



*Arabian and Sand Gazelles in the Dubai Desert Conservation Reserve -
2023*



Survey Date: 18th October, 2023

Survey Team:

Gerhard Erasmus, Basil Roy, Aline Witte de la Torre, Maria Jose Martin, Pubudu Madurapperuma



Contents

Summary	3
1. Introduction	4
2. Methodology.....	4
3. Results and Discussion	6
Recommendations	12
References	12



Summary

The Dubai Desert Conservation Reserve (24.857092° N, 55.675099° E) is one of the oldest reserves established in the UAE. With an area of 225 km², the reserve hosts several species indigenous to the hyper-arid desert ecosystem. This survey aimed to collect species count and ecological data for the two gazelle species present in the reserve namely the Sand Gazelle (*Gazella marica*) and the Arabian Gazelle (*Gazella arabica*). A total of 421 Arabian gazelles were recorded, they were mostly concentrated in the gravel plains located around Al Maha Resort, and around waterholes as well. A total of 107 Sand gazelles were counted and they were mainly found in isolated areas in the south of the reserve and up in the north where the presence of humans is lower. The number of females was higher in both species and their social structures were very similar. Both gazelle species decreased in numbers since 2021 (Jaradat, et al., 2021) with a 43% decrease for the Arabian Gazelle and 40% for the Sand gazelle. It is important to take into account that this year, a construction project from DEWA started in the DDCR, taking 5% of the total reserve's surface. Since it is one of the main differences between this year's survey and the previous one, we can assume that this is one of the main reasons that affected the dynamics of the gazelles.



1. Introduction

The Dubai Desert Conservation Reserve (DDCR) is the first National Park in the United Arab Emirates. It was established in 2003 with an area of 225 km², equivalent to 4.7% of Dubai's total land. The main purpose was to protect the desert ecosystem and its endangered inhabitants. The DDCR hosts different species, including ungulates like the Arabian Oryx and the Arabian and Sand Gazelles, and is a key location for rare birds such as the Lappet-faced Vulture and the Asian Houbara. One of the first conservation actions in the DDCR was the reintroduction of the Arabian Oryx (*Oryx leucoryx*) and the two indigenous gazelle species, the Sand and Arabian gazelles (*Gazella marica* and *Gazella arabica*, respectively). (Dubai Desert Conservation Reserve, n.d.).

Arabian gazelles, also known as Idme (إدمي), are categorised as Vulnerable by the IUCN Red list of Threatened Species in the last assessment made in 2016, with only 5000-7000 mature individuals (IUCN SSC Antelope Specialist Group, *Gazella arabica*, 2017). The species is described by its slim figure with a coat of fawn to dark brown on the back, head, and neck while other parts are white, being very distinguishing the two white face marks flanking the eyes.

As of 2016, the Sand Gazelle, also known as Al reem (الريم), is also classified under the IUCN as "vulnerable" with a decreasing trend. In 2016 their estimated adult population was 1,750-2150. In terms of phenotype, Sand gazelles usually have a lighter shade of brown with a white face, camouflaging it very well in their preferred sand dune habitat (IUCN SSC Antelope Specialist Group, *Gazella marica*, 2017).

Both species are kept in private locations along the Arabian Peninsula, however, their numbers in the wild are reduced and their populations keep decreasing due to illegal capture and hunting.

This survey aims to estimate the population of the target species within the DDCR, as well, to study aspects of the ecology and biology of both gazelle species (Sand and Arabian gazelles) in the protected area. The survey teams would also record other species of major site value including the Asian Houbara (*Chlamydotis macqueenii*), Pharaoh Eagle-owl (*Bubo ascalaphus*), and Lappet-faced Vulture (*Torgos tracheliotos*). Knowing that both gazelle species and other species are major site value species for the DDCR, this report is ultimately aiming at fulfilling the long-term monitoring programs' requirements. The survey focuses on these five species for several reasons. Firstly, the weekly DDCR ungulates count focuses primarily on the feed spots which are dominated by the Arabian Oryx. Therefore, the Arabian Oryx data is more reliable, but the data is not as accurate for the gazelle species and a different survey method is required to improve the assessment of their populations within the DDCR. Furthermore, it will be important to perform frequent counts to accurately estimate the numbers present in the DDCR for management purposes. Secondly, the three avian species are rare to find in the DDCR and as of 2016 the Lappet-faced vulture is listed as an endangered species so it was necessary to include them in this survey (Jaradat, et al., 2021)

2. Methodology

The Gazelles count took place on 18th October 2023 in the DDCR. The team met at 5.30 am ready to start the survey from 06:00 am to 11:00 am. The fenced reserve was divided into six areas, two grouped together: the Margham area, north area, south area, east area (Acacia and Idmi Lake), Al



Maha Resort, and the central area (Gravel plain, camel farm, stables, and the middle gate). The same map used in the last annual survey (Jaradat, et al., 2021) was used with the remarkable difference that this year, a construction project from DEWA started its operations, taking 5% of the DDCR. This area corresponds with the Grey tracks from the map (figure 1).

A team consisting of 2-5 people was appointed into each area. Vehicles were driven at 10 - 30 km/h, depending on the area and terrain. Each team travelled a different distance depending on the appointed area (Table 1), with an average distance of 74.5 km covered.

The survey used a mix of vehicle transect and ground count methods. Only main roads were used to cover the entire reserve area in one day and avoid over counting. On average, the counting lasted for 4-5 hours per team. The survey also included farm/irrigated areas. Rare species, if spotted, were recorded as well.

Each team used a GPS device, binoculars and camera to capture large groups of species that might need recounting, gender classification, or interesting observations. Collected data included the following: species, gender, number of individuals in each category (adult male, adult female, juvenile (including calf), and unknown), location and GPS coordinates.

The identification of a species was based on its characteristics as per the presentation and training provided by Aline for all the target species. Arabian gazelles have distinct black lines and white stripes on both sides of their face while Sand gazelles have a white face with a tear-drop-shaped black colouring under their eyes. Moreover, Sand gazelles tend to be stockier and shorter than the relatively slender, taller Arabian Gazelle. The sex of the gazelle in both species was distinguished by the size and shape of their horns. Female horns tend to be thinner and less prominent than the thick and long horns of a male gazelle. Young gazelles are characterized by their smaller size and if they are fawns, no visible horns. As for fawns and juveniles, it can get tricky to gender the individuals without looking at the genitalia, so the age group and species identification was the aim for these individuals.

No.	Survey Team	No. members	Area	Track colour in map	Total Km driven
1	Gerhard	1	South	Yellow	69
2	Basil, Dimitrios, Penelope	3	North East: Acacia & Idmi Lake	Cyan	104
3	Aline, Maria	2	Margham	Blue	67
4	Pubudu, Lara, Omar, Kris	4	Al Maha Resort, Central (Gravel Plain, Camel Farm, Stables, Middle gate)	Black	58

Table 1 The DDCR gazelle survey teams and the effort

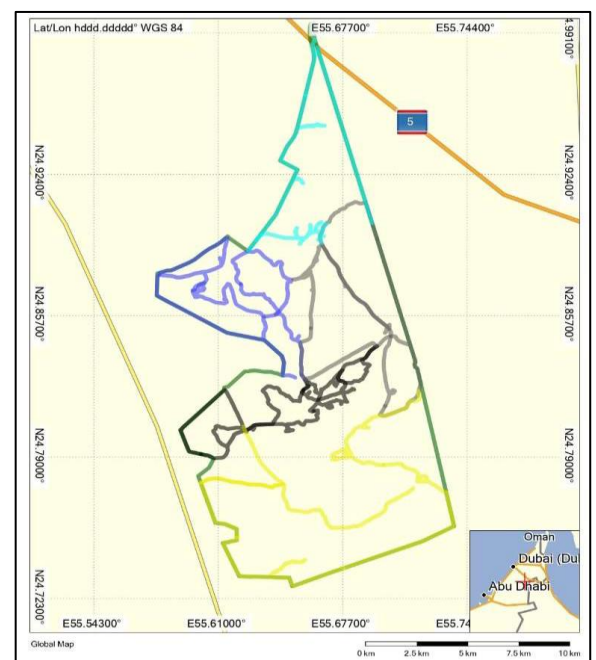


Figure 1 Tracks covered by the survey teams in the DDCR (Jaradat, et al., 2021)

3. Results and Discussion

A total of 421 Arabian gazelles, 107 Sand gazelles, 1 Pharaoh-eagle Owl and 1 Arabian Red Fox were recorded during the count (Figure 2). The total kilometres driven by the 4 teams during the count was 298 km.

SPECIES	TOTAL	Males	Females	Juveniles	Unidentified
Arabian Gazelle	421	132	201	88	11
Sand Gazelle	107	41	59	7	
Arabian Fox	1				1
Pharaoh Eagle Owl	1				1

Figure 2 Result of total numbers and species recorded during the survey in the DDCR.

➤ *Gazelle species encountered*

The Arabian gazelles were the most abundant species (Figure 3), with a total count of 421 individuals including 201 females (47.7%), 132 males (31.4%), 88 juveniles (20.9%) and 11 (2.6%) of undetermined sex.

Regarding the Sand Gazelle, a total of 107 individuals were recorded. This included 59 females (55.1%), 41 males (38.3%) and 7 juveniles (6.5%).

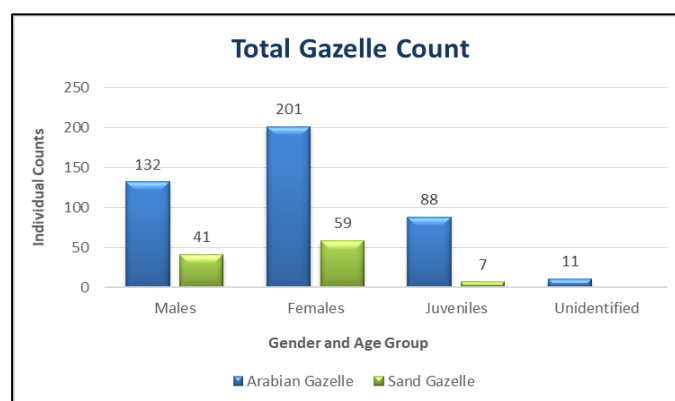


Figure 3 Total count of Arabian and Sand gazelles in the DDCR

These results have been surprising, especially in the case of the Arabian Gazelle, since higher numbers for both species were expected. In the case of the Arabian Gazelle, there has been a significant drop in their numbers going from 732 individuals recorded in the last survey done in 2021 (Jaradat, et al., 2021) to only 421 individuals recorded in the current survey. This doesn't align either with the last results recorded during the weekly counts done by the staff the 17th October 2023. A total of 457 Arabian Gazelle were counted in the last weekly survey done on the main roads where the feeding points are located, however this number is closer to our results.

In this survey, the total number of Sand Gazelles was 107. This result is lower than the previous survey which recorded 178. The difference is not as high as in the case of the Arabian Gazelle but we can

observe a drop in the numbers. The total is, as well, lower than the number of Sand Gazelles recorded during the weekly counts (total of 131) done by the team the day before to the annual survey.

For both species, the difference in the total numbers between the current annual survey and the previous one done in 2021 (Jaradat, et al., 2021) can be the result of the difference in the time of the year where both surveys were done. In 2021, the annual survey took place in July when the average temperature was 36.9°C (Dubai Municipality, Data from Weather Station in Al Maha (DDCR), 2021). During the summer months, we can observe directly and through the camera traps that the behaviour of the animals change. They tend to be closer to the waterholes located in the reserve since they have higher demand of this resource, hence they can be easily seen due to the location of these waterholes. However, this current annual survey took place in October when the average temperature during the day is 28.9°C (Dubai Municipality, Data from Weather Station in Al Maha (DDCR), 2023). During colder months, ungulates in general, tend to spread out in the reserve, resting in areas deep in the desert away from the roads.

➤ Social structure

For a better understanding of the dynamics and behaviour of these species of gazelles, the social structures were analysed. 94% of the Arabian Gazelles were in groups, while only 6% were recorded alone (Figure 4). This matches with the last results from 2021. However, this year we can see that the number of solitary females is higher than previously recorded, being equal to the amount of lone males. There is as well a percentage of calves/juveniles found alone. Some of the locations between the solitary females and the calves/juveniles were close. Females leaving the youngest covered or resting could be a reason for this higher number of lonely females and juveniles. In the case of the Sand Gazelle, the results were similar to the Arabian Gazelle with only a 9% of the individuals being solitary, most of them males (80%) (Figure 5). For both cases, this can be interpreted as gazelles being social animals rather than rare solitary individuals.

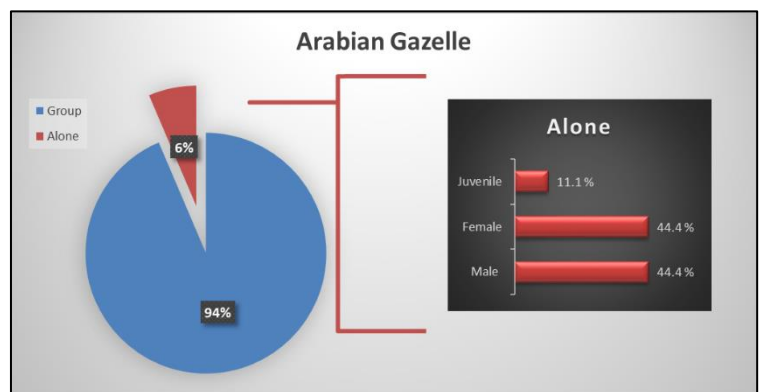


Figure 4 Arabian Gazelle social structure

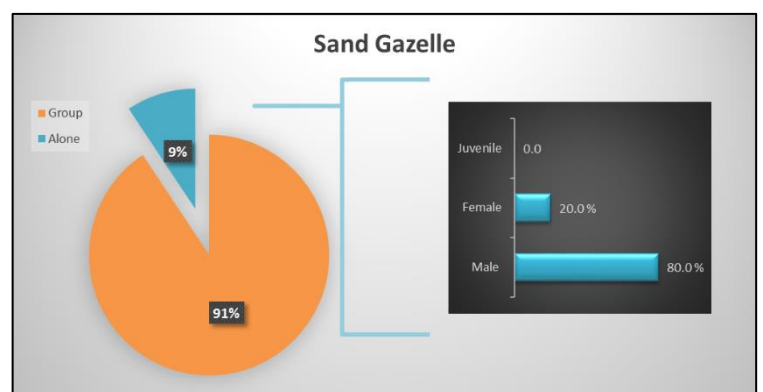


Figure 5 Sand Gazelle social structure

➤ Gazelle frequency

If we analyse deeper their populations we can infer their dynamics in the DDCR. As stated before, both species of gazelles are social animals. In the case of Arabian Gazelles, apart from the solitary records, we observe a preference for groups of 2 individuals, with a tendency of a decrease in the frequency when higher number of individuals from the same group (Figure 6). From these bi-groups, most of them were formed by 2 females, followed by two males together and a female with her youngster. As expected, a group formed by a male and a calf/juvenile is the least recorded (Figure 7).

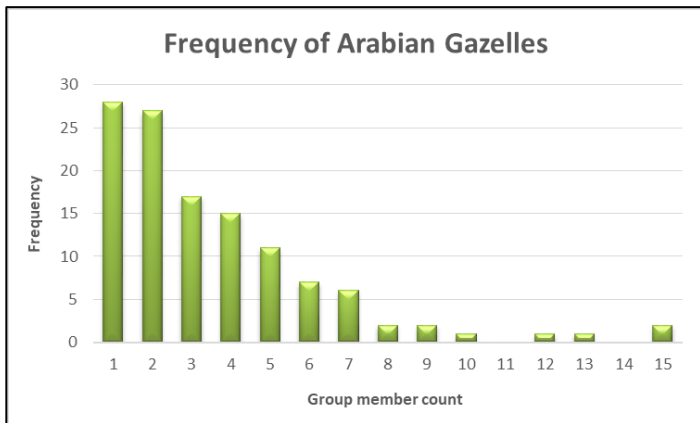


Figure 6 Frequency of Arabian Gazelles

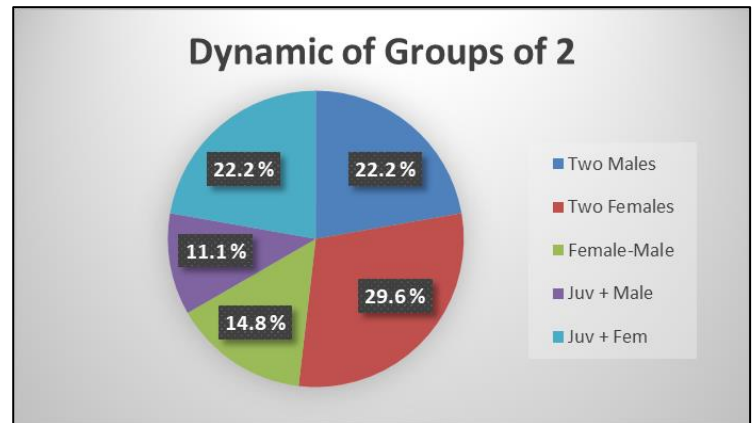


Figure 7 Dynamics of groups of 2 in Arabian Gazelle

Regarding the Sand Gazelle, apart from the solitary individuals, the most frequent group recorded is group of 3 individuals (figure 8), where mostly females and juveniles were found, followed by trios with dominance of females or trios of adult males. We didn't record any group of 3 individuals with males and juveniles or with a dominance of males. There is a need to take into consideration that this species is very elusive and these gazelles prefer deep sand dunes, so it is harder to spot them especially when the weather conditions are favourable.

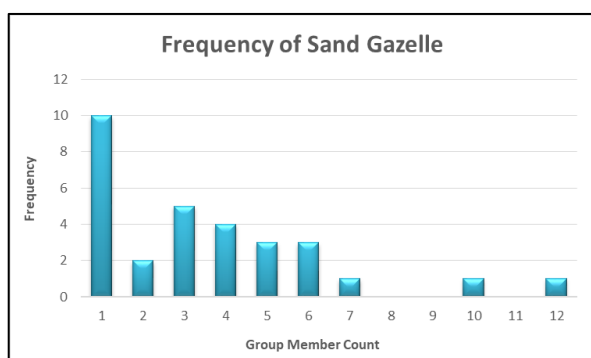


Figure 8 Frequency of Sand Gazelles

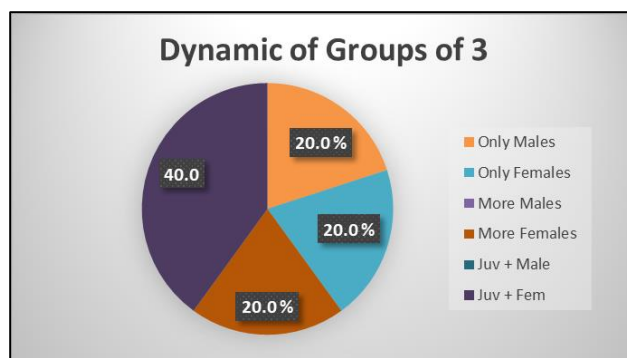


Figure 9 Dynamics of groups of 3 in Sand Gazelle



➤ Gazelle distribution

Arabian gazelles were mostly found in the dunes and gravel plains surrounding the Al Maha Resort and DDCR office (figure 10). There were some recorded in the south of the reserve, but most of them were recorded in the north part of the reserve. These results are very different from the 2021 annual survey (Jaradat, et al., 2021), where the team observed a more spread out population. The new construction project from DEWA must probably be the reason since all the gazelles that were previously recorded in the waterholes and tracks located in this area, had to move to less disturbed locations of the reserve.

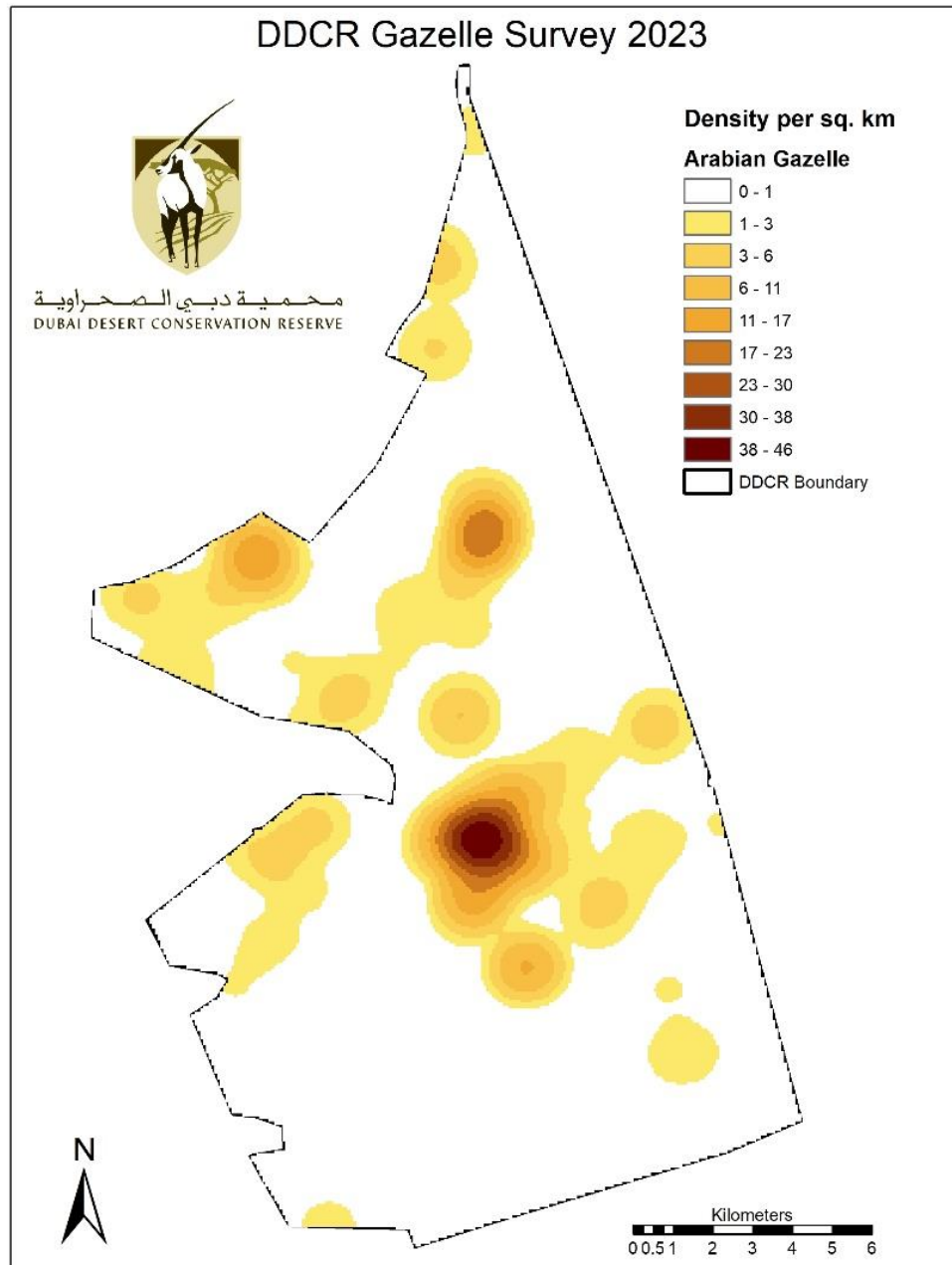


Figure 10 Arabian Gazelle distribution - density per km²

Sand gazelles' distribution is surprising since they could be observed in different areas from the reserve, although in small numbers (figure 11). Most of the groups were located in the south of the reserve. This result aligns with the fact that they are more elusive and tend to be in more isolated areas. The south of the DDCR is an area where the presence of people is lower than in other areas. Even though they could be observed spread out throughout the reserve, close to areas where there is human activity, their locations coincide with areas where there are not a lot of tracks so the traffic is reduced. They occur as well in areas close to waterholes, like in the southwest part of the reserve.

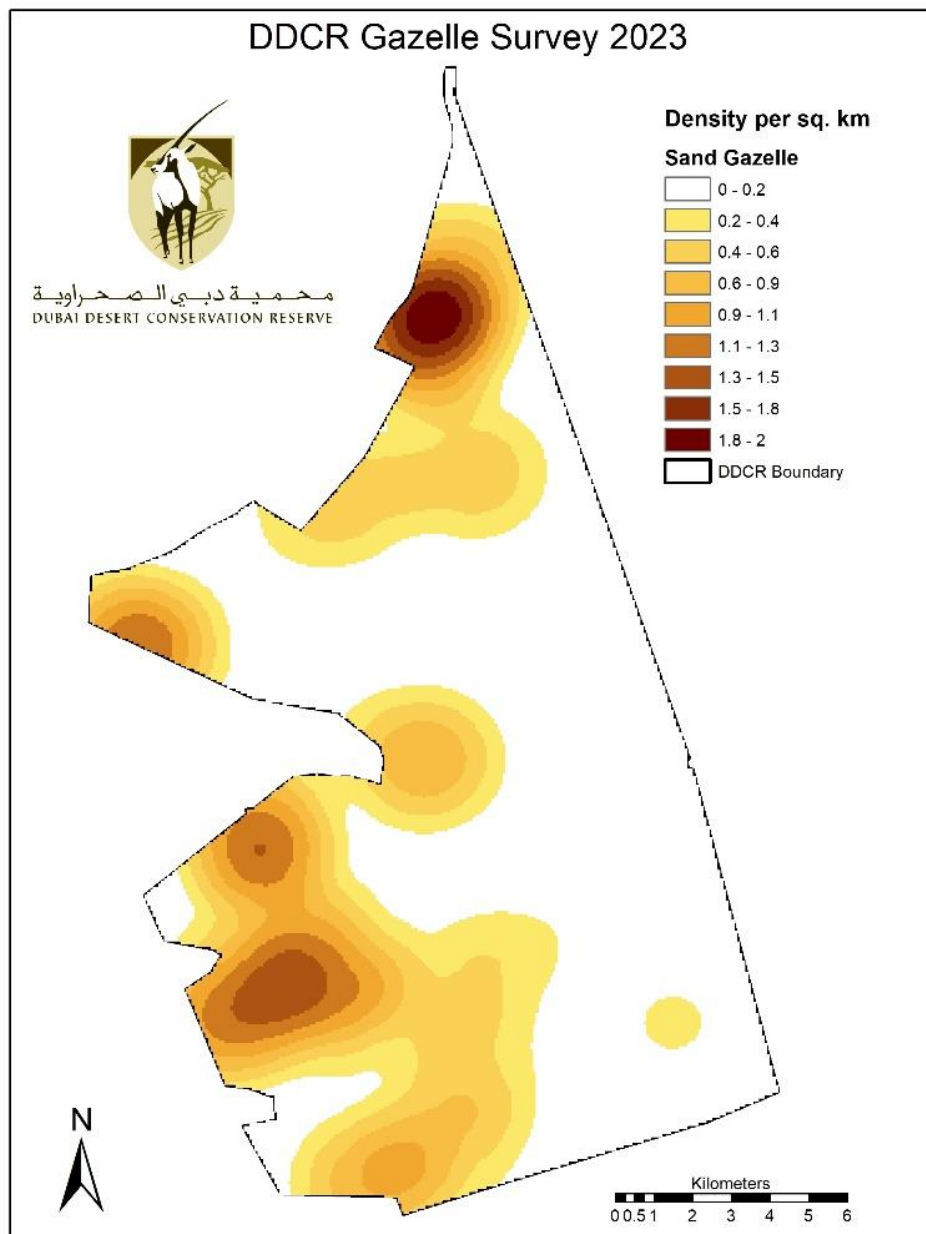


Figure 11 Sand Gazelle distribution - density per km²

➤ Other encounters

The target species to record if observed were the Asian Houbara, any species of Vulture (with focus on the more frequent Lappet-faced Vulture) and the Pharaoh Eagle-owl. Only one Pharaoh Eagle-owl was observed close to the waterhole located in Al Maha area. None of the other target species were recorded, but there was a sighting of an Arabian Red Fox in the more isolated area in the south of the reserve (figure 12).

In the last annual survey in 2021 (Jaradat, et al., 2021), two Asian Houbaras and one Lappet-faced Vulture were observed. The fact that there has not been any release of Asian Houbaras during this year could be the main reason to not have observed any. Although Asian Houbaras have been recorded this year during the weekly surveys, the observations were very rare so it was expected to not record any during the annual survey. Regarding the vultures, we still observe them through the camera traps every month including October. However, they start appearing closer to midday since the temperatures are not that high anymore so when the survey took place, they were probably perching in their resting areas.

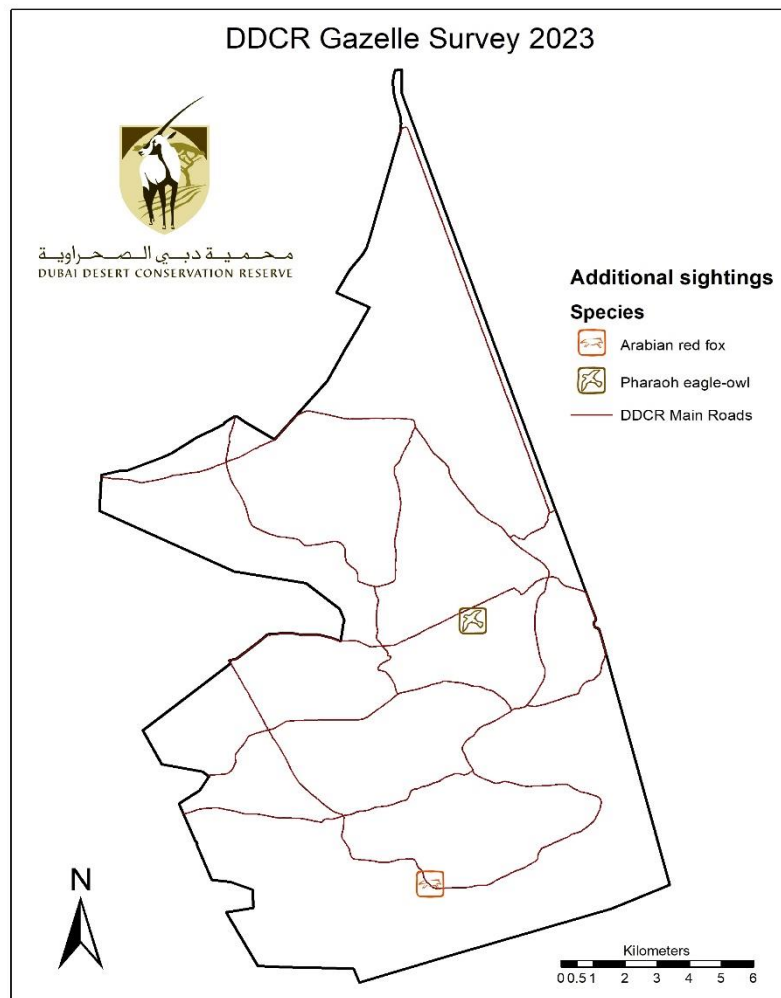


Figure 12 Other species encountered in the DDCR during the annual Gazelle survey



Recommendations

The annual survey has a more focused methodology and is more accurate than the Weekly DDCR Ungulate counts and other surveys done by teams that come to DDCR such as Biosphere. However, its accuracy could be improved even more by increasing the number of people per team and the amount of teams surveying. This would allow areas that are away from the main tracks to be surveyed, especially for species like the Sand Gazelle that prefers deep sand dune habitats. Moreover, it would ensure a faster and more accurate counting when in the field dividing the tasks such as driving, looking out, counting or writing, between the different members of the team. In addition, there are no studies on the genetic diversity of the gazelles in the DDCR. This type of data could contribute significantly to the scientific knowledge pool of these species.

References

- Dubai Desert Conservation Reserve. (n.d.). *Dubai Desert Conservation Reserve*. Retrieved from Reserve History: <https://www.ddcr.org/about/?overview>
- Dubai Municipality. (2021). *Data from Weather Station in Al Maha (DDCR)*.
- Dubai Municipality. (2023). *Data from Weather Station in Al Maha (DDCR)*.
- IUCN SSC Antelope Specialist Group. (2017). *Gazella arabica*. *The IUCN Red List of Threatened Species*: e.T117582065A88018124. doi:<https://dx.doi.org/10.2305/IUCN.UK.2017-2.RLTS.T117582065A88018124.en>
- IUCN SSC Antelope Specialist Group. (2017). *Gazella marica*. *The IUCN Red List of Threatened Species*: e.T8977A50187738. doi:<https://dx.doi.org/10.2305/IUCN.UK.2017-2.RLTS.T8977A50187738.en>
- Jaradat, A., Sher Shah, M., Mansoor, S., Simkins, G., Khafaga, T., Khafaga, E., . . . Khan, R. (2021). *Arabian and Sand Gazelles in the Dubai Desert Conservation Reserve*. Dubai Desert Conservation Reserve.