



1 INTRODUCTION

Rutila Resources (Rutila) is developing the Balla Balla Mine and associated export facilities comprising stockpiles and transshipment port with an initial 6 mtpa output from the mine (Balla Balla Project). The Balla Balla Project is midway between Port Hedland and Karratha, northwest of Whim Creek in the Pilbara Region of WA. Approval has been granted under State and Federal environmental legislation. As a result of the approval of the export facilities, interest was shown by third parties with 'stranded' ore bodies in the Pilbara.

Rutila has investigated the potential for the further development of the export facilities to accommodate third party ore (haematite DSO). A key factor in the viability of this expansion is a connection to the central Pilbara mining region via a new rail line. Rutila plans to seek approval under Part IV of the *Environmental Protection Act 1986* (EP Act) for a new approximately 200 km railway line from the Flinders Mines Ltd proposed mine known as the Pilbara Iron Ore Project (PIOP), 60 km north-west of Tom Price, to the stockpile area at the Balla Balla Export Facility.

The railway line is expected to include: rail line from mine to port; rail loop, car unloader and conveyor at the port; rail loop, stockyard, rail loading area and associated facilities at mine; borrow pits; access roads; communications; water bores and pipelines; accommodation camps; workshop areas; overpass over RTIO railway line; and crossing of NW Coastal Highway.

Phoenix was commissioned to conduct a gap analysis to identify the scope of terrestrial fauna studies (vertebrate fauna and short-range endemic (SRE) invertebrates) required to inform the environmental approvals process for the proposed railway. The expected level of assessment is Assessment based on Proponent Information (API).

2 AIM OF GAP ANALYSIS

The aim of the study was as follows:

- identify all publicly available relevant previous fauna surveys and review their adequacy:
 - brief, critical review of previous survey reports
 - where available, review impact assessment documents for the projects the surveys were conducted for to determine if the surveys were considered adequate by the regulators
- map adequately surveyed areas along rail corridor
- conduct database searches to identify previous conservation significant fauna records
- conduct a high-level desktop habitat assessment along the entire rail corridor
- review mapped surveyed areas, desktop habitat mapping, aerial photography, satellite imagery and database records to identify areas along the rail alignment where
 - habitats may be extrapolated from existing information
 - a Level 2 field survey will be required.

3 METHODS

The methods for the gap analysis were based on a proposed corridor of 2 km width that included two alternative alignments in the northern half and three terminating short spurs in the southern section (Figure 1Error! Reference source not found.). Habitat mapping occurred in the 2 km wide corridor, literature and database searches were based on an approximately 20 km buffer either side of the proposed railway corridor.

3.1 LITERATURE REVIEW

- Identification of mining projects within an approximately 20 km buffer along the rail alignment based on DMP (2010, 2011)
- Literature review of publicly available terrestrial fauna surveys as relevant to the Project. Internet-based literature searches were based on the list of mining proposals within 20 km buffer and projects evident through the fauna database searches (i.e. 'collector' of specimens identified through database searches).

3.2 DATABASE SEARCHES

- Database searches of the WA Museum Arachnology/Myriapodology, Mollusca and Crustacea databases and Phoenix/S. Judd's Isopoda database as primary resource for the distribution of terrestrial SREs. These databases also allowed an interpretation on previous invertebrate fauna surveys the target area
- NatureMap (DPaW 2014) database search for conservation significant fauna within a 20 km buffer either side of an approximate rail corridor
- EPBC protected matters search tool (Department of the Environment 2014).

3.3 FAUNA HABITATS

- Preliminary habitat delineation along the alignment
- Mapping of study area identifying adequately surveyed areas, areas that can be extrapolated and areas requiring field survey.

3.4 CONSULTATION WITH OEPA

4 RESULTS

4.1 LITERATURE REVIEW

4.1.1 Pilbara Biological Survey 2002–2007

The Department of the Environment and Conservation (DEC; now Department of Parks and Wildlife – DPaW) has conducted a baseline biological survey in the Pilbara between 2002 and 2007, the Pilbara Biological Survey (PBS) (McKenzie *et al.* 2009). Ten sites of this survey were situated in the southern section of a 20 km buffer along the alignment corridor mainly along Roebourne-Wittenoom Road and along the Fortescue River and at two sites along RTIO's Hamersley-Robe River railway line (Figure 1) Four further sites were situated just east and south of Whim Creek in the northern section of the corridor. No PBS sites were located in an approximately 100 km stretch of the 20 km railway buffer between these sites.

4.1.2 Fauna surveys for mining and infrastructure projects

The following mining projects were identified with fauna surveys conducted in the area and some of which have terrestrial fauna surveys associated with them (as indicated) (Figure 1, from north to south):

- **Venturex Resources Ltd:** Pilbara Copper-Zinc Project, including the Whim Creek and Mons Cupri desposits (the Whim Creek Project), but also the Salt Creek and Balla Balla Copper-Zinc Projects. The mining tenements are situated east of the very northern part of the proposed rail. No fauna surveys could be identified for these projects during the gap analysis.
- **Australasian Resources Ltd:** Sherlock Bay Nickel Project. The Sherlock Bay tenements are located to the east of the proposed northern part of the proposed rail. The fauna survey report by Biota (2004) was not available for study and therefore the study area could not be mapped. The fauna survey informed a vegetation clearing permit and it was concluded that there was a possibility for priority fauna to inhabit the project area, but that the degraded condition of the soil and vegetation communities and the lack of sightings indicate that it is unlikely that the vegetation represents significant habitat for fauna (Department of Environment 2005). The study targeted invertebrates, but not specifically SREs as it was conducted prior to GS 20 (EPA 2009b); some widespread arachnids and myriapods from the Sherlock Bay area collected by Biota (2004) are in WA Museum databases.
- **Rutila Resources Ltd:** Balla Balla VTi Magnetite Project and Balla Balla Export Facilities: Terrestrial fauna and shorebird studies by (Phoenix 2013a, b); previous fauna surveys considered in desktop review of this included Bamford (2006, 2008a, b) and Turpin (2011).
- **Flinders Mines Ltd:** Pilbara Iron Ore Project: Extensive Level 2 vertebrate fauna surveys and targeted Northern Quoll surveys were complemented by an SRE survey that utilised wet pitfall traps at the Blacksmith area of the Pilbara Iron Ore Project (Ecoscape 2011).
- **Fortescue Metals Group Ltd:** Solomon Hub, which includes the Firetail and Kings mines and the Solomon railway (but also the proposed Central Pilbara Project and the Serenity deposit); the Solomon Hub is located to the east of the southern end of the proposed railway. Numerous terrestrial fauna surveys have been conducted at the Solomon Hub (Coffey 2008, 2010; Ecologia 2010a, b; Ecoscape 2010a, b; Phoenix 2010) and ongoing

terrestrial fauna surveys support the environmental obligations for the Solomon Life of Mine (S. Grein/T Edwards, Fortescue Metals Group, email to V. Framenau, April 2014).

The proposed rail corridor crosses all for subregions of the IBRA Pilbara bioregion, from north to south, the Roebourne Synopsis (PIL4) (Kendrick & Stanley 2001), the Chichester subregion (PIL1) (Kendrick & McKenzie 2001), the Fortescue Plains subregion (PIL2) (Kendrick 2001a) and the Hamersley subregion (PIL3) (Kendrick 2001b). Terrestrial faunistic surveys have been conducted mainly in the Roebourne Synopsis (Sherlock Bay Nickel Project, Balla Balla VTi Magnetite Project, PBS) and the Hamersley subregion (Pilbara Iron Ore Project, Solomon Hub) and these surveys may allow transfer of regional results to minimise survey effort. Faunistic data in the Fortescue Plain are mainly based on PBS sites. The Chichester subregion is poorly surveyed at a regional scale and appears to require the most intense survey effort to document potential impacts on terrestrial fauna.

Fauna surveys supported the environmental approvals process of projects at different levels of assessment (Table 4-1). Ministerial approvals conditions of some of the projects in relation to terrestrial fauna were mainly monitoring of conservation significant vertebrates such as the Northern Quoll, Pilbara Leaf-nosed Bat, Mulgara and Pilbara Olive Python (Table 4-1).

Table 4-1 Adequacy of fauna surveys and reports

Project	Proponent (current)	Fauna study	Adequacy, EPA assessment
Pilbara Copper-Zinc Project, including the Whim Creek and Mons Cupri desposits (the Whim Creek Project) ando the Salt Creek and Balla Balla Copper-Zinc Projects	Venturex Resources Ltd	No fauna studies could be identified for these projects	n/a
Sherlock Bay Nickel Project	Australasian Resources Ltd	Biota (2004) (not publicly available)	Study showed poor quality fauna habitat and absence of conservation significant species. It successfully supported clearing permit (Department of Environment 2005)
Balla Balla Magnetite Project	Rutila Resources Ltd	Bamford (2006, 2008a, b) and Turpin (2011)	Vertebrate fauna conditions only in relation to the construction of trenches (EPA 2009a)
Balla Balla Export Facilities	Rutila Resources Ltd	Phoenix (2013a, b)	Fauna surveys supported approvals process at the level of API; project approved without conditions in relation to terrestrial fauna (EPA 2013a)

Project	Proponent (current)	Fauna study	Adequacy, EPA assessment
Pilbara Iron Ore Project – Stage 1	Flinders Mines Ltd	Ecoscope (2011) Level 2 vertebrate and SRE survey	Fauna surveys supported approvals process at the level of API; project approved without conditions in relation to terrestrial fauna (EPA 2013b)
Solomon Hub and extensions (e.g. Mt Sheila, Serenity, McLeod, Stingray)	Fortescue Metals Group Ltd	(Coffey 2008, 2010; Ecologia 2010a, b; Ecoscope 2010a, b; Phoenix 2010); (Ecologia 2012a, b)	Multiple fauna surveys for major project assessed at the level of PER (EPA 2011; FMG 2011). Ministerial conditions included Fauna Management Plan that included monitoring Northern Quoll, Pilbara Leaf-nosed Bat, Mulgara and Pilbara Olive Python (FMG 2012)

4.2 DATABASE SEARCHES

4.2.1 WA Museum databases

The concentration of studies in the vicinity of the very northern and southern parts of the proposed railway corridor is also reflected in the database search returns from the WA Museum. For example, the Arachnology/Myriapodology database returned a total of 2,856 records with no record of any invertebrate from the Chichester subregion (Figure 2). Dense clusters of invertebrate data are apparent towards the south and south-east of the proposed railway corridor produced by the surveys supporting environmental assessments of Flinders Mines; Pilbara Iron Ore Project and FMG's Solomon Hub.

4.2.2 NatureMap search

Similarly, there was a paucity of vertebrate fauna in the Chichester subregion based on the NatureMap query. The query reported seven mammals, eleven birds and two reptiles of variable conservation significance to occur within a 20 km buffer along the railway corridor. Migratory seabirds that are unlikely to be affected by the railway construction were excluded from the list:

- **Rare or likely to become extinct:**
 - *Dasyurus hallucatus* (Northern Quoll)
 - *Falco hypoleucos* (Grey Falcon)
 - *Liasis olivaceus barroni* (Pilbara Olive Python)
 - *Rhinonictes aurantia* (Orange Leaf-nosed Bat)

- **Specially protected fauna:**
 - *Falco peregrinus* (Peregrine Falcon)
- **Priority 3**
 - *Lagorchestes conspicillatus leichardti* (Spectacled Hare-wallaby)
- **Priority 4**
 - *Ardeotis australis* (Australian Bustard)
 - *Burhinus grallarius* (Bush Stone-curlew)
 - *Leggadina lakedownensis* (Short-tailed Mouse, Karekanga)
 - *Macroderma gigas* (Ghost Bat)
 - *Notoscincus butleri* (Lined Soil-crevice Skink)
 - *Phaps histrionica* (Flock Bronzewing, Flock Pigeon)
 - *Pseudomys chapmani* (Western Pebble-mound Mouse, Ngadji)
 - *Sminthopsis longicaudata* (Long-tailed Dunnart)
- **Protected under international agreement:**
 - *Apus pacificus* (Fork-tailed Swift)
 - *Ardea modesta* (Eastern Great Egret)
 - *Glareola maldivarum* (Oriental Pratincole)
 - *Haliaeetus leucogaster* (White-bellied Sea-Eagle)
 - *Merops ornatus* (Rainbow Bee-eater)
 - *Plegadis falcinellus* (Glossy Ibis).

4.2.3 EPBC protected matters search

The EPBC protected matters search identified two birds, four mammals and two species of reptiles to potentially occur within a 20-km buffer either side of the rail corridor (EN – Endangered, VU – Vulnerable):

- **Birds**
 - *Macronectes giganteus* (Southern Giant Petrel) – EN
 - *Rostratula australis* (Australian Painted Snipe) – EN
- **Terrestrial mammals**
 - *Dasyurus hallucatus* (Northern Quoll) – EN
 - *Macrotis lagotis* (Greater Bilby) – VU
 - *Notoryctes caurinus* (Northern Marsupial Mole) – EN
 - *Rhinonicteris aurantia* (Pilbara form) (Pilbara Leaf-nosed Bat) – VU
- **Terrestrial reptiles**
 - *Ctenotus angusticeps* (Airlie Island Ctenotus) – VU

- *Liasis olivaceus barroni* (Olive Python – Pilbara subspecies) (VU)

4.3 FAUNA HABITATS

Three broad habitat types were differentiated within the 2 km survey corridor of the proposed railway and of these, plains and plateaus represent the most common type with about two thirds of the area (Table 4-2; Figure 3). Slopes along hills, mesas and rocky outcrops represent about a quarter of the survey corridor and rivers cover about one tenth.

Table 4-2 Habitat types of the rail corridor

Habitat	Area (ha)	%
Plain and plateau (grasslands, shrublands, woodlands, drainage lines, minor creek lines, washdown flood plain)	47108	68
Slopes (hill, mesa, outcrop)	15934	23
River, large creek and associated vegetation	6027	9
Total	69069	100

4.4 CONSULTATION WITH OEPA

The main outcomes of the meeting with the OEPA were:

- support of a Level 1 vertebrate fauna habitat assessment and comprehensive listing of vertebrate fauna species likely to occur in the habitats of the study area, followed by a Level 2/targeted survey for conservation significant species if required in consultation with the OEPA Terrestrial Ecosystem Branch
- Level 1 vertebrate fauna assessment should focus on identifying potentially restricted habitats and areas where the proposed rail may cause a barrier between important habitats, e.g. rock piles and permanent water source. Vegetation mapping should be used to validate habitat mapping, particularly identification of any restricted habitats
- proposed work scope for the Level 1 vertebrate fauna assessment should be discussed with OEPA Terrestrial Ecosystems Branch on its adequacy
- For SREs all isolated habitats should be sampled (Level 2 survey), including isolated sandy patches, wetlands and distinctive rocky outcrops. All reference reports/nearby projects should be shown on maps and maps displaying records from database searches should include all raw (i.e. non-SRE) records to demonstrate survey density. It may be possible to extrapolate SRE occurrence for some sections where there is adequate regional data at sites with similar habitats in the same land system
- alignment should avoid Millstream Chichester National Park and Mungaroona Range Nature Reserve.

5 RECOMMENDED SURVEY PLAN

In summary, highest density of faunistic data is present within the Hamersley subregion and results of previous surveys may be transferable to the railway project. Mesas and hills are prominent in this area which may support some conservation significant fauna such as the Northern Quoll or SREs such as wall crab spiders of the genus *Karaops*.

Similarly, the Roebourne synopsis shows good fauna data around the proposed railway corridor and in contrast to the southern section, habitats are predominantly uniform plains. Conservation significant vertebrate fauna may be less prevalent but SREs, in particular land snails in the family Camaenidae may occur. The section of the railway corridor passing through the Fortescue plain is characterised by flat topography and uniform habitat characteristics. Some faunistic data is present, mainly provided by the PBS.

Poorest fauna data exists in the Chichester subregion part of the proposed railway corridor. Habitat diversity is comparatively high with good representation of all three habitat types. This area will attract the highest intensity of survey as faunistic data at the regional level is poor.

The recommended survey approach is a Level 1 vertebrate fauna survey/habitat assessment combined with a Level 2 SRE survey to the exclusion of wet pitfall traps. This initial survey should focus on the section of the proposed railway that traverses the Chichester subregion.

A Level 2/targeted vertebrate survey may be required for conservation significant species.

This survey approach is currently being costed by Phoenix for submission to Preston Consulting on behalf of Rutila Resources.

Yours Sincerely,

Karen Crews

Director; General Manager

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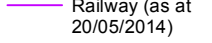
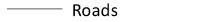
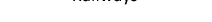
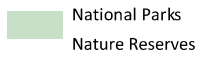
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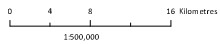
Figure 1 **Rutila Rail Project conceptual map**

Figure 2 **Terrestrial invertebrate records (WA Museum)**

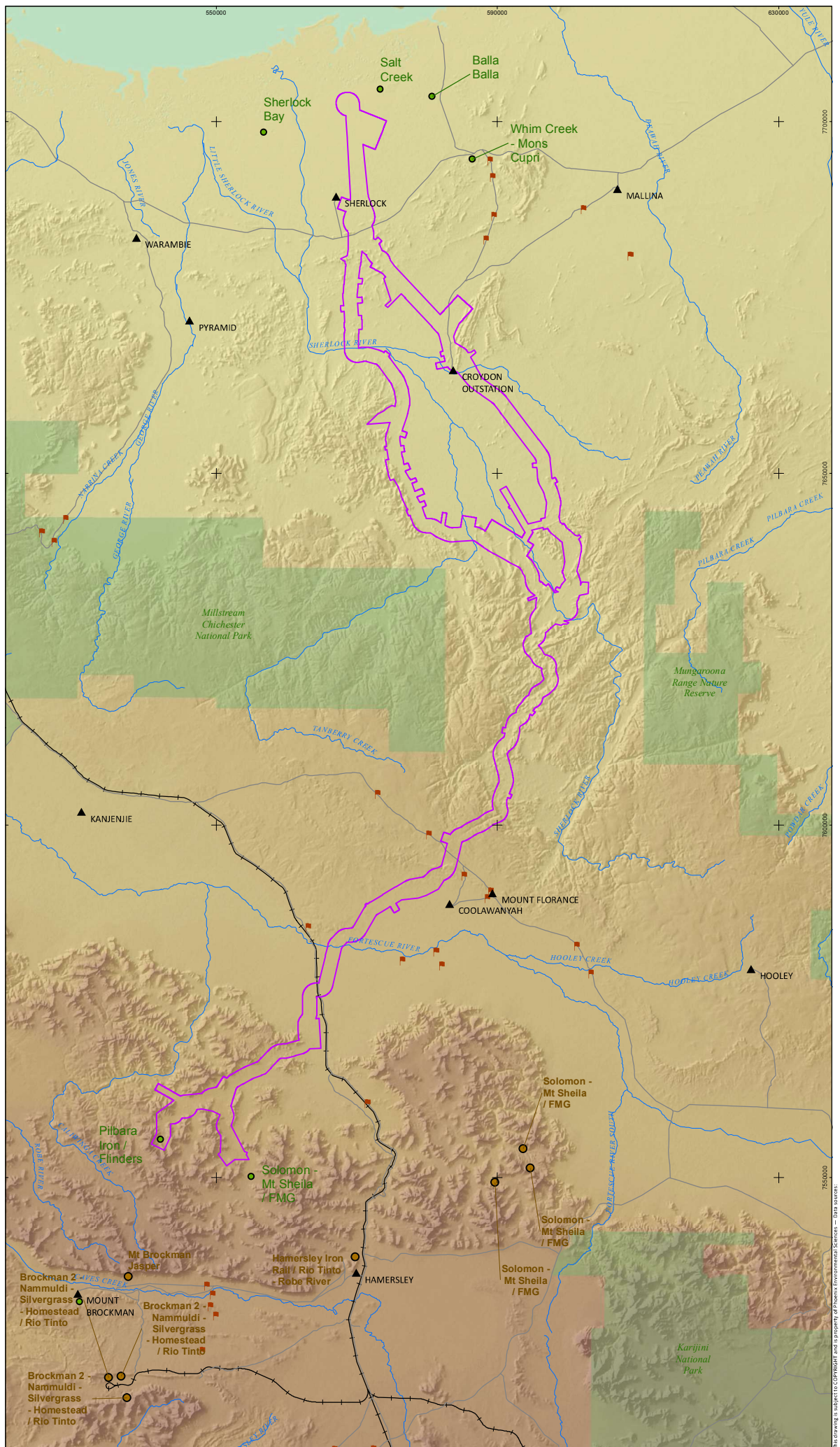
Figure 3 **Broad fauna habitat assessment for Rutila Rail Project**

Figure 1
Rutila rail project
contextual map

-  Major resources
-  Pilbara Biological Survey sites
-  Towns
-  Homesteads
-  Rutila Proposed Railway (as at 20/05/2014)
-  Roads
-  Railways
-  National Parks
Nature Reserves



Client: client name
Project: project name
Author: G. Bouheloup
Date: 20/05/2014
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

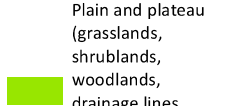
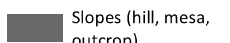
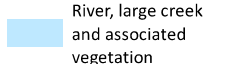


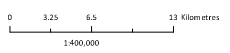
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Figure 3
Broad fauna habitat
assessment for the
Rutila rail Project

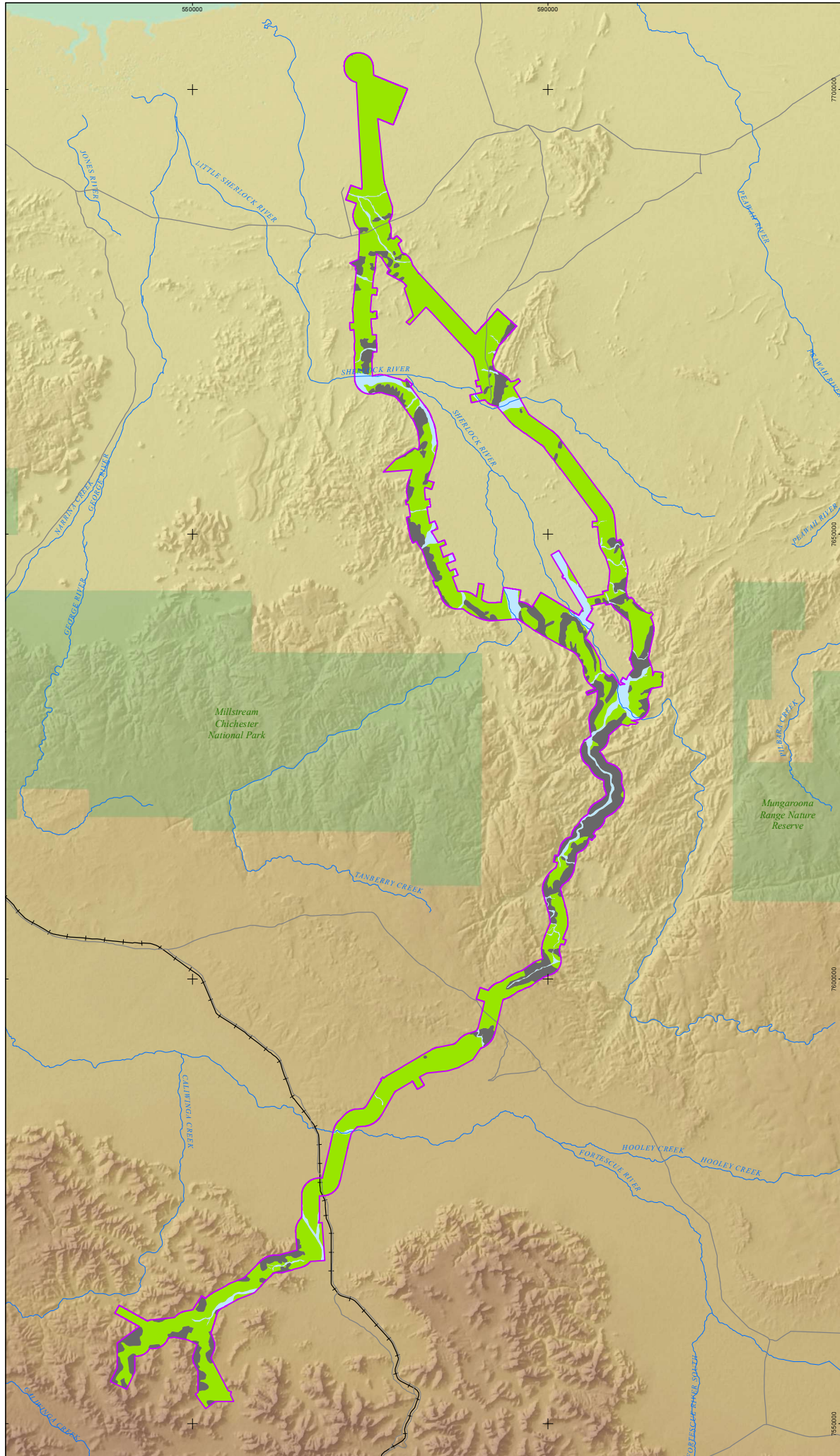
-  Rutila Proposed Railway (as at 20/05/2014)
-  Towns
-  Roads
-  Railways
-  Major Water Courses
-  National Park, Nature Reserve

Fauna habitats

-  Plain and plateau (grasslands, shrublands, woodlands, drainage lines, minor creek lines, washdown flood plain)
-  Slopes (hill, mesa, outcrop)
-  River, large creek and associated vegetation



Client: client name
 Project: project name
 Author: G. Bouheloup
 Date: 20/05/2014
 Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994



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