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FORTESCUE METALS GROUP
CHRISTMAS CREEK WATER MANAGEMENT SCHEME
PILBARA OLIVE PYTHON ANNUAL MONITORING REPORT 2014

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ACRONYMS

DEC	Department of Environment and Conservation (now DPaW)
DoE	Department of Environment (formerly DSEWPaC)
DPaW	Department of Parks and Wildlife (formerly DEC)
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now Department of the Environment)
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
IBRA	Interim Biogeographic Regionalisation for Australia
WC Act	*Wildlife Conservation Act 1950*

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EXECUTIVE SUMMARY

Fortescue Metals Group is developing the Pilbara Iron Ore and Infrastructure Project, which involves a series of iron ore mines (Cloudbreak, Christmas Creek and Solomon) in the Pilbara region of Western Australia. The Christmas Creek mine site is located approximately 110 kilometres north of Newman, on the Roy Hill and Hillside pastoral leases.

The Christmas Creek mine site, in the eastern Pilbara, was approved by both the State and Commonwealth in December 2005 as part of the *Stage B Project: An east-west railway line and Christmas Creek and Mindy Mindy mines* (Ministerial Statement 707; EPBC Approval Decision 2004/1562). Mining commenced in 2008, and has since been predominantly above the water table. To access further ore deposits (located below the water table) approval for increased dewatering was required.

Additional information was provided in the document *Christmas Creek Water Management Scheme: EPBC Fauna Impact Assessment, CC-RP-EN-0013*, and the Minister's delegate approved the project, subject to conditions, on 11 August 2011 under EPBC Act approval 2010/5706. Condition 14 of the EPBC Act approval (2010/5706) required the preparation of a Fauna Management Plan (FMP). The FMP (CC-PL-EN-003_Rev1) and qualified expert review of the plan, was approved by DSEWPaC on 12 January 2012. Because environmental factors can influence population monitoring, the Department requested three years of annual monitoring for Pilbara Olive Python to be completed at a reduced scope and intensity.

Monitoring was conducted in accordance with the objectives and methodology outlined in the fauna monitoring guidelines described in the Christmas Creek Water Management Scheme Fauna Management Plan, as well as in accordance with the EPA's Guidance Statement No. 56 (EPA 2004), Position Statement No. 3 (EPA 2002) and *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA and DEC 2010). Species specific guidelines for surveying the Pilbara Olive Python (DSEWPaC 2011) were consulted during the development of monitoring methodology.

The monitoring was conducted in January 2014, during the season considered most appropriate to maximise the likelihood of recording Pilbara Olive Pythons, determined by DSEWPaC's guidelines.

Sampling sites were established within the impact zone of the Christmas Creek Mine, and within a control zone, located approximately 20-30 km north of the Christmas Creek Mine.

The monitoring was undertaken in both the impact and control zones using the following two sampling methods, which were deemed suitable for detecting the presence of the Pilbara Olive Python:

- Systematic active-search sampling at monitoring sites; and
- Road spotting transects.

No Pilbara Olive Pythons were observed within the impact or control zones. The habitats at the impact sites were similar to the habitats at control sites, which generally comprised major creeklines with surface water. These habitats are not considered optimal habitat for the Pilbara Olive Python, with the species generally preferring gorge habitats with permanent or semi-permanent rock pools. As this habitat type is limited to a small area outside the impact area, to the north-east of the Christmas Creek mine, the abundance of Pilbara Olive Pythons within the study area is expected to be low.

As no Pilbara Olive Pythons have been recorded in the two years of monitoring within the impact zone, and single year of monitoring in the control zone, there is insufficient data to test for

differences between the impact and control zones. Sampling effort at the active-search monitoring sites and road spotting transects will be repeated during future monitoring. If Pilbara Olive Pythons are recorded during future monitoring surveys, statistical differences can then be tested for.

In summary, the annual monitoring detailed in this report satisfies the requirements of the Christmas Creek Fauna Management Plan for 2013-2014 monitoring period. The next monitoring event will be in January 2015.

1 INTRODUCTION

1.1 PROJECT OVERVIEW

Fortescue is developing the Pilbara Iron Ore and Infrastructure Project, which involves a series of iron ore mines (Cloudbreak, Christmas Creek and Solomon) in the Pilbara region of Western Australia. The Christmas Creek mine site is located approximately 110 kilometres north of Newman, on the Roy Hill and Hillside pastoral leases (Figure 1.1).

The Christmas Creek mine site in the eastern Pilbara was approved by both State and Commonwealth in December 2005 as part of the *Stage B Project: An east-west railway line and Christmas Creek and Mindy Mindy mines* (Ministerial Statement 707; EPBC Approval Decision 2004/1562). Mining commenced in 2008, and has since been predominantly above the water table. To access further ore deposits (located below the water table) approval for increased dewatering was required.

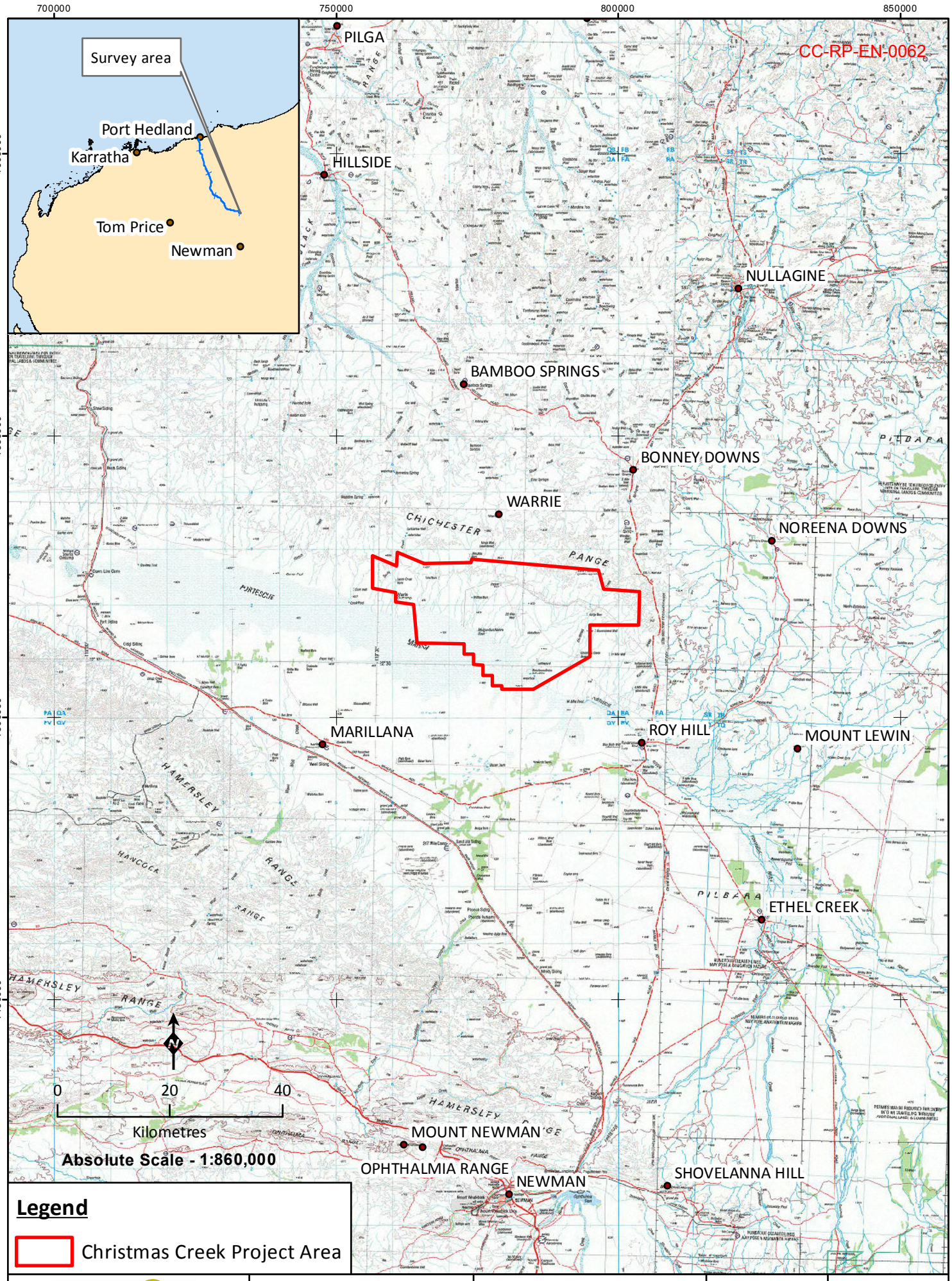
The increased dewatering requirements were met through the development of the Christmas Creek Water Management Scheme, which was referred to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC - now the Department of the Environment (DoE)) in October 2010. DSEWPaC considered the project a "Controlled Action" to be assessed at the level of Assessment on Preliminary Documents, and requested information on the following matters of national environmental significance:

- Night Parrot (*Pezoporus occidentalis*);
- Northern Quoll (*Dasyurus hallucatus*);
- Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia* (Pilbara form);
- Greater Bilby (*Macrotis lagotis*);
- Mulgara (*Dasycercus cristicauda/blythi*); and
- Pilbara Olive Python (*Liasis olivaceus barronii*).

Additional information was provided in the document *Christmas Creek Water Management Scheme: EPBC Fauna Impact Assessment, CC-RP-EN-0013*, and the Minister's delegate approved the project, subject to conditions, on 11 August 2011 under EPBC Act approval 2010/5706. Condition 14 of the EPBC Act approval required the preparation of a Fauna Management Plan (FMP). The FMP (CC-PL-EN-003_Rev1) and qualified expert review of the plan, was approved by DSEWPaC on 12 January 2012.

Baseline (non-invasive) monitoring, required under the FMP, was completed between November 2012 and June 2013 by *ecologia* Environment (*ecologia*). The baseline monitoring recorded no evidence of Threatened fauna or critical habitat suitable to support Threatened fauna. Therefore, consistent with the FMP, which requires ongoing monitoring be conducted where Threatened fauna species presence has been confirmed, no additional monitoring was recommended by the baseline monitoring report.

However, because environmental factors can influence population monitoring, DSEWPaC requested three years of annual monitoring for Pilbara Olive Python to be completed at a reduced scope and intensity.



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FMG Fortescue The New Force in Iron Ore

Location of Christmas Creek Project Area

Figure: 1.1	**Drawn: NJ**
Project ID: 1578	**Date: 10/03/2014**

Coordinate System
Name: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: NJ088

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1.2 SCOPE OF WORK

The scope of work was to conduct an annual monitoring program for the EPBC Act listed Pilbara Olive Python (*Liasis olivaceus barroni*). The program was undertaken in accordance with the objectives and methodology described in the Christmas Creek Water Management Scheme Fauna Management Plan and the scope of work (CC-SW-EN-0008_Rev0), as well as in accordance with the EPA's Guidance Statement No. 56 (EPA 2004), Position Statement No. 3 (EPA 2002) and *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA and DEC 2010).

The monitoring program was conducted:

- during the optimal season of activity (summer) to ensure ideal representation; and
- at Pilbara Olive Python impact and control monitoring sites, as required within the scope of work (CC-SW-EN-0008) based on the following criteria:
  - (i) results of the baseline survey investigations;
  - (ii) access and heritage (ethnographic and archaeological) constraints;
  - (iii) avoidance of future infrastructure development areas;
  - (iv) Fortescue Environment personnel advice; and
  - (v) adherence to statistical design.

1.3 SPECIES INFORMATION

Pilbara Olive Python (*Liasis olivaceus barroni*): EPBC Act Vulnerable, WC Act Schedule 1

The Pilbara subspecies of the Olive Python (*Liasis olivaceus barroni*) only occurs in the rocky ranges of the Pilbara region of Western Australia. This subspecies is currently listed under the WC Act as "fauna that is rare or likely to become extinct" (Schedule 1) and as "Vulnerable" under the EPBC Act. The Great Sandy Desert separates the Pilbara Olive Python from northern populations of *Liasis olivaceus olivaceus*, from which it is distinguished on the basis of midbody scale rows and ventral scale counts. It is a dull olive-brown or pale fawn python that can grow to 4.5 m (Wilson and Swan 2013).

This subspecies is found throughout the Pilbara with the extremities of its range bounded by the Tropic of Capricorn in the South, the North West Coast Highway in the West, the Indian Ocean in the North, and the Great Sandy Desert in the East. In the Pilbara, it inhabits watercourses, riverine woodlands, and areas of permanent water in rocky gorges and gullies (Pearson 2006). It is often found directly adjacent to pools of water, usually among rocks and water plants, and sometimes even submerged. Permanent water is thought to be important for attracting prey species. Though primarily found in close proximity to water, overburden heaps and railway embankments may also be utilised. Radiotelemetry has found that individuals spend the cooler winter months sheltering in caves and rock crevices, often some distance from permanent water. In the warmer months the pythons can move widely, usually in close proximity to water and rock outcrops (TSSC 2008).

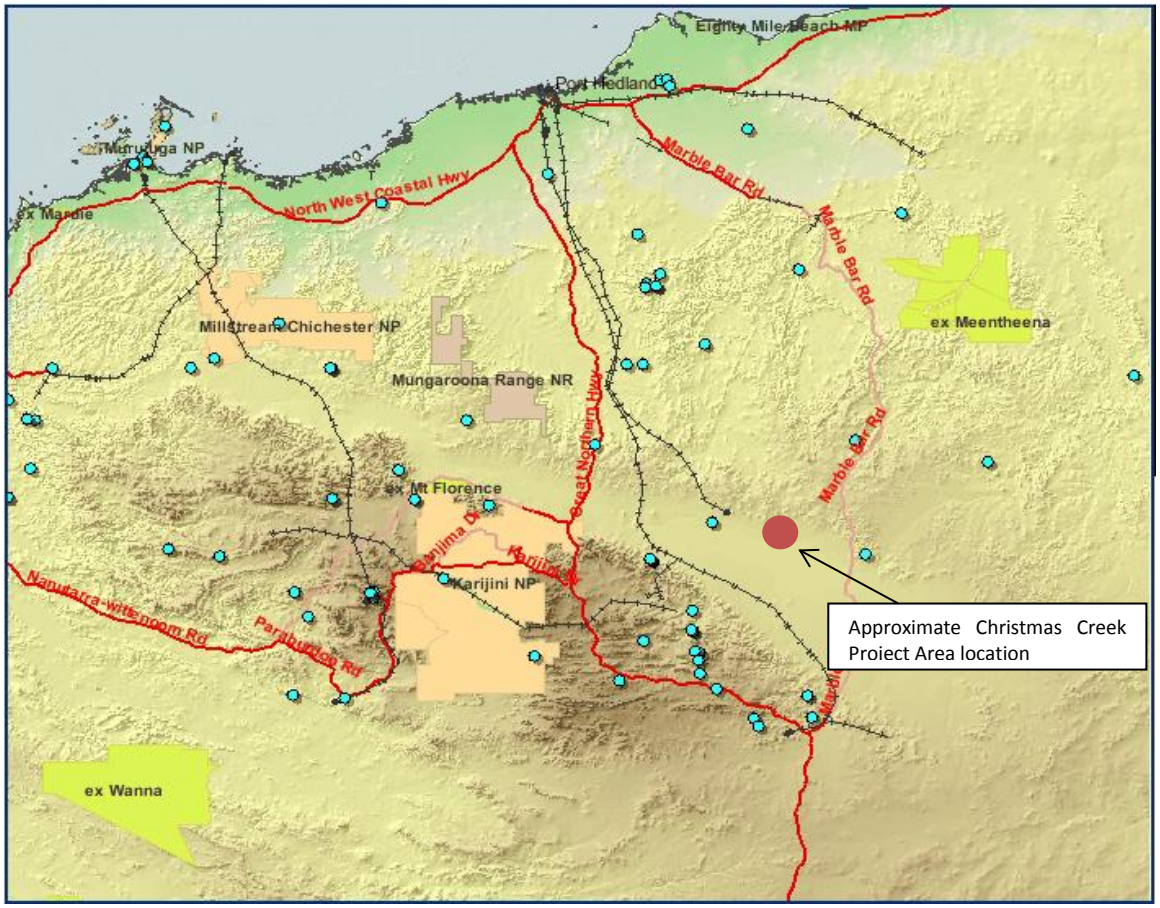
This subspecies is an adept swimmer, often hunting in water. It feeds on a variety of vertebrates including rock wallabies, fruit bats, ducks, and pigeons. In late winter or early spring males will travel large distances to find and mate with females. Eggs are laid in November and hatch approximately two months later (TSSC 2008).

Population size estimates are difficult due to the species cryptic nature and lack of a reliable trapping or census (TSSC 2008). The main threats to this subspecies are likely to come from predation from feral cats and foxes, particularly of juveniles, competition with foxes for food, and destruction of habitat, principally due to gas and mining development (Pearson 2006).

1.3.1 Previous records

The Pilbara Olive Python has been previously recorded from the Christmas Creek Mine site on two separate occasions (Figure 2.1). The first was during the Christmas Creek Life of Mine fauna survey in March 2011 (ENV 2012a), and the second was recorded in Mokare pit October 2013 and then subsequently relocated by site environmental staff to the southwest of the project area (Figure 1).

Pilbara Olive Pythons have not been readily recorded in the surrounding region. A sloughed skin was recorded from the Fortescue Kutayi project (*ecologia* 2013) located 25 km east of the Christmas Creek mine site and individuals have been recorded from the local area surrounding the BC Iron Nullagine project (Bamford 2013), located approximately 30 km north of the Christmas Creek mine site, however exact location information of the recorded individuals was not reported. Regional Pilbara Olive Python records can be seen in Figure 1.2.



Source: Naturemap (DPaW 2014)

Figure 1.2 – Regional NatureMap records of Pilbara Olive Python

2 SURVEY METHODOLOGY

Monitoring was conducted in accordance with the objectives and methodology outlined in the fauna monitoring guidelines described in the Christmas Creek Water Management Scheme Fauna Management Plan, as well as in accordance with the EPA's Guidance Statement No. 56 (EPA 2004), Position Statement No. 3 (EPA 2002) and *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA and DEC 2010). Species specific guidelines for surveying the Pilbara Olive Python (DSEWPaC 2011) were consulted during the development of survey methods.

Sampling sites were established within the impact zone of the Christmas Creek Mine, and within a control zone, located approximately 20-30 km north of the Christmas Creek Mine.

The monitoring was undertaken in both the impact and control zones using the following two sampling methods:

- Systematic active-search sampling at monitoring sites; and
- Road spotting transects.

Systematic monitoring sites and nocturnal road spotting transects were defined, where repeatable sampling can be conducted over a fixed time period, using an equal or standardised sampling effort. The resulting data can then be analysed statistically.

The survey effort was divided between impact and control sites. Control sites were located at a suitable distance (approximately 13 km) from the impact zone, so that individuals that occur in these areas are not expected to be impacted by the project.

The monitoring survey was conducted in January 2014, during the wet season which is appropriate to maximise the likelihood of recording Pilbara Olive Pythons, in accordance with DSEWPaC's guidelines (DSEWPaC 2011). Survey timing and duration is summarised in Table 2.1.

Table 2.1 – Summary of survey timing and duration for each monitoring survey

Survey	Survey Dates	Duration (days)	Person Days
Pilbara Olive Python	4–10 January 2014	7	14

Habitat condition was also used to determine the location of the monitoring sites. Habitat condition was assessed whilst on site based on the below criteria (Table 2.2) and good to excellent habitat was selected to increase the likelihood of capturing individuals from local populations.

Table 2.2 – Habitat condition categories

Habitat condition	Criteria
Excellent	Vegetation is pristine or nearly so*, no obvious sign of damage caused by modern humans or introduced fauna (cattle, feral cat, dog, rabbit). No signs of recent, extensive fires.
Very good	Some relatively slight signs of damage caused by the activities of modern humans. e.g. damage to tree trunks by repeated fires, no significant signs of introduced fauna or occasional vehicle tracks.
Good	More obvious signs of damage caused by the activities of modern humans, including some obvious impact to vegetation structure such as that caused by low levels of grazing or by selective logging. Some tracks or secondary evidence of introduced fauna. Some signs of recent fires.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of modern humans such as partial clearing or very frequent fires. Presence of introduced fauna.

Habitat condition	Criteria
Very poor	Severely impacted by grazing, introduced fauna, fire, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management.
Completely degraded	Areas that are completely or almost completely without vegetation communities and are heavily impacted by extensive fires and/or introduced species e.g. cattle pasture.

*Assessment of vegetation condition follows the Trudgen scale (Department of Environmental Protection 2000)

The suitability of habitat for each species was assessed using the categories as provided in Table 2.3.

Table 2.3 – Characteristics and suitability of potential habitat for Pilbara Olive Python

Species	Low suitability		Moderate suitability		High suitability	
	Foraging habitat	Denning/ roosting habitat	Foraging habitat	Denning/ roosting habitat	Foraging habitat	Denning/ roosting habitat
Pilbara Olive Python	Rocky plain or creekline with few hiding spots (tree hollows, crevices) which is mainly used as travel ground.		Rocky gully with some trees with hollows and crevices. Water may be present.		Permanent or semi-permanent water pool in rocky gorge with high density of medium sized crevices, caves and eucalypt trees with hollows	

Note: Categories and habitat descriptions are based on current knowledge of the species

2.1 PILBARA OLIVE PYTHON

2.1.1 Timing

Pilbara Olive Pythons were monitored during the wet season from 4–10 January 2014. This period is aligned with the season of peak activity for pythons, as the warmer temperatures increase activity levels.

2.1.2 Monitoring site selection

Pilbara Olive Pythons were monitored using nocturnal targeted searches in areas of potential habitat such as major creeklines. Site locations are shown in Table 2.4 and mapped in Figure 2.1. All sites were visited once per survey night. The locations of the monitoring sites were selected based on the habitats and requirements outlined in the fauna management plan. Site accessibility was also taken into consideration, since all sites needed to be visited each night.

The road spotting transects covered roads that linked all the monitoring search sites and were selected to cross the majority of the impact area and a representative section of non-impacted habitat to the north of Christmas Creek. The starting point for the road spotting circuits alternated each night, with the first night commencing in the control area, and the second night commencing in the impact area. The remaining four nights followed this pattern. The alternating starting points were formed to allow for temporal changes in Pilbara Olive Python nocturnal activity to be observed within both the impact and control areas.

Table 2.4 – Locations of Pilbara Olive Python monitoring sites

Monitoring site	Coordinates		Search effort (mins)
	Easting	Northing	
Impact site 1 (POP I1)	7525314	760100	360
Impact site 2 (POP I2)	7523248	773786	360
Impact site 3 (POP I3)	7519004	781778	360
Impact site 4 (POP I4)	7519042	795859	360
Control site 1 (POP C1)	7556395	775880	360
Control site 2 (POP C2)	7553911	785545	360
Control site 3 (POP C3)	7555277	789497	360
Control site 4 (POP C4)	7553058	793650	360

Datum: GDA 94, Zone: 50K

2.1.3 Survey effort

To allow comparison of results, each monitoring site was searched by two zoologists for 30 minutes on each of the six nights surveyed. A total of six hours of searching was completed at each monitoring site (Table 2.4). Nocturnal road spotting transects were completed each night, totalling 45 hours (7.5 hours per night) during the survey.

2.1.4 Environmental data

Environmental data are essential to allow the assessment of the cause of potential changes in populations of targeted fauna in future. Environmental data for the survey period was obtained from the Fortescue weather station at Christmas Creek, which records relevant data such as temperature, rainfall and humidity on an ongoing basis (Appendix A).

2.2 ANIMAL ETHICS

All monitoring was conducted as per *ecologia*'s Animal Ethics Code of Practice, which conforms to Section 5 of the Australian code of practice for the care and use of animals for scientific purposes (NHMRC 2004). In all cases, fauna were identified in the field and released at the point of capture.

2.3 MONITORING TEAM AND LICENCES

Field survey team members are listed in Table 2.5. The monitoring survey was conducted under DPaW Regulation 17 Licence SF009642.

Table 2.5 – Field survey personnel

Survey Member	Qualification	Experience
Damien Cancilla	BSc (Hon)	9 years
Astrid Heidrich	MSc	7 years

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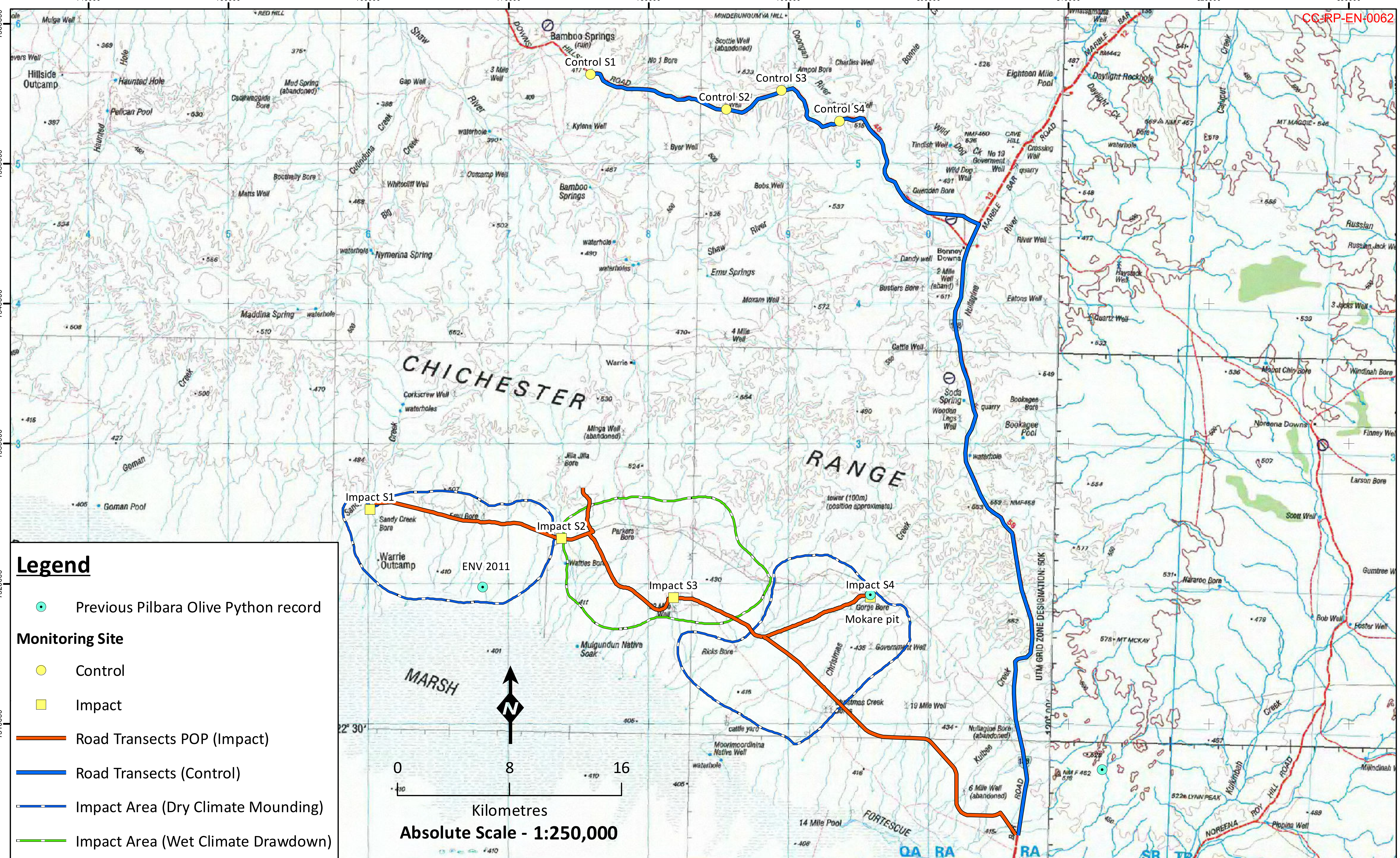

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FMG Fortescue The New Force in Iron Ore

Location of monitoring sites and road-spotting transects

Figure: 2.1
Project ID: 1578

Drawn: DC
Date: 06/03/2014

Coordinate System
Name: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: NJ089

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3 RESULTS

3.1 PILBARA OLIVE PYTHON RECORDS

3.1.1 Impact sites

No individuals or secondary evidence of the Pilbara Olive Python were recorded within the impact zone during the current survey.

3.1.2 Control sites

No individuals or secondary evidence of the Pilbara Olive Python were recorded within the control zone during the current survey.

3.2 STATISTICAL ANALYSES

As no Pilbara Olive Pythons have been recorded in the two years of monitoring within the impact zone, and single year of monitoring in the control zone, there is insufficient data to test for differences between the impact and control zones. However, the detection of Pilbara Olive Pythons during future monitoring surveys will enable statistical analyses to be carried out, allowing changes in population sizes to the Pilbara Olive Pythons to be identified, by applying a variety of analysis methods (Henderson and Seaby 2008; Quinn and Keough 2002) to the mark-recapture data collected. This information will then be compared with an analysis of environmental attributes to allow an accurate determination of impact (if any) to the targeted species to be made.

3.3 ADDITIONAL NON-TARGET SPECIES RECORDED

During the survey, two species of conservation significance were recorded: the Bush Stone-curlew (two records) and Australian Bustard (six records), both listed as DPaW Priority 4. Details of non-target conservation significant fauna recorded are listed in Table 3.1.

Table 3.1 – Non-targeted conservation significant species records

Species	Coordinates		Record
	Easting	Northing	
Bush Stone-curlew	796606	7551663	One individual
Bush Stone-curlew	793490	7553037	Two individuals
Australian Bustard	780456	7555177	One individual
Australian Bustard	776881	7555827	One individual
Australian Bustard	774096	7557643	One individual
Australian Bustard	771622	7558136	One individual
Australian Bustard	781371	7554849	One individual
Australian Bustard	781536	7554850	One individual

Datum: GDA 94
Zone: 50K

Appendix C shows all non-targeted species recorded. From both the impact and control areas, a total of 18 reptile species and four amphibian species were recorded.

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4 DISCUSSION

4.1.1 Targeted Pilbara Olive Python monitoring

No Pilbara Olive Pythons or secondary evidence was recorded during the current survey.

Nocturnal road spotting proved a successful method in recording reptile species, particularly snake species, with a total of nine snake species recorded (Appendix C). This included three python species (Stimson's, Pygmy and Black-headed), indicating that python species were active during the time of surveying.

Weather conditions during the survey were considered suitable, with daily maximum temperatures above 35°C, with minimum temperatures during surveying above 25°C. An indication of weather conditions experienced during the survey, taken from BoM's Newman weather station is shown in Appendix A. No Pilbara Olive Python critical habitat in the form of rocky gorges and gullies with permanent water pools is present within the Project Area. Suitable Pilbara Olive Python habitat within the Christmas Creek mine site is restricted to large eucalypt lined creeklines with semi-permanent pools.

Replicates of this habitat were searched in the control area located to the north of the mine site. This habitat type is typically used by pythons to move through the landscape where they can find shelter in any available rocky crevices and hollows in the surrounding eucalypts. This habitat is not expected to support permanent populations of Pilbara Olive Pythons, however it is expected to be utilised at different times by individuals moving across the landscape.

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5 CONCLUSION

The survey methods adopted by *ecologia* for the annual Christmas Creek targeted Pilbara Olive Python monitoring program followed methodology and were compliant with the Christmas Creek Water Management Scheme Fauna Management Plan (CC-PL-EN-003_Rev1) and are in accordance with state and federal guidelines, including the EPA's Guidance Statement No. 56 (EPA 2004), Position Statement No. 3 (EPA 2002) and *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA and DEC 2010). Species specific guidelines for surveying the Pilbara Olive Python (DSEWPaC 2011) were consulted during the development of monitoring methods. These methods were deemed appropriate for detecting the presence of the Pilbara Olive Python, when suitable habitats for the species are present, and weather conditions are optimal for observing active behaviour.

No Pilbara Olive Pythons were observed within the impact or control zones. The habitats at the impact sites were similar to the habitats at control sites, which generally comprised major creeklines with surface water. These habitats are not considered optimal habitat for the Pilbara Olive Python, with the species generally preferring gorge habitats with permanent or semi-permanent rock pools, and as this habitat type is limited to a small area north-east of the Christmas Creek mine, the abundance of Pilbara Olive Pythons within the study area is expected to be low.

As no Pilbara Olive Pythons have been recorded in the two years of monitoring within the impact zone, and single year of monitoring in the control zone, there is insufficient data to test for differences between the impact and control zones. Sampling effort at the active-search monitoring sites and road spotting transects will be repeated during future monitoring. If Pilbara Olive Pythons are recorded during future monitoring, statistical differences can then be tested for.

In summary, the annual monitoring detailed in this report satisfies the requirements of the Christmas Creek Fauna Management Plan for 2013-2014 monitoring period. The next monitoring event will be in January 2015.

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APPENDIX A WEATHER DATA DURING SURVEY

Weather data during the survey taken from the Newman weather station (BoM station 007176).

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
4/2/14	25.5	36.8	0
5/2/14	25.3	38.6	0
6/2/14	26.3	38.6	0
7/2/14	25.3	40.7	0
8/2/14	24.3	41.2	0
9/2/14	27.3	39.0	0
10/2/14	26.4	35.5	0

APPENDIX B SITE DESCRIPTIONS

Site description	Site photo
Pilbara Olive Python targeted sites	
Control site 1 (POP C1): Large sandy creek line with small ephemeral pools. Vegetation on edge of creek line comprises mulga woodland. No exposed rock outcrops present.	
Control site 2 (POP C2): Small eucalypt lined watercourse with several isolated pools on stony substrate. No exposed rock outcrops present.	

Site description	Site photo
Control site 3 (POP C3): Large rock pools near small breakaways. Vegetation includes *Melaleuca* shrubs. Crevices present within the exposed rock.	
Control site 4 (POP C4): Large eucalypt lined watercourse with several isolated pools on stony substrate. No exposed rock outcrops present.	
Impact site 1 (POP I1): Large eucalypt lined watercourse with several isolated pools on stony substrate. No exposed rock outcrops present.	

Site description	Site photo
Impact site 2 (POPI4): Large eucalypt lined watercourse with several isolated pools on stony substrate. No exposed rock outcrops present.	
Impact site 3 (POP I3): Large eucalypt lined watercourse with several isolated pools on stony substrate. No exposed rock outcrops present.	

Site description	Site photo
Impact site 4 (POP I4): Large eucalypt lined watercourse with several isolated pools on stony substrate. No exposed rock outcrops present.	

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APPENDIX C SPECIES RECORDED DURING MONITORING SURVEY (BYCATCH)

Family and species	Common name	Impact sites					Control sites				
		POP I1	POP I2	POP I3	POP I4	Impact Road	POP C1	POP C2	POP C3	POP C4	Control Road
Chelonidae											
Chelodina steindachneri	Flat-shelled Turtle		1					1	2		
Gekkonidae											
Diplodactylus conspicillatus	Fat-tailed Gecko										1
Heteronotia binoei	Bynoe's Gecko		1							1	
Gehyra variegata	Tree Dtella		3	3	1					1	
Pygopodidae											
Delma nasuta											1
Lialis burtonis	Burton's Legless Lizard										2
Agamidae											
Amphibolurus longirostris	Long-nosed Dragon								1		
Pogona minor	Dwarf Bearded Dragon										1
Scincidae											
Eremiascincus fasciolatus	Narrow-banded Sandswimmer	1			1						
Elapidae											
Brachyurophis approximans	Northwestern Shovel-nosed Snake										1
Furina ornata	Moon Snake										1
Pseudechis australis	Mulga Snake										4
Pseudonaja mengdeni	Gwardar										1
Suta fasciata	Rosen's Snake										1

Family and species	Common name	Impact sites					Control sites				
		POP I1	POP I2	POP I3	POP I4	Impact Road	POP C1	POP C2	POP C3	POP C4	Control Road
Boidae											
Antaresia perthensis	Pygmy Python									1	
Antaresia stimsoni	Stimson's Python				1						
Aspidites melanocephalus	Black-headed Python										2
Typhlopidae											
Ramphotyphlops grypus				1							
Amphibians											
Hylidae											
Cyclorana maini	Sheep Frog							1		1	
Cyclorana platycephala	Water-holding Frog		3								
Litoria rubella	Little Red Tree Frog	1		1	1		1	1	1	1	
Limnodynastidae											
Platyplectrum spenceri	Centralian Burrowing Frog		1								