

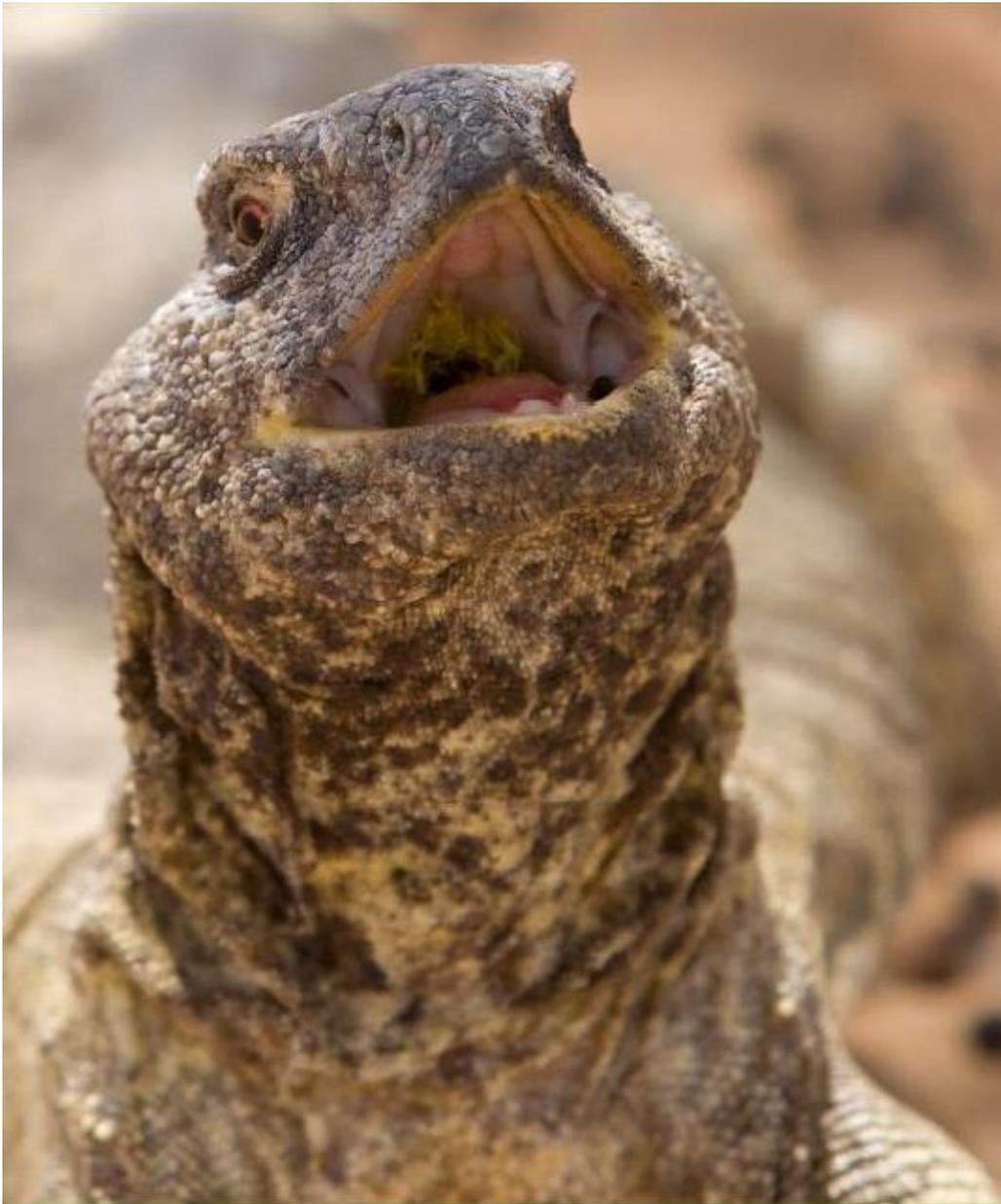


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DUBAI DESERT CONSERVATION RESERVE



Survey of Leptien's Spiny-tailed Lizard
(*Uromastyx aegyptica leptieni*)
In the Dubai Desert Conservation Reserve

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Introduction

Leptien's spiny-tailed lizards (*Uromastix leptieni*) are large ground dwelling herbivorous lizards found on gravel terrain and inter-dune compact soils endemic to UAE and Oman. They can grow up to 65cm long and usually live in loose colonies. Single burrows are rarely found there are usually several, at some 20 to 100 meters distance from its neighbour. Despite their dragon-like appearance they are very placid animals that prefer to flee rather than enter into conflict.

Their favoured plants include the coarse desert grasses as well as the evergreen herbs, with arthropods making up less than 1% of their diet. They have a very low metabolism that allows them to not only make the most of a low calorie diet, but to also go several weeks without eating anything. They rarely need to drink as they extract most of their water from their food. Excessive salts are excreted through a salt gland near their eyes.

Since the establishment of the Dubai Desert Conservation Reserve (DDCR), it has been protected from many destructive influences such as Camels, 4X4 vehicles and littering. Its fauna and flora have subsequently increased in abundance and are reaching healthy populations once again.

As Spiny-tailed lizards are part of the herbivore community in the DDCR and were directly affected by low vegetation density and 4X4 driving in the past, it was decided that a survey of their numbers, distribution and density needed to be conducted.

The results from this survey are intended for use in monitoring the Spiny-tailed lizard population through repetition of the survey on an annual basis.

The Al Maha Reserve (AMR) which is included in the DDCR was established in 1999. The DDCR was established in 2004 but still had camel farmers operating within its boundaries until the end of 2008. It is therefore safe to assume that the Spiny-tailed lizard density will be lower in the DDCR.

Unfortunately due to temperature decrease and subsequent lizard dormancy, the survey had to be completed over two hot seasons for the entire DDCR to be surveyed. It would be wise to commence future surveys soon after individuals are observed to emerge from their winter dormancy, so as to complete it over one season.



Image 1: An adult male Spiny-tailed lizard.

Materials & Methods

The survey was conducted from 29 August 2008 to 29 October 2008 (half the study area) & again from (11-21 May 2009), while the spiny-tailed lizards were active between 6am and 10am.

To record the co-ordinates of each spiny-tailed lizard's burrow, a Garmin GPS Map76 was used. Each burrow was placed into one of the following categories based on the presence or absence of activity:

1. **Active:** Entrance is open and there are clear signs of activity around the burrow (tracks, fresh faeces, etc.)



Images 2 & 3: Active Burrows with clear tracks at the entrance.

2. **Inactive:** Entrance is open but shows signs of sand build-up. Clearly no activity (tracks, fresh faeces, etc.) around the burrow.



Image 4: In-active burrow partially filled with sand.

3. **Abandoned:** Entrance is closed (filled with sand) but the gravel ridge around the burrow is still obviously present



Image 5: Abandoned burrow with gravel ridge.

To assist in maintaining well spaced transects, a track log was performed while walking over the plains. This also ensured that the entire gravel plain was covered. The distance between transects was dependant on the vegetation cover and terrain which affected the discovering of burrows. The transects were 30-60 meters apart over open and sparsely vegetated terrain. However over rough and more densely vegetated terrain, the transects were 15-30 meters apart. Burrows were recorded along both sides of the transects.

The data collected was uploaded to ArcGIS using mxGPS software and plotted on a map displaying the gravel plains in the DDCR. This ensured that all the gravel plains were covered in the survey.

Tracklogs recorded for Spiny-tailed lizard survey

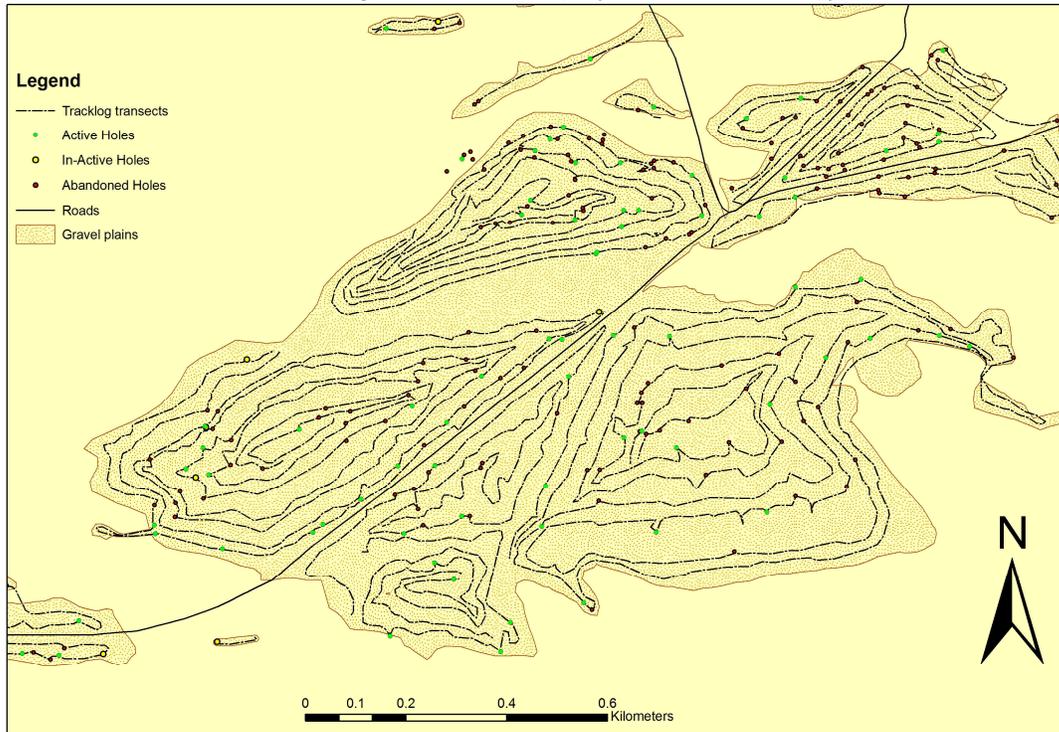


Figure 1: Example of track logs recorded for the survey.



Image 6: Surveying for Spiny-tailed lizards while running a track log on the GPS.

Results

Population count:

DDCR:	Burrows	Percentage (%)
1. Active	189	42.66
2. Inactive	18	4.06
3. Abandoned	236	53.27
	443	100
AMR:		
1. Active	259	32.87
2. Inactive	25	3.17
3. Abandoned	504	63.96
	788	100
Total:		
1. Active	448	36.39
2. Inactive	43	3.49
3. Abandoned	740	60.11
	1231	100

Table 1: Three study sites displaying burrow classification, number counted and the percentage of total.



Image 7: Spiny-tailed lizard basking at his burrow.

Distribution:
1. DDCR survey site

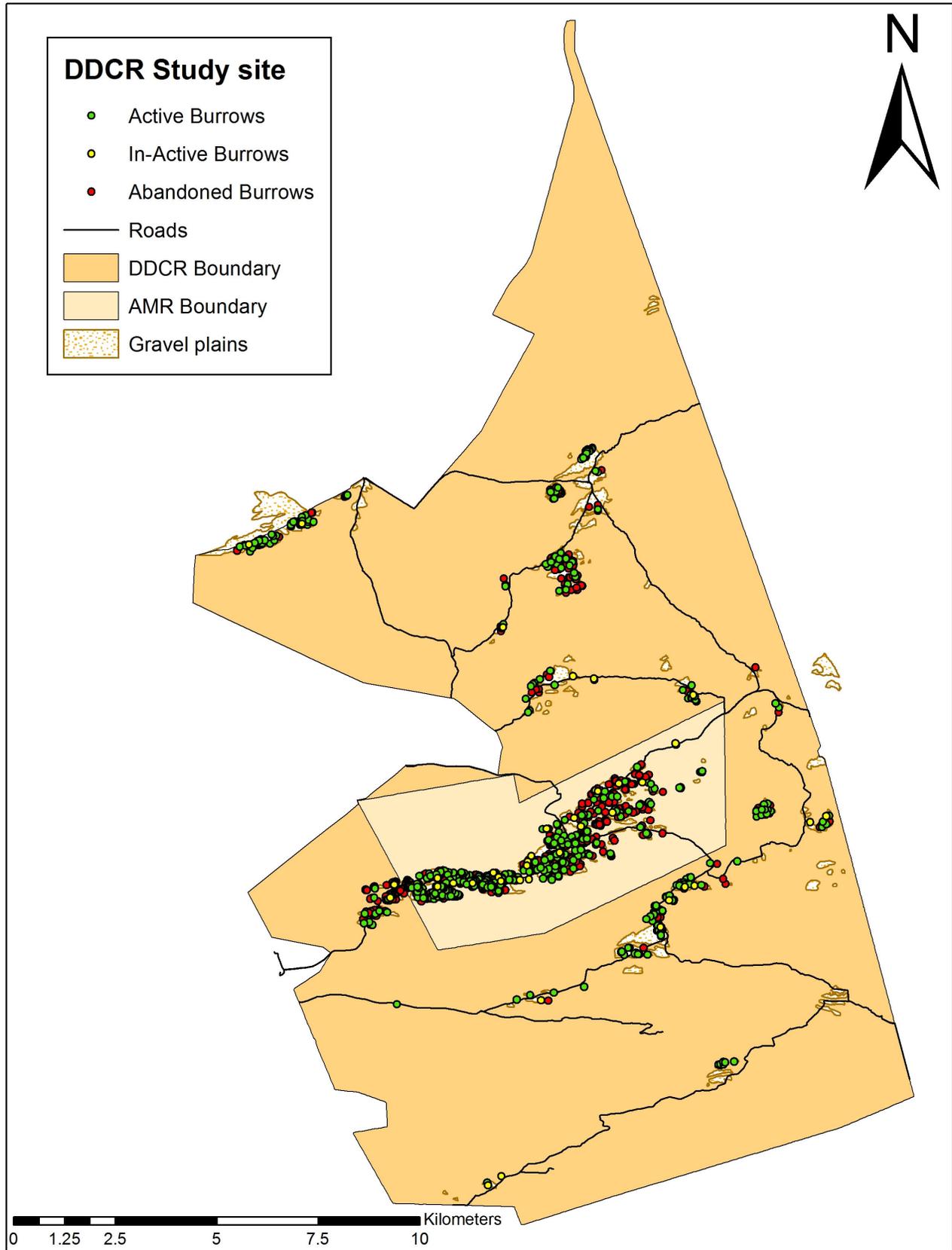


Figure 2.1: Map of the DDCR showing all the recorded Spiny-tailed lizard burrows and gravel plains.

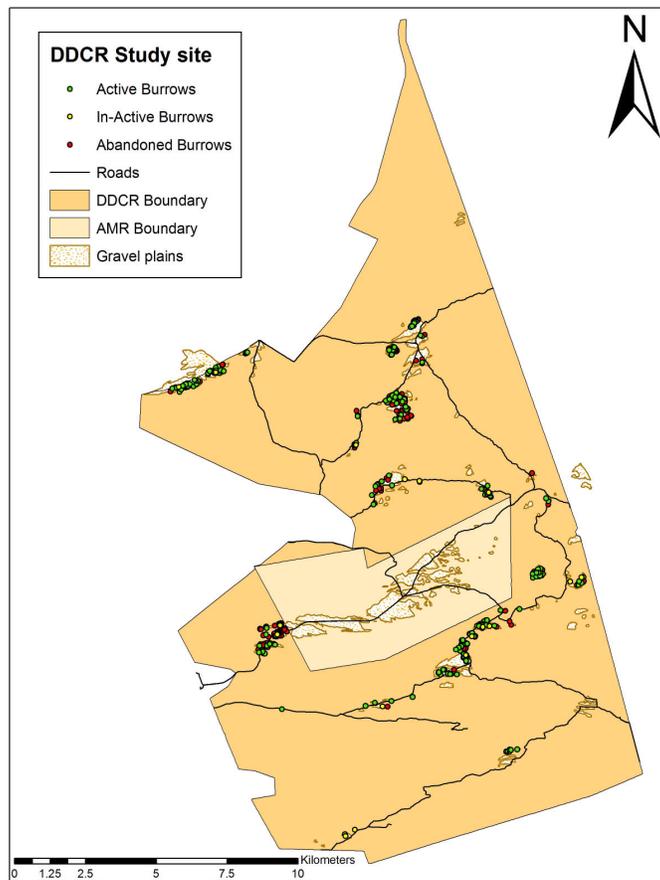


Figure 2.2: All Spiny-tailed lizard burrows in the DDCR site.

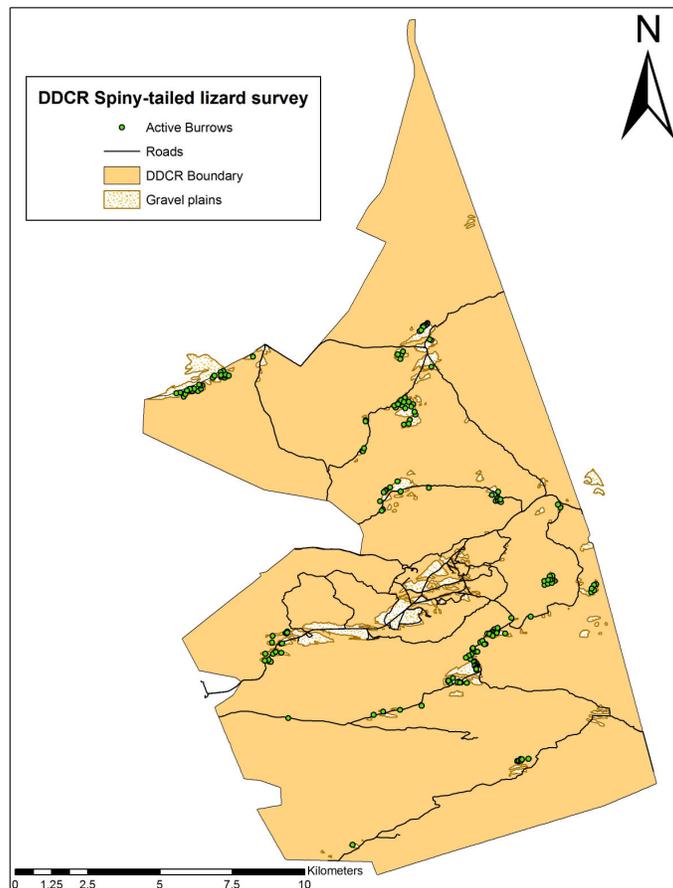


Figure 2.3: All active Spiny-tailed lizard burrows in the DDCR site.

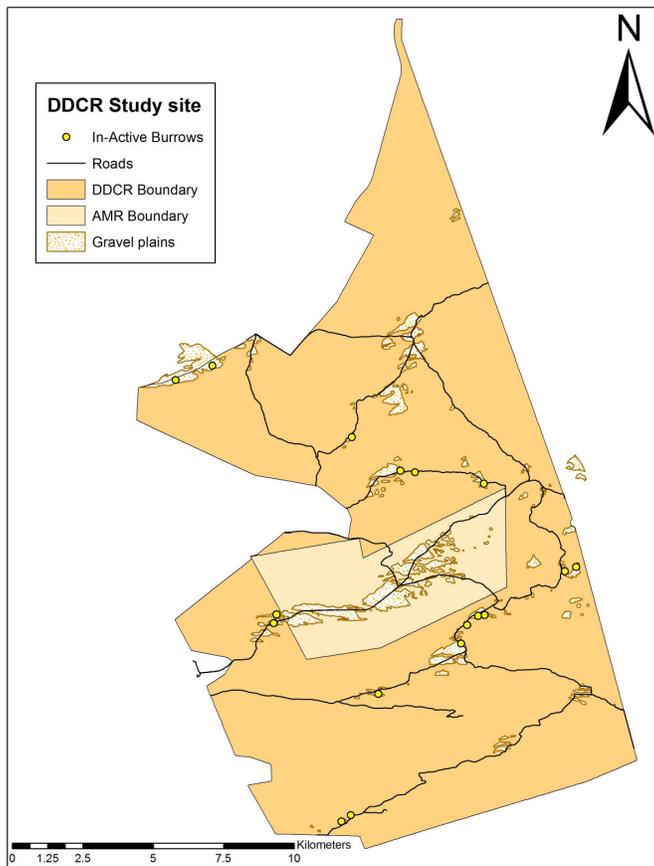


Figure 2.4: All in-active Spiny-tailed lizard burrows in the DDCR site.

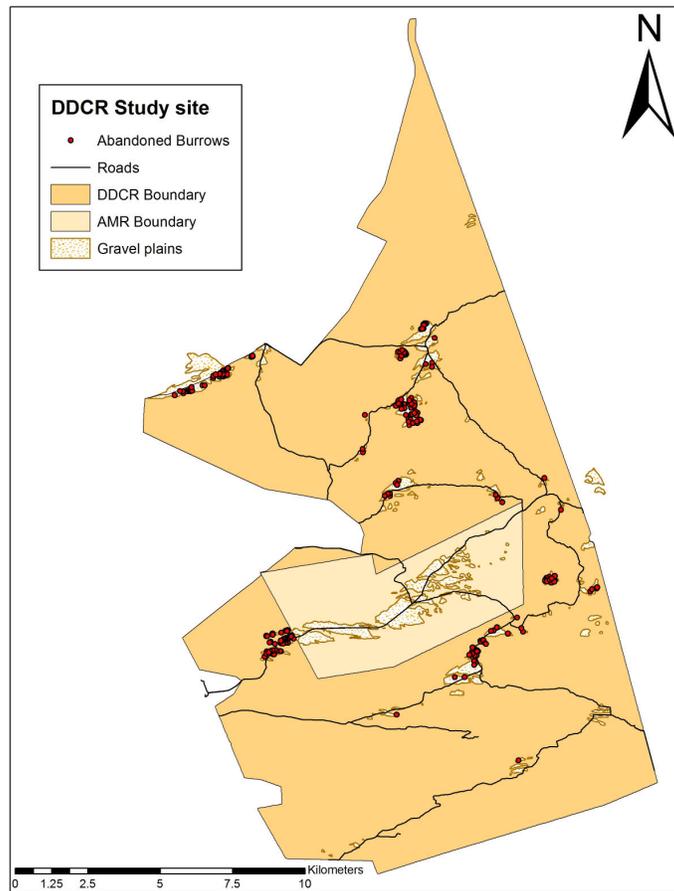


Figure 2.5: All abandoned Spiny-tailed lizard burrows in the DDCR site.

2. Al Maha Reserve survey site

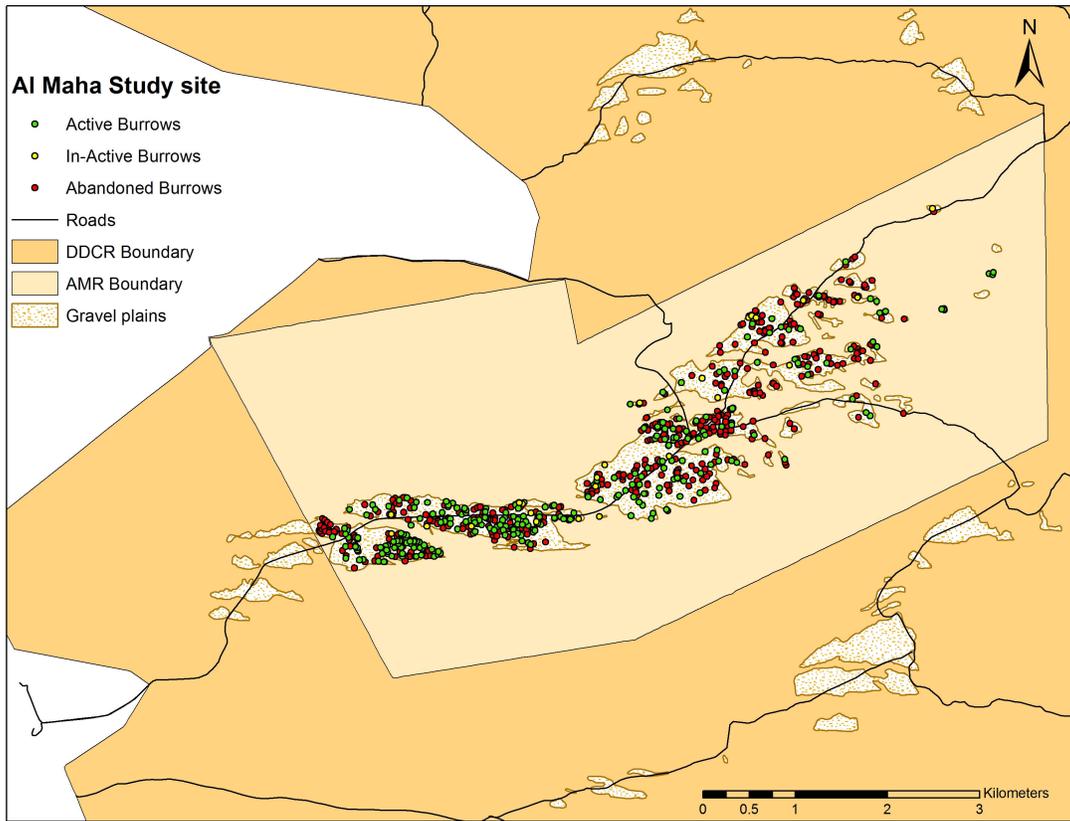


Figure 3.1: All recorded Spiny-tailed lizard burrows in the Al Maha site.

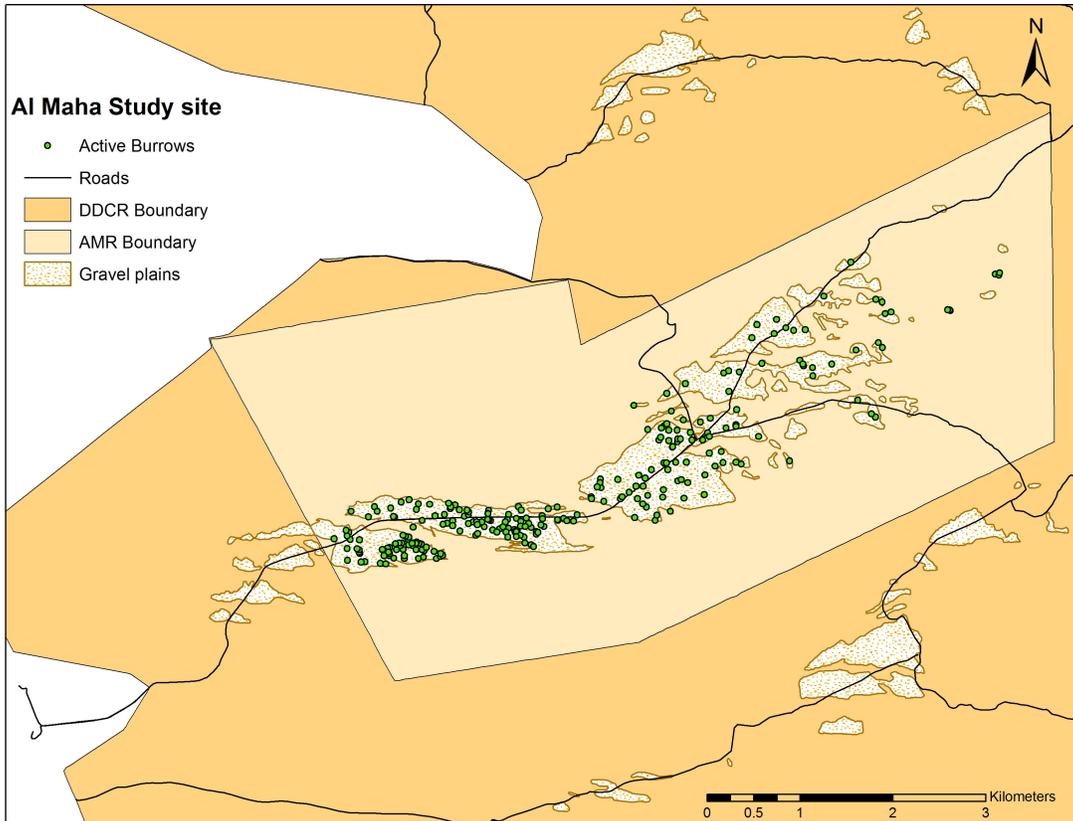


Figure 3.2: All active Spiny-tailed lizard burrows in the Al Maha site.

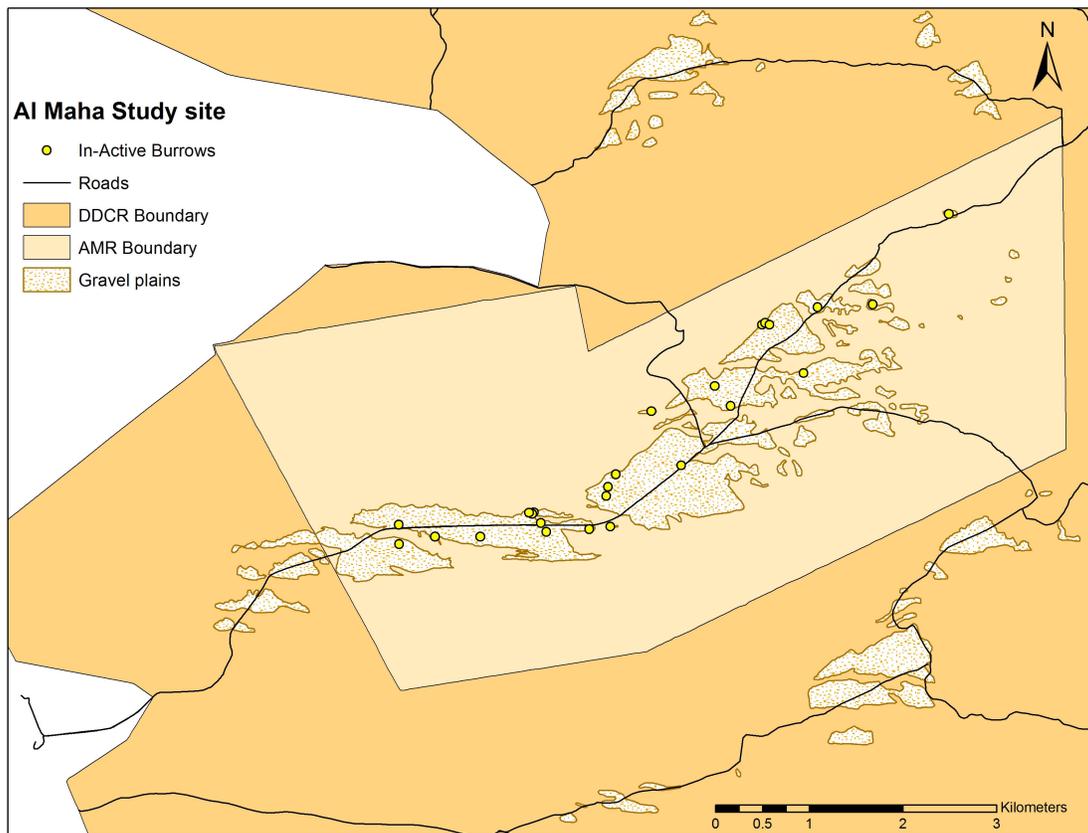


Figure 3.3: All in-active Spiny-tailed lizard burrows in the AI Maha site.

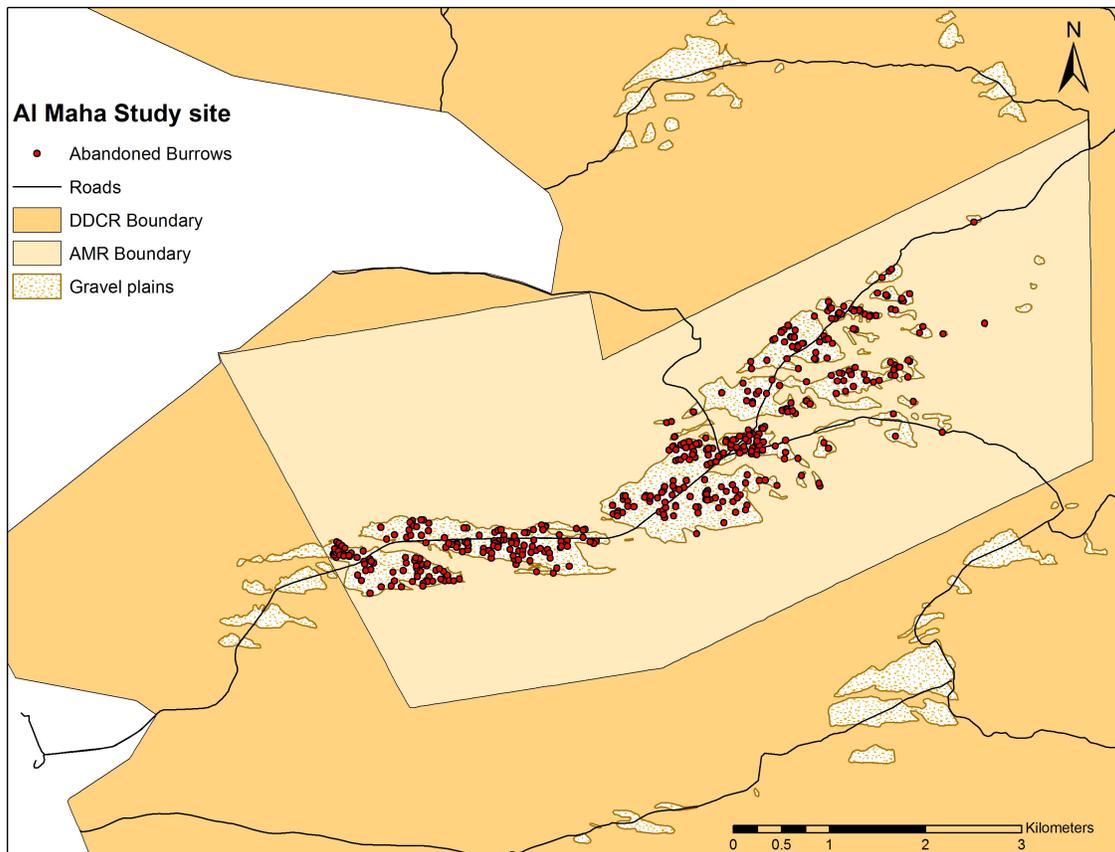


Figure 3.4: All abandoned Spiny-tailed lizard burrows in the AI Maha site.

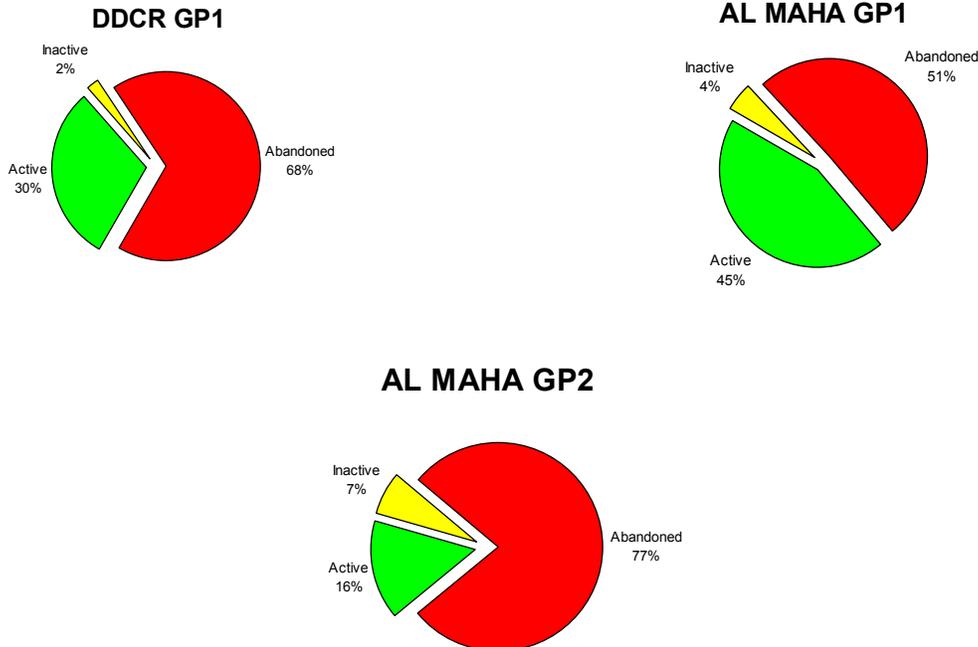
Discussion

1. Burrow classification inter-relation:

From the results in table 1, there appears to be a relationship between the Active, Inactive & Abandoned burrows in both study sites. To determine whether this is so, data from individual gravel plains was compared. Refer to the tables below.

	Burrows	Percentage (%)
DDCR - gravel plain 1		
1. Active	17	30.4
2. Inactive	1	1.8
3. Abandoned	38	67.9
	56	100
Al Maha - gravel plain 1		
1. Active	90	44.6
2. Inactive	9	4.5
3. Abandoned	103	51
	202	100
Al Maha - gravel plain 2		
1. Active	7	15.6
2. Inactive	3	6.7
3. Abandoned	35	77.8
	45	100

Table 2: The relationship between Active, In-active & Abandoned burrows at three sample gravel plains.



Charts 1-3: represent the data from table 2:

As can be seen from the above results, there appears to be no consistent relationship. It is therefore presumed that the overall consistency between the study sites is due to the averaging out of all the data.

2. Density:

To further compare the data in the 2 study sites, the vegetation density versus the Spiny-tailed lizard density was determined for each of the gravel plains discussed above. The results are as follows:

	Burrows	Percentage (%)	Total area (km ²)	Burrow density (holes/km ²)	Veg density (%)
DDCR - gravel plain 1			0.5685		0.55
1. Active	17	30.4		29.91	
2. Inactive	1	1.8		1.76	
3. Abandoned	38	67.9		66.85	
	56	100		98.51	
Al Maha - gravel plain 1			0.7896		2.67
1. Active	90	44.6		113.98	
2. Inactive	9	4.5		11.40	
3. Abandoned	103	51		130.44	
	202	100		255.82	
Al Maha - gravel plain 2			0.3143		1.10
1. Active	7	15.6		22.27	
2. Inactive	3	6.7		9.55	
3. Abandoned	35	77.8		111.36	
	45	100		143.18	

Table 3: Spiny-tailed lizard density relative to the vegetation density.

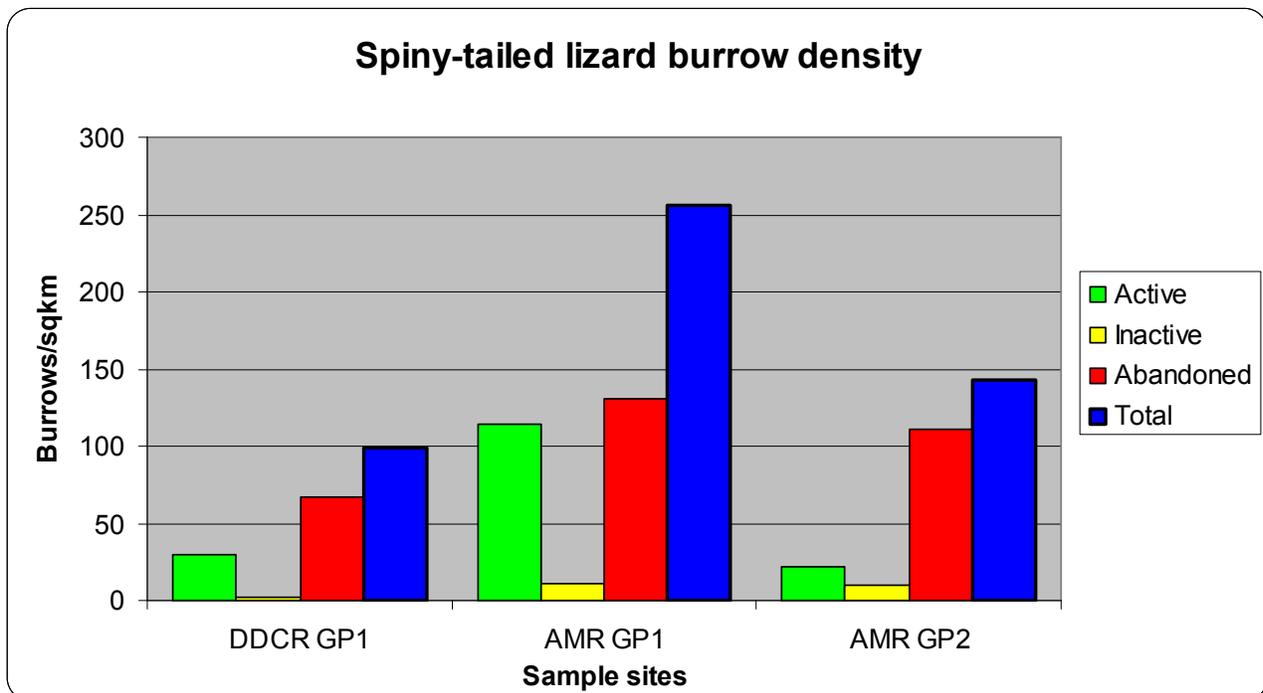


Chart 4: Burrow density per km² in three sample sites

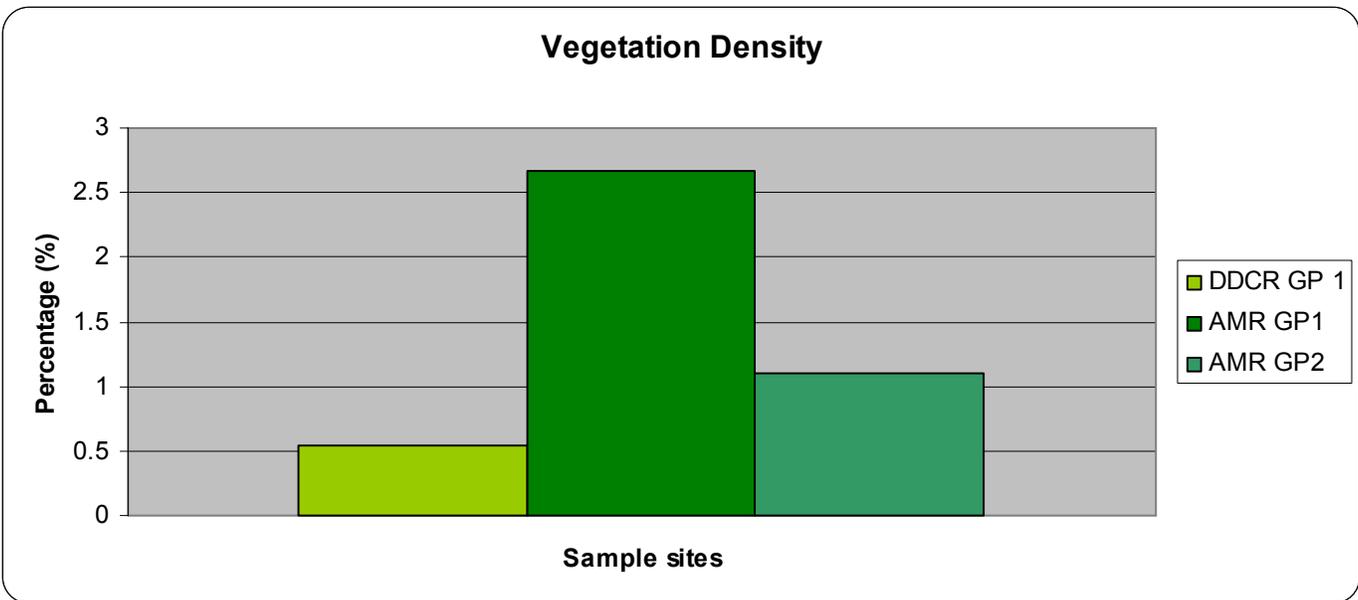


Chart 5: Vegetation density for the 3 sample sites.

In the maps of the Al Maha study site (figures 3.1 – 3.4) there is a clear decrease in burrow density from east to west (AMR GP1-AMR GP2). Table 3 and chart 5 show that the vegetation density follows the same trend. Higher vegetation density therefore has a direct effect upon the density of Spiny-tailed lizards. It is also important to note that different plant communities also have an effect on the density of Spiny-tailed lizards. Each of the three gravel plains selected for comparison have different vegetation communities. For example in Al Maha gravel 1 (in the east); plant communities B, C & D are to be found while in Al Maha gravel plain 2 (in the centre); plant communities A, E & F occur (DDCR Vegetation survey 2008/9). Therefore the lack of certain plant species favoured by spiny-tailed lizards in the Al Maha gravel plain 2, may contribute to the greatly lowered lizard density in Al Maha gravel plain 2 (see figure 4.2).

3. Distribution:

The distribution of Spiny-tailed lizards on gravel plains may be affected by the distribution of vegetation (which relates to the proximity of vegetation from the lizard's burrow). The majority of burrows were found in moderately vegetated areas (close enough for foraging). In other words, less risk would be taken while moving away from the burrow to feed. Fewer were recorded in densely vegetated areas of the gravel plain, suggesting the need for Spiny-tailed lizards to have a clear view of their territory to avoid predation, detect potential rivals and make use of a cooling breeze during the warmer times of the day. This is supported by the fact that burrows were often found on raised gravel mounds or the sloped section of the gravel plain. Gravel plains with a less solid sandy surface were also found to have lower burrow density. This is probably due to sand filling the burrow too regularly.

Data from the Vegetation Survey was compared with the Spiny-tailed lizard's distribution & density in the maps below.

Each of the vegetation types has indicator plant species. The vegetation types that have the greatest number & density of burrows are listed below in order of burrow density for the DDCR:

DDCR-P Habitat's Indicator species:	<i>Dipterygium glaucum; Indigofera colutea and Haloxylon salicornicum</i>
DDCR-C Habitat's Indicator species:	<i>Rhanterium epapposum</i>
DDCR-E Habitat's Indicator species:	<i>Monsonia nevia</i>
DDCR-Z Habitat's Indicator species:	<i>Monsonia nevia</i>
DDCR-J Habitat's Indicator species:	<i>Crotalaria aegyptiaca; Limeum arabicum and Leptadenia pyrotechnica.</i>
DDCR-W Habitat's Indicator species:	<i>Centropodia forsskaolii</i>
DDCR-G Habitat's Indicator species:	<i>Limeum arabicum</i>

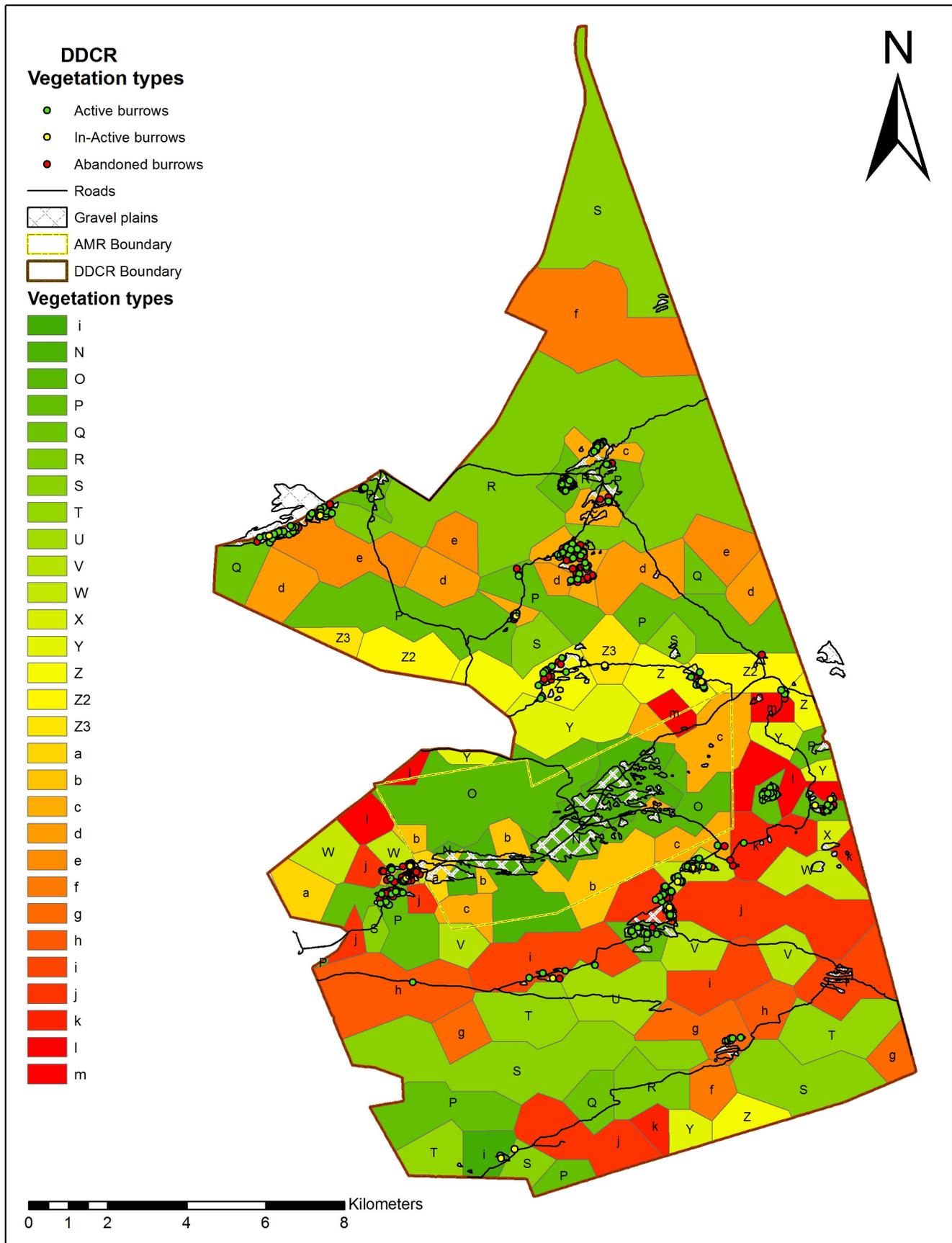


Figure 4.1: Vegetation types in the DDCR

Each of the vegetation types has indicator plant species. The vegetation types that have the greatest number & density of burrows are listed below in order of burrow density for Al Maha:

- AMR-N** Habitat's Indicator species: *Heliotropium digynum*; *Moltkiopsis ciliata*; *Centropodia forsskaolii* and *Leptadenia pyrotechnica*
- AMR-A** Habitat's Indicator species: *Arnebia hispidissima*
- AMR-B** Habitat's Indicator species: *Rhanterium epapposum*

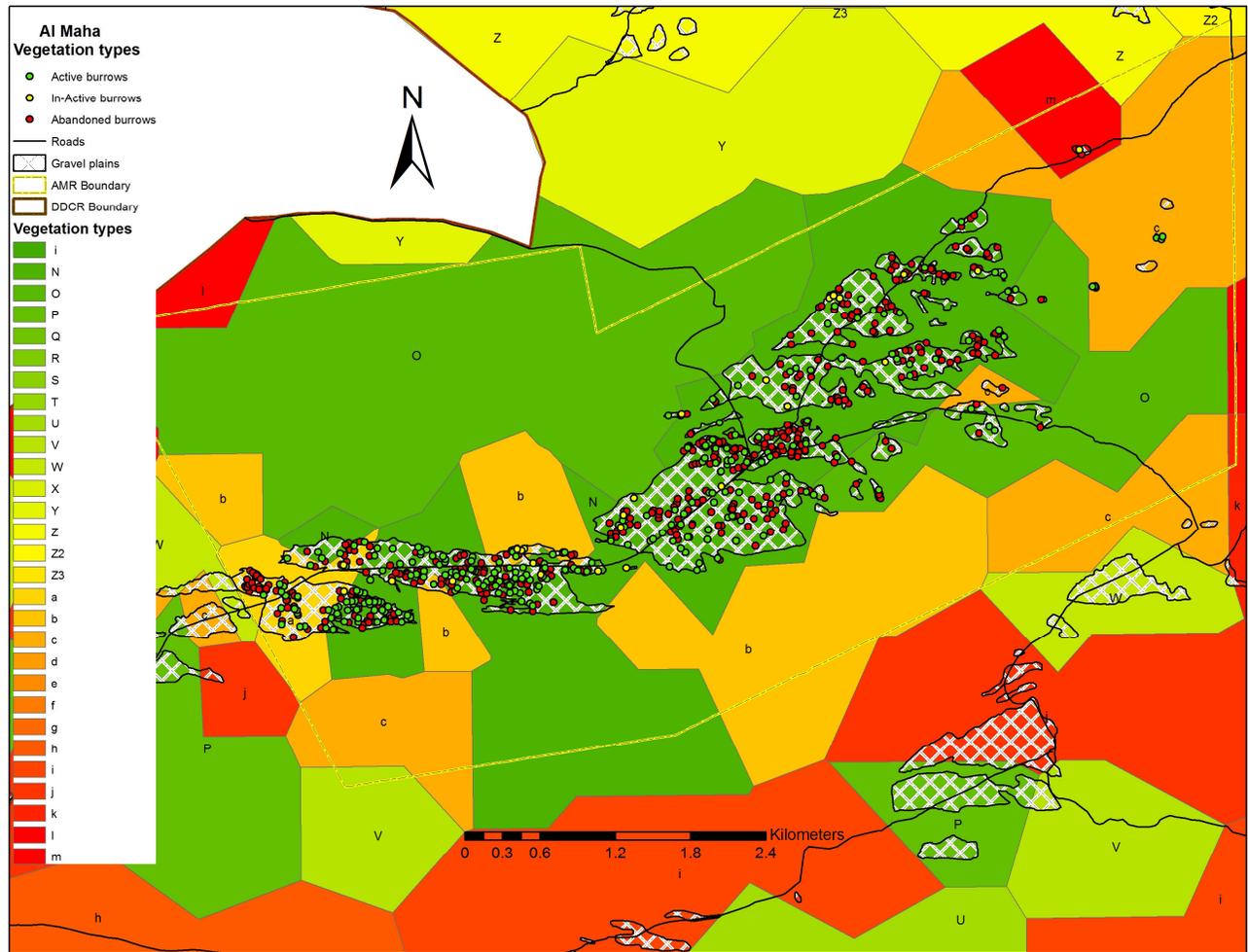


Figure 4.2: Vegetation types in Al Maha

4. Burrow abandonment:

Abandoned and in-active burrows may both be the result of mortalities or relocation, although in-active burrows are more likely to contain Spiny-tailed lizards in short term dormancy or early dormancy.

Recommendations

Further studies and surveys conducted on Spiny-tailed lizards in the DDCR may benefit from an expanded approach to the type of data collected. A few recommendations are made below for future consideration:

- Burrow/behavioural observations: A study of selected Spiny-tailed lizards during different times of the year and day, collecting the data on, preferred food plants, foraging distance from burrow, social behaviour, etc. could prove beneficial.
- Spiny-tailed lizard distribution and density study combined with a vegetation survey specifically of the gravel plains determining the vegetation types more accurately.
- Individual identification through photography and recording burrow location, repeated annually.
- Recording the size of burrows, entrance width and height.
- Age and sex ratio of the population.
- Searching for burrows in stable dune areas.
- Comparing abandoned burrow sites with active sites to determine whether abandoned burrows are reused.
- Recording of species that share Spiny-tailed lizard burrows for example: lizards, geckos, snakes and scorpions. (see image 7: for tracks of a lizard clearly using a Spiny-tailed lizard burrow)

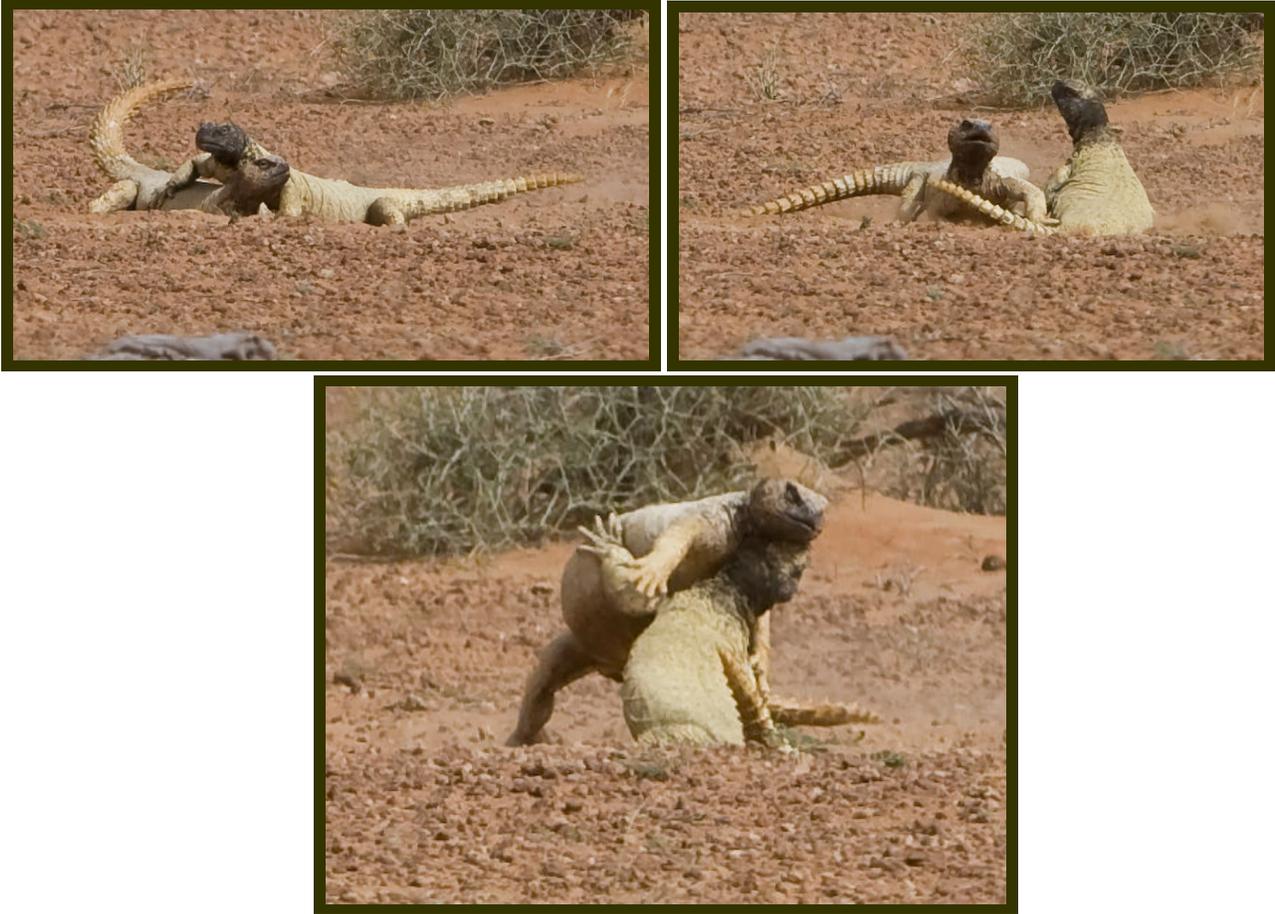


Image 8: Lizard tracks entering a Spiny-tailed lizard burrow.

Conclusion

The survey revealed that a healthy, well protected population of spiny-tailed lizards exists within the Al Maha Reserve. Its longer history of protection compared with that of the DDCR may account for the greater population density in Al Maha.

The DDCR population has much opportunity to increase since the removal of all camels from the reserve and future surveys would reveal useful data on Spiny-tailed lizard repopulation rates.



Images 9-11: Male Spiny-tailed lizards fighting in the AMR



Image 12: A typical example of a male Leptien's spiny-tailed lizard

References

UAE Interact Website, www.uaeinteract.com/nature/reptile/liz01.asp,
Spiny-tailed lizard.

Vegetation Survey, Dubai Desert Conservation Reserve, 2009