNomad1	BioNomad1	BioNomad1	BioNomad1	BioNomad1	BioNomad1	BioNomad1	BioNomad1	BioNomad1
Date	3/11/2012	3/11/2012	3/12/2012	3/12/2012	3/12/2012	3/13/2012	3/13/2012	3/15/2012	3/9/2012	3/9/2012	3/9/2012	3/10/2012	3/10/2012	3/10/2012	3/11/2012	3/12/2012	3/12/2012	3/12/2012
Recorder	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	J. Turpin;	R. Loyd;	R. Loyd;	R. Loyd;	R. Loyd;	R. Loyd;	R. Loyd;	T. Rasmussen;	R. Loyd;	R. Loyd;	R. Loyd;

	50K 0676512 7682004 119.1 1.0	50K 0675540 7685500 137.8 11841.3	50K 0675790 7688853 130.9 1.0	50K 0675558 7693195 86.6 1.0	50K 0673427 7695615 0.0 11841.0	50K 0674762 7702949 81.5 0.8	50K 0674834 7706786 71.3 0.9	50K 0671700 7742910 22.9 0.9	50K 0685902 7663698 160.8 0.9	50K 0681608 7669451 138.3 0.9	50K 0676408 7677915 113.6 1.2	50K 0675859 7680756 123.7 1.1	50K 0673883 7685367 102.1 1.0	50K 0674689 7689610 105.2 1.3	50K 0674641 7692229 104.5 1.0	50K 0673938 7700954 71.9 0.9	50K 0673646 7703699 57.0 1.0	50K 0674047 7705770 63.9 1.3
Slope	Level	Moderately inclined	Moderately inclined	Level	Moderately inclined	Very steep	Very gently inclined	Level	Gently inclined	Level	Level	Level	Very gently inclined	Level	Moderately inclined	Level	Very gently inclined	Level
Relative inclination of slope	Not required for flats	Maximal	Waning	Not required for flats	Waning	Maximal	Waning	Not required for flats		Not required for flats	Not required for flats	Not required for flats	Minimal	Not required for flats	Maximal	Not required for flats	Minimal	Not required for flats
Morphology	Flat	Simple slope	Hillock	Flat	Hillock	Ridge	Flat	Flat	Simple slope	Flat	Flat	Flat	Flat	Flat	Ridge	Flat	Flat	Flat
Landform	Plain	Tor	Tor	Plain	Tor	Risecrest	Plain	Plain	Plain	Plain	Plain	Plain	Plain	Plain	Risecrest	Plain	Drainage depression	Plain
Landform comments		granite outcrop				iron stone ridge, many rock crevices	similar to mulgara burrow habitat											
Disturbance	Light grazing by hoofed mammals; Fire damage (more than 10 years ago);	Light grazing by hoofed mammals;	Light grazing by hoofed mammals;	Light grazing by hoofed mammals; Fire damage (1-5 years ago);	Light grazing by hoofed mammals;	Light grazing by hoofed mammals; Fire damage (5-10 years ago);	Light grazing by hoofed mammals; Fire damage (1-5 years ago);	No disturbance;	No disturbance;	No disturbance; Fire damage (1-5 years ago);	Fire damage (1-5 years ago);	Light grazing by hoofed mammals;	Light grazing by hoofed mammals; Fire damage (5-10 years ago);	No disturbance;	Fire damage (5-10 years ago);	Light grazing by hoofed mammals;	Light grazing by hoofed mammals;	Light grazing by hoofed mammals;
Vegetation condition	Mature phase	Mature phase	Mature phase	Early regeneration	Uneven age	Mature phase	Early regeneration	Mature phase	Mature phase	Mature phase	Uneven age	Mature phase	Mature phase		Advanced regeneration	Mature phase	Mature phase	Mature phase
Leaf litter	2-10%	2-10%	0-2%	0-2%	0-2%	2-10%	0-2%	2-10%	0-2%	0-2%	0-2%	0-2%	0-2%	2-10%	2-10%	0-2%	0-2%	0-2%
Wood litter	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	2-10%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%
Dead stags						2											1	
Hollow bearing Trees						1											1	
Broad floristic formation	triodia pungens hummock grassland	triodia hummock grassland surrounding outcrop	granite outcrop	triodia hummock grassland	granite outcrop	triodia pungens hummock grassland	triodia pungens hummock grassland	spinifex sandplain							Spinifex grassland			
Tree structure Tall																		None
Tree structure Mid		Isolated trees								Isolated trees	Isolated trees						Isolated clumps of trees	None
Tree structure Low		Isolated trees				Isolated trees			Isolated trees	Isolated trees	Isolated trees	Isolated clumps of trees					Isolated clumps of trees	None
Shrub structure Tall						None											None	None
Shrub structure Mid	Isolated shrubs	isolated clumps of shrubs	Isolated shrubs		Isolated shrubs	Isolated shrubs	Isolated shrubs		Sparse shrubland		Isolated shrubs		Isolated shrubs	Isolated shrubs	Sparse shrubland		isolated clumps of shrubs	None
Shrub structure Low	Isolated shrubs	Isolated shrubs	Isolated shrubs	Isolated shrubs	Isolated shrubs	Isolated shrubs	Isolated shrubs	Open shrubland	Isolated shrubs	Open shrubland	isolated clumps of shrubs	Isolated shrubs	Sparse shrubland	Sparse shrubland	Open shrubland	Isolated shrubs	Sparse shrubland	Open shrubland
Grass structure Tall																		None
Grass structure Mid	Grassland	Open grassland	Isolated grasses		Isolated grasses	Open grassland	Sparse grassland	Open grassland		Open grassland		Grassland		Grassland	Grassland	Grassland		Open grassland
Grass structure Low	Grassland	Sparse grassland	Isolated grasses	Open grassland	Isolated grasses	Open grassland	Sparse grassland	Grassland	Open grassland	Sparse grassland	Open grassland		Open grassland		Grassland		Open grassland	Isolated grasses
Dominant tree species	hakea	bauhinia looking thing				ficus			bloodwood	bloodwood	bloodwood	eucalypt					eucalypts	
Dominant shrub species	acacia stellaticeps	acacia	acacia tumida	acacia	acacia tumida	acacia inequalatera	acacia inequalatera	acacia stellaticeps	mixed acacia	mixed acacia	mixed acacia	acacia	acacia inequilatera	mixed acacia	Very varied, unknown spp.	acacia	acacia	mixed acacia
Dominant grass species	triodia pungens	triodia pungens	triodia pungens	triodia	triodia pungens	triodia pungens	triodia pungens	triodia sp	triodia	triodia	triodia	triodia	triodia	triodia	Triodia sp.	triodia	triodia	triodia
Dominant herb species								mixed		mixed herbs	mixed	mixed	mixed	mixed		unknown	none	none
Herb Cover	0-2%	0-2%	0-2%	0-2%	0-2%		0-2%	0-2%	0-2%	2-10%	2-10%	2-10%	2-10%	0-2%	0-2%	0-2%	0-2%	0-2%
Vegetation Comments																recent fire within 200m (patchy)		
Microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief
Sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	Minor sheet erosion	Minor sheet erosion	Minor sheet erosion
Rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	Minor rill erosion	No rill erosion
Gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	Minor gully erosion	No gully erosion	No gully erosion	Minor gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion
Gully depth		N/A No gullies						N/A No gullies	<1.5m	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies

Water bodies		seasonal in outcrop	seasonal rock pool		many seasonal rock pool	adjacent pool												ephemeral pools on small claypans
Soil texture	Loamy sand	Sand	Sand	Sand	Sandy loam	Sandy loam	Clayey sand	Sand	Sandy loam	Course Sand	Course Sand	Course Sand	Course Sand	Sandy loam	Sandy loam	Loamy sand	Sand	Clayey sand
Soil colour	Red	Red	Red	Orange	Brown		Brown	Orange	Orange	Brown	Orange	Yellow	Orange	Orange	Brown	Orange	Orange	Orange
Soil strength	Weak	Weak	Weak	Weak	Weak			Firm	Weak	Very weak	Very weak	Very weak	Very weak	Weak	Very weak	Weak	Very weak	Firm
Soil comments												cryptogram crust						
Existence of substrate form	No surface exposure;	Vertical exposure (Outcropping); Course fragments (Boulders, etc);	Vertical exposure (Outcropping); Course fragments (Boulders, etc);	No surface exposure;	Vertical exposure (Outcropping); Course fragments (Boulders, etc);	Vertical exposure (Outcropping); Course fragments (Boulders, etc);	No surface exposure;	No surface exposure;	Course fragments (Boulders, etc);	Course fragments (Boulders, etc);	No surface exposure;	No surface exposure;	No surface exposure;	No surface exposure;	Vertical exposure (Outcropping);	Course fragments (Boulders, etc);	No surface exposure;	Course fragments (Boulders, etc);
Abundance of coarse fragments	No coarse fragments	Common	Extremely or very abundant	No coarse fragments	Very slightly or very few	Very or abundant	Moderate or many	No coarse fragments	Very or abundant	Slight or few	No coarse fragments	No coarse fragments	No coarse fragments	No coarse fragments		Slight or few	No coarse fragments	Moderate or many
Size of course fragments	Fine gravelly or small pebbles	Coarse gravelly or large pebbles	Large boulders	Fine gravelly or small pebbles	Coarse gravelly or large pebbles	Bouldery or boulders	Medium gravelly or large pebbles		Coarse gravelly or large pebbles	Medium gravelly or large pebbles						Coarse gravelly or large pebbles		Fine gravelly or small pebbles
Abundance of rockoutcrop	No rock outcrop	Very rocky	Rockland	No rock outcrop	Rockland	Very rocky	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop	Rockland	No rock outcrop	No rock outcrop	No rock outcrop
Rock type		granite outcrop			granite outcrop	ironstone			quartz	quartz					Basalt	quartz		mixed quartz/calcrete
Geology comments												large boulder pile & domes nearby ~ 100m away						

TRIP B (CONTD.)

Unit ID	BioNomad1	BioNomad1	BioNomad1	BioNomad1	BioNomad1	BioNomad1	BioNomad1	BioNomad1	BioNomad1
Date	3/13/2012	3/13/2012	3/13/2012	3/13/2012	3/14/2012	3/14/2012	3/15/2012	3/15/2012	3/15/2012
Recorder	R. Loyd;	R. Loyd;	R. Loyd;	R. Loyd;	R. Loyd;	R. Loyd;	R. Loyd;	R. Loyd;	R. Loyd;
	50K 0673687 7712330 59.0 1.1	50K 0672684 7717535 46.2 1.2	50K 0672868 7714151 46.6 1.7	50K 0672805 7720931 65.2 1.9	50K 0672901 7724166 42.0 1.4	50K 0671384 7728866 24.5 0.9	50K 0670859 7733294 25.9 0.8	50K 0669308 7737476 6.9 0.9	50K 0670109 7734721 15.3 1.5
Slope	Level	Level	Level	Level	Level	Level	Level	Level	Level
Relative inclination of slope	Not required for flats	Not required for flats	Not required for flats	Not required for flats	Not required for flats	Not required for flats	Not required for flats	Not required for flats	Not required for flats
Morphology	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat
Landform	Plain	Plain	Plain	Plain	Plain	Plain	Plain	Plain	Plain
Landform comments									
Disturbance	Light grazing by hoofed mammals;	No disturbance;	Light grazing by hoofed mammals; Fire damage (less than 1 year ago);	Light grazing by hoofed mammals; Fire damage (1-5 years ago);	Light grazing by hoofed mammals; Limited clearing; Fire damage (1-5 years ago);	Fire damage (1-5 years ago);	Fire damage (1-5 years ago);	Fire damage (1-5 years ago);	Fire damage (1-5 years ago);
Vegetation condition	Mature phase	Mature phase	Early regeneration	Mature phase	Advanced regeneration	Advanced regeneration	Advanced regeneration	Uneven age	Advanced regeneration
Leaf litter	0-2%	0-2%	0-2%	2-10%	0-2%	0-2%	0-2%	2-10%	0-2%
Wood litter	0-2%	2-10%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%
Dead stags								4	
Hollow bearing Trees									
Broad floristic formation									
Tree structure Tall	None	None	None	None	None	None	None	Isolated trees	None
Tree structure Mid	None	None	None	None	None	Isolated trees	None	Open forest	None
Tree structure Low	None	None	None	None	None	None	None	Isolated trees	Isolated trees
Shrub structure Tall	None	None	None	None	None	None	None	None	None
Shrub structure Mid	isolated clumps of shrubs	Isolated shrubs	Isolated shrubs	Sparse shrubland	Sparse shrubland	Isolated shrubs	Isolated shrubs	None	Isolated shrubs
Shrub structure Low	Isolated shrubs	Open shrubland	Open shrubland	Open shrubland	Open shrubland	Sparse shrubland	Sparse shrubland	isolated clumps of shrubs	Sparse shrubland
Grass structure Tall	None		None	None	None	None	None	None	None

Grass structure Mid	None	Grassland	None	None	None	None	None	None	None
Grass structure Low	Grassland		Isolated clumps of grasses	Grassland	Open grassland	Open grassland	Open grassland	Grassland	Open grassland
Dominant tree species						bloodwood		vitrix	gammophila
Dominant shrub species	mixed acacia	mixed acacia & other low shrubs	acacia inequalatera	acacia inequilatera	acacia inequalatera	mixed acacia	mixed acacia	mixed acacia	mixed acacia
Dominant grass species	triodia	triodia	triodia	triodia	triodia	triodia & aristida	triodia	triodia	triodia
Dominant herb species	unknown	unknown	mixed	mixed	unknown	mixed	unknown		unknown
Herb Cover	2-10%	0-2%	10-30%	10-30%	10-30%	10-30%	2-10%	0-2%	0-2%
Vegetation Comments					extensive clearing towards the rail within 100m				
Microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief	No microrelief
Sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion
Rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion
Gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion
Gully depth	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies
Water bodies							ephemeral pools spread out through area	small ephemeral pools in broad area	small ephemeral pools in broad area
Soil texture	Loamy sand	Loamy sand	Loamy sand	Loamy sand	Course Sand	Loamy sand	Loamy sand	Loamy sand	Sand
Soil colour	Brown	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Soil strength	Weak	Weak	Weak	Weak	Very weak	Weak	Weak	Weak	Weak
Soil comments									
Existence of substrate form	Course fragments (Boulders, etc);	No surface exposure;	Course fragments (Boulders, etc);	No surface exposure;	No surface exposure;	No surface exposure;	No surface exposure;	No surface exposure;	No surface exposure;
Abundance of coarse fragments	Common	No coarse fragments	Very slightly or very few	No coarse fragments	No coarse fragments	No coarse fragments	Very slightly or very few	No coarse fragments	No coarse fragments
Size of course fragments	Medium gravelly or large pebbles		Fine gravelly or small pebbles				Medium gravelly or large pebbles		
Abundance of rockoutcrop	No rock outcrop	No rock outcrop	Very slightly rocky	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop
Rock type	quartz		granite						
Geology comments			only a few small granite boulders <1ft diameter						

TRIP C																		
Unit ID	Getac1	Getac1	Getac1	Getac1	Getac1	Getac1	Getac1	Getac1	Getac1	Getac1	Getac1	Getac1	Getac1	Getac1	Getac3	Getac123	Getac123	Getac123
Date	4/15/2012	4/15/2012	4/15/2012	4/15/2012	4/15/2012	4/17/2012	4/19/2012	4/21/2012	4/21/2012	4/21/2012	4/21/2012	4/22/2012	4/22/2012	4/24/2012	4/19/2012	4/15/2012	4/19/2012	4/19/2012
Recorder	M. Brown;	M. Brown;	B. Maryan;	M. Brown;	M. Brown;	M. Brown;	M. Brown;	M. Brown;	B. Maryan;	M. Brown;	B. Maryan;	M. Brown;	B. Maryan;	B. Maryan; M. Brown;	B. Maryan;	R. Loyd;	R. Loyd;	R. Loyd;
	50K 0698720 7584115 296.3 1.0	50K 0692631 7597377 260.6 1.0	50K 0694533 7603672 256.8 0.8	50K 0701167 7579661 345.1 0.9	50K 0704689 7574046 353.1 1.0	50K 0706780 7553684 526.5 0.9	50K 0705506 7557821 511.9 0.9	50K 0708890 7515803 427.5 0.8	50K 0706865 7519020 411.9 0.8	50K 0707795 7530998 411.2 0.9	50K 0708511 7537045 429.2 0.8	50K 0694363 7592273 276.9 0.8	50K 0692213 7645616 194.3 1.0	50K 0708835 7540561 435.7 0.9	50K 0707557 7530385 405.8 0.9	50K 0689894 7651317 177.3 1.1	50K 0709065 7545464 453.9 0.8	50K 0708290 7534581 425.8 0.9
Slope	Level	Level	Level	Moderately inclined	Moderately inclined	Very gently inclined	Gently inclined	Level	Level	Gently inclined	Level	Level	Very gently inclined	Level	Level	Level	Level	Moderately inclined
Relative inclination of slope	Not required for flats	Not required for flats	Minimal	Waxing	Waxing	Waxing	Waning	Not required for flats	Not required for flats	Waning	Not required for flats	Not required for flats	Minimal	Not required for flats	Not required for flats	Not required for flats	Not required for flats	Waning
Morphology	Flat	Open depression	Flat	Upper slope	Simple slope	Simple slope	Mid-slope	Flat	Flat	Mid-slope	Flat	Flat	Hillock	Flat	Flat	Open depression	Flat	Hillock
Landform	Plain	Valley flat	Plain	Hillcrest	Rock platform	Hillslope	Hillslope	Plain	Plain	Hillslope	Plain	Plain	Plain	Plain	Plain	Flood-out	Plain	Hillslope
Landform comments																some small mounds/hillocks		

Disturbance	Light grazing by hoofed mammals; Fire damage (5-10 years ago);	Fire damage (5-10 years ago);	Light grazing by hoofed mammals;	Limited clearing; Fire damage (5-10 years ago);	No disturbance;	Light grazing by hoofed mammals; Limited clearing; Fire damage (5-10 years ago);	Fire damage (5-10 years ago);	Light grazing by hoofed mammals; Limited clearing; Fire damage (5-10 years ago);	Light grazing by hoofed mammals;	Limited clearing; Fire damage (5-10 years ago);	Light grazing by hoofed mammals;	Limited clearing;	Light grazing by hoofed mammals;	Limited clearing;	Light grazing by hoofed mammals;	Heavy grazing by hoofed mammals; Limited clearing;	Light grazing by hoofed mammals; Fire damage (1-5 years ago);	Limited clearing;
Vegetation condition	Uneven age	Uneven age	Mature phase	Uneven age	Mature phase	Uneven age	Uneven age	Uneven age	Mature phase	Uneven age	Mature phase	Mature phase	Uneven age	Mature phase	Mature phase	Mature phase	Uneven age	Mature phase
Leaf litter	0-2%	0-2%	0-2%	2-10%	0-2%	2-10%	0-2%	2-10%	2-10%	10-30%	0-2%	0-2%	0-2%	2-10%	2-10%	0-2%	10-30%	2-10%
Wood litter	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	0-2%	10-30%	0-2%	2-10%	0-2%	0-2%	2-10%	2-10%	0-2%	10-30%	0-2%
Dead stags																	10	
Broad floristic formation	triodia plain	sparse shrubland	triodia plain	grassland	isolated grassland	grassland	grassland	open mulga	open mulga woodland with sparse shrubs and areas of triodia	grassland	open mulga woodland with sparse shrubs and grasses	grassland	open wattle over triodia with low granite exposures	open woodland	open mulga woodland with sparse shrubs			
Tree structure Tall	None	None	None	None	None				Open woodland		Open woodland			None	Open woodland	None	Isolated trees	None
Tree structure Mid	Isolated clumps of trees	None		None	None			Open woodland		Isolated clumps of trees						None	Isolated trees	Isolated trees
Tree structure Low	None	None		None	None			Isolated trees		Isolated trees				Open woodland		None	None	None
Shrub structure Tall	None	None	isolated clumps of shrubs	None	None				Sparse shrubland		Open shrubland		acacia sp.		Sparse shrubland	None	isolated clumps of shrubs	Sparse shrubland
Shrub structure Mid	Isolated shrubs	Sparse shrubland		Isolated shrubs	None		Isolated shrubs	Isolated shrubs						Sparse shrubland		None	Isolated shrubs	Open shrubland
Shrub structure Low	Isolated shrubs	Isolated shrubs		Isolated shrubs	None			isolated clumps of shrubs		isolated clumps of shrubs		Isolated shrubs				Isolated shrubs	Shrubland	Sparse shrubland
Grass structure Tall	None	None	Open grassland	None	None		Isolated grasses		Open grassland		Open grassland		triodia sp.		Isolated clumps of grasses	None	None	None
Grass structure Mid	Isolated clumps of grasses	None		Open grassland	Isolated clumps of grasses	Open grassland	Open grassland	Open grassland		Open grassland		Grassland		Sparse grassland		None	Isolated clumps of grasses	None
Grass structure Low	Grassland	Open grassland		Open grassland	Isolated grasses		Open grassland	Open grassland		Open grassland		Open grassland				Open grassland	Sparse grassland	Open grassland
Dominant tree species	corymbia hammersleyana							acacia annuera	mulga	corymbia sp.	mulga			mulga	acacia aneura		vitrix	bloodwood
Dominant shrub species	acacia sp.	a inequilateria	acacia	acacia sp.			gravilia sp.	prunacarpa	unknown sp.	acacia sp	acacia sp.	acacia sp	acacia spp.	acacia sp	acacia sp.	unknown	mulga & gidgee	gidgee & hakea
Dominant grass species	triodia sp.	triodia sp	triodia	triodia sp	triodia sp	unknown tussock grass		triodia sp.	triodia sp.	triodia sp	triodia sp. and other low grasses	triodia sp	triodia sp.	buffle	unknown species	triodia	triodia & themeda	triodia
Dominant herb species						unknown		unknown						unknown			mixed	
Herb Cover	0-2%	0-2%		0-2%	0-2%	30-70%	0-2%	2-10%				0-2%		0-2%		0-2%	0-2%	0-2%
Microrelief									Hummocky microrelief		Hummocky microrelief	No microrelief	Hummocky microrelief		No microrelief	No microrelief	No microrelief	No microrelief
Sheet erosion	Minor sheet erosion	No sheet erosion		No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	Minor sheet erosion	No sheet erosion	Minor sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	Moderate sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion
Rill erosion	No rill erosion	No rill erosion		No rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion	Minor rill erosion	No rill erosion	Minor rill erosion	No rill erosion	No rill erosion	Minor rill erosion	Moderate rill erosion	No rill erosion	No rill erosion	Minor rill erosion
Gully erosion	No gully erosion	No gully erosion		No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	No gully erosion	Minor gully erosion
Gully depth	N/A No gullies	N/A No gullies		N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies	N/A No gullies		N/A No gullies		N/A No gullies	<1.5m
Water bodies	n/a														nil	river with pools within 200m		
Soil texture	Course Sand	Sand		Fine sand	Course Sand	Clay loam	Sand	Fine sand	Sandy clay loam	Fine sand	Clay loam	Course Sand	Sandy loam	Loamy sand	Clay loam	Silty loam	Sandy clay loam	Clay loam
Soil colour	Pale	Red		Red	Red	Red	Red	Red	Red	Red	Red	Orange	Orange	Red	Red	Orange	Brown	Red
Soil strength	Very weak	Weak		Loose	Very weak	Firm	Weak	Very weak	Firm	Weak	Firm	Firm	Firm	Weak	Firm	Weak	Firm	Weak
Soil comments																		
Existence of substrate form	No surface exposure;	No surface exposure;		Course fragments (Boulders, etc);	Course fragments (Boulders, etc);		Course fragments (Boulders, etc);	No surface exposure;	No surface exposure;	Course fragments (Boulders, etc);	No surface exposure;	Course fragments (Boulders, etc);	Vertical exposure (Outcropping);	Course fragments (Boulders, etc);	No surface exposure;	No surface exposure;	No surface exposure;	Course fragments (Boulders, etc);
Abundance of coarse fragments	Very slightly or very few	Very slightly or very few		Moderate or many	Extremely or very abundant	Common	Common	No coarse fragments	Common	Common	Common	Common	Common	Common	Common	Slight or few	No coarse fragments	Very or abundant

Size of course fragments	Medium gravelly or large pebbles	Fine gravelly or small pebbles		Bouldery or boulders	Bouldery or boulders	Stony or stones	Cobbly or cobbles		Fine gravelly or small pebbles	Coarse gravelly or large pebbles	Fine gravelly or small pebbles	Medium gravelly or large pebbles	Stony or stones	Coarse gravelly or large pebbles	Coarse gravelly or large pebbles	Medium gravelly or large pebbles		Coarse gravelly or large pebbles
Abundance of rockoutcrop	No rock outcrop	No rock outcrop		Slightly rocky	Rockland	No rock outcrop	Very slightly rocky		No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop	Very slightly rocky	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop	No rock outcrop
Rock type				granite	granite	unknown	ironstone			ironstone		unknown	granite			quartz		quartz

TRIP C (CONTD.)

Unit ID	Getac123	Getac123	Getac123	Getac123
Date	4/19/2012	4/21/2012	4/21/2012	4/22/2012
Recorder	R. Loyd;	R. Loyd;	R. Loyd;	R. Loyd;
	50K 0707116 7527237 412.5 1.1	50K 0708638 7549380 471.0 0.9	50K 0708904 7531103 416.3 0.9	50K 0706236 7570575 355.4 0.8
Slope	Level	Level	Level	Level
Relative inclination of slope	Not required for flats	Not required for flats	Not required for flats	Not required for flats
Morphology	Open depression	Lower slope	Flat	Flat
Landform	Flood-out	Stream channel	Plain	Plain
Disturbance	Light grazing by hoofed mammals;	Light grazing by hoofed mammals; Limited clearing;	Light grazing by hoofed mammals; Limited clearing;	No disturbance;
Vegetation condition	Mature phase	Advanced regeneration	Mature phase	Mature phase
Leaf litter	0-2%	2-10%	2-10%	0-2%
Wood litter	0-2%	2-10%	2-10%	0-2%
Dead stags		2		
Hollow bearing Trees		2		
Tree structure Tall	None	Isolated clumps of trees	None	None
Tree structure Mid	None	Isolated clumps of trees	None	Isolated trees
Tree structure Low	None	Isolated clumps of trees	None	None
Shrub structure Tall	None	None	Isolated shrubs	None
Shrub structure Mid	None	isolated clumps of shrubs	Open shrubland	isolated clumps of shrubs
Shrub structure Low	Closed shrubland	Isolated shrubs	Sparse shrubland	Sparse shrubland
Grass structure Tall	None	None	None	None
Grass structure Mid	None	Closed grassland	None	Grassland
Grass structure Low	Isolated clumps of grasses	Grassland	Isolated clumps of grasses	Isolated clumps of grasses
Dominant tree species		river red		eucalyptus spp
Dominant shrub species	samphire	mixed acacia	mulga & horse mulga	mixed acacia
Dominant grass species	unknown	ulalia?? & triodia	aristida	triodia
Dominant herb species		unknown	unknown	unknown
Herb Cover	0-2%	2-10%	2-10%	0-2%
Microrelief	Gilgai microrelief	No microrelief	No microrelief	No microrelief
Sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion	No sheet erosion
Rill erosion	No rill erosion	No rill erosion	No rill erosion	No rill erosion
Gully erosion	No gully erosion	Minor gully erosion	No gully erosion	No gully erosion
Gully depth	N/A No gullies	<1.5m	N/A No gullies	N/A No gullies

Water bodies		small ephemeral pool in stream	bore close by		
Soil texture	Clayey sand	Clay loam	Clayey sand	Course Sand	
Soil colour	Brown	Brown	Orange	Orange	
Soil strength	Very weak	Very firm	Very weak	Very weak	
Soil comments					
Existence of substrate form	No surface exposure;	Vertical exposure (Outcropping); Course fragments (Boulders, etc);	Course fragments (Boulders, etc);	Course fragments (Boulders, etc);	
Abundance of coarse fragments	No coarse fragments	Common	Very or abundant	Moderate or many	
Size of course fragments		Stony or stones	Medium gravelly or large pebbles	Medium gravelly or large pebbles	
Abundance of rockoutcrop	No rock outcrop	Slightly rocky	No rock outcrop		
Rock type		ironstone	gibber type rock		

Appendix D Survey site locations

Survey Type	Zone	Easting	Northing	Survey/ Remarks
Opportunistic Survey Sites				
Opportunistic 1	50K	698694	7630917	Current Survey (Trip C)
Opportunistic 2	50K	706756	7553687	Current Survey (Trip C)
Opportunistic 3	50K	706774	7553694	Current Survey (Trip C)
Opportunistic 4	50K	708715	7540007	Current Survey (Trip C)
Opportunistic 5	50K	708751	7539996	Current Survey (Trip C)
Opportunistic 6	50K	707670	7530340	Current Survey (Trip C)
Opportunistic 7	50K	707296	7560923	Current Survey (Trip C)
Opportunistic 8	50K	707670	7530341	Current Survey (Trip C)
Opportunistic 9	50K	706900	7527338	Current Survey (Trip C)
Opportunistic 10	50K	684326	7666904	Current Survey (Trip C)
Opportunistic 11	50K	674700	7703013	Current Survey (Trip C)
Opportunistic 12	50K	674726	7685563	Current Survey (Trip C)
Opportunistic 13	50K	706748	7553695	Current Survey (Trip C)
Opportunistic 14	50K	708613	7537001	Current Survey (Trip C)
Opportunistic 15	50K	708617	7537008	Current Survey (Trip C)
Opportunistic 16	50K	707405	7564548	Current Survey (Trip C)
Opportunistic 17	50K	707409	7564551	Current Survey (Trip C)
Opportunistic 18	50K	694677	7606858	Current Survey (Trip C)
Opportunistic 19	50K	697384	7588389	Current Survey (Trip C)
Opportunistic 20	50K	699803	7581551	Current Survey (Trip C)
Opportunistic 21	50K	708772	7540378	Current Survey (Trip C)
Opportunistic 22	50K	708772	7540380	Current Survey (Trip C)
Opportunistic 23	50K	673985	7708125	Current Survey (Trip C)
Opportunistic 24	50K	688236	7661887	Current Survey (Trip C)
Opportunistic 25	50K	694092	7640661	Current Survey (Trip C)
Opportunistic 26	50K	690400	7658911	Current Survey (Trip C)
Opportunistic 27	50K	669790	7738329	Current Survey (Trip C)
Opportunistic 28	50K	706103	7554421	Current Survey (Trip C)
Opportunistic 29	50K	708835	7540561	Current Survey (Trip C)
Opportunistic 30	50K	709072	7540635	Current Survey (Trip C)
Opportunistic 31	50K	709073	7540634	Current Survey (Trip C)
Opportunistic 32	50K	706740	7553678	Current Survey (Trip C)
Opportunistic 33	50K	705802	7560159	Current Survey (Trip C)
Opportunistic 34	50K	707760	7566536	Current Survey (Trip C)
Opportunistic 35	50K	708618	7539342	Current Survey (Trip C)
Opportunistic 36	50K	706910	7527389	Current Survey (Trip C)
Opportunistic 37	50K	706899	7527338	Current Survey (Trip C)
Opportunistic 38	50K	707391	7552916	Current Survey (Trip C)
Opportunistic 39	50K	707046	7561267	Current Survey (Trip C)
Opportunistic 40	50K	709134	7540629	Current Survey (Trip C)
Opportunistic 41	50K	714202	7511309	Current Survey (Trip C)
Opportunistic 42	50K	695145	7608284	Current Survey (Trip C)
Opportunistic 43	50K	674920	7694181	Current Survey (Trip C)
Opportunistic 44	50K	655360	7736888	Port Hedland Regional Fauna (ENV, 2011)
Opportunistic 45	50K	658707	7724593	Port Hedland Regional Fauna (ENV, 2011)
Opportunistic 46	50K	664954	7721725	Port Hedland Regional Fauna (ENV, 2011)
Opportunistic 47	50K	673179	7722559	Port Hedland Regional Fauna (ENV, 2011)
Opportunistic 48	50K	665098	7736949	Port Hedland Regional Fauna (ENV, 2011)
Opportunistic 49	50K	665497	7732240	Port Hedland Regional Fauna (ENV, 2011)
Opportunistic 50	50K	670105	7739483	Port Hedland Regional Fauna (ENV, 2011)
Opportunistic 51	50K	675810	7722738	Port Hedland Regional Fauna (ENV, 2011)
Opportunistic 52	50K	675797	7737510	Port Hedland Regional Fauna (ENV, 2011)
Opportunistic 53	50K	661483	7747701	Port Hedland Regional Fauna (ENV, 2011)
Opportunistic 54	50K	659124	7747711	Port Hedland Regional Fauna (ENV, 2011)
Opportunistic 55	50K	669230	7744302	Rail RGP5 Nelson Point to Bing Siding (ecologia, 2009)
Opportunistic 56	50K	667161	7744635	Rail RGP5 Nelson Point to Bing Siding (ecologia, 2009)
Opportunistic 57	50K	665510	7745372	Rail RGP5 Nelson Point to Bing Siding (ecologia, 2009)
Opportunistic 58	50K	671026	7742889	Rail RGP5 Nelson Point to Bing Siding (ecologia, 2009)
Opportunistic 59	50K	671148	7743332	Rail RGP5 Nelson Point to Bing Siding (ecologia, 2009)

Survey Type	Zone	Easting	Northing	Survey/ Remarks
Opportunistic 60	50K	671676	7744458	Rail RGP5 Nelson Point to Bing Siding (ecologia, 2009)
Opportunistic 61	50K	672122	7746238	Rail RGP5 Nelson Point to Bing Siding (ecologia, 2009)
Opportunistic 62	50K	670736	7747488	Rail RGP5 Nelson Point to Bing Siding (ecologia, 2009)
Opportunistic 63	50K	670446	7748428	Rail RGP5 Nelson Point to Bing Siding (ecologia, 2009)
Opportunistic 64	50K	670422	7749029	Rail RGP5 Nelson Point to Bing Siding (ecologia, 2009)
Opportunistic 65	50K	706136	7525887	Rail RGP5 Redmont Cowra Camp & Borrow Areas (ecologia, 2007)
Opportunistic 66	50K	707050	7526746	Rail RGP5 Redmont Cowra Camp & Borrow Areas (ecologia, 2007)
Opportunistic 67	50K	708256	7566511	Rail RGP5 Redmont Cowra Camp & Borrow Areas (ecologia, 2007)
Opportunistic 68	50K	718900	7498675	Rail RGP5 Redmont Cowra Camp & Borrow Areas (ecologia, 2007)
Opportunistic 69	50K	718800	7498450	Rail RGP5 Redmont Cowra Camp & Borrow Areas (ecologia, 2007)
Opportunistic 70	50K	715900	7497440	Rail RGP5 Redmont Cowra Camp & Borrow Areas (ecologia, 2007)
Opportunistic 71	50K	716050	7497300	Rail RGP5 Redmont Cowra Camp & Borrow Areas (ecologia, 2007)
Opportunistic 72	50K	714080	7495325	Rail RGP5 Redmont Cowra Camp & Borrow Areas (ecologia, 2007)
Opportunistic 73	50K	707253	7553727	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Opportunistic 74	50K	707597	7552209	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Opportunistic 75	50K	707857	7551887	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Opportunistic 76	50K	708528	7550935	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Opportunistic 77	50K	707376	7548659	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Opportunistic 78	50K	703049	7543264	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Bat Recorder Locations				
Bat Recorder Location 1	50K	695011	7606920	Current Survey (Trip A)
Bat Recorder Location 2	50K	709076	7544370	Current Survey (Trip A)
Bat Recorder Location 3	50K	701778	7578573	Current Survey (Trip A)
Bat Recorder Location 4	50K	699986	7631191	Current Survey (Trip A)
Bat Recorder Location 5	50K	706912	7527414	Current Survey (Trip A)
Bat Recorder Location 6	50K	696226	7588888	Current Survey (Trip A)
Bat Recorder Location 7	50K	706265	7554232	Current Survey (Trip A)
Bat Recorder Location 8	50K	703801	7559088	Current Survey (Trip A)
Bat Recorder Location 9	50K	701777	7578571	Current Survey (Trip A)
Bat Recorder Location 10	50K	699983	7631195	Current Survey (Trip A)
Bat Recorder Location 11	50K	707255	7560913	Current Survey (Trip A)
Bat Recorder Location 12	50K	705306	7559442	Current Survey (Trip A)
Bat Recorder Location 13	50K	675505	7686533	Current Survey (Trip A)
Bat Recorder Location 14	50K	675470	7683703	Current Survey (Trip A)
Bat Recorder Location 15	50K	690346	7651222	Current Survey (Trip A)

Survey Type	Zone	Easting	Northing	Survey/ Remarks
Bat Recorder Location 16	50K	695487	7637014	Current Survey (Trip A)
Bat Recorder Location 17	50K	693373	7645476	Current Survey (Trip A)
Bat Recorder Location 18	50K	679028	7675134	Current Survey (Trip B)
Bat Recorder Location 19	50K	674764	7702950	Current Survey (Trip B)
Bat Recorder Location 20	50K	674509	7686754	Current Survey (Trip B)
Bat Recorder Location 21	50K	660510	7753840	Port Hedland Regional Fauna (ENV, 2011)
Bat Recorder Location 22	50K	657761	7748938	Port Hedland Regional Fauna (ENV, 2011)
Bat Recorder Location 23	50K	669174	7731594	Port Hedland Regional Fauna (ENV, 2011)
Bat Recorder Location 24	50K	672023	7729062	Port Hedland Regional Fauna (ENV, 2011)
Bat Recorder Location 25	50K	654504	7730005	Port Hedland Regional Fauna (ENV, 2011)
Bat Recorder Location 26	50K	738721	7479847	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 27	50K	706912	7527566	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 28	50K	707099	7540406	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 29	50K	708439	7545604	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 30	50K	707919	7548997	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 31	50K	708196	7549239	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 32	50K	702733	7577287	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 33	50K	693185	7585723	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 34	50K	689861	7595423	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 35	50K	695345	7606447	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 36	50K	699570	7627286	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 37	50K	697223	7632332	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 38	50K	688700	7648300	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 39	50K	678976	7675121	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 40	50K	676963	7678370	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 41	50K	679605	7673304	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 42	50K	675500	7683579	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 43	50K	674658	7702876	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 44	50K	670867	7712066	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 45	50K	663490	7752672	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 46	50K	662603	7752560	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 47	50K	662759	7752148	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 48	50K	662486	7750533	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Bat Recorder Location 49	50K	662800	7752771	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)

Survey Type	Zone	Easting	Northing	Survey/ Remarks
Camera Trap Locations				
Camera 1	50K	718855	7507849	Current Survey (Trip A)
Camera 2	50K	696109	7588969	Current Survey (Trip A)
Camera 3	50K	698756	7621194	Current Survey (Trip A)
Camera 4	50K	697299	7588309	Current Survey (Trip A)
Camera 5	50K	696279	7588749	Current Survey (Trip A)
Camera 6	50K	696133	7608476	Current Survey (Trip A)
Camera 7	50K	698770	7632509	Current Survey (Trip A)
Camera 8	50K	707282	7560936	Current Survey (Trip A)
Camera 9	50K	706096	7559399	Current Survey (Trip A)
Camera 10	50K	699559	7624297	Current Survey (Trip A)
Camera 11	50K	699530	7627317	Current Survey (Trip A)
Camera 12	50K	698770	7632508	Current Survey (Trip A)
Camera 13	50K	705302	7559448	Current Survey (Trip A)
Camera 14	50K	676295	7681630	Current Survey (Trip A)
Camera 15	50K	690369	7651068	Current Survey (Trip A)
Camera 16	50K	675470	7683704	Current Survey (Trip A)
Camera 17	50K	675389	7685648	Current Survey (Trip A)
Camera 18	50K	698753	7621195	Current Survey (Trip A)
Camera 19	50K	694850	7641078	Current Survey (Trip B)
Camera 20	50K	687143	7663704	Current Survey (Trip B)
Camera 21	50K	679296	7675395	Current Survey (Trip B)
Camera 22	50K	676376	7681587	Current Survey (Trip B)
Camera 23	50K	675565	7685602	Current Survey (Trip B)
Camera 24	50K	675662	7686454	Current Survey (Trip B)
Camera 25	50K	674774	7702944	Current Survey (Trip B)
Camera 26	50K	673668	7716405	Current Survey (Trip B)
Camera 27	50K	674512	7686751	Current Survey (Trip B)
Camera 28	50K	673281	7710547	Current Survey (Trip B)
Camera 29	50K	694015	7638010	Current Survey (Trip C)
Camera 30	50K	693445	7637993	Current Survey (Trip C)
Camera 31	50K	695016	7640865	Current Survey (Trip C)
Camera 32	50K	693665	7637406	Current Survey (Trip C)
Camera 33	50K	695032	7640764	Current Survey (Trip C)
Camera 34	50K	695096	7640957	Current Survey (Trip C)
Camera 35	50K	654716	7729993	Port Hedland Regional Fauna (ENV, 2011)
Camera 36	50K	668761	7731587	Port Hedland Regional Fauna (ENV, 2011)
Camera 37	50K	672023	7729062	Port Hedland Regional Fauna (ENV, 2011)
Trap Site Locations				
Trap Site A	50K	706149	7547408	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Trap Site B	50K	704990	7546048	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Trap Site C	50K	704673	7544323	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Trap Site 1	50K	705585	7541671	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Trap Site 2	50K	703270	7541012	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Trap Site 3	50K	702958	7542253	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Trap Site 4	50K	708218	7540498	Rail RGP5 Level 2 Chichester Deviation (ecologia, 2008)
Trap Site 5	50K	703627	7540793	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 6	50K	707099	7540406	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 7	50K	708208	7548036	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 8	50K	708312	7549277	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 9	50K	708216	7549434	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 10	50K	705303	7554483	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 11	50K	696628	7576912	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)

Survey Type	Zone	Easting	Northing	Survey/ Remarks
Trap Site 12	50K	693185	7585723	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 13	50K	689861	7595423	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 14	50K	694812	7606258	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 15	50K	696450	7612053	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 16	50K	699317	7627012	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 17	50K	695135	7636881	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 18	50K	693268	7640757	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 19	50K	688322	7648009	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 20	50K	739586	7480760	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 21	50K	731547	7496662	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 22	50K	729833	7499162	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 23	50K	715452	7510492	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 24	50K	705003	7530980	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 25	50K	705603	7528440	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 26	50K	704211	7522341	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 27	50K	705205	7525886	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 28	50K	704390	7522557	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 29	50K	688362	7659068	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 30	50K	681434	7670024	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 31	50K	676417	7675303	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 32	50K	674652	7686581	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 33	50K	670997	7701341	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 34	50K	670433	7710647	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 35	50K	667835	7720390	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 36	50K	670964	7727523	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 37	50K	665490 6	773619	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 38	50K	705854	7554941	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 39	50K	699520	7627272	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 40	50K	688334	7648012	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 41	50K	687827	7648123	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 42	50K	674532	7686670	Proposed Hope Downs from Weeli Wolli to Port Headland (Biota, 2002)
Trap Site 43	50K	748655	7483524	Stage A FMG Survey (Biota, 2004)
Trap Site 44	50K	746022	7484800	Stage A FMG Survey (Biota, 2004)
Trap Site 45	50K	709548	7514915	Stage A FMG Survey (Biota, 2004)
Trap Site 46	50K	706572	7519899	Stage A FMG Survey (Biota, 2004)
Trap Site 47	50K	705800	7522052	Stage A FMG Survey (Biota, 2004)
Trap Site 48	50K	707003	7527411	Stage A FMG Survey (Biota, 2004)
Trap Site 49	50K	707081	7527159	Stage A FMG Survey (Biota, 2004)

Survey Type	Zone	Easting	Northing	Survey/ Remarks
Trap Site 50	50K	708410	7532624	Stage A FMG Survey (Biota, 2004)
Trap Site 51	50K	708643	7534351	Stage A FMG Survey (Biota, 2004)
Trap Site 52	50K	708837	7537068	Stage A FMG Survey (Biota, 2004)
Trap Site 53	50K	707076	7554262	Stage A FMG Survey (Biota, 2004)
Trap Site 54	50K	705901	7558329	Stage A FMG Survey (Biota, 2004)
Trap Site 55	50K	708766	7567092	Stage A FMG Survey (Biota, 2004)
Trap Site 56	50K	706116	7570911	Stage A FMG Survey (Biota, 2004)
Trap Site 57	50K	703693	7575431	Stage A FMG Survey (Biota, 2004)
Trap Site 58	50K	699399	7583110	Stage A FMG Survey (Biota, 2004)
Trap Site 59	50K	697549	7587790	Stage A FMG Survey (Biota, 2004)
Habitat Assessments				
Northen Quoll Habitat Assessment 1	50K	676433	7679381	Habitat with potential but no trace
Northen Quoll Habitat Assessment 2	50K	675954	7680802	Habitat with potential but no trace
Northen Quoll Habitat Assessment 3	50K	675544	7680782	Habitat with potential but no trace
Northen Quoll Habitat Assessment 4	50K	674239	7684141	Habitat with potential but no trace
Northen Quoll Habitat Assessment 5	50K	674285	7683733	Habitat with potential but no trace
Northen Quoll Habitat Assessment 6	50K	674519	7686687	Habitat with potential but no trace
Northen Quoll Habitat Assessment 7	50K	676343	7681607	Habitat with potential but no trace
Northen Quoll Habitat Assessment 8	50K	675407	7686752	Habitat with potential but no trace
Northen Quoll Habitat Assessment 9	50K	675366	7688107	Habitat with potential but no trace
Northen Quoll Habitat Assessment 10	50K	676330	7681602	Habitat with potential but no trace
Northen Quoll Habitat Assessment 11	50K	675460	7683696	Large permanent denning habitat
Northen Quoll Habitat Assessment 12	50K	675426	7685540	Large permanent denning habitat
Northen Quoll Habitat Assessment 13	50K	675406	7686508	Large permanent denning habitat
Northen Quoll Habitat Assessment 14	50K	694484	7606987	Large permanent denning habitat
Northen Quoll Habitat Assessment 15	50K	694544	7607361	Habitat with potential but no trace
Northen Quoll Habitat Assessment 16	50K	699611	7624375	Large permanent denning habitat
Northen Quoll Habitat Assessment 17	50K	700695	7580114	Habitat with potential but no trace
Northen Quoll Habitat Assessment 18	50K	696703	7589574	Non-denning habitat
Northen Quoll Habitat Assessment 19	50K	695940	7588454	Habitat with potential but no trace

Survey Type	Zone	Easting	Northing	Survey/ Remarks
Northen Quoll Habitat Assessment 20	50K	695219	7589310	Habitat with potential but no trace
Northen Quoll Habitat Assessment 21	50K	694807	7588934	Habitat with potential but no trace
Northen Quoll Habitat Assessment 22	50K	694305	7607267	Habitat with potential but no trace
Northen Quoll Habitat Assessment 23	50K	694193	7607343	Habitat with potential but no trace
Northen Quoll Habitat Assessment 24	50K	697041	7588441	Habitat with potential but no trace
Northen Quoll Habitat Assessment 25	50K	696304	7588744	Habitat with potential but no trace
Northen Quoll Habitat Assessment 26	50K	695991	7589023	Habitat with potential but no trace
Northen Quoll Habitat Assessment 27	50K	694077	7593561	Habitat with potential but no trace
Northen Quoll Habitat Assessment 28	50K	693260	7595479	Habitat with potential but no trace
Northen Quoll Habitat Assessment 29	50K	695476	7607077	Habitat with potential but no trace
Northen Quoll Habitat Assessment 30	50K	695291	7607025	Habitat with potential but no trace
Northen Quoll Habitat Assessment 31	50K	707331	7568946	Habitat with potential but no trace
Northen Quoll Habitat Assessment 32	50K	699790	7580946	Habitat with potential but no trace
Northen Quoll Habitat Assessment 33	50K	702039	7578490	Habitat with potential but no trace
Northen Quoll Habitat Assessment 34	50K	704799	7574109	Habitat with potential but no trace
Northen Quoll Habitat Assessment 35	50K	699981	7581654	Non-denning habitat
Northen Quoll Habitat Assessment 36	50K	698612	7584583	Habitat with potential but no trace
Northen Quoll Habitat Assessment 37	50K	697604	7586310	Habitat with potential but no trace
Northen Quoll Habitat Assessment 38	50K	696174	7589062	Habitat with potential but no trace
Northen Quoll Habitat Assessment 39	50K	694547	7606896	Habitat with potential but no trace
Northen Quoll Habitat Assessment 40	50K	694184	7607034	Habitat with potential but no trace
Northen Quoll Habitat Assessment 41	50K	693711	7607632	Habitat with potential but no trace
Northen Quoll Habitat Assessment 42	50K	699726	7623286	Habitat with potential but no trace

Survey Type	Zone	Easting	Northing	Survey/ Remarks
Northen Quoll Habitat Assessment 43	50K	699302	7624190	Large permanent denning habitat
Northen Quoll Habitat Assessment 44	50K	699075	7624982	Large permanent denning habitat
Northen Quoll Habitat Assessment 45	50K	699546	7627313	
Northen Quoll Habitat Assessment 46	50K	697561	7631820	Large permanent denning habitat
Northen Quoll Habitat Assessment 47	50K	697792	7631700	Large permanent denning habitat
Northen Quoll Habitat Assessment 48	50K	699627	7624573	Large permanent denning habitat
Northen Quoll Habitat Assessment 49	50K	699551	7625400	Habitat with potential but no trace
Northen Quoll Habitat Assessment 50	50K	699551	7627760	Large permanent denning habitat
Northen Quoll Habitat Assessment 51	50K	698079	7631936	Large permanent denning habitat
Northen Quoll Habitat Assessment 52	50K	690953	7649892	Large permanent denning habitat
Northen Quoll Habitat Assessment 53	50K	690377	7651069	Large permanent denning habitat
Northen Quoll Habitat Assessment 54	50K	690673	7647749	Large permanent denning habitat
Northen Quoll Habitat Assessment 55	50K	690634	7647772	Small permanent denning habitat
Northen Quoll Habitat Assessment 56	50K	691579	7646178	Habitat with potential but no trace
Northen Quoll Habitat Assessment 57	50K	692118	7644914	Habitat with potential but no trace
Northen Quoll Habitat Assessment 58	50K	692440	7644112	Habitat with potential but no trace
Northen Quoll Habitat Assessment 59	50K	692364	7643143	Habitat with potential but no trace
Northen Quoll Habitat Assessment 60	50K	693714	7640476	Habitat with potential but no trace
Northen Quoll Habitat Assessment 61	50K	693406	7640447	Non-denning habitat
Northen Quoll Habitat Assessment 62	50K	699725	7626782	Non-denning habitat
Northen Quoll Habitat Assessment 63	50K	697076	7586120	Habitat with potential but no trace
Northen Quoll Habitat Assessment 64	50K	706705	7568873	Habitat with potential but no trace
Northen Quoll Habitat Assessment 65	50K	707275	7560936	Non-denning habitat

Survey Type	Zone	Easting	Northing	Survey/ Remarks
Northen Quoll Habitat Assessment 66	50K	677525	7677639	Habitat with potential but no trace
Northen Quoll Habitat Assessment 67	50K	674211	7694634	Non-denning habitat
Northen Quoll Habitat Assessment 68	50K	679543	7672558	Habitat with potential but no trace
Northen Quoll Habitat Assessment 69	50K	679676	7672549	Small permanent denning habitat
Northen Quoll Habitat Assessment 70	50K	679291	7673281	Small permanent denning habitat
Northen Quoll Habitat Assessment 71	50K	679110	7673315	Large permanent denning habitat
Northen Quoll Habitat Assessment 72	50K	675241	7681699	Large permanent denning habitat
Northen Quoll Habitat Assessment 73	50K	675329	7680862	Large permanent denning habitat
Northen Quoll Habitat Assessment 74	50K	676220	7678462	Small permanent denning habitat
Northen Quoll Habitat Assessment 75	50K	679445	7675492	Habitat with potential but no trace
Northen Quoll Habitat Assessment 76	50K	695096	7640923	Small permanent denning habitat
Northen Quoll Habitat Assessment 77	50K	679615	7675913	Small permanent denning habitat
Northen Quoll Habitat Assessment 78	50K	679253	7676424	Small permanent denning habitat
Northen Quoll Habitat Assessment 79	50K	678889	7677262	Small permanent denning habitat
Northen Quoll Habitat Assessment 80	50K	677541	7678965	Small permanent denning habitat
Northen Quoll Habitat Assessment 81	50K	677292	7678716	Small permanent denning habitat
Northen Quoll Habitat Assessment 82	50K	677396	7678798	Small permanent denning habitat
Northen Quoll Habitat Assessment 83	50K	679302	7675387	Large permanent denning habitat
Northen Quoll Habitat Assessment 84	50K	676374	7681587	Large permanent denning habitat
Northen Quoll Habitat Assessment 85	50K	675317	7684426	Small permanent denning habitat
Northen Quoll Habitat Assessment 86	50K	675518	7685488	Large permanent denning habitat
Northen Quoll Habitat Assessment 87	50K	675509	7685790	Large permanent denning habitat
Northen Quoll Habitat Assessment 88	50K	675607	7686356	Large permanent denning habitat

Survey Type	Zone	Easting	Northing	Survey/ Remarks
Northen Quoll Habitat Assessment 89	50K	675706	7686769	Large permanent denning habitat
Northen Quoll Habitat Assessment 90	50K	675790	7688852	Large permanent denning habitat
Northen Quoll Habitat Assessment 91	50K	675160	7695597	Habitat with potential but no trace
Northen Quoll Habitat Assessment 92	50K	674762	7702950	Large permanent denning habitat
Northen Quoll Habitat Assessment 93	50K	674821	7704033	Large permanent denning habitat
Northen Quoll Habitat Assessment 94	50K	673668	7716405	Small permanent denning habitat
Northen Quoll Habitat Assessment 95	50K	673665	7716395	Small permanent denning habitat
Northen Quoll Habitat Assessment 96	50K	675670	7686446	Large permanent denning habitat
Northen Quoll Habitat Assessment 97	50K	677830	7674965	Non-denning habitat
Northen Quoll Habitat Assessment 98	50K	676434	7678614	Habitat with potential but no trace
Northen Quoll Habitat Assessment 99	50K	675573	7681668	Habitat with potential but no trace
Northen Quoll Habitat Assessment 100	50K	674043	7685626	Non-denning habitat
Northen Quoll Habitat Assessment 101	50K	673907	7685750	Non-denning habitat
Northen Quoll Habitat Assessment 102	50K	673883	7685554	Non-denning habitat
Northen Quoll Habitat Assessment 103	50K	675039	7681803	Non-denning habitat
Northen Quoll Habitat Assessment 104	50K	674722	7688845	Habitat with potential but no trace
Northen Quoll Habitat Assessment 105	50K	674641	7692231	Small permanent denning habitat
Northen Quoll Habitat Assessment 106	50K	674538	7692143	Small permanent denning habitat
Northen Quoll Habitat Assessment 107	50K	674562	7691569	Small permanent denning habitat
Northen Quoll Habitat Assessment 108	50K	674693	7695836	Small permanent denning habitat
Northen Quoll Habitat Assessment 109	50K	674778	7694795	Small permanent denning habitat
Northen Quoll Habitat Assessment 110	50K	674395	7697811	Temporary denning habitat
Northen Quoll Habitat Assessment 111	50K	674351	7697712	Non-denning habitat

Survey Type	Zone	Easting	Northing	Survey/ Remarks
Northen Quoll Habitat Assessment 112	50K	674606	7697537	Non-denning habitat
Northen Quoll Habitat Assessment 113	50K	673959	7704337	Habitat with potential but no trace
Northen Quoll Habitat Assessment 114	50K	674013	7704283	Habitat with potential but no trace
Northen Quoll Habitat Assessment 115	50K	673848	7711303	Non-denning habitat
Northen Quoll Habitat Assessment 116	50K	673845	7711353	Non-denning habitat
Northen Quoll Habitat Assessment 117	50K	673822	7711375	Habitat with potential but no trace
Northen Quoll Habitat Assessment 118	50K	673841	7711394	Non-denning habitat
Northen Quoll Habitat Assessment 119	50K	673841	7711431	Non-denning habitat
Northen Quoll Habitat Assessment 120	50K	673823	7711460	Habitat with potential but no trace
Northen Quoll Habitat Assessment 121	50K	673806	7711540	Non-denning habitat
Northen Quoll Habitat Assessment 122	50K	673832	7711545	Non-denning habitat
Northen Quoll Habitat Assessment 123	50K	673829	7711693	Non-denning habitat
Northen Quoll Habitat Assessment 124	50K	673771	7712174	Non-denning habitat
Northen Quoll Habitat Assessment 125	50K	673279	7710546	Habitat with potential but no trace
Northen Quoll Habitat Assessment 126	50K	673300	7710640	Habitat with potential but no trace
Northen Quoll Habitat Assessment 127	50K	670685	7734201	Habitat with potential but no trace
Northen Quoll Habitat Assessment 128	50K	671192	7732327	Habitat with potential but no trace
Northen Quoll Habitat Assessment 129	50K	671243	7732284	Non-denning habitat
Northen Quoll Habitat Assessment 130	50K	671231	7732254	Non-denning habitat
Northen Quoll Habitat Assessment 131	50K	671322	7731873	Habitat with potential but no trace
Northen Quoll Habitat Assessment 132	50K	671457	7731404	Habitat with potential but no trace
Northen Quoll Habitat Assessment 133	50K	671468	7731332	Non-denning habitat
Northen Quoll Habitat Assessment 134	50K	671499	7731237	Habitat with potential but no trace

Survey Type	Zone	Easting	Northing	Survey/ Remarks
Northen Quoll Habitat Assessment 135	50K	671517	7731157	Habitat with potential but no trace
Northen Quoll Habitat Assessment 136	50K	674644	7685827	No Evidence
Northen Quoll Habitat Assessment 137	50K	675375	7682555	No Evidence
Northen Quoll Habitat Assessment 138	50K	675614	7681916	No Evidence
Northen Quoll Habitat Assessment 139	50K	678738	7675393	No Evidence
General Habitat Assessment 1	50K	706211	7554130	Current Survey
General Habitat Assessment 2	50K	714205	7510274	Current Survey
General Habitat Assessment 3	50K	710605	7513220	Current Survey
General Habitat Assessment 4	50K	718858	7507859	Current Survey
General Habitat Assessment 5	50K	706284	7523884	Current Survey
General Habitat Assessment 6	50K	706285	7523582	Current Survey
General Habitat Assessment 7	50K	721932	7508120	Current Survey
General Habitat Assessment 8	50K	706120	7524260	Current Survey
General Habitat Assessment 9	50K	708263	7565888	Current Survey
General Habitat Assessment 10	50K	699447	7621174	Current Survey
General Habitat Assessment 11	50K	695992	7589024	Current Survey
General Habitat Assessment 12	50K	693262	7595478	Current Survey
General Habitat Assessment 13	50K	695289	7607026	Current Survey
General Habitat Assessment 14	50K	696418	7610659	Current Survey
General Habitat Assessment 15	50K	697380	7612617	Current Survey
General Habitat Assessment 16	50K	698545	7617658	Current Survey
General Habitat Assessment 17	50K	694393	7606839	Current Survey
General Habitat Assessment 18	50K	694708	7606730	Current Survey
General Habitat Assessment 19	50K	698160	7617463	Current Survey
General Habitat Assessment 20	50K	707282	7560938	Current Survey
General Habitat Assessment 21	50K	705299	7559399	Current Survey
General Habitat Assessment 22	50K	706264	7560105	Current Survey
General Habitat Assessment 23	50K	674852	7688796	Current Survey
General Habitat Assessment 24	50K	705246	7560226	Current Survey
General Habitat Assessment 25	50K	704169	7560262	Current Survey
General Habitat Assessment 26	50K	675427	7685539	Current Survey
General Habitat Assessment 27	50K	700375	7622441	Current Survey

Survey Type	Zone	Easting	Northing	Survey/ Remarks
General Habitat Assessment 28	50K	700320	7625184	Current Survey
General Habitat Assessment 29	50K	700483	7625992	Current Survey
General Habitat Assessment 30	50K	699949	7629959	Current Survey
General Habitat Assessment 31	50K	695042	7638366	Current Survey
General Habitat Assessment 32	50K	694316	7637393	Current Survey
General Habitat Assessment 33	50K	696517	7636097	Current Survey
General Habitat Assessment 34	50K	699924	7629931	Current Survey
General Habitat Assessment 35	50K	689153	7659897	Current Survey
General Habitat Assessment 36	50K	706211	7554130	Current Survey
General Habitat Assessment 37	50K	714205	7510274	Current Survey
General Habitat Assessment 38	50K	710605	7513220	Current Survey
General Habitat Assessment 39	50K	718858	7507859	Current Survey
General Habitat Assessment 40	50K	706284	7523884	Current Survey
General Habitat Assessment 41	50K	706285	7523582	Current Survey
General Habitat Assessment 42	50K	721932	7508120	Current Survey
General Habitat Assessment 43	50K	706120	7524260	Current Survey
General Habitat Assessment 44	50K	708263	7565888	Current Survey
General Habitat Assessment 45	50K	699447	7621174	Current Survey
General Habitat Assessment 46	50K	695992	7589024	Current Survey
General Habitat Assessment 47	50K	693262	7595478	Current Survey
General Habitat Assessment 48	50K	695289	7607026	Current Survey
General Habitat Assessment 49	50K	696418	7610659	Current Survey
General Habitat Assessment 50	50K	697380	7612617	Current Survey
General Habitat Assessment 51	50K	698545	7617658	Current Survey
General Habitat Assessment 52	50K	694393	7606839	Current Survey
General Habitat Assessment 53	50K	694708	7606730	Current Survey
General Habitat Assessment 54	50K	698160	7617463	Current Survey
General Habitat Assessment 55	50K	707282	7560938	Current Survey
General Habitat Assessment 56	50K	705299	7559399	Current Survey
General Habitat Assessment 57	50K	706264	7560105	Current Survey
General Habitat Assessment 58	50K	674852	7688796	Current Survey
General Habitat Assessment 59	50K	705246	7560226	Current Survey
General Habitat Assessment 60	50K	704169	7560262	Current Survey
General Habitat Assessment 61	50K	675427	7685539	Current Survey

Survey Type	Zone	Easting	Northing	Survey/ Remarks
General Habitat Assessment 62	50K	700375	7622441	Current Survey
General Habitat Assessment 63	50K	700320	7625184	Current Survey
General Habitat Assessment 64	50K	700483	7625992	Current Survey
General Habitat Assessment 65	50K	699949	7629959	Current Survey
General Habitat Assessment 66	50K	695042	7638366	Current Survey
General Habitat Assessment 67	50K	694316	7637393	Current Survey
General Habitat Assessment 68	50K	696517	7636097	Current Survey
General Habitat Assessment 69	50K	699924	7629931	Current Survey
General Habitat Assessment 70	50K	689153	7659897	Current Survey
General Habitat Assessment 71	50K	674154	7693415	Current Survey
General Habitat Assessment 72	50K	674033	7697334	Current Survey
General Habitat Assessment 73	50K	670566	7741775	Current Survey
General Habitat Assessment 74	50K	691060	7658820	Current Survey
General Habitat Assessment 75	50K	686576	7665303	Current Survey
General Habitat Assessment 76	50K	682403	7670085	Current Survey
General Habitat Assessment 77	50K	679447	7675492	Current Survey
General Habitat Assessment 78	50K	674956	7699597	Current Survey
General Habitat Assessment 79	50K	674090	7709870	Current Survey
General Habitat Assessment 80	50K	673864	7713703	Current Survey
General Habitat Assessment 81	50K	673669	7717413	Current Survey
General Habitat Assessment 82	50K	694781	7640429	Current Survey
General Habitat Assessment 83	50K	695096	7640924	Current Survey
General Habitat Assessment 84	50K	689603	7661272	Current Survey
General Habitat Assessment 85	50K	683935	7668685	Current Survey
General Habitat Assessment 86	50K	683336	7669408	Current Survey
General Habitat Assessment 87	50K	679083	7676621	Current Survey
General Habitat Assessment 88	50K	677283	7679417	Current Survey
General Habitat Assessment 89	50K	676512	7682004	Current Survey
General Habitat Assessment 90	50K	675540	7685500	Current Survey
General Habitat Assessment 91	50K	675790	7688853	Current Survey
General Habitat Assessment 92	50K	675558	7693195	Current Survey
General Habitat Assessment 93	50K	673427	7695615	Current Survey
General Habitat Assessment 94	50K	674762	7702949	Current Survey
General Habitat Assessment 95	50K	674834	7706786	Current Survey

Survey Type	Zone	Easting	Northing	Survey/ Remarks
General Habitat Assessment 96	50K	671700	7742910	Current Survey
General Habitat Assessment 97	50K	685902	7663698	Current Survey
General Habitat Assessment 98	50K	681608	7669451	Current Survey
General Habitat Assessment 99	50K	676408	7677915	Current Survey
General Habitat Assessment 100	50K	675859	7680756	Current Survey
General Habitat Assessment 101	50K	673883	7685367	Current Survey
General Habitat Assessment 102	50K	674689	7689610	Current Survey
General Habitat Assessment 103	50K	674641	7692229	Current Survey
General Habitat Assessment 104	50K	673938	7700954	Current Survey
General Habitat Assessment 105	50K	673646	7703699	Current Survey
General Habitat Assessment 106	50K	674047	7705770	Current Survey
General Habitat Assessment 107	50K	673687	7712330	Current Survey
General Habitat Assessment 108	50K	672684	7717535	Current Survey
General Habitat Assessment 109	50K	672868	7714151	Current Survey
General Habitat Assessment 110	50K	672805	7720931	Current Survey
General Habitat Assessment 111	50K	672901	7724166	Current Survey
General Habitat Assessment 112	50K	671384	7728866	Current Survey
General Habitat Assessment 113	50K	670859	7733294	Current Survey
General Habitat Assessment 114	50K	669308	7737476	Current Survey
General Habitat Assessment 115	50K	670109	7734721	Current Survey
General Habitat Assessment 116	50K	698720	7584115	Current Survey
General Habitat Assessment 117	50K	692631	7597377	Current Survey
General Habitat Assessment 118	50K	694533	7603672	Current Survey
General Habitat Assessment 119	50K	701167	7579661	Current Survey
General Habitat Assessment 120	50K	704689	7574046	Current Survey
General Habitat Assessment 121	50K	706780	7553684	Current Survey
General Habitat Assessment 122	50K	705506	7557821	Current Survey
General Habitat Assessment 123	50K	708890	7515803	Current Survey
General Habitat Assessment 124	50K	706865	7519020	Current Survey
General Habitat Assessment 125	50K	707795	7530998	Current Survey
General Habitat Assessment 126	50K	708511	7537045	Current Survey
General Habitat Assessment 127	50K	694363	7592273	Current Survey
General Habitat Assessment 128	50K	692213	7645616	Current Survey
General Habitat Assessment 129	50K	708835	7540561	Current Survey

Survey Type	Zone	Easting	Northing	Survey/ Remarks
General Habitat Assessment 130	50K	707557	7530385	Current Survey
General Habitat Assessment 131	50K	689894	7651317	Current Survey
General Habitat Assessment 132	50K	709065	7545464	Current Survey
General Habitat Assessment 133	50K	708290	7534581	Current Survey
General Habitat Assessment 134	50K	707116	7527237	Current Survey
General Habitat Assessment 135	50K	708638	7549380	Current Survey
General Habitat Assessment 136	50K	708904	7531103	Current Survey
General Habitat Assessment 137	50K	706236	7570575	Current Survey

Appendix E Locations of conservation significant fauna recorded from the Study Area

Species or feature	Conservation Status	Easting	Northing	Notes	Source
MAMMALS					
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694255	7637881	Fresh tracks	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694394	7637802	Fresh diggings	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694412	7637838	Fresh diggings	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694576	7637838	Fresh Tracks	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694247	7637847	Digging	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694268	7637841	Digging	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694327	7637808	Digging	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694375	7637837	Digging	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694383	7637802	Digging	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694219	7637752	Digging	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694392	7637804	Digging	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694311	7638113	Digging	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694470	7638114	Fresh Tracks	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694826	7638121	Digging	Current Survey (Trip A)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694713	7640935	Fresh Digging	Current Survey (Trip B)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694695	7640813	Fresh Digging	Current Survey (Trip B)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694666	7641004	Fresh Digging	Current Survey (Trip B)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694850	7641075	Fresh Burrow	Current Survey (Trip B)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694740	7640808	Old Burrow	Current Survey (Trip B)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	679536	7675950	Old Diggings	Current Survey (Trip B)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	677396	7678801	Old Burrow	Current Survey (Trip B)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694415	7637847	Diggings	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	693469	7637983	Tracks	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	695001	7640846	Tracks	Current Survey (Trip C)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	693428	7637654	Old Burrow	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	693865	7638065	Observation	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	693490	7637999	Diggings	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694004	7639079	Old Burrow	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694380	7637804	Diggings	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694112	7637659	Diggings	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	693722	7637698	Old Burrow	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694659	7637853	Tracks	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	693767	7638639	Tracks	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694738	7640803	Old Burrow	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694729	7640813	Fresh Digging	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694885	7640792	Fresh Tracks	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	695011	7640851	Possibly active burrow	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	695044	7640625	Fresh Tracks	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	695097	7640821	Possible Burrow	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	694919	7639467	Possible Burrow	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	695156	7640390	Tracks	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	695021	7640791	Fresh Burrow	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	693851	7637755	Fresh Digging	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	693829	7637727	Fresh Tracks	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	693665	7637406	Active Burrow	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	698753	7621195	Burrow	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	695095	7640955	Tracks	Current Survey (Trip C)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	691294	7643634	Inactive burrow	FMG Stage A Fauna Survey (Biota 2004)
Bilby (*Macrotis lagotis*)	Vulnerable (EPBC); Schedule 1 (WC); Vulnerable (IUCN)	674709	7697481	Tracks	BHPBIO

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	688608	7662003	Reasonably fresh burrow	Current Survey (Trip B)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	688495	7662011	Fresh burrow	Current Survey (Trip B)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	688367	7662962	Old burrow	Current Survey (Trip B)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	674312	7711694	Digging	Current Survey (Trip B)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	673986	7715315	Inactive burrow	Current Survey (Trip B)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	671671	7742984	Probable Burrow	Current Survey (Trip B)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	671604	7742937	Probable Burrow	Current Survey (Trip B)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	674675	7697494	Fresh tracks	Current Survey (Trip B)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	672086	7726734	Burrow	Current Survey (Trip B)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	669490	7736684	Inactive burrow	Current Survey (Trip B)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	688135	7662615	Burrow	Current Survey (Trip C)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	688617	7662014	Inactive Burrow	Current Survey (Trip C)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	688629	7662019	Possibly active burrow	Current Survey (Trip C)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	688524	7662079	Inactive Burrow	Current Survey (Trip C)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	688205	7662448	Possibly active burrow	Current Survey (Trip C)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	688322	7648009	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	687827	7648123	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	688334	7648012	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	696450	7612053	Eliot Trap	FMG Stage A Fauna Survey (Biota, 2004)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	688322	7648009	Eliot Trap	FMG Stage A Fauna Survey (Biota, 2004)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	687827	7648123	Eliot Trap	FMG Stage A Fauna Survey (Biota, 2004)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	681434	7670024	Eliot Trap	FMG Stage A Fauna Survey (Biota, 2004)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	676417	7675303	Eliot Trap	FMG Stage A Fauna Survey (Biota, 2004)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	670997	7701341	Eliot Trap	FMG Stage A Fauna Survey (Biota, 2004)
Mulgara (*Dasycercus* sp.)	*D. cristicauda*- Vulnerable (EPBC); Schedule 1 (WC) | *D. blythi*- Priority 4 (DEC)	665490	7736196	Eliot Trap	FMG Stage A Fauna Survey (Biota, 2004)
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	704990	7546048	N/A	Rail RGP5 Chichester Deviation (ecologia, 2008)
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	696239	7635431	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	695994	7636039	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	695975	7636049	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	695989	7636049	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	695985	7636059	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	695442	7637378	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	695434	7637382	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	695435	7637396	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	695440	7637396	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	695436	7637402	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	694642	7639338	N/A	BHPBIO

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	694607	7639342	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	694633	7639348	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	694600	7639368	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	694593	7639377	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	695989	7636049	N/A	BHPBIO
Ghost Bat (*Macroderma gigas*)	Priority 4 (DEC)	696238	7635433	N/A	BHPBIO
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	694380	7603699	N/A	BHPBIO
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	694633	7639348	N/A	BHPBIO
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	674709	7697481	N/A	BHPBIO
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	674692	7697482	N/A	BHPBIO
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	695985	7636059	N/A	BHPBIO
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672006	7729143	N/A	Mooka Siding (Biologic, 2010)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672071	7729174	N/A	Mooka Siding (Biologic, 2010)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672094	7729131	N/A	Mooka Siding (Biologic, 2010)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672319	7729239	N/A	Mooka Siding (Biologic, 2010)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672434	7727736	N/A	Mooka Siding (Biologic, 2010)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	673000	7728304	N/A	Mooka Siding (Biologic, 2010)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	673512	7720235	N/A	Mooka Siding (Biologic, 2010)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	675001	7727883	N/A	Mooka Siding (Biologic, 2010)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	676182	7729936	N/A	Mooka Siding (Biologic, 2010)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	670993	7732590	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	673665	7716394	N/A	Current Survey

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	674400	7697809	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	674509	7686754	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	674683	7697492	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	674737	7703016	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	674825	7692767	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	675670	7686446	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	679296	7675392	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	679299	7675394	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	690374	7651059	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	692713	7599427	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	697045	7588444	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	699953	7631187	N/A	Current Survey
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	694812	7606258	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	699520	7627272	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	688322	7648009	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	687827	7648123	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678013.3	7715377	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678079.3	7715382	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	6777993	7715362	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678065	7715349	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678053.3	7715351	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	689789.6	7724760	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	689808.3	7724703	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	669260.2	7697552	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	669205.9	7697552	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678499.3	7700536	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	690894.6	7694143	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	689960.6	7737016	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672473.9	7664136	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	690131	7737054	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	686886.3	7679098	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	686907.8	7679110	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	686931	7679205	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672470.8	7664131	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672479.8	7664128	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672482.2	7664119	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672445.1	7664163	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672463.9	7664136	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672466.8	7664147	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672484.7	7664125	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672487.8	7664084	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672494.2	7664113	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	661410	7670297	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	661464.7	7670287	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	661470.8	7670284	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	659636.3	7698487	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	659664.5	7698469	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	659729.6	7698495	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678532.1	7700540	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678538.8	7700535	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678581.2	7700547	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678501	7700544	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678553.5	7700533	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678502.3	7700540	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678530.2	7700521	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678543.8	7700547	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678578.7	7700539	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	690874.9	7694104	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	690875.6	7694135	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	690903.7	7694163	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678202.9	7685284	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678178.4	7685283	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678213.3	7685289	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678221	7685284	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678236.5	7685292	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678255	7685297	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	678257.9	7685299	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	680290.7	7681919	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	680333.3	7681904	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	680370.8	7681863	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	680320.6	7681904	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	680348.3	7681898	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	680378.9	7681861	N/A	RGP5 Fauna Survey Northern Quoll Wider Area Survey (ecologia 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	671981	7728880	N/A	RGP5 Northern Quoll Survey Quarry 1,2,4 and E. Turner River (ecologia, 2008)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	671927	7729163	N/A	RGP5 Northern Quoll Survey Quarry 1,2,4 and E. Turner River (ecologia, 2008)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	675113	7685730	N/A	RGP5 Northern Quoll Survey Quarry 1,2,4 and E. Turner River (ecologia, 2008)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	675301	7685704	N/A	RGP5 Northern Quoll Survey Quarry 1,2,4 and E. Turner River (ecologia, 2008)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	675419	7685699	N/A	RGP5 Northern Quoll Survey Quarry 1,2,4 and E. Turner River (ecologia, 2008)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	675147	7685649	N/A	RGP5 Northern Quoll Survey Quarry 1,2,4 and E. Turner River (ecologia, 2008)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	707987	7569352	N/A	RGP5 Northern Quoll Survey Quarry 1,2,4 and E. Turner River (ecologia, 2008)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	708504	7568440	N/A	RGP5 Northern Quoll Survey Quarry 1,2,4 and E. Turner River (ecologia, 2008)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	674348	7703085	N/A	RGP5 Northern Quoll Survey Quarry 1,2,4 and E. Turner River (ecologia, 2008)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	674281	7703132	N/A	RGP5 Northern Quoll Survey Quarry 1,2,4 and E. Turner River (ecologia, 2008)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	672000	7729128	N/A	RGP5 Northern Quoll Monitoring (ecologia, 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	675280	7985658	N/A	RGP5 Northern Quoll Monitoring (ecologia, 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	697450	7632658	N/A	RGP5 Northern Quoll Monitoring (ecologia, 2009)
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	697450	7632658	N/A	RGP5 Northern Quoll Monitoring (ecologia, 2009)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC); Schedule 1 (WC); Endangered (IUCN)	697450	7632658	N/A	RGP5 Northern Quoll Monitoring (ecologia, 2009)
Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*)	Vulnerable (EPBC); Schedule 1 (WC)	675470	7683703	SM2 recording	Current Survey (Trip A)
Short-tailed Mouse (*Leggadina lakedownensis*)	Priority 4 (DEC)	707076	7554262	N/A	FMG Stage A (Biota, 2004)
Short-tailed Mouse (*Leggadina lakedownensis*)	Priority 4 (DEC)	708312	7549277	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Short-tailed Mouse (*Leggadina lakedownensis*)	Priority 4 (DEC)	705303	7554483	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Short-tailed Mouse (*Leggadina lakedownensis*)	Priority 4 (DEC)	696628	7576912	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Western Little Free-tailed Bat (*Mormopterus loriae cobourgiana*)	Priority 1 (DEC)	662594	7753080	N/A	Hope Downs Rail Corridor (Biota, 2002)
Western Little Free-tailed Bat (*Mormopterus loriae cobourgiana*)	Priority 1 (DEC)	671008	7717595	N/A	Hope Downs Rail Corridor (Biota, 2002)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	699005	7621277	Mound (non-active)	Current Survey (Trip A)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	698952	7622399	Active Mound	Current Survey (Trip A)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	699262	7621196	Mound	Current Survey (Trip A)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	660983	13222122	Active Mound	Current Survey (Trip A)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	700325	7624595	Active Mound	Current Survey (Trip A)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	694914	7637438	Old Mound	Current Survey (Trip A)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	696031	7637910	Active Mound	Current Survey (Trip A)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	695881	7637907	Active Mound	Current Survey (Trip A)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	686421	7663948	Mound	Current Survey (Trip B)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	694282	7641817	Active Mound	Current Survey (Trip B)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	684709	7667894	Active Mound	Current Survey (Trip B)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	684620	7667979	Active Mound	Current Survey (Trip B)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	684233	7668428	Active Mound	Current Survey (Trip B)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	683732	7668780	Active Mound	Current Survey (Trip B)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	682413	7670316	Active Mound	Current Survey (Trip B)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	682287	7670412	Active Mound	Current Survey (Trip B)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	676620	7680546	Inactive Mound	Current Survey (Trip B)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	680720	7670309	Inactive Mound	Current Survey (Trip B)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	690704	7647771	Inactive Mound	Current Survey (Trip C)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	694910	7637493	Active Mound	Current Survey (Trip C)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	674986	7720499	N/A	Mooka Siding (Biologic, 2010)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	675021	7720469	N/A	Mooka Siding (Biologic, 2010)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	674903	7720600	N/A	Mooka Siding (Biologic, 2010)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	674912	7720576	N/A	Mooka Siding (Biologic, 2010)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	673044	7722426	N/A	Mooka Siding (Biologic, 2010)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	729833	7499162	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	706149	7547408	N/A	Rail RGP5 Chichester Deviation (ecologia, 2008)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	703270	7541012	N/A	Rail RGP5 Chichester Deviation (ecologia, 2008)
Western Pebble-Mound Mouse (*Pseudomys chapmani*)	Priority 4 (DEC)	708218	7540498	N/A	Rail RGP5 Chichester Deviation (ecologia, 2008)
BIRDS					
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	723505	7505373	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	713013	7511488	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	705446	7524150	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	724545	7505712	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	705907	7521190	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	706081	7524493	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	707053	7526310	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	724233	7506461	Tracks	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	713742	7511153	Tracks	Current Survey (Trip A)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	710388	7515424	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	697576	7587535	Scats	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	695667	7611731	Tracks	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	695242	7610801	Tracks	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	697727	7617074	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	697697	7616902	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	697062	7615977	Tracks	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	698015	7614437	Tracks	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	697961	7616626	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	694716	7606922	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	680711	7670948	Observation	Current Survey (Trip A)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	694764	7638400	Tracks	Current Survey (Trip A)
Fork-tailed Swift (*Apus pacifiicus*)	Migratory (EPBC); Schedule 3 (WC)	710691	7513548	Observation	Current Survey (Trip A)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	708267	7565919	Observation	Current Survey (Trip A)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	697392	7617231	Tracks	Current Survey (Trip A)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	697548	7612185	Tracks	Current Survey (Trip A)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	696958	7632045	Observation	Current Survey (Trip A)
Flock Bronzewing (*Phaps histrionica*)	Priority 4 (DEC)	704746	7558101	Observation	Current Survey (Trip A)
Flock Bronzewing (*Phaps histrionica*)	Priority 4 (DEC)	698734	7621198	Observation	Current Survey (Trip A)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	701926	7578403	Observation	Current Survey (Trip A)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	701766	7578553	Observation	Current Survey (Trip A)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	705717	7560260	Observation	Current Survey (Trip A)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	706100	7559396	Observation	Current Survey (Trip A)
Black-necked Stork (*Ephippiorhynchus asiaticus*)	Near Threatened (IUCN)	692842	7595747	Observation	Current Survey (Trip A)
Grey Falcon (Falco hypoleucos)	Priority 4 (DEC); Near Threatened (IUCN)	706233	7554103	Observation	Current Survey (Trip A)
Oriental Pratincole (*Glareola maldivarum*)	Migratory (EPBC); Schedule 3 (WC)	675614	7708924	Observation	Current Survey (Trip A)
Oriental Pratincole (*Glareola maldivarum*)	Migratory (EPBC); Schedule 3 (WC)	674762	7713419	Observation	Current Survey (Trip A)
Oriental Pratincole (*Glareola maldivarum*)	Migratory (EPBC); Schedule 3 (WC)	673643	7715314	Observation	Current Survey (Trip A)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Oriental Pratincole (*Glareola maldivarum*)	Migratory (EPBC); Schedule 3 (WC)	673897	7710903	Observation	Current Survey (Trip A)
Flock Bronzewing (*Phaps histrionica*)	Priority 4 (DEC)	673870	7691080	Remains	Current Survey (Trip B)
Flock Bronzewing (*Phaps histrionica*)	Priority 4 (DEC)	674172	7697714	Observation	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	678549	7674530	Tracks	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	673096	7711632	Tracks	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	690164	7660776	Observation	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	323392	7668460	Observation	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	686864	7663675	Observation	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	675562	7691024	Observation	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	757404	15602717	Tracks	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	673754	7719277	Observation	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	681887	7669213	Tracks	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	674000	7684407	Tracks	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	674315	7692657	Tracks	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	672876	7719388	Tracks	Current Survey (Trip B)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	670877	7733167	Observation	Current Survey (Trip B)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	687960	7663841	Observation	Current Survey (Trip B)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	670330	7740371	Observation	Current Survey (Trip B)
Fork-tailed Swift (*Apus pacifiicus*)	Migratory (EPBC); Schedule 3 (WC)	674700	7703011	Observation	Current Survey (Trip B)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	674638	7687370	Tracks	Current Survey (Trip B)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	669899	7735399	Tracks	Current Survey (Trip B)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	693817	7637897	Tracks	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	707431	7552490	Observation	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	673264	7720805	Observation	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	698440	7631345	Observation	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	699925	7627937	Observation	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	699969	7625861	Observation	Current Survey (Trip C)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	698976	7619270	Observation	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	695429	7637036	Call	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	699952	7631182	Tracks	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	695407	7608703	Observation	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	698163	7631801	Observation	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	694804	7637930	Tracks	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	706067	7554489	Observation	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	693976	7637880	Tracks	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	693805	7637913	Tracks	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	699948	7626993	Observation	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	695647	7609317	Observation	Current Survey (Trip C)
Bush-Stone Curlew (*Burhinus grallarius*)	Priority 4 (DEC); Near Threatened (IUCN)	706173	7561362	Observation	Current Survey (Trip C)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	708170	7532138	Observation	Current Survey (Trip C)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	689349	7650900	Observation	Current Survey (Trip C)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	699232	7620113	Observation	Current Survey (Trip C)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	707388	7552935	Observation	Current Survey (Trip C)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	694028	7637603	Observation	Current Survey (Trip C)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	697950	7618148	Observation	Current Survey (Trip C)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	707106	7526919	Tracks	Current Survey (Trip C)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	707273	7552838	Observation	Current Survey (Trip C)
Black-necked Stork (*Ephippiorhynchus asiaticus*)	Near Threatened (IUCN)	694524	7606937	Observation	Current Survey (Trip C)
Black-necked Stork (*Ephippiorhynchus asiaticus*)	Near Threatened (IUCN)	678810	7675352	Observation	Current Survey (Trip C)
Black-necked Stork (*Ephippiorhynchus asiaticus*)	Near Threatened (IUCN)	678925	7675281	Observation	Current Survey (Trip C)
Peregrine Falcon (*Falco peregrinus*)	Schedule 4 (WC)	708439	7566567	Observation	Current Survey (Trip C)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	673188	7720323	N/A	Mooka Siding (Biologic, 2010)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Black-necked Stork (*Ephippiorhynchus asiaticus*)	Near Threatened (IUCN)	708643	7534351	N/A	FMG Stage A (Biota, 2004)
Peregrine Falcon (*Falco peregrinus*)	Schedule 4 (WC)	708643	7534351	N/A	FMG Stage A (Biota, 2004)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	709548	7514915	N/A	FMG Stage A (Biota, 2004)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	706572	7519899	N/A	FMG Stage A (Biota, 2004)
Australian Bustard (*Ardeotis australis*)	Priority 4 (DEC); Near Threatened (IUCN)	697549	7587790	N/A	FMG Stage A (Biota, 2004)
Fork-tailed Swift (*Apus pacifiicus*)	Migratory (EPBC); Schedule 3 (WC)	748655	7483524	N/A	FMG Stage A (Biota, 2004)
Fork-tailed Swift (*Apus pacifiicus*)	Migratory (EPBC); Schedule 3 (WC)	746022	7484800	N/A	FMG Stage A (Biota, 2004)
Fork-tailed Swift (*Apus pacifiicus*)	Migratory (EPBC); Schedule 3 (WC)	709548	7514915	N/A	FMG Stage A (Biota, 2004)
Fork-tailed Swift (*Apus pacifiicus*)	Migratory (EPBC); Schedule 3 (WC)	707076	7554262	N/A	FMG Stage A (Biota, 2004)
Fork-tailed Swift (*Apus pacifiicus*)	Migratory (EPBC); Schedule 3 (WC)	706116	7570911	N/A	FMG Stage A (Biota, 2004)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	706116	7570911	N/A	FMG Stage A (Biota, 2004)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	703693	7575431	N/A	FMG Stage A (Biota, 2004)
Cattle Egret (*Ardea ibis*)	Migratory (EPBC); Schedule 3 (WC)	662586	7753059	N/A	Port Headland Regional Survey (ENV, 2011)
Eastern Great Egret *(Ardea modesta)*	Migratory (EPBC); Schedule 3 (WC)	654495	7730008	N/A	Port Headland Regional Survey (ENV, 2011)
Eastern Reef Egret *(Egretta sacra)*	Migratory (EPBC); Schedule 3 (WC)	662586	7753059	N/A	Port Headland Regional Survey (ENV, 2011)
Whitebellied Sea-eagle (Haliaeetus leucogaster)	Migratory (EPBC); Schedule 3 (WC)	657741	7748937	N/A	Port Headland Regional Survey (ENV, 2011)
Whitebellied Sea-eagle (Haliaeetus leucogaster)	Migratory (EPBC); Schedule 3 (WC)	662586	7753059	N/A	Port Headland Regional Survey (ENV, 2011)
Eastern Osprey *(Pandion haliaetus)*	Migratory (EPBC); Schedule 3 (WC)	667098	7753456	N/A	Port Headland Regional Survey (ENV, 2011)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	659315	7724501	N/A	Port Headland Regional Survey (ENV, 2011)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	673845	7722643	N/A	Port Headland Regional Survey (ENV, 2011)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	673912	7721866	N/A	Port Headland Regional Survey (ENV, 2011)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	674135	7720714	N/A	Port Headland Regional Survey (ENV, 2011)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	674138	7720711	N/A	Port Headland Regional Survey (ENV, 2011)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	672354	7730924	N/A	Port Headland Regional Survey (ENV, 2011)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	672050	7730678	N/A	Port Headland Regional Survey (ENV, 2011)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	673875	7721521	N/A	Port Headland Regional Survey (ENV, 2011)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	674111	7720968	N/A	Port Headland Regional Survey (ENV, 2011)
Bush-Stone Curlew (*Burhinus grallarius)*	Priority 4 (DEC); Near Threatened (IUCN)	676316	7734399	N/A	Port Headland Regional Survey (ENV, 2011)
Bush-Stone Curlew (*Burhinus grallarius)*	Priority 4 (DEC); Near Threatened (IUCN)	673512	7720235	N/A	Port Headland Regional Survey (ENV, 2011)
Bush-Stone Curlew (*Burhinus grallarius)*	Priority 4 (DEC); Near Threatened (IUCN)	673332	7721486	N/A	Port Headland Regional Survey (ENV, 2011)
Bush-Stone Curlew (*Burhinus grallarius)*	Priority 4 (DEC); Near Threatened (IUCN)	673385	7720306	N/A	Port Headland Regional Survey (ENV, 2011)
Bush-Stone Curlew (*Burhinus grallarius)*	Priority 4 (DEC); Near Threatened (IUCN)	673701	7720102	N/A	Port Headland Regional Survey (ENV, 2011)
Bush-Stone Curlew (*Burhinus grallarius)*	Priority 4 (DEC); Near Threatened (IUCN)	673868	7721794	N/A	Port Headland Regional Survey (ENV, 2011)
Bush-Stone Curlew (*Burhinus grallarius)*	Priority 4 (DEC); Near Threatened (IUCN)	673881	7720280	N/A	Port Headland Regional Survey (ENV, 2011)
Bush-Stone Curlew (*Burhinus grallarius)*	Priority 4 (DEC); Near Threatened (IUCN)	673909	7721989	N/A	Port Headland Regional Survey (ENV, 2011)
Bush-Stone Curlew (*Burhinus grallarius)*	Priority 4 (DEC); Near Threatened (IUCN)	674087	7721839	N/A	Port Headland Regional Survey (ENV, 2011)
Bush-Stone Curlew (*Burhinus grallarius)*	Priority 4 (DEC); Near Threatened (IUCN)	673826	7720867	N/A	Port Headland Regional Survey (ENV, 2011)
Bush-Stone Curlew (*Burhinus grallarius)*	Priority 4 (DEC); Near Threatened (IUCN)	673373	7728384	N/A	Port Headland Regional Survey (ENV, 2011)
Bush-Stone Curlew (*Burhinus grallarius)*	Priority 4 (DEC); Near Threatened (IUCN)	672899	7729139	N/A	Port Headland Regional Survey (ENV, 2011)
Grey Plover *(Pluvialis squatarola)*	Migratory (EPBC); Schedule 3 (WC)	673945	7751791	N/A	Port Headland Regional Survey (ENV, 2011)
Oriental Plover *(Charadrius veredus)*	Migratory (EPBC); Schedule 3 (WC)	673801	7726792	N/A	Port Headland Regional Survey (ENV, 2011)
Ruddy Turnstone *(Arenaria interpres)*	Migratory (EPBC); Schedule 3 (WC)	673945	7751791	N/A	Port Headland Regional Survey (ENV, 2011)
Red-necked Stint *(Calidris ruficollis)*	Migratory (EPBC); Schedule 3 (WC)	673945	7751791	N/A	Port Headland Regional Survey (ENV, 2011)
Bar-tailed Godwit *(Limosa lapponica)*	Migratory (EPBC); Schedule 3 (WC)	673945	7751791	N/A	Port Headland Regional Survey (ENV, 2011)
Greytailed Tattler *(Tringa brevipes)*	Migratory (EPBC); Schedule 3 (WC)	662586	7753059	N/A	Port Headland Regional Survey (ENV, 2011)
Whimbrel *(Numenius phaeopus)*	Migratory (EPBC); Schedule 3 (WC)	673945	7751791	N/A	Port Headland Regional Survey (ENV, 2011)
Caspian Tern *(Hydroprogne caspia)*	Migratory (EPBC); Schedule 3 (WC)	654495	7730008	N/A	Port Headland Regional Survey (ENV, 2011)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	658075	7743873	N/A	Port Headland Regional Survey (ENV, 2011)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	655230	7738721	N/A	Port Headland Regional Survey (ENV, 2011)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	657879	7725666	N/A	Port Headland Regional Survey (ENV, 2011)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	666100	7732371	N/A	Port Headland Regional Survey (ENV, 2011)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	706149e	7547408	N/A	Rail RGP5 Chicester Deviation (ecologia, 2008)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	705585	7541671	N/A	Rail RGP5 Chicester Deviation (ecologia, 2008)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	703270	7541012	N/A	Rail RGP5 Chicester Deviation (ecologia, 2008)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	702958	7542253	N/A	Rail RGP5 Chicester Deviation (ecologia, 2008)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	706149	7547408	N/A	Rail RGP5 Chicester Deviation (ecologia, 2008)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	704990	7546048	N/A	Rail RGP5 Chicester Deviation (ecologia, 2008)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	704673	7544323	N/A	Rail RGP5 Chicester Deviation (ecologia, 2008)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	703270	7541012	N/A	Rail RGP5 Chicester Deviation (ecologia, 2008)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	702958	7542253	N/A	Rail RGP5 Chicester Deviation (ecologia, 2008)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	708218	7540498	N/A	Rail RGP5 Chicester Deviation (ecologia, 2008)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	703627	7540793	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	707099	7540406	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	696450	7612053	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	693268	7640757	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	688322	7648009	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	693185	7585723	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Australian Bustard *(Ardeotis australis)*	Priority 4 (DEC); Near Threatened (IUCN)	665490	7736196	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	739586	7480760	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	729833	7499162	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	704390	7522557	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	703627	7540793	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	707099	7540406	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	708208	7548036	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	708312	7549277	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)

Species or feature	Conservation Status	Easting	Northing	Notes	Source
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	694812	7606258	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	688362	7659068	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	676417	7675303	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	670997	7701341	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	667835	7720390	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Rainbow Bee-Eater (*Merops ornatus*)	Migratory (EPBC); Schedule 3 (WC)	665490	7736196	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
Peregrine Falcon (*Falco peregrinus*)	Schedule 4 (WC)	705303	7554483	N/A	Proposed Hope Downs Weeli Wolli to Port Headland (Biota, 2002)
REPTILES					
Ctenotus nigrilineatus	Priority 1 (DEC)	694564	7606907	Observation	Current Survey (Trip A)
Ctenotus uber johnstonei	Priority 2 (DEC)	706572	7519899	N/A	FMG Stage A (Biota, 2004)