GLOBAL
ATOMIC FUELS
CORPORATION

PROJECT TO EXPLOIT THE URANIUM DEPOSITS OF THE *"ADRAR EMOLES 3"* RESEARCH PERMIT (AGADEZ REGION, NIGER)

UPDATE OF THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Report on biodiversity
(Rainy season)

October 2022

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INTRODUCTION

As part of the update of the Environmental and Social Impact Assessment (ESIA) of the Adrar Emoles 3 uranium mining project, a biodiversity study was carried out to characterise biodiversity in the project area. In order to obtain information on biodiversity in the rainy season, a similar study was conducted. A data collection mission visited the site from 10 to 17 October 2022.

The present document, which constitutes the report of the said study, is structured around two (2) components, namely flora and fauna, each consisting of sub-items.

1.   OBJECTIVES AND RESULTS OF THE STUDY

The main objective of this study is to update the data on fauna and flora during the rainy season.

Specifically, it is about:

- Carried out habitat points;

- Characterise the fauna and flora at these habitat points;

- Take the GPS coordinates of the various observations, within a radius of 7 km and 15 km from the heart of the deposits;

- Develop thematic maps.

The expected results of the study are:

- Habitat points are carried out;

- The fauna and flora are characterised at these habitat points;

- GPS coordinates for the various observations, within a radius of 7 km and 15 km from the heart of the deposits, are taken;

- Thematic maps are developed.

2.   FLORA COMPONENT

2.1. Methodological approach

In order to carry out the flora study, a methodological framework focusing on the following points was adopted: Identification of habitat points, Characterisation of woody and herbaceous vegetation, Processing and analysis of collected data.

2.1.1. Identification of habitat points

The identification of habitat points was done along five (5) transects spaced approximately 5 km apart within a 15 km radius from the core of the deposits. The transects were established during the first mission in September 2021.

The characterisation of the habitats is carried out at the level of the three (3) geomorphological units that are the plateaus, the plains and the valleys that are found within the perimeter of the exploitation permit. This (characterisation) made it possible to distinguish the different types of existing stands.

2.1.2. Characterisation of woody and herbaceous vegetation

Data collection is done in sample plots of 2500 m² (50 m *50 m) corresponding to the minimum area. A plot was defined for each habitat point (survey) and its geographical coordinates were recorded using a GPS.

A total of 37 + 4+ survey points were walked, for which information on woody and herbaceous vegetation was collected. For the first 37 points, a quick observation of the state of the vegetation, the floristic composition and the nature of the soil was carried out. For the four 4+ surveys, an exhaustive census of woody plants was carried out. The dendrometric parameters measured were trunk diameter at base (D20), diameter at breast height (D 1.30 m), total tree height (H) and tree health. The number of offshoots is counted. All trees with a diameter of D20 less than 5 cm are considered as regeneration.

2.1.3. Data processing and analysis

This stage consisted of the processing and analysis of the data collected, according to the objectives of the study, in particular with the Excel spreadsheet and the Geographic Information System (GIS) software. This led to the elaboration of thematic maps and related graphics.

2.2. Results of the study

The results of this study are of two (2) types. These are information on the description of the 37 habitat points through direct observation and the results of the dendrometric measurements carried out through 4 surveys (R38 to 41) in the two (2) valleys in the exploitation area.

Thus, the description of the 37 habitat points (Tables 1 to 5) identified the following areas: grassy steppes, shrub and tree areas, modified areas/habitats, heavily vegetated areas, namely valleys and plains.

2.2.1. Characterisation of habitats

The following tables (1-5) give the characteristic features of the habitats in the different surveys (R1-R37) during the rainy season. They show the types of vegetation formations associated with the geomorphology, as well as their condition, their herbaceous cover, and the heights of the different plant species.

Table 1 Habitat characteristics (surveys R1-R6)

Survey	Geomorphology	Types of training	Soil	Distance between trees	State of the vegetation	Floristic composition	Regeneration	Grass cover (%)	Height of the stratum (m)	Altitude(m)	Latitude in dd	Longitude in dd
R1	Rocky plateaus	Steppe with *Panicum turgidum*	Rocky outcrops (sandstone)	No trees	Semi green	- *Panicum turgidum* ; - *Stipagrostis vulnerans*	Near zero	1 - 5 %	< 1 m	547,762207	17,7925	7,75086
R2	Sanded trays	Steppe with *Aristida funiculata; Panicum turgidum; Boerhavia repens*	Sandy, coarse-textured soil	> 25 m	Semi Green	- *Acacia raddiana;* - *Maerua crassifolia;* - *Balanites aegyptiaca;* - *Calotropis procera;* - *Ziziphus mauritania,* - *Hyphaene thebaica,* - *Aristida funiculata;* - *Panicum turgidum;* - *Boerhavia repens;* - *Cenchrus biflorus;* - *Citrullus colocynthis;* - *Corchorus tridens*	Strong	50 - 75 %	5 m	528,538086	17,7579	7,76992
R3	Plain	Grass steppe with *Panicum turgidum, Aristida finiculata* and *Cassia mimosoides*	Gravelly and rocky soil	> 50 m	Semi green	- *Acacia raddiana;* - *Maerua crassifolia,* - *Aristida funiculata;* - *Panicum turgidum,* - *Cassia mimosoide*	Low	1 - 5 %	2 m	549,522949	17,7433	7,79864
R4	Rocky plateau	Shrub Steppe	Sandy-clay soil	5 m	Semi green	- *Acacia ehrenbergiana ;* - *Acacia raddiana;* - *Balanites aegyptiaca;* - *Maerua crassifolia,* - *Aristida funiculata;* - *Citrullus colocynthis;* - *Panicum turgidum*	Strong	20 - 50 %	3 m	536,939453	17,7269	7,81873
R5	Rocky plateaus	Localized vegetation remnant	Gravelly and rocky soil	No trees	Semi green	- *Aristida funiculata*	None	1 - 5 %	< 0,5 m	534,660156	17,7679	7,78304
R6	Curaceous Plateaux	Localized vegetation remnant	Rock outcrops	> 50 m	Semi green	- *Acacia ehrenbergiana;* - *Balanites aegyptiaca;* - *Maerua crassifolia,* - *Aristida funiculata;* - *Panicum turgidum,* - *cassia mimosoide*	Near zero	1 - 5 %	1 m	524,502197	17,819	7,72182

Table 2 Habitat characteristics (surveys R7-R13)

Survey	Geomorphology	Types of training	Soil	Distance between trees	State of the vegetation	Floristic composition	Regeneration	Grass cover (%)	Height of the stratum (m)	Altitude (m)	Latitude in dd	Longitude in dd
R7	Sandy valley	Steppe with *Panicum turgidum* and *Cenchrus prieuri*	Sandy, coarse-textured soil	5 m	Green	- *Calotropis procera* - *Acacia ehrenbergiana* - *Acacia raddiana* - *Balanites aegyptiaca* - *Maerua crassifolia* - *Aristida funiculata* - *Panicum turgidum* - *Boerhavia repens* - *Cassia italica* - *Cenchrus prieuri*	Average	> 75 %	4 m	514,0907593	17,85031189	7,74287316
R8	Valley	Steppe with *Aristida finiculata* and *Zizuphus mauritiana*	Sandy, coarse-textured soil	5 m	Green	- *Calotropis procera* - *Acacia ehrenbergiana* - *Acacia raddiana* - *Balanites aegyptiaca* - *Maerua crassifolia* - *Ziziphus mauritania* - *Aristida funiculata* - *Panicum turgidum*	Average	50 - 75 %	4 m	515,7553711	17,86379071	7,78792371
R9	Rocky plateaus	Localized vegetation remnant	Rock outcrops	No tree	Green	- *Aristida funiculata*		1 - 5 %	< 0,5 m	501,4935303	17,86023111	7,72550087
R10	Valley	Steppe with *Panicum turgidum*	Sandy-clay soil	5 m	Green	- *Boscia senegalensis* - *Acacia ehrenbergiana* - *Acacia raddiana* - *Balanites aegyptiaca* - *Maerua crassifolia* - *Aristida funiculata*	Strong	> 75 %	6 m	493,4946289	17,86332757	7,72116058
R11	Valley	Steppe with *Panicum turgidum*	Sandy-clay soil	5 m	Semi green	- *Acacia ehrenbergiana* - *Balanites aegyptiaca* - *Acacia raddiana* - *Maerua crassifolia* - *Aristida funiculate* - *Panicum turgidum*	Strong	> 75 %	4 m	518,1557007	17,79203802	7,71638322

Survey	Geomorphology	Types of training	Soil	Distance between trees	State of the vegetation	Floristic composition	Regeneration	Grass cover (%)	Height of the stratum (m)	Altitude (m)	Latitude in dd	Longitude in dd
R12	Valley	Steppe with *Panicum turgidum*	Sandy, coarse-textured soil	5 m	Green	- *Acacia ehrenbergiana* - *Acacia raddiana* - *Calotropis procera* - *Maerua crassifolia* - *Aristida funiculata* - *Panicum turgidum*	Average	50 - 75 %	5 m	504,9383545	17,75507261	7,72451225
R13	Sanded trays	Shrub steppe with *Panicum turgidum* and *Cassia mimosoides*	Sandy, coarse-textured soil	100 m	Semi green	- *Acacia ehrenbergiana* - *Acacia raddiana* - *Aristida funiculate* - *Panicum turgidum* - *Cassia mimosoide* - *Euphorbia aegyptiaca*	Average	50 - 75 %	3 m	515,1231079	17,76676802	7,70929949

Table 3 Habitat characteristics (surveys R14-R20)

Survey	Geomorphology	Types of training	Soil	Distance between trees	State of the vegetation	Floristic composition	Regeneration	Grass cover (%)	Height of the stratum (m)	Altitude in m	Latitude in dd	Longitude in dd
R14	Valley	Steppe with *Panicum turgidum*	Sandy-clay soil	5 m	Semi green	- *Acacia ehrenbergiana* - *Acacia raddiana* - *Balanites aegyptiaca* - *Maerua crassifolia* - *Aristida funiculate* - *Panicum turgidum*	Average	20 - 50 %	6 m	501,4438477	17,77576614	7,68711393
R15	Plain	Grass steppe with *Aristida funiculata*	Rocky outcrops (sandstone)	> 100 m	Semi green	- *Acacia ehrenbergiana* - *Aristida funiculate* - *Panicum turgidum*	Low	5 - 20 %	1 m	485,5023193	17,79350473	7,66764992
R16	Rocky plateaus	Shrub steppe with *Panicum turgidum* and *Aristida finiculata*	Rock outcrops	100 m	Green	- *Acacia ehrenbergiana* - *Acacia raddiana* - *Maerua crassifolia* - *Aristida funiculate* - *Panicum turgidum*	Low	20 - 50 %	2 m	483,7755127	17,80441284	7,64651936
R17	Rocky plateaus	Grass steppe with *Aristida funiculata* and *Panicum turgidum*	Rock outcrops	> 100 m	Green	- *Acacia ehrenbergiana* - *Maerua crassifolia* - *Aristida funiculate* - *Panicum turgidum*	Very low	5 - 10 %	1 m	481,420166	17,81609554	7,63420664
R18	Valley	Gallery forest	Sandy-clay soil	5 m	Green	- *Acacia ehrenbergiana* - *Acacia raddiana* - *Balanites aegyptiaca* - *Boscia senegalensis* - *Maerua crassifolia* - *Aristida funiculata*	Strong	50 - 75 %	7 m	466,6442261	17,81317526	7,60863537
R19	Sanded trays	Shrub steppe with *Panicum turgidum*	Sandy, coarse-textured soil	100 m	Semi green	- *Acacia ehrenbergiana* - *Acacia raddiana* - *Maerua crassifolia* - *Aristida funiculate* - *Panicum turgidum*	Strong	50 - 75 %	3 m	489,029541	17,85543272	7,62339344
R20	Sanded trays	Grass steppe with *Panicum turgidum*	Sandy, coarse-textured soil	No trees	Green	- *Panicum turgidum* - *Aristida funiculata*	Low	20 - 50 %	1 m	498,4844971	17,86979106	7,64599219

Table 4 Habitat characteristics (surveys R21-R28)

Survey	Geomorphology	Types of training	Soil	Distance between trees	State of the vegetation	Floristic composition	Regeneration	Grass cover (%)	Height of the stratum (m)	Altitude in m	Latitude in dd	Longitude in dd
R21	Rocky plateaus	Localized vegetation remnant	Gravelly and rocky soil	No trees	Semi green	- *Aristida funiculata*	None	1 - 5 %	< 0,5 m	498,2946777	17,85156639	7,67579715
R22	Valley	Gallery forest	Sandy-clay soil	5 m	Green	- *Acacia ehrenbergiana* - *Acacia raddiana* - *Balanites aegyptiaca* - *Boscia senegalensis* - *Aristida funiculata* - *Panicum turgidum*	Strong	> 75 %	8 m	483,144165	17,84909887	7,68351807
R23	Valley	Steppe with *Acacia ehrenbergiana* and *Maerua crassifolia*	Sandy-clay soil	25 m	Semi green	- *Acacia ehrenbergiana* - *Maerua crassifolia*	Low	50 - 75 %	4 m	492,5551147	17,76489679	7,63646372
R24	Valley	Forest gallery	Sandy-clay soil	5 m	Green	- *Balanites aegyptiaca* - *Acacia ehrenbergiana* - *Acacia raddiana* - *Maerua crassifolia,* - *Aristida funiculata* - *Panicum turgidum*	Strong	> 75 %	6 m	495,4853516	17,76002581	7,65670356
R25	Rocky plateaus	Grass steppe with *Aristida funiculata*	Rock outcrops	> 100 m	Semi green	- *Acacia ehrenbergiana,* - *Aristida funiculata;* - *Panicum turgidum*	Average	> 75 %	1m	500,7680054	17,74075667	7,67444381
R26	Plain	Steppe with *Aristida finiculata* and *Euphorbia aegyptiaca*	Sandy, coarse-textured soil	25 m	Green	- *Acacia raddiana* - *Acacia ehrenbergiana* - *Balanites aegyptiaca* - *Maerua crassifolia* - *Aristida funiculata* - *Panicum turgidum* - *Euphorbia aegyptiaca*	Low	20 - 50 %	6 m	499,6590576	17,73682727	7,68796142
R27	Rocky plateaus	Localized vegetation remnant	Gravelly and rocky soil	> 100 m	Semi green	- *Acacia ehrenbergiana* - *Aristida finiculata*	Near zero	5 - 10 %	3 m	508,371582	17,73358253	7,69872166
R28	Valley	Forest gallery	Sandy soil, fine texture	5 m	Green	- *Acacia raddiana* - *Acacia nilotica* - *Calotropis procera*	Strong	> 75 %	7 m	510,2754517	17,75568966	7,73940816

Survey	Geomorphology	Types of training	Soil	Distance between trees	State of the vegetation	Floristic composition	Regeneration	Grass cover (%)	Height of the stratum (m)	Altitude in m	Latitude in dd	Longitude in dd
						- *Ziziphus mauritania* - *Hyphaene thebaica* - *Aristida funiculata* - *Panicum turgidum*						

Table 5 Habitat characteristics (surveys R28-R37)

Survey	Geomorphology	Types of training	Soil	Distance between trees	State of the vegetation	Floristic composition	Regeneration	Grass cover (%)	Height of the stratum (m)	Altitude in m	Latitude in dd	Longitude in dd
R28	Valley	Gallic forest	Sandy soil, fine texture	5 m	Green	- *Acacia raddiana* - *Acacia nilotica* - *Calotropis procera* - *Ziziphus mauritania,* - *Hyphaene thebaica,* - *Aristida funiculate* - *Panicum turgidum*	Strong	> 75 %	7 m	510,2754517	17,75568966	7,73940816
R29	Plain	Grass steppe with *Caccia mimosoides*	Soil sand, coarse texture	100 m	Semi green	- *Acacia ehrenbergiana* - *Balanites aegyptiaca* - *Aristida funiculate* - *Panicum turgidum* - *Cassia mimosoide*	Average	> 75 %	4m	488,0388184	17,69874053	7,64478627
R30	Rocky plateaus	Bare surface	Gravelly and rocky soil	No trees		- *CLEAR*	None	0%	0 m	489,1968994	17,70939085	7,62280596
R31	Plain	Steppe with *Calotropis procera* and *Aristida finiculata*	Sandy soil, fine texture	10 m	Semi green	- *Calotropis procera* - *Acacia raddiana* - *Balanites aegyptiaca* - *Aristida funiculata*	Low	20 - 50 %	5m	475,0681763	17,72295929	7,60472443
R32	Valley	Forest gallery	Sandy-clay soil	5 m	Semi green	- *Acacia ehrenbergiana* - *Acacia raddiana* - *Balanites aegyptiaca* - *Calotropis procera*	Strong	> 75 %	7m	465,9248047	17,73525037	7,59631777
R33	Plain	Shrub steppe with *Panicum turgidum*	Sandy-clay soil	25 m	Semi green	- *Acacia ehrenbergiana* - *Aristida funiculate* - *Panicum turgidum*	Strong	> 75 %	2m	458,6110229	17,75641785	7,57415771
R34	Valley	Forest gallery	Sandy-clay soil	5 m	Green	- *Grewia tenax* - *Acacia ehrenbergiana* - *Balanites aegyptiaca* - *Aristida funiculate* - *cassia tora,*	Average	> 75 %	5m	461,7724609	17,76182233	7,56390668
R35	Rocky plateaus	Grass steppe with *Aristida funiculata*	Gravelly and rocky soil	>100 m	Semi green	- *Acacia ehrenbergiana* - *Aristida funiculata*	Near zero	20 - 50 %	< 0,5 m	467,4057617	17,79694401	7,55050554
R36	Rocky plateaus	Grass steppe with *Aristide finiculata* and *Panicum turgidum*	Gravelly and rocky soil	100 m	Semi green	- *Acacia ehrenbergiana* - *Maerua crassifolia* - *Aristida funiculate* - *Panicum turgidum*	Average	50 - 75 %	1m	472,7519531	17,79493325	7,60200187

Survey	Geomorphology	Types of training	Soil	Distance between trees	State of the vegetation	Floristic composition	Regeneration	Grass cover (%)	Height of the stratum (m)	Altitude in m	Latitude in dd	Longitude in dd
R37	Plain	Grass steppe with *Aristida funiculata*	Sandy soil, coarse texture	50 m	Semi green	- *Acacia raddiana* - *Acacia ehrenbergiana* - *Balanites aegyptiaca* - *Maerua crassifolia* - *Aristida funiculate* - *Panicum turgidum*	Low	> 75 %	4m	500,6781006	17,80576661	7,68572974

2.2.2. Floristic composition

A total of 38 species (25 herbaceous and 13 woody) were recorded in and around the area compared to 29 species in December 2021. This difference is due to the rainy season which allowed the identification of some herbaceous species. The woody species are divided into 8 families including Mimosaceae (4 or 30%), Arecaceae (2 or 15%), Capparaceae (2; 15%), Zygolaceae (1 or 7%), Asclepiadaceae (1; 7%), Rhamaceae (1 or 7%) and Burseraceae (1 or 7%), Tiliaceae (1 or 7%) (see Table 6 below).

Compared to the December 2021 mission, there is little change in woody species. In addition, the phenology of the trees is completely green and regeneration is observed at certain survey points.

Table 6 Woody species identified in the project area

SCIENTIFIC NAME	FAMILY	LOCAL NAME	Status in Niger
Acacia ehrenbergiana	Mimosaceae	Tamat	Claase B
Acacia raddiana	Mimosaceae	Afagak	Claase B
Accacia nilotica	Mimosaceae	tiggaert	Class A
Accacia senegal	Mimosaceae	dibshi	Class A
Balanites aegyptiaca	Zygophyllaceae	Aborak	Class A
Boscia senegalensis	Capparidaceae	Tedent	Class B
Calotropis procera	Asclepiadaceae	Tirza	Class B
Commiphora africana	Burseraceae	Adäras	Class B
Grevia tenax	Tiliaceae	terkoet	Class B
Hyphaene thebaica	Arecaceae	Taggeyt	Class A
Maerua crassifolia	Cappariacae	Agar	Class B
Phoenix dactylifera	Arecaceae	Talizouk	Class B
Ziziphus mauritania	Rhamnaceae	Abaka	Class B

In Niger forest species are classified according to two protection regimes "Class A" and "Class B" (Articles 59 of Decree n°2018 191/PRN/ME/DD of 16 March 2018).

- "Class A": concerns all species of ecological and socio-economic value recognised as threatened or endangered on a national scale and whose protection and reintroduction is necessary (Article 60 of Decree n°2018-191/PRN/ME/DD of 16 March 2018)

- "Class B": Concerns all species of ecological and socio-economic value that are not listed in Class A and that are threatened with overexploitation in a given region, to such an extent that their regeneration is compromised or poorly carried out (Article 61 Decree n°2018 191/PRN/ME/DD of 16 March 2018)

As for the herbaceous plants, they are distributed in thirteen (13) families of which the Graminae represent the most important (7 species or 28%), Caesalpiniaceae (3 species or 12%), Amaranthaceae (1 species or 6%), Poaceae (1 species or 6%), Capparidaceae (2 species or 8%), Tiliaceae (2 species or 8%), Cyperaceae (2 species or 8%), Fabaceae (1 species or 4%), and Aizoaceae (1 species or 4%), Cucurbitaceae (1 species or 4%), Nyctaginaceae (1 species or 4%), Euphorbiaceae (1 species or 4%), Nyctaginaceae Table 7 below).

Eight (8) new species were recorded in addition to those identified during the last inventory, an increase of 32%.

Table 7 Herbaceous species inventoried in and around the permit area

SCIENTIFIC NAME	FAMILY	LOCAL NAME
Andropogon gayanus	Gramineae	Katagoêts
Aristida Sp	Gramineae	Tazmei
Cassia obtusifolia	Caesalpiniaceae	Abaezzey
Celosia trigyna	Amaranthaceae	Tajelanghitayt.
Cenchrus bilorus	Poaceae	Wajjag
Chrysopogon aucheri	Graminae	Taezmé
Cleome africana	Capparidaceae	Taedak
Corchorus depressus	Tiliaceae	Amadghos
Corchorus olitorius	Tiliaceae	Melahya
Cymbopogon sp	Gramineae	Tebéremt
Cyperus Alopecuroides	Cyperaceae	
Digitaria Horizontalis	Gramineae	Ishibaen
Eragrostis tremula	Gramineae	Tegit
Indicofera Nummulariifolia	Fabaceae	Agarof
Limeum Viscosum	Aizoaceae	Tamasalt
Panicum turgidum	Gramineae	Afazo
Schoenoplectus corymbosus	Cyperaceae	Alögi
Cassia mimosoides	Caesalpiniaceae	Tiggarna' madal
Cleome viscosa	Capparidaceae	adagall nagasaye
Indigofera cordifolia	Fabaceae	
Citrillus colocynthis	Cucurbitaceae	tagallat
Boerhavia repens	Nyctaginaceae	Tamasalt
Euphorbia aegyptiaca	Euphorbiaceae	Taelakh
Cryptolepis sanguinolenta	Periplocaceae	Oemaman
Cassia italica	Caesalpiniaceae	agargar

2.2.3. Floristic groups

The analysis of the above tables (1 to 5 on habitat characterisation) reveals seven (7) types of plant association or grouping indicated in Table 8 below. These are distributed in the three (3) geomorphological units which are *the Plateaux, Plains and Valleys.*

Table 8 Floristic groups in relation to geomorphology

Floristic grouping	Characteristic species	Geomorphological units	Contact details	
G1	- *Acacia ehrenbergiana,* - *Acacia radiana,* - *Panicum turgidum,* - *Balanites aegyptiaca*	Valley	N 17°56'50.5''	E 007°35'04.5''
G2	- *Calotropis procera,* - *Acacia ehrenbergiana,* - *Balanites aegyptiaca*	Plain	N 17°45'19.6''	E 007°43'30.8''
G3	- *Balanites aegyptiaca,* - *Acacia ehrenbergiana*	Plain	N 17°45'34.8''	E 007°39'10.6''
G4	- *Balanites aegyptiaca,*	Valley	N 17°51'36.3''	E 007°42'40.0''

Floristic grouping	Characteristic species	Geomorphological units	Contact details	
	- *Acacia ehrenbergiana*, - *Boscia senegalensis*			
G5	- *Aristida finiculata* (specific stand)	Plain	N 17°45'42.6''	E 007°33.49.8''
G6	- *Acacia ehrenbergiana* (specific stand)	Plain	N 17°45'42.2''	E 007°33'54.1''
G7	- *Panicum turgidum*, - *Aristida finiculata*, - *Acacia ehrenbergiana*	Sandy plateau/rocky plateau	N 17°46'05.2''	E 007°42'30.5""

2.2.4. Characterisation of the surveys R38 to R41

For the survey points R38, R39, R40 and R41, an exhaustive census of the woody plants was made. The dendrometric parameters measured were trunk diameter at the base (D20), diameter at breast height (D 1.30 m), total height (H) and tree health.

Figure 1 below shows the floristic composition of the woody plants in these surveys (R38 to 41).
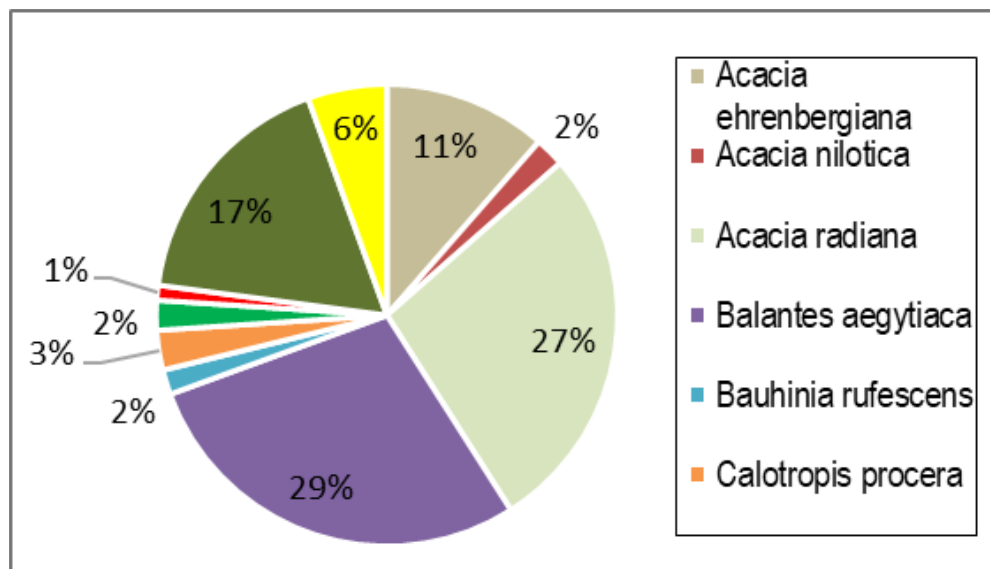

Figure 1 Floristic composition (R38-R41)

Analysis of Figure 1 above shows a strong dominance of Balanites aegyptiaca and *Acacia radiana* with respectively 29% and 27% of the overall floristic composition. They are followed by *Maerua crassifolia* (17%) and *Acacia ehrenbergiana* (11%). Species such as Acacia nilotica (2%), *Hyphaene thebaica* (2%), *Bauhinia rufescens* (2%) and Lianes (1%) are endemic to the Elagozane valley where they exist in a few old individuals. This means that these species do not renew themselves, or at least very slowly, and therefore could disappear over time.

The situation regarding the health status of the woody plants at points R38 to R41 is shown in Figure 2 below.
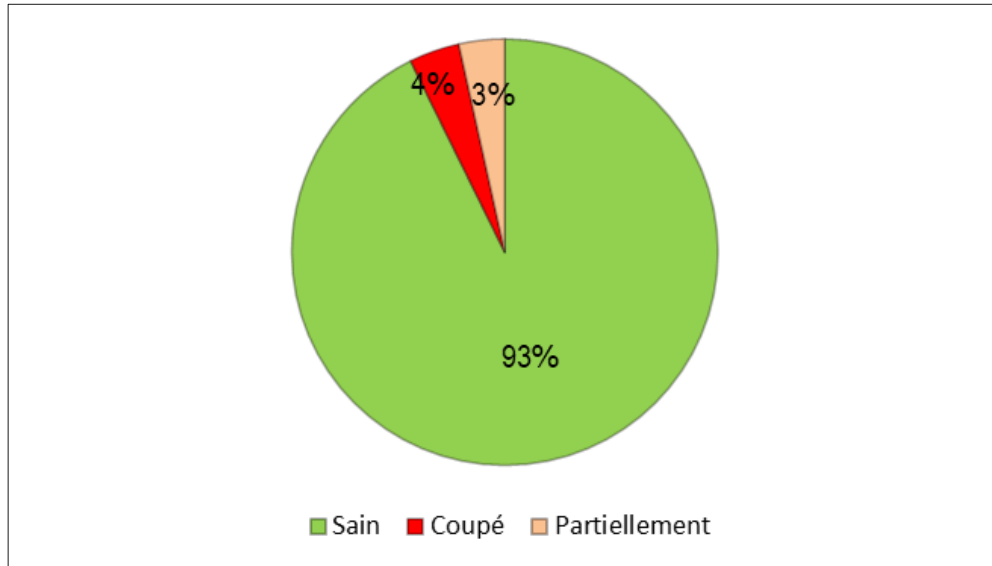
Figure 2 Health status of woody plants (R38-R41)

Overall, the woody formation is doing well. Thus, 93% of the trees are healthy. However, clear-cutting was observed on about 4% of the formation and 3% of the trees are dry, although they are still alive. Clear cutting is a sign of anthropisation of the forest formations. In these areas, the main source of energy is wood. The Balanites aegyptiaca, because of the quality of its wood, is the most affected by logging.

The diameter and height structures of the woody plants are shown in figures 3 and 4 respectively.
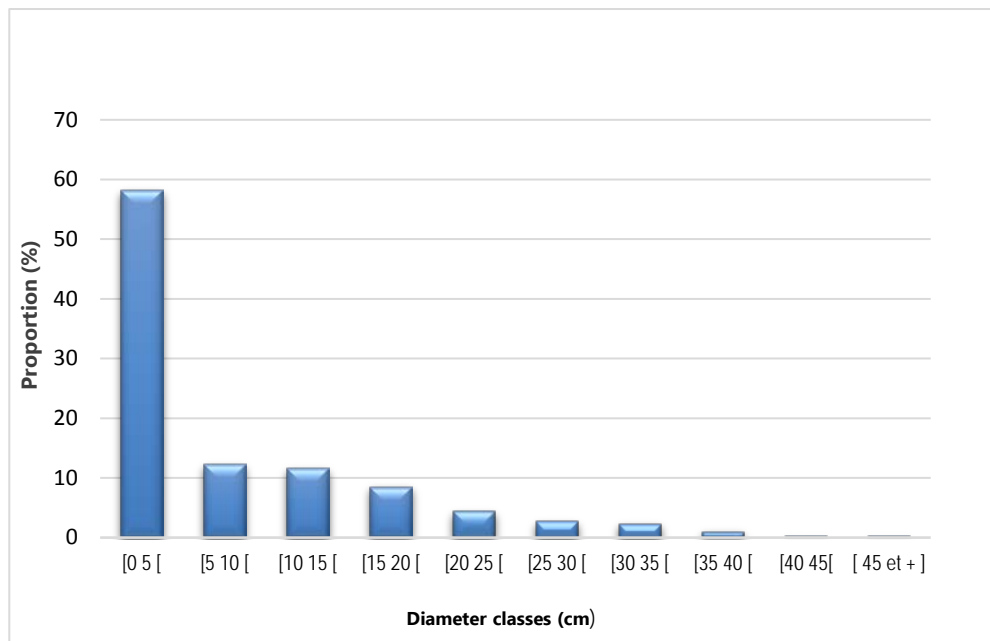
Figure 3 Diameter structure (D1,30) of woody plants (R38-R41)

The **L-shaped** diagram in Figure 3 above illustrates a woody formation with a high predominance of young, small-diameter individuals, which is characteristic of a rejuvenating population, thus reflecting strong natural regeneration in the study area.

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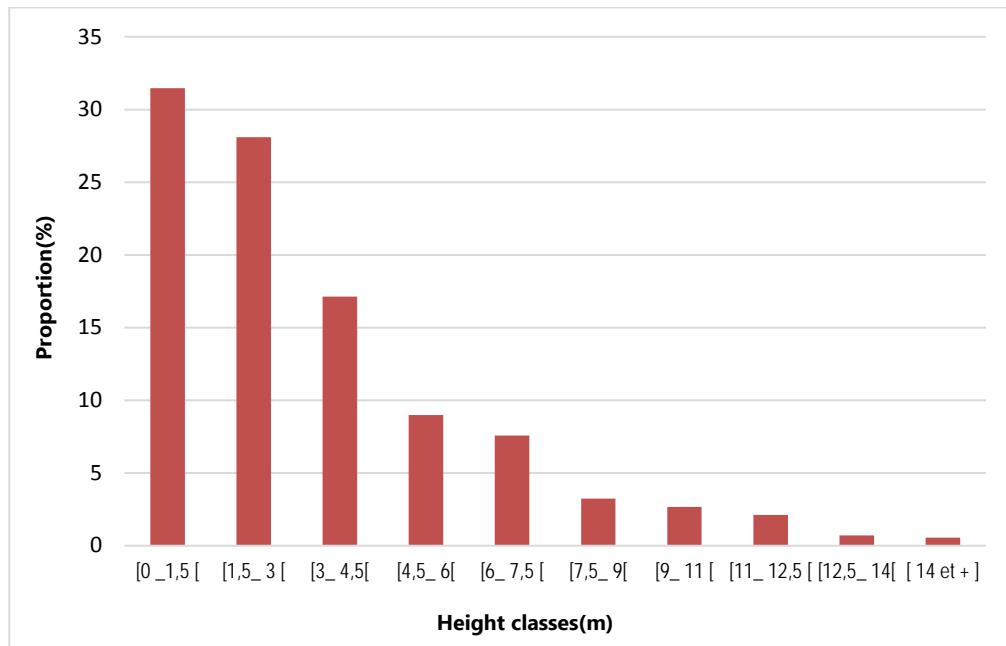
Figure 4 Height structure of woody plants (R38-R41)

The ***L-shaped*** diagram in Figure 4 above illustrates a woody formation with a high predominance of young, low individuals, characteristic of a rejuvenating population. This translates into strong natural regeneration.

3. WILDLIFE COMPONENT

3.1. Methodology

The mission was essentially carried out in a 4*4 vehicle with two (2) observers, a driver and a guide. It was carried out in several stages, namely systematic monitoring, the use of photographic traps , data collection using a Cybertracker (www.cybertracker.org) with independent GPS data.

3.1.1. Systematic monitoring

Following the reconnaissance stage, a planning of transects for monitoring covering the site over a radius of 7 km and 15 km was made. As one of the main objectives of the mission was to provide clear information on the distribution of natural resources, a grid of five (5) northwest/southeast transects spaced at 5 km intervals was defined.

All direct and indirect observations of fauna were entered into a Cybertracker as well as the vegetation control points (plots) to obtain a fully geo-referenced database.

3.1.2. Camera traps

Four (4) Browning cameras were used during the mission. They were placed opportunistically at burrows, waterholes and some large valleys and were baited with sardines to maximise the chances of attracting small carnivores during the night. Photo 1 below shows one of the camera traps attached as part of the mission.

Photo 1 Camera trap set up next to a burrow

3.2. Results of the observations

During the monitoring mission, direct and indirect observations were recorded. In practice, these observations mainly concerned the most easily observable mammals, birds and reptiles.

The four (4) photographic traps used during three (3) nights, i.e. twelve (12) different positions, allowed us to record some carnivores that were difficult to observe during the day.

A total of 49 animal species were observed, including 34 birds, 10 mammals and 4 reptiles.

3.2.1. Mammals and reptiles

The species observed directly and indirectly during this mission are Dorcas Gazelle, Jackal, Cape Hare, Mouflon, Ratel, Fennec, Pale Fox, Raccoon, Libyan Cat. Of these mammals, only the dorcas gazelle and the mouflon are classified as vulnerable on the IUCN red list. Photo 2 below shows a ratel photographed by the trap camera.

Photo 2 Ratel photographed by the camera

As far as reptiles are concerned, the Horned Viper (see photo 3), Snake, Uromastix and common lizards are among the species inventoried.

Photo 3 Horned viper (Cerastes ceraste)

The IUCN status of these species (mammals and reptiles) is given in Table 9 below.

Table 9 Status of mammal and reptile species

Type of observation	French name	Scientific name	IUCN status	CMS	CITES
Indirect,	Dorcas	*Gazella dorcas*	Vulnerable	I	III
Direct	Cape Hare	*Lepus capensis*	Least Concern		
Indirect	Mouflons_manchette	*Ammotragus lervia*	Vulnerable	II	II
Indirect, camera trap	Ratel	*Mellivora capensis*	Least Concern		III
Indirect	Libyan cat	*Felis lybica Felis silvestris*	Least Concern		
Indirect, direct, camera trap	Common Jackal	*Canis aureus*	Least Concern		III
Indirect	Pork spice	*Hystrix cristata*	Least Concern		
Indirect	Pale fox	*Vulpes pallida*	Least Concern		
Direct	Herison	*Paraechinus aethiopicus*	Least Concern		
Direct	Uromastyx	*Uromastyx geyri*	Nearly menaced		
Direct	Lezard	*Agama agama*	Least Concern		
Direct,	Desert monitor	*Varanus griseus*	Least Concern		I
indirect	Horned viper	*Cerastes ceraste*	Least Concern		
Direct	Snake	*Psammophis sibilans or Psammophis subtaeniatus*	Least Concern		
Direct	Frog	*Rana dalmatina*	Least Concern		

3.2.2. Birds

Several bird species were observed in the project area. Identification was made using the Birds of Western Africa guide, 2ème edition by Nik Borrow and Ron Demey and resulted in 34 species being identified. The raptors observed were the Egyptian vulture and the kestrel.

Of these birds, only the Egyptian vulture is classified as endangered on the IUCN Red List (see Table 10 below), CITES Appendix II and CMS Appendix II/I.

Table 10 Status of bird species in the project area

French name	Scientific name	IUCN status	CITES	CMS
Podobean Agrobate	*Cercotrichos podobe*	Least Concern		
Rufous Agrobate	*Cercotrichas galactotes*	Least Concern		

Sahara Bunting	*Emberiza striolata*	Least Concern		
Red-billed Hornbill	*Tockus nasutus*	Least Concern		
Crested Cocksucker	*Galerida cristata*	Least Concern		
Capuchins silver beak	*Euodice cantans*	Least Concern		
Blue-eared Choucador	*Lamprotornis chalybaeus*	Least Concern		
Brown Raven	*Corvus ruficollis*	Least Concern		
Short-tailed Raven	*Corvus rhipidurus*	Least Concern		
Pied Raven	*Corvusalbus*	Least Concern		
Ruffed Collie	*Urocolius macrourus*	Least Concern		
Tawny Cratérope	*Turdoides fulvus*	Least Concern		
Kestrel	*Falco tinnunculus*	Least Concern		
Brown-bellied Ganga	*Pterocles exustus*	Least Concern		
Lichtenstein Ganga	*Pterocles lichtensteinii*	Least Concern		
White-throated Bee-eater	*Merops albicollis*	Least Concern		
African Hoopoe	*Upupa epops senegalensis*	Least Concern		
Great horned owl	*Bubo ascalaphus*	Least Concern		
Hoopoe	*Upupa epops*	Least Concern		
House Swift	*Apus affinis*	Least Concern		
Golden sparrow	*Passer luteus*	Least Concern		
White-fronted sparrow	*Eremopterix nigriceps*	Least Concern		
Egyptian Percnopter	*Neophron pernopterus*	**At risk**	III	I/II
Little green bee-eater	*Merops orientalis*	Least Concern		
Southern Shrike	*Lanius meridionalis*	Least Concern		
Rock pigeon	*Columba guinea*	Least Concern		
Guinea fowl Common	*Numida meleagris*	Least Concern		
Collared dove	*Streptopelia senegalensis*	Least Concern		
Masked dove	*Oena capensis*	Least Concern		
Mourning Dove	*Streptopelia decipens*	Least Concern		
White-headed Wheatear	*Oenanthe leucopyga*	Least Concern		
Desert Parrot	*Oenanthe desertii*	Least Concern		
Isabella Wheatear	*Oenanthe isabellina*	Least Concern		

CONCLUSION

Conducted during the rainy season, this study made it possible to characterise the plant formations and fauna in the area of the "Adrar Emoles 3" uranium mining project.

Thus, as far as flora is concerned, a total of 38 species (25 herbaceous and 13 woody) have been recorded in and around the area, compared with 29 species in December 2021.

The herbaceous cover is not very diverse and is dominated by a perennial poaceae (*Panicum turgidum*). The woody formation is moderately diversified and dominated by Acacia. They contain very localised endemic species such as *Boscia senegalensis, Greria tenax, Acacia nilotica*. The height and diameter structures indicate good regeneration.

With regard to the fauna, the study enabled the observation of a total of 49 animal species, including 34 birds, 10 mammals and 4 reptiles.

Among mammals and reptiles, the species listed as vulnerable by the IUCN are *Gazella dorcas* and *Ammotragus lervia*. The *Uromastyx geyri is* considered a *near-threatened* species according to the same status. The others are species of Least Concern.

For birds, only the Egyptian vulture is classified as endangered on the IUCN Red List, CITES Appendix II and CMS Appendix II/I.

APPENDICES

- Appendix 1: Map of Floristic Groups
- Appendix 2: Herbaceous map
- Appendix 3: Map of wildlife observation points