

**An assessment of the lizard fauna on the Vale
Nouvelle-Calédonie areas KO 4, Bureaux KO 4,
BS 10, BS V6, KWRSF, Ext ROM PAD & Ext.
MIA, and ZEF.**

**Cygnnet Surveys & Consultancy
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1. INTRODUCTION

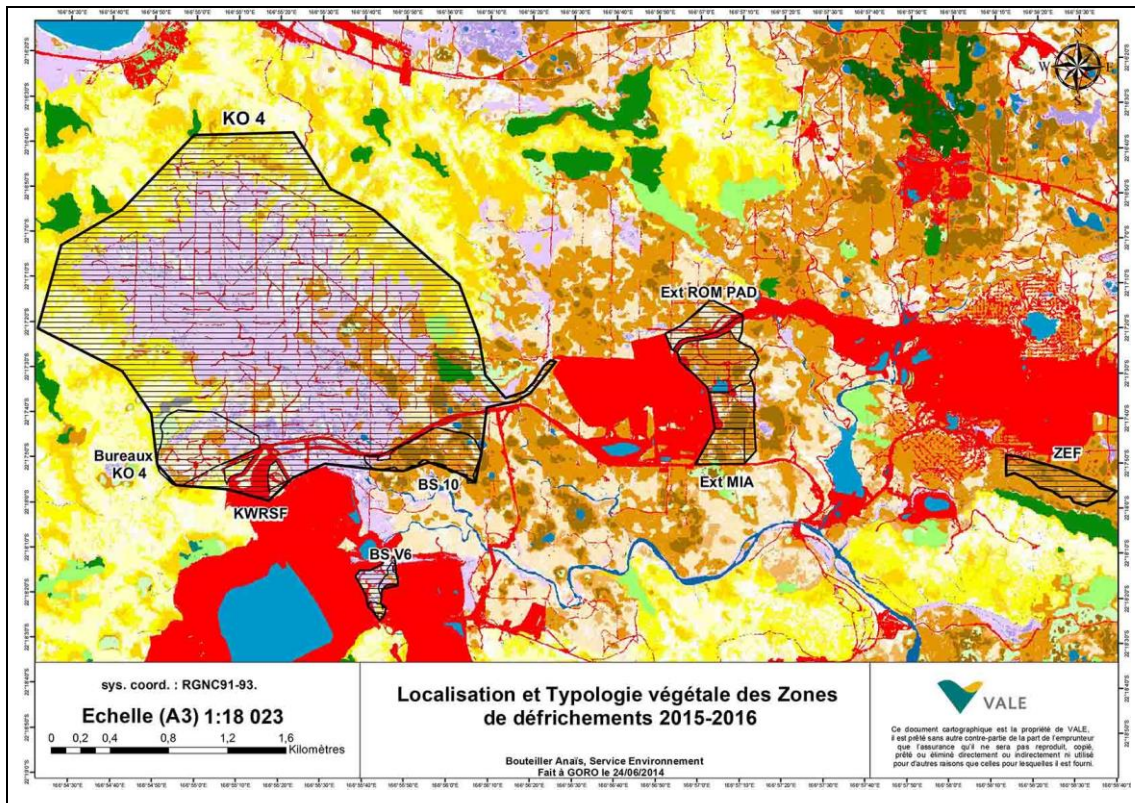
Cygnnet Surveys and Consultancy (CSC) were contracted by Vale Nouvelle-Calédonie to provide an expert assessment of the lizard fauna likely to occur on areas associated with the development of the KO4 sediment storage facility, areas associated with ore processing facility (FPP) and an area within the 5-10 year mine plan to be cleared, and identify the potential occurrence of sensitive species or habitat of conservation significance for lizards on these areas.

A number of studies have been commissioned by VN-C to investigate the lizard fauna of the Goro Plateau. The nature of these studies has been to establish monitoring sites for lizards (Sadlier & Swan, 2008), to inventory the lizard fauna in the areas of mine development (Sadlier & Swan, 2009a; Sadlier & Swan, 2010a; Sadlier *et al.*, 2011a), and to inventory the lizard fauna of proposed areas for preservation (Sadlier & Swan, 2009b and Sadlier *et al.*, 2011d). More recently a number of baseline inventory studies have been commissioned to assess the lizard fauna of concessions held by VN-C (Sadlier & Swan, 2010b & 2010c; Sadlier *et al.*, 2011b, 2011c, 2012, 2013a, 2013b, 2013c, 2014a, 2014b & 2014c).

These studies in combination have identified a rich and diverse lizard fauna of ~25 species on the Goro Plateau and adjacent areas of the Grand Sud. Included are a number of **significant species** which have been identified as of particular conservation concern by virtue having one or more aspects of their biology (habitat preferences, diet, home range, etc.) specialized, and which in combination with their extent of occurrence influences the ability of these species to persist into the future. The richest habitat is humid forest from which 20 species have been recorded, including three species of giant gecko formerly in the genus *Rhacodactylus*, one of which is endemic to the Grand Sud. Tall maquis preforest also has a rich lizard fauna, with up to 14 species recorded from this habitat type, whereas open maquis arbustif or herbaceous maquis typically have a low diversity of species and low abundance. As a result of these studies humid forest and maquis forest have been identified as **significant habitats** for lizards in the region.

2. STUDY SITES

This study focuses on the main area of west Kwe drainage to be affected by the construction of the KO4 sediment storage facility including the clearance of the areas Bureaux KO 4, BS 10 and KWRSF, development of the area BS V6 near the Carriere Audemand, development of the Ext. ROM PAD site also incorporating the area ext. MIA. Also included is the area to be affected by clearance of the mine buffer zone ZEF.



Location of areas KO 4, Bureaux KO 4, BS 10, BS V6, KWRSF, Ext ROM Pad & Ext. MIA, and ZEF that were the focus of fauna surveys for lizards in July/August 2014.

3. METHODS

Survey sites at each area were selected according to the following criteria:

- to encompass the full range of habitats so as to assess the species diversity for each area as completely as possible.
- to target specific habitats in which lizard species of particular conservation concern might occur.
- to obtain an estimate of the number of individuals of each species likely to be affected by the proposed development activities.

Previous studies to assess the diversity and abundance of lizard species in forest and maquis habitats in the Grand Sud have shown that strategically placed glue traps are highly effective in detecting the presence of the majority of day active skink species, and particularly effective in detecting the presence of secretive species. It is also the only effective method for detecting the presence of skink species in areas with a dense understory and groundcover. For these reasons this was the primary method used to detect diurnal and secretive skinks in all habitats across the areas surveyed.

The number of sites surveyed on each area reflected the size of the area, the diversity of habitats present, and the logistics with regard to accessibility. Each survey site had two to three transects, each transect representing a site replicate. At each transect one glue-trap was laid at each of 10 stations (each station 5-8 m. apart) along a transect line. Glue traps were strategically placed under or next to sheltering sites (crevices and cracks created where outcropping cuirasse boulders contact the ground, under and next to logs), in areas of litter or amongst surface debris, and under vegetation.

Geckos are usually the less diverse of the two lizard groups present. Geckos are active at night foraging in low shrubs, small trees, or the forest canopy. By day they shelter in retreat sites in standing vegetation or under cover on the ground. Timed nocturnal searches were undertaken in the first two hours after sunset. These night searches generally consisted of walking along tracks through maquis and forest habitats in the general vicinity of survey sites, or through the forest following transect markers. The method used to search for geckos is by detecting the reflection from the eye when a beam of light is directed towards the lizard, or by scanning vegetation with a powerful light at closer range to observe geckos on twigs or branches. Binoculars modified to carry a torch and emit a light beam from below the eyepieces of the binocular are used to detect eye reflection. This method readily detects both the larger and smaller geckos, but to be effective it generally requires a minimum search distance of 10-15m., and a co-worker is often required to collect the gecko for positive identification while the first observer keeps the animal in sight from a distance. Records are

also kept of lizards encountered opportunistically on transects during the course of checking glue traps.

The assessments of diversity of individual areas are based on extensive field and research experience on the New Caledonian lizard fauna by the CSC Principal Investigator and also draw support from the results of previous studies by CSC in the Grand Sud.



Typical placement of glue traps under vegetation in herbaceous maquis.



Typical placement of glue traps in the open (above left) and under a log (above right) in forest habitat.

4. RESULTS

AREA KO 4

Search effort: twenty sites in total were established in the area of the AREA KO 4 in July/August 2014 which included fifteen sites within the KO4 basin, two sites within the area BS 10, two sites within the area Bureaux KO 4, and a single site on the area identified as KWRSE.

Location of all sites investigated on the AREA KO 4 and habitat type for each replica.					
Area	Site	Co-ordinates		Habitat (type_n1)	(type_n2)
KO 4 basin	Site 1	Transect A	-22.28448S x 166.91170E	Maquis - hydromorphic	E
		Transect B	-22.28354S x 166.91170E	Maquis - hydromorphic	G
		Transect C	-22.28385S x 166.91064E	Maquis - hydromorphic	E
KO 4 basin	Site 2	Transect A	-22.28757S x 166.91226E	Maquis - hydromorphic	G
		Transect B	-22.28779S x 166.91269E	Maquis - hydromorphic	E
		Transect C	-22.28697S x 166.91188E	Maquis - hydromorphic	E
KO 4 basin	Site 3	Transect A	-22.29395S x 166.91727E	Maquis ligno-herbace	G
		Transect B	-22.29305S x 166.91708E	Maquis ligno-herbace	G
		Transect C	-22.29362S x 166.91643E	Maquis arbustif - dense	S
Bureaux KO 4	Site 4	Transect A	-22.29738S x 166.91763E	Maquis arbustif ouvert	H
		Transect B	-22.29752S x 166.91690E	Maquis arbustif ouvert	H
		Transect C	-22.29646S x 166.91747E	Maquis arbustif ouvert	H
KO 4 basin	Site 5	Transect A	-22.28042S x 166.91667E	Maquis - hydromorphic	E
		Transect B	-22.28251S x 166.91661E	Maquis - hydromorphic	E
		Transect C	-22.28372S x 166.91624E	Maquis - hydromorphic	E
KO 4 basin	Site 6	Transect A	-22.28547S x 166.91652E	Maquis - hydromorphic	E
		Transect B	-22.28704S x 166.91652E	Maquis - hydromorphic	E
		Transect C	-22.28816S x 166.91650E	Maquis - hydromorphic	E
Bureaux KO 4	Site 7	Transect A	-22.29567S x 166.91531E	Humid forest	N
		Transect B	as for A	Humid forest	N
		Transect C	as for A	Humid forest	N
KO 4 basin	Site 8	Transect A	-22.27972S x 166.91859E	Maquis - hydromorphic	E
		Transect B	-22.27962S x 166.91945E	Maquis - hydromorphic	E
		Transect C	-22.28087S x 166.92024E	Maquis - hydromorphic	E
KO 4 basin	Site 9	Transect A	-22.28951S x 166.92509E	Maquis arbustif semi-ouvert	J
		Transect B	-22.28878S x 166.92531E	Maquis arbustif semi-ouvert	J
		Transect C	-22.28704S x 166.92436E	Maquis arbustif semi-ouvert	J
KO 4 basin	Site 10	Transect A	-22.28309S x 166.92418E	Maquis ligno-herbace	U
		Transect B	-22.28213S x 166.92235E	Maquis ligno-herbace	G
		Transect C	-22.28203S x 166.92517E	Maquis ligno-herbace	G
KO 4 basin	Site 11	Transect A	-22.29253S x 166.92604E	Maquis - hydromorphic	E
		Transect B	-22.29318S x 166.92601E	Maquis - hydromorphic	E
		Transect C	-22.29419S x 166.92596E	Maquis - hydromorphic	E
KO 4 basin	Site 12	Transect A	-22.28941S x 166.92746E	Paraforest – Gymn. dom.	L
		Transect B	as for A	Paraforest – Gymn. dom.	L

Area	Site	Co-ordinates		Habitat (type_n1)	(type_n2)
KO 4 basin	Site 13	Transect A Transect B	-22.28481S x 166.92842E as for A	Maquis ligno-herbace Maquis ligno-herbace	U U
KO 4 basin	Site 14	Transect A Transect B	-22.29197S x 166.92931E -22.29177S x 166.92908E	Paraforest – Gymn. dom. Paraforest – Gymn. dom.	K K
KO 4 basin	Site 15	Transect A Transect B	-22.29365S x 166.93228E -22.29364S x 166.93254E	Paraforest – Gymn. dom. Paraforest – Gymn. dom.	K K
KO 4 basin	Site 16	Transect A Transect B	-22.29235S x 166.93283E as for A	Humid forest Humid forest	T T
KO 4 basin	Site 17	Transect A Transect B	-22.28877S x 166.93213E as for A	Humid forest Humid forest	N N
BS 10	Site 18	Transect A Transect B	-22.29572S x 166.93431E -22.29589S x 166.93451E	Paraforest – Gymn. dom. Paraforest – Gymn. dom.	K K
BS 10	Site 19	Transect A Transect B	-22.29718S x 166.93297E -22.29660S x 166.93369E	Maquis arbustif ouvert Maquis arbustif ouvert	J J
KWRSE	Site 20	Transect A Transect B Transect C	-22.29725S x 166.92032E -22.29785S x 166.92197E -22.29787S x 166.92169E	Maquis - hydromorphic Maquis - hydromorphic Maquis - hydromorphic	H H H
KO 4 basin	Site A AS7	Transect A Transect B Transect C	-22.29226S x 166.93030E as for A as for A	Humid forest Humid forest Humid forest	T T T
KO 4 basin	Site B AS7	Transect A Transect B Transect C	-22.28633S x 166.92399E as for A as for A	Maquis ligno-herbace Maquis ligno-herbace Maquis ligno-herbace	U U U
KO 4 basin	Site C AS7	Transect A Transect B Transect C	-22.28464S x 166.91327E -22.87318S x 166.91327E -22.91334S x 166. 28541E	Maquis - hydromorphic Maquis - hydromorphic Maquis - hydromorphic	E E E
KO 4 basin	Site D AS7	Transect A Transect B Transect C	-22.29365S x 166.916845E as for A as for A	Maquis - hydromorphic Maquis - hydromorphic Maquis - hydromorphic	E E E
KO 4 basin	Site E AS7	Transect A Transect B Transect C	-22.28922S x 166.90796E as for A as for A	Maquis - hydromorphic Maquis - hydromorphic Maquis - hydromorphic	E E E
BS 10	Site 6 Gardenia	Transect A Transect B Transect C	-22.976S x 166.930E as for A as for A	Paraforest – Gymn. dom. Paraforest – Gymn. dom. Paraforest – Gymn. dom.	K K K

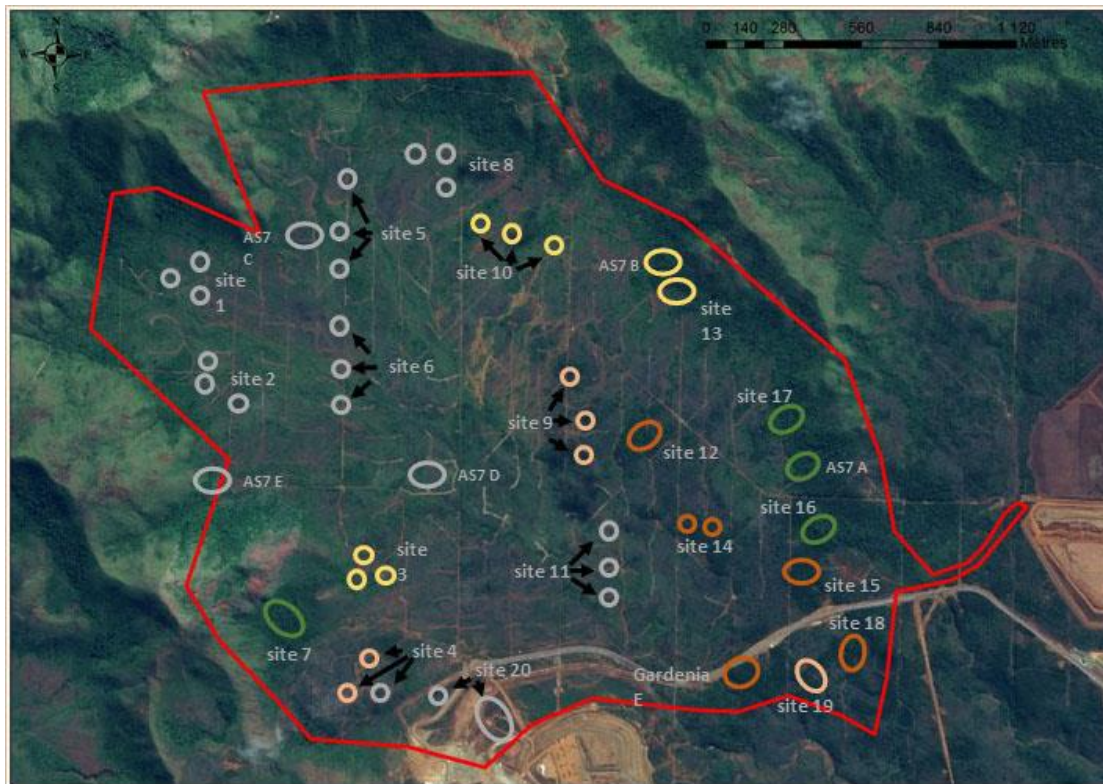
Note: 'Habitat' corresponds to the broad vegetation types (type_n1), and the code for the finer level of vegetation type (type_n2) as determined in field during the course of the surveys.

These sites were surveyed in the period 29th July – 5th August 2014. A total of 580 trap stations were operational across the AREA KO 4 over the survey period.

During this period timed nocturnal searches were undertaken in the major habitat types present as follows: 3 person hours in maquis on hydromorphic soils (site 6); 3.5 person hours collectively in humid forest (1.5 hours site 7; 1 hour site 16; 1 hour site 17); 1 hour in *Gymnostoma* dominated paraforest (site 18),

A further six sites within the AREA KO 4 had previously been surveyed as part of the surveys of the AS7 concession (five sites) and Gardenia concession (one site). The methodology used was the same and the results of these earlier surveys are included here.

Collectively over the AREA KO 4 the search effort comprised 26 sites with 700 individual trap stations. The representation of vegetation type covered by these sites was humid forest (14.5%), *Gymnostoma* dominated paraforest (15.7%), maquis arbustif (10%), ligno-herbaceous maquis (14.5%) and maquis on hydromorphic soils (44.3%). These add up to 99%.



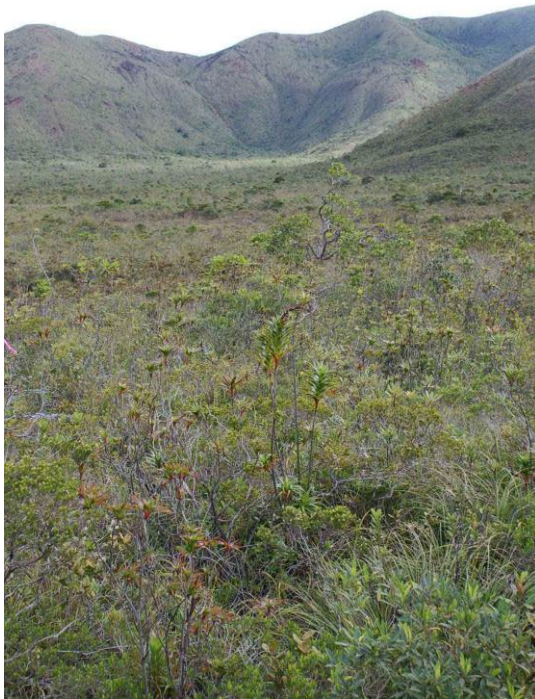
Sites surveyed on the AREA KO 4 and including sites surveyed as part of studies on the AS7 and Gardenia concessions – sites color coded to habitat type.

The KO 4 basin: is an extensive gradually sloping area at the base of the apex of the east-west running Kwé Range and north-south running Kwa Neie Range where they join.



The KO 4 basin viewed from Bureaux KO 4.
Top – western sector. Centre – central sector. Bottom – eastern sector.

The predominant vegetation on the low lying areas is low maquis on hydromorphic soils (sites 1, 2, 5, 6, 8, and 11; AS7 C, D, and E), with scattered areas of open-dense maquis arbustif (site 9, 4, 19) and *Gymnostoma* dominated paraforest (site 12, 14, 15, 18; *Gardenia* E), and isolated areas of forest generally at the base of the ranges (site 7, 16 and 17; AS7 A). The lower slopes of the range are vegetated with (usually dense) ligno-herbaceous maquis (sites 3, 10 and 13; AS7 B).



**Low maquis on hydromorphic soils
typical of much of the habitat over the
KO 4 basin.**

Left: Site 8.

Below: Site 2.





Dense maquis ligno-herbace at the base of the range – site 13 in the north of the KO 4 basin.



Maquis arbustif semi-ouvert – site 9 in the centre of the KO 4 basin.



***Gymnostoma* dominated maquis paraforestier – site 15 in the east of the KO 4 basin.**

Bureaux KO 4: an area of open maquis arbustif on a rise with a broken ferrallitique cuirasse iron cap (site 4), and extending to the base of an adjacent range with an area of forest at the base of the range (site 7).



Forest patch in the area KO 4 Bureaux – site 7.



Interior of forest patch in the area KO 4 Bureaux – site 7.



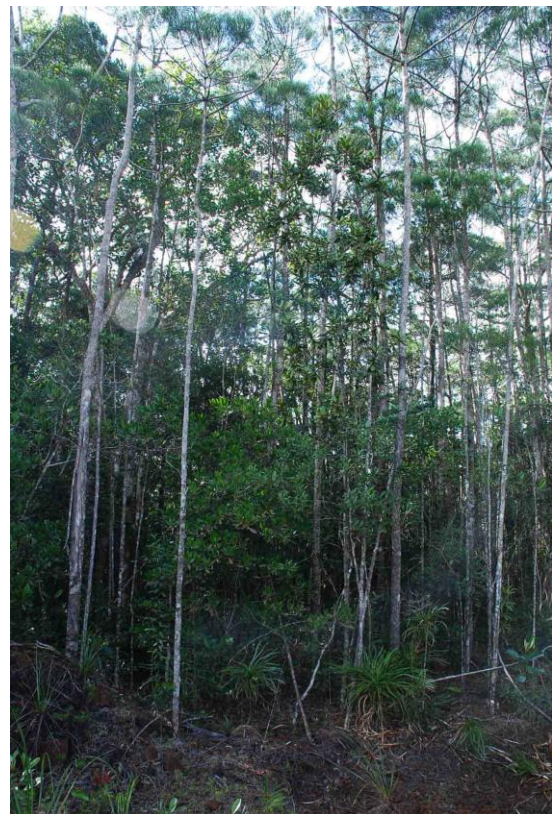
Maquis arbustif ouvert (above & below) on the area KO 4 Bureaux – site 4.



BS 10: an area of dense maquis with patches of *Gymnostoma* dominated paraforest, the latter on a broken ferrallitique cuirasse ironcap. Two sites were established in the area BS 10 in July/August 2014, one (site 18) in *Gymnostoma* dominated paraforest and one in maquis arbustif (site 19), and one of the Gardenia concession survey sites from June 2010 (Gardenia site 6) was located in *Gymnostoma* dominated paraforest.



Open maquis arbustif on the area BS 10 – site 18.



***Gymnostoma* dominated maquis paraforestier – site 19 in the area BS 10.**

KWRSE: a small area (divided into two patches by roadworks) of ligno-herbaceous maquis on a ferrallitic cuirasse iron cap (site 20).



Maquis on hydromorphic surface in the area KWRSE – site 20.

Species Recorded: twelve species of lizard (eight skinks and four geckos) were recorded across the 20 sites surveyed within the KO 4 basin, Bureaux KO 4, BS 10 and KWRSE areas from the surveys undertaken in July/August 2014, and surveys of the Gardenia concession (part of BS 10) undertaken in June 2010 and of the AS7 concession undertaken in March 2011 combined.

Humid forest had the highest diversity of species with 9 taxa recorded from the four humid forest sites surveyed on the KO 4 AREA. Humid forest also had the greatest abundance of individuals with 103 of the 287 records for all survey effort on the KO 4 AREA. The majority of records from humid forest habitat were primarily ‘forest’ inhabiting skinks, including one species of particular conservation significance, *Simiscincus aurantiacus*, listed as threatened on the IUCN Red list. The most abundant and widespread species in humid forest were *Marmorosphax tricolor* (n = 58) and *Sigaloseps deplanchei* (n = 21), which were recorded from all four forest sites. The primarily ‘forest’ inhabiting skinks *Caledoniscincus notialis* and *Tropidoscincus variabilis* were also recorded from one or more of the forest sites. The densities of *Sigaloseps deplanchei* and *Caledoniscincus notialis* recorded during the July/August 2014 survey period were lower overall than those for the March 2011 survey period of the AS7 concession. This likely reflects the lower optimal temperatures for diurnal lizard activity in humid forest habitat during the July/August 2014 survey period compared to earlier surveys. Three species of gecko are recorded from humid forest habitat in the area,

including one of particular conservation significance the giant gecko *Rhacodactylus sarasinorum*, listed as threatened on the IUCN Red list, were recorded from humid forest during the July/August 2014 survey period.

A moderate diversity of species were recorded from paraforest habitat. Five taxa were recorded from the five *Gymnostoma* dominated paraforest sites surveyed on the AREA KO 4. The species recorded included the primarily ‘forest’ inhabiting skinks, *Marmorosphax tricolor*, *Sigaloseps deplanchei*, *Caledoniscincus notialis* and *Simiscincus aurantiacus*, a species of particular conservation significance (see above). Only a single species of gecko, *Bavayia septuiclavis*, was recorded from paraforest habitat in the area.

A moderate diversity of seven species of lizards were recorded from the eleven hydromorphic maquis habitats surveyed, and six species from the four ligno-herbaceous maquis sites. No species were recorded from the two maquis arbustif sites. No species of conservation concern were recorded from maquis habitats in the area.

Several primarily ‘forest’ inhabiting skinks, *Marmorosphax tricolor*, *Sigaloseps deplanchei*, *Caledoniscincus notialis* and *Tropidoscincus variabilis* were recorded from hydromorphic maquis and ligno-herbaceous maquis habitat on AREA KO 4. The records of *Marmorosphax tricolor* from hydromorphic maquis are all from the survey of the AS7 concession undertaken in March 2011. The species presence in this habitat at this time of year vs it’s apparent absence in July/August is unclear, but could indicate a degree of temporary mobility during the wet season (March) into habitat which is otherwise not optimal for the species in drier months.

Significant species: two significant species were recorded from the AREA KO 4 during the July/August 2014 survey period. The skink *Simiscincus aurantiacus* and the gecko *Rhacodactylus sarasinorum* were both from humid forest habitat, and *Simiscincus aurantiacus* was also recorded in paraforest habitat.

Significant sites: the areas of humid forest and paraforest surveyed in the east of the AREA KO 4 have a diversity of lizard species that includes two threatened species of regional significance, and potentially several other of conservation significance. Otherwise, much of the AREA KO 4 consists of open and dense maquis habitat that typically has a low diversity of lizard species and no species of particular conservation concern reliant upon it.

Species	Sites												
	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Caledoniscincus austrocaledonicus</i>	5	4	2	-	4	6	-	5	8	10	4	-	-
<i>Caledoniscincus notialis</i>	-	-	1	-	-	-	4	-	-	2	-	6	1
<i>Lioscincus tillieri</i>	-	-	-	-	-	-	-	2	-	-	-	-	-
<i>Marmorosphax tricolor</i>	-	-	1	-	-	-	12	-	-	-	-	15	11
<i>Phoboscincus garnieri</i>	-	-	1	-	-	-	-	-	-	-	-	-	-
<i>Sigaloseps deplanchei</i>	-	-	-	-	-	-	1	-	-	-	-	1	3
<i>Simiscincus aurantiacus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Tropidoscincus variabilis</i>	-	-	-	-	-	1	-	1	2	-	-	-	-
<i>Bavayia sauvagii</i>	-	-	-	-	-	1	-	-	-	-	-	-	-
<i>Bavayia septuiclavus</i>	-	-	-	-	-	-	2	-	-	-	-	-	-
<i>Rhacodactylus auriculatus</i>	-	-	-	-	-	1	-	-	-	-	-	-	-
<i>Rhacodactylus sarasinorum</i>	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	5	4	5	0	4	9	19	8	10	12	4	22	15

	14	15	16	17	18	19	20	AS7 A	AS7 B	AS7 C	AS7 D	AS7 E	Ga. 6
<i>Caledoniscincus austrocaledonicus</i>	-	-	-	-	-	-	-	-	-	1	2	4	-
<i>Caledoniscincus notialis</i>	9	-	2	-	-	-	-	7	3	4	3	2	-
<i>Lioscincus tillieri</i>	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Marmorosphax tricolor</i>	4	2	7	17	3	-	-	22	10	1	9	2	6
<i>Phoboscincus garnieri</i>	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Sigaloseps deplanchei</i>	2	-	4	4	4	-	-	12	1	-	-	-	6
<i>Simiscincus aurantiacus</i>	-	-	-	1	2	-	-	-	-	-	-	-	-
<i>Tropidoscincus variabilis</i>	-	-	-	-	-	-	-	1	1	2	-	1	-
<i>Bavayia sauvagii</i>	-	-	-	-	-	-	-	1	-	-	-	-	-
<i>Bavayia septuiclavus</i>	1	-	1	1	1	-	-	-	-	-	-	-	-
<i>Rhacodactylus auriculatus</i>	-	-	-	-	-	-	-	3	-	3	-	4	-
<i>Rhacodactylus sarasinorum</i>	-	-	-	1	-	-	-	-	-	-	-	-	-
Total	16	2	14	24	10	0	0	46	15	11	14	13	12

AREA BS V6

A small area of hydromorphic maquis on a broken ferrallitique cuirasse iron cap surface. The site is completely isolated from nearby areas of natural vegetation, it lies adjacent to a quarry area and is bounded by a primary access road along the base of the retaining wall of the Zone 1 sediment storage area. The site is extremely degraded by dust on the vegetation.

Sites surveyed on the AREA BS V6 – sites color coded to habitat type.



AREA BSV6, degraded maquis shrubland on hydromorphic surface.



Search effort: one site was surveyed on the AREA BS V6 in the period 4th – 6th August 2014. A total of 30 trap stations were operational throughout the survey period which comprised two full days and nights.

Location of the site investigated on the AREA BS V6 and habitat type for each replica.					
Area	Site	Co-ordinates		Habitat (type_n1)	(type_n2)
BS V6	Site 1	Transect A	-22.30470S x 166.29836E	Maquis - hydromorphic	E
		Transect B	-22.30552S x 166.29841E	Maquis - hydromorphic	E
		Transect C	-22.30509S x 166.92905E	Maquis – arbustif ouvert	H

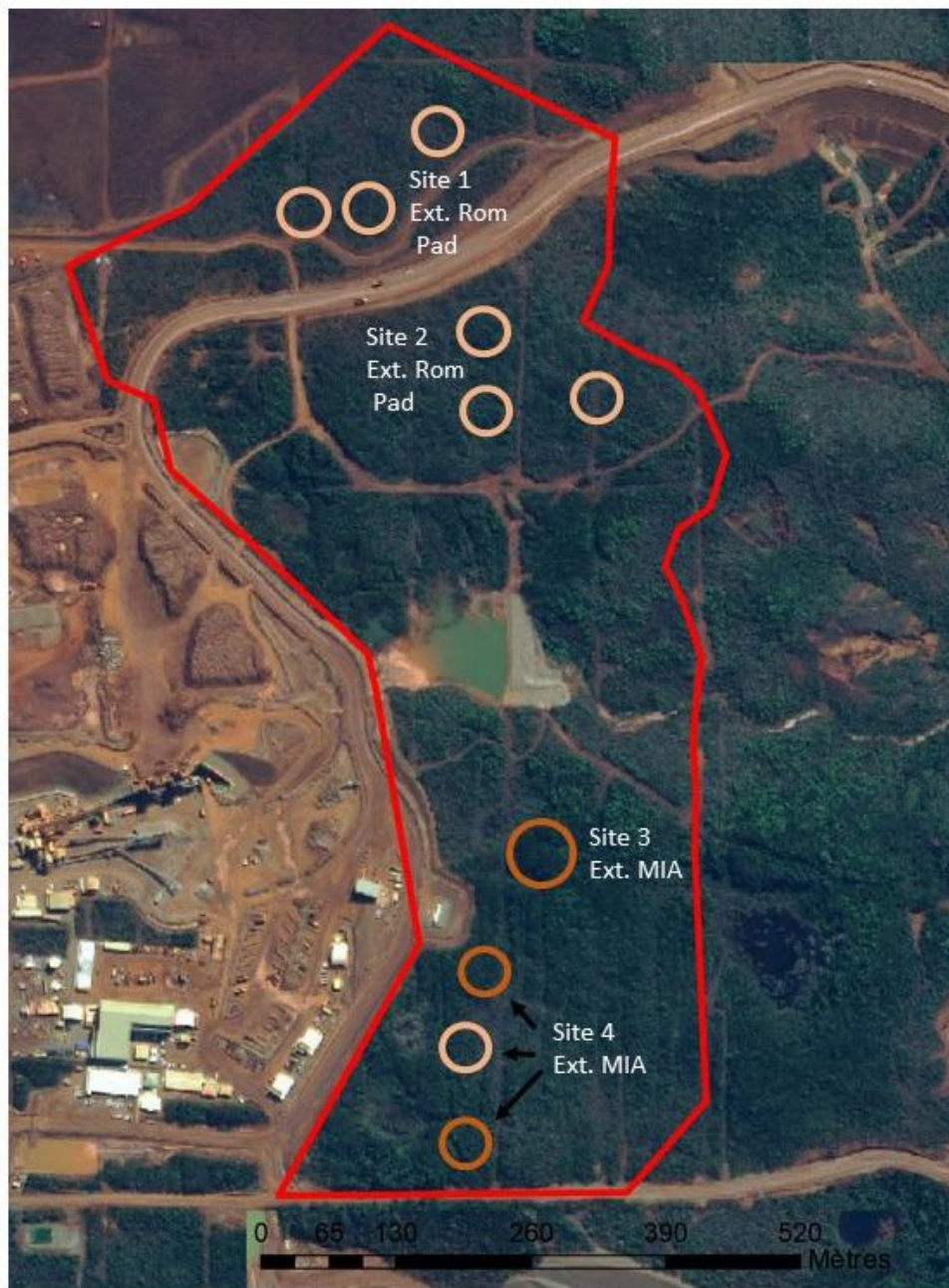
Species Recorded: no species of lizard were recorded from the AREA BS V6.

Significant species: no significant species of lizard are expected to inhabit the AREA BS V6.

Significant sites: there are no significant areas for lizards of conservation significance on the AREA BS V6.

AREAS Ext. ROM PAD & Ext. MIA

Search effort: two sites (1 & 2) were surveyed on the Ext. ROM PAD area and two (3 & 4) on the Ext. MIA area in the period 5th – 7th August 2014. A total of 120 trap stations were operational throughout the survey period which comprised two full days and nights.



Sites surveyed on the AREAS Ext. ROM PAD & ext. MIA – sites color coded to habitat type..

Location of sites investigated on the AREAS Ext. ROM PAD & Ext. MIA and habitat type for each replica.					
Area	Site	Co-ordinates		Habitat (type_n1)	(type_n2)
Ext. ROM PAD	Site 1	Transect A	-22.28866 x 166.95105E	Maquis arbustif ouvert/dense	H & J
		Transect B	-22.28885S x 166.95064E	Maquis arbustif semi-ouvert	H
		Transect C	-22.28805S x 166.95105E	Maquis arbustif ouvert/dense	H & J
Ext. ROM PAD	Site 2	Transect A	-22.28993S x 166.95203E	Maquis arbustif ouvert/dense	H & J
		Transect B	-22.29037S x 166.95201E	Maquis arbustif semi-ouvert	J
		Transect C	-22.29082S x 166.95271E	Maquis arbustif ouvert	H
Ext. MIA	Site 3	Transect A	-22.29410S x 166.95238E	Paraforest – Gymn. dom.	K
		Transect B	-22.29456S x 166.95232E	Paraforest – Gymn. dom.	K
		Transect C	-22.29450S x 166.95221E	Paraforest – Gymn. dom.	K
Ext. MIA	Site 4	Transect A	-22.29703S x 166.95181E	Paraforest – Gymn. dom.	J
		Transect B	-22.29649S x 166.95186E	Maquis arbustif ouvert	H
		Transect C	-22.29562S x 166.95186E	Paraforest – Gymn. dom.	J

Collectively over the four sites the trap stations covered open to dense maquis arbustif (55%) and *Gymnostoma* dominated paraforest (45%).



Site 1 on the Ext. ROM PAD area – open maquis arbustif on a broken ferrallitique cuirasse iron cap surface.



Site 3 on the Ext. MIA area – *Gymnostoma* dominated maquis paraforestier.



Species Recorded: no species were recorded from the open to dense maquis arbustif of sites 1 and 2 on the Ext. ROM PAD area, and only a low diversity of species was recorded from *Gymnostoma* dominated paraforest habitat of sites 3 and 4 on the Ext. MIA area. The species recorded from paraforest on the Ext. MIA area were the primarily ‘forest’ inhabiting skinks, *Marmorosphax tricolor*, *Sigaloseps deplanchei* and *Caledoniscincus notialis*.

Species	Sites			
	1 – Ext. ROM PAD	2 – Ext. ROM PAD	3 – Ext. MIA	4 – Ext. MIA
<i>Caledoniscincus notialis</i>	-	-	1	-
<i>Marmorosphax tricolor</i>	-	-	8	2
<i>Sigaloseps deplanchei</i>	-	-	2	1
TOTAL	0	0	11	3

Species of lizard and number of individuals recorded from the AREAS Ext. ROM PAD & Ext. MIA.

Significant species: no significant species of lizard were recorded from the Ext. ROM PAD and Ext. MIA sites. Several threatened species of lizard could occur in the areas of tall *Gymnostoma* dominated paraforest habitat of the Ext. MIA area site 3 (see SUMMARY).

Significant sites: the area of tall *Gymnostoma* dominated paraforest habitat in the vicinity of site 3 on the Ext. MIA area could have several threatened species of lizard (see SUMMARY).

AREA ZEF

An area of dense maquis arbustif on a broken ferrallitique cuirrasse iron cap surface. The site was heavily dissected and cleared by tracks. Survey sites were established in areas adjacent to those already cleared and did not necessarily lie within the AREA ZEF.



Sites surveyed on the AREA ZEF – sites color coded to habitat type.



AREA ZEF, open maquis arbustif (left) of site 1 and dense maquis arbustif (right) of site 2.

Search effort: two sites were surveyed on the AREA ZEF in the period 7th – 9th August 2014. A total of 60 trap stations were operational throughout the survey period which comprised two full days and nights.

Location of the site investigated on the AREA ZEF and habitat type for each replicate.					
Area	Site	Co-ordinates		Habitat (type_n1)	(type_n2)
ZEF	Site 1	Transect A	-22.29717S x 166.97086E	Maquis arbustif semi-ouvert	I
		Transect B	-22.29731S x 166.97121E	Maquis arbustif semi-ouvert	I
		Transect C	-22.29729S x 166.97145E	Maquis arbustif - dense	I
ZEF	Site 2	Transect A	-22.29805S x 166.97450E	Maquis arbustif - dense	J
		Transect B	as for A	Maquis arbustif - dense	J
		Transect C	-22.29805S x 166.97626E	Maquis arbustif - dense	J

Species Recorded: a low diversity of species were recorded from maquis arbustif habitat of the AREA ZEF. Three taxa were recorded from the dense maquis arbustif habitat at site 2, the primarily ‘forest’ inhabiting skinks *Marmorosphax tricolor* and *Caledoniscincus notialis*, and the generalist species *Caledoniscincus austrocaledonicus*, and one species, *Caledoniscincus notialis*, from the more open maquis arbustif semi-ouvert habitat at site 1.

Species	Sites	
	1 – ZEF	2 – ZEF
<i>Caledoniscincus austrocaledonicus</i>	-	1
<i>Caledoniscincus notialis</i>	1	8
<i>Marmorosphax tricolor</i>	-	1
TOTAL	1	10

Significant species: no significant species of lizard were recorded from the AREA ZEF.

Significant sites: there are no areas of significance for the conservation of lizards on the AREA ZEF.

5. SUMMARY

Significant species

Significant species are those of particular conservation concern by virtue of having one or more aspects of their biology (habitat preferences, diet, home range, etc.) specialized, and which in combination with their extent of occurrence can determine the ability of the species to persist into the future. Two significant species of lizards were recorded from humid forest habitats on the concessions surveyed.

The threatened skink *Simiscincus aurantiacus* ('Vulnerable') was recorded from humid forest and paraforest habitat on the AREA KO 4 and the threatened gecko *Rhacodactylus sarasinorum* ('Vulnerable') was also recorded from humid forest habitat in the east of the AREA KO 4.

Several other lizard species of conservation significance have been recorded from humid forest and paraforest habitat similar to that surveyed on the AREA KO 4. The skink *Graciliscincus shonae* has been recorded from paraforest habitat on the 20-30 year mine plan and the skink *Nannoscincus mariei* from humid forest in the Wadjana conservation area, and the geckos *Eurydactylodes symmetricus* and *Bavayia goroensis* have been recorded from humid forest on the Kwe Range and adjacent paraforest habitat. All are listed as threatened on the IUCN Red list.

No significant species were recorded on the AREAS Ext. ROM PAD & Ext. MIA. Several lizard species of conservation significance have been recorded from paraforest habitat similar to that surveyed on the Ext. MIA area. The skink *Graciliscincus shonae* has been recorded from paraforest habitat on the 20-30 year mine plan and the skink *Simiscincus aurantiacus* from paraforest on the AREA KO 4 and adjacent to the Kwe Range, and the geckos *Eurydactylodes symmetricus* and *Bavayia goroensis* have been recorded from paraforest adjacent to the Kwe Range. All are listed as threatened on the IUCN Red list.

No significant species are expected to occur on the AREA BS V6 or AREA ZEF.

Significant sites

Humid Forest: In southern New Caledonia, the greatest diversity of lizards is found in humid forest, with ~20 species now recorded from this habitat in the region (Sadler & Swan, 2009a), over half of which are largely restricted to this habitat type.

Forest habitat on AREA KO 4 is present as patches of varying size, but which internally are well developed with the essential microhabitat components for a diversity of lizard species. The skink *Simiscincus aurantiacus* and gecko *Rhacodactylus sarasinorum*, both listed as threatened under the IUCN Red List criteria, were recorded from one of the forest patches surveyed. These species, and the threatened skinks *Nannoscincus mariei* and *Graciliscincus shonae*, and geckos *Eurydactylodes symmetricus* and *Bavayia goroensis* could occur in the humid forest in the east of AREA KO 4.

Maquis Paraforestier & Preforestier: Previous studies have recorded a total ~15 species of lizard from this habitat type on the Goro Plateau (Sadler *et al.*, 2011a). This is a level of diversity approaching that recorded for humid forest, and far greater than maquis arbustif or ligno-herbaceous maquis. A high proportion of species recorded from maquis paraforestier and maquis preforestier habitat (10 of 15) are regional endemics (species restricted to the southern ultramafic region), and a number of these are listed as of conservation significance under IUCN Red List criteria.

The skink *Simiscincus aurantiacus*, a species listed as threatened under IUCN Red List criteria, was recorded from one of the paraforest sites surveyed on the AREA KO 4. The species has been recorded from other patches of paraforest in the area, and its occurrence in paraforest habitat is usually associated with the presence of a broken ferrallitique cuirasse iron cap, which provides the suitable microhabitat for the species. Several other threatened species, the skinks *Nannoscincus mariei* and *Graciliscincus shonae*, and geckos *Eurydactylodes symmetricus* and *Bavayia goroensis*, have also been recorded from patches of paraforest in areas adjacent to the AREA KO 4 and the Ext. MIA area.

6. KEY POINTS

The surveys of the AREA KO 4, AREA BS V6, AREAS Ext. ROM PAD & Ext. MIA and AREA ZEF in July/August 2014 identified the presence of significant sites for species of particular conservation significance as follows:

- areas of humid forest in the east of AREA KO 4 are expected to contain a diversity of lizard species, including several of conservation significance.
- areas of humid forest in the east of AREA KO 4 have populations of the giant gecko, *Rhacodactylus sarasinorum*, a species of particular conservation concern in the region.

- areas of tall *Gymnostoma paraforest* on a broken ferrallitique cuirrasse iron cap of the AREA KO 4 are expected to contain a diversity of lizard species, including several of conservation significance.

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