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DUBAI DESERT CONSERVATION RESERVE



## Annual gazelle Survey in the Dubai Desert Conservation Reserve (DDCR) - 2025



**November 4<sup>th</sup>, 2025**

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## Abstract

The Dubai Desert Conservation Reserve (24.857092° N, 55.675099° E) is among the earliest protected areas established in the United Arab Emirates. Covering approximately 225 km<sup>2</sup>, the reserve supports a range of species adapted to the region's hyper-arid desert environment. This survey was designed to gather population and ecological information on the two gazelle species occurring within the reserve: the Sand Gazelle (*Gazella marica*) and the Arabian Gazelle (*Gazella arabica*).

A total of 680 Arabian Gazelles were recorded, with observations largely concentrated within the gravel plains surrounding the Al Maha Resort and in the vicinity of waterholes. In contrast, 156 Sand Gazelles were documented, predominantly occupying more remote southern areas of the reserve where human activity is comparatively low. In both species, females outnumbered males, and social group composition showed similar patterns. Overall, the findings align closely with those reported in the previous survey (DDCR, 2024). During the current season, two surveys are being conducted to enable a comparative assessment between summer and winter conditions.



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## Introduction

The Dubai Desert Conservation Reserve (DDCR) is the United Arab Emirates' first national park, established by government decree in 2003. Covering an area of approximately 225 km<sup>2</sup>, it accounts for about 4.7% of Dubai's total land area. The reserve was created to protect a representative portion of Dubai's original inland desert landscape, together with its native flora and fauna. DDCR supports a diverse desert ecosystem and is home to hundreds of species, including three ungulates: the Arabian oryx (*Oryx leucoryx*), Arabian gazelle (*Gazella arabica*), and sand gazelle (*Gazella marica*) (DDCR, 2023).

The Arabian gazelle is a small, slender ungulate weighing between 12 and 16 kg, characterised by a fawn to brown dorsal coat, white underparts, and distinctive white facial stripes extending from the eyes to the nostrils. According to the most recent IUCN assessment conducted in 2016, the global wild population was estimated at 5,000 – 7,000 mature individuals, and the species is currently listed as Vulnerable (IUCN SSC Antelope Specialist Group, 2023). The sand gazelle is the second largest ungulate species in the UAE, with adult weights ranging from 15 to 25 kg. It displays sandy-brown upperparts and white facial and ventral colouring. Its wild population was estimated at 1,750 – 2,150 mature individuals during the 2016 assessment, and it is also classified as Vulnerable by the IUCN (IUCN SSC Antelope Specialist Group, 2017).

Both gazelle species have experienced significant population declines and have disappeared from large parts of their historical range. These declines are attributed to factors such as hunting, illegal capture, habitat degradation and fragmentation, and more recently, competition with domestic livestock. Conservation efforts for gazelles in the UAE began in 1999 with their reintroduction into the Al Maha Reserve, now known as the DDCR, and have continued through the establishment of protected areas and targeted conservation programmes across the country (Javed, Garcia-Rawlins, Rodriguez, Sakir, & Dhaheri, 2020; DDCR, 2023; IUCN SSC Antelope Specialist Group, 2023; Shalmon, Sun, & Wronski, 2020; Cunningham & Wacher, 2009).

As part of DDCR's Major Site Values (MSV) monitoring programme, weekly ungulate counts are conducted along the reserve's main road network, with particular focus on feeding stations. While these surveys provide useful long-term data, they are limited to road-accessible areas, leaving large portions of the reserve unsampled. In addition, feeding sites are often dominated by Arabian oryx, which may introduce bias and reduce the accuracy of gazelle population estimates. Consequently, targeted surveys focusing specifically on Arabian and sand gazelles are required to obtain more reliable population assessments. The present survey aims to estimate gazelle population sizes within the DDCR, examine key aspects of their biology and ecology, and generate annual data to support management and conservation planning.

Although the primary focus of this survey is on gazelles, additional MSV species were also recorded due to their rarity within the UAE. These include the Asian houbara (*Chlamidotis macqueenii*), Pharaoh Eagle-owl (*Bubo ascalaphus*), and Lappet-faced vulture (*Torgos tracheliotos*).

## Methodology

The survey was conducted on November 4<sup>th</sup>, 2025, from 6:10 AM to 10:30 AM with a total of 23 participants. The reserve was divided into six distinct areas: Central, North, South, Al Maha Resort, Al Maha, Margham and Fenceline (Figure 1). The surveyed areas remained consistent with those of previous surveys (Jaradat, et al., 2021) (DDCR, 2024) although this year we included a dedicated team for the area of the Al Maha Resort (Table 1).

Participants were organized into seven teams, each consisting of 2–5 individuals. Each team was assigned a specific survey area and provided with a 4x4 vehicle, which was driven at speeds ranging from 10 to 30 km/h throughout the duration of the survey.

Maria Jose Martin, DDCR Conservation Officer, provided training on species identification and sex determination for all target species 30 minutes before activities began. The survey used a mix of vehicle transects and ground count methods. Main roads and tracks were used to cover the entire reserve, and all areas were counted simultaneously to eliminate double-counting as much as possible. Four irrigated zones were included in the survey, namely Tawi Hussein, Tawi Ruwayyan, Tawi Manana, and Tawi al Fawi in the Margham, North, Central and



South areas respectively. Each team carried one GPS device, binoculars and a camera. Collected data included: species, gender, age group, number of individuals in each age group by gender, location, GPS coordinates of each sighting and kilometres driven. Juveniles were not gendered and individuals that could not be grouped under gender or age were recorded as “unidentified” (Figure 2).

No.	Survey Team	No. Members	Area	Track colour in map	Total Km driven
1	Gerhard, Jaden, Julie, Hakima	4	Central	Green	48
2	Aline, Deepa	2	North	Orange	18
3	Hugo, Delano	2	South	Purple	47
4	Dushan, Michael	2	Al Maha Resort		
5	Pubudu, Balamurugan, Ahmed, Anupama	4	Al Maha	Pink	102
6	Maria, Aneesh, Elinor, Ummer	4	Margham	Orange	47
7	Felix, Naseer, Lokman, Islam, Gopal	5	Fence	Black	90

Table 1 Team effort during survey

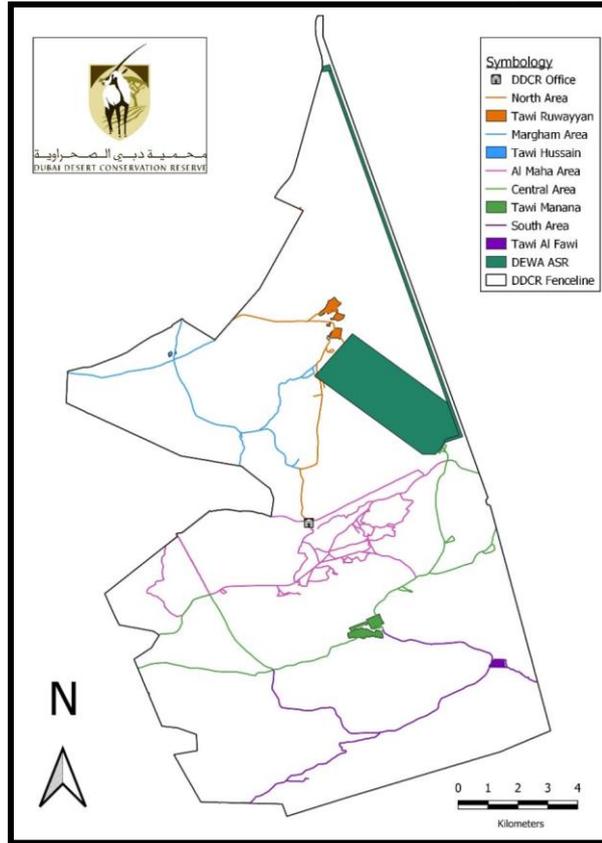


Figure 1 Map of surveyed areas



DATASHEET: GAZELLE COUNT SURVEY											
TEAM NAME:											Date (DD/MM/YY)
Team members:											Time
Vehicle KM Start			Vehicle KM Finish			Total Distance KM					
Total Area Covered											
Sighting No.	Species name (select)				Total number of: Males (M), Females (F), Juveniles (J)			Location	GPS Coordinates (N, E)	Comments	
	Arabian Gazelle	Sand Gazelle	Houbara	Vulture	M	F	J				
1	Arabian Gazelle	Sand Gazelle	Houbara	Vulture	Pharaoh Eagle-owl	M	F	J			
2	Arabian Gazelle	Sand Gazelle	Houbara	Vulture	Pharaoh Eagle-owl	M	F	J			
3	Arabian Gazelle	Sand Gazelle	Houbara	Vulture	Pharaoh Eagle-owl	M	F	J			
4	Arabian Gazelle	Sand Gazelle	Houbara	Vulture	Pharaoh Eagle-owl	M	F	J			
5	Arabian Gazelle	Sand Gazelle	Houbara	Vulture	Pharaoh Eagle-owl	M	F	J			
6	Arabian Gazelle	Sand Gazelle	Houbara	Vulture	Pharaoh Eagle-owl	M	F	J			
7	Arabian Gazelle	Sand Gazelle	Houbara	Vulture	Pharaoh Eagle-owl	M	F	J			
8	Arabian Gazelle	Sand Gazelle	Houbara	Vulture	Pharaoh Eagle-owl	M	F	J			
9	Arabian Gazelle	Sand Gazelle	Houbara	Vulture	Pharaoh Eagle-owl	M	F	J			
10	Arabian Gazelle	Sand Gazelle	Houbara	Vulture	Pharaoh Eagle-owl	M	F	J			

Figure 2 Data sheet used for the gazelle count survey

## Results & Discussion

A total of 680 Arabian gazelles (194 males, 313 females, 171 juveniles and 2 individuals of unidentified sex) were recorded. The total count for Sand gazelles was 156, with 48 males, 63 females and 30 juveniles.

No species listed under the MSV were sighted. However, the teams recorded the following bird species: one eagle (not identified to species level), two Grey Herons, one Osprey, and one Shikra (Table 2).

Species	Total	Males	Females	Juveniles	UnID
Arabian Gazelle	680	194	313	171	2
Sand Gazelle	156	48	63	30	15
Eagle	1				1
Heron	2				2
Osprey	1				1
Shikra	1				1

Table 2 Gazelle count survey results, including other species recorded.

### ➤ Abundance of gazelle species

The Arabian gazelle was the most abundant species recorded, with a total of 680 individuals (Figure 3), a figure very similar to that recorded last year (684 individuals) (DDCR, 2024). However, it should be noted that this year the Al Maha Resort area was included in the survey. In this area, only golf carts are permitted, and a substantial number of gazelles inhabit the spaces between villas and other resort buildings.

The difference between the two years is minimal, indicating that the population is stable. These results are consistent with those obtained during the 2021 survey (Jaradat, et al., 2021).

The annual count is notably higher than the weekly count conducted by the DDCR team during the same week, which recorded 356 individuals. This discrepancy is likely due to differences in survey methodology, as weekly counts are conducted along specific roads and near feeding stations, whereas the annual count covers a much wider area.

The Sand gazelle was recorded in numbers (156 individuals) similar to those of last year, although a slight decrease was observed. Sand gazelles are a more timid species and tend to inhabit areas with less human activity. Despite



the decrease, the population appears to be stable, as weekly counts conducted by the monitoring team recorded 221 individuals.

In this case, the difference between the two counts may be explained by the timing of the annual survey. During the survey period, animals typically use the early morning hours to move and graze, gradually shifting toward vegetated areas that provide shade as temperatures rise. This movement pattern may reduce detectability during the survey.

The weekly counts compile observations of all three ungulate species within the reserve throughout the year. For the Arabian gazelle, the 2025 weekly average was 446 individuals, which is even lower to the total recorded during the current annual survey, which makes sense since as mentioned, they only cover certain roads of the reserve. However, large portions of the reserve remain inaccessible due to the absence of roads, potentially leading to an underestimation of the true population size.

Conversely, in sand gazelles, the opposite pattern is observed. The compilation of weekly counts for 2025 is 282, which is almost double than this surveys count. This difference could have different explanations such as the timing when the survey was done (it is normally right after sunrise, while the weekly count varies from 05:00AM to 08:00 depending on the time of the year). As mentioned before, during early mornings, animals tend to be grazing and it is later in the day when they approach vegetated areas.

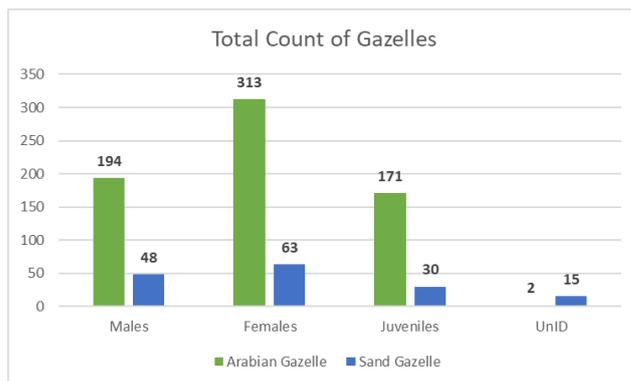


Figure 3 Total count of individuals for Arabian and Sand Gazelle.

### ➤ Social structure

The social structures of these gazelle species were analysed to better understand their behavioural dynamics. Overall, 89% of Arabian Gazelles were observed in groups, while only 11% were recorded as solitary individuals (Figure 4, left), consistent with findings from the previous two years. Solitary individuals were predominantly males, followed by females, with juveniles recorded least frequently. In several cases, solitary females and calves or juveniles were observed in close proximity, suggesting that females may temporarily leave younger individuals while they are resting or concealed.

For the Sand Gazelle, only males were recorded as solitary individuals during the study period, while the majority of individuals (94%) were observed in groups (Figure 4, right). In both species, these results indicate a predominantly social structure, with solitary occurrences being relatively uncommon. This pattern is consistent with observations recorded in 2023 and 2024.

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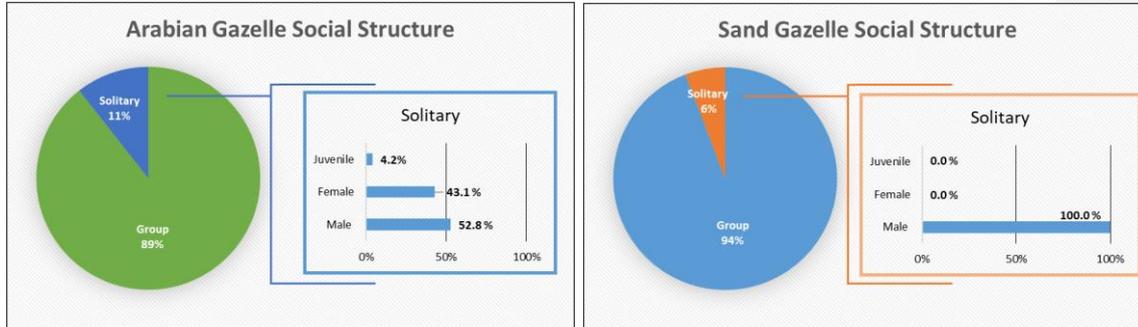


Figure 4 Social Structure. Left: Arabian Gazelle; Right: Sand Gazelle

### ➤ Gazelle Frequency

A closer examination of the population data provides insight into gazelle social structure within the DDCR. Arabian gazelles are most frequently observed in small units, with pairs being the most common grouping, while sightings of solitary individuals occur less often. Larger groups are progressively less frequent (Figure 5, left).

The majority of pairs recorded consisted of two females, followed by female–calf associations (Figure 5, right). During the current monitoring period, three instances of male–juvenile groupings were also documented. While these findings show some variation compared to previous years, they remain within the expected range of gazelle behavioural patterns. (DDCR, 2023) (DDCR, 2024).

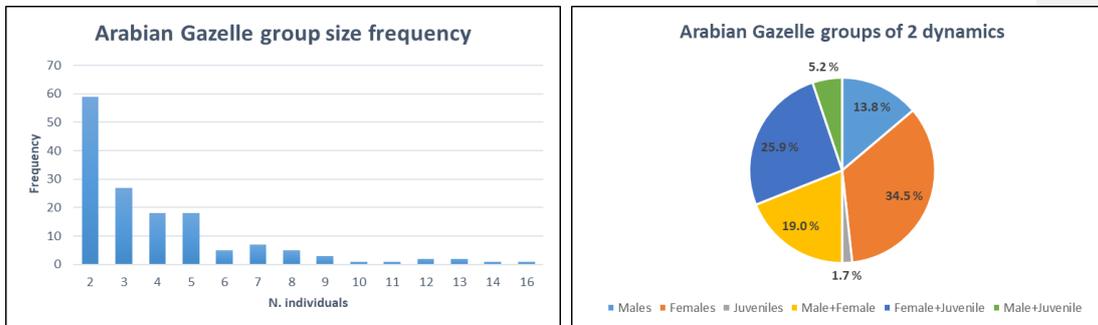


Figure 5 Left: Frequency of each group size - Arabian Gazelle; Right: Dynamics of the groups of 2 - Arabian Gazelle

For Sand Gazelles, this year's results differ from those observed in 2024. The most frequently recorded group sizes consisted of two and three individuals (Figure 6, left), with male–female pairs comprising 50% of the observed pairs (Figure 6, right). In 2023, a high number of groups of two individuals was recorded; however, this year only four pairs were observed. Overall, group sizes recorded this year were more varied in terms of the number of individuals, whereas in 2024 most individuals were recorded in small groups of up to five individuals (DDCR, 2024). It is important to note that this species is particularly elusive and shows a preference for deep sand dune habitats, which makes it difficult to detect, especially under favourable weather conditions.

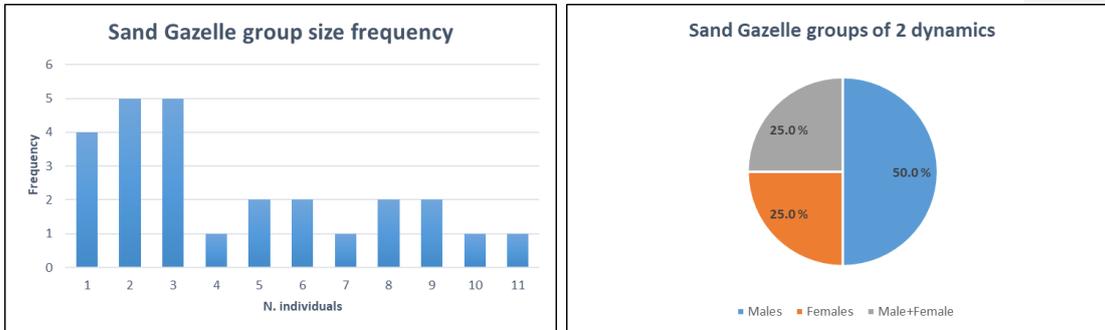


Figure 6 Frequency of each group size - Sand Gazelle; Right: Dynamics of the groups of 2 - Sand Gazelle

### ➤ Gazelle Distribution

The highest concentration of Arabian Gazelles was recorded on the dunes and gravel plains surrounding the Al Maha Resort and the DDCR Office (Figure 7). Compared to 2024, gazelles were observed to be more widely distributed throughout the reserve during this survey. However, their overall distribution pattern remains similar, largely coinciding with vegetated areas.

Arabian Gazelles were primarily observed on the dunes and gravel plains surrounding the Al Maha Resort and the DDCR Office. Although some sightings were recorded in the southern parts of the reserve, most observations were concentrated in the northern regions, particularly in areas dominated by Ghaf groves. These findings are consistent with results obtained in previous surveys conducted in 2021 and 2023 (Jaradat, et al., 2021) (DDCR, 2023). Nevertheless, the current survey indicates that Arabian Gazelles are now more widely dispersed across the reserve.

Following the completion of the DEWA ASR Project fencing, increased gazelle activity was observed in proximity to the fenced area. This may suggest that gazelles are beginning to adapt to the presence and effects of the project.

Sand gazelles were most frequently recorded in the southern sector of the reserve (Figure 8). This pattern is consistent with the species' preference for secluded habitats and areas with limited disturbance, as well as with DDCR's routine monitoring observations. The southern portion of the reserve generally experiences lower levels of human activity, which may contribute to the higher occurrence of sand gazelles in this area. While the overall spatial pattern remains comparable to previous surveys (DDCR, 2024), sand gazelles continue to be associated with central southern zones containing Ghaf groves and established feeding stations.

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### DDCR Annual Gazelle Survey 2025

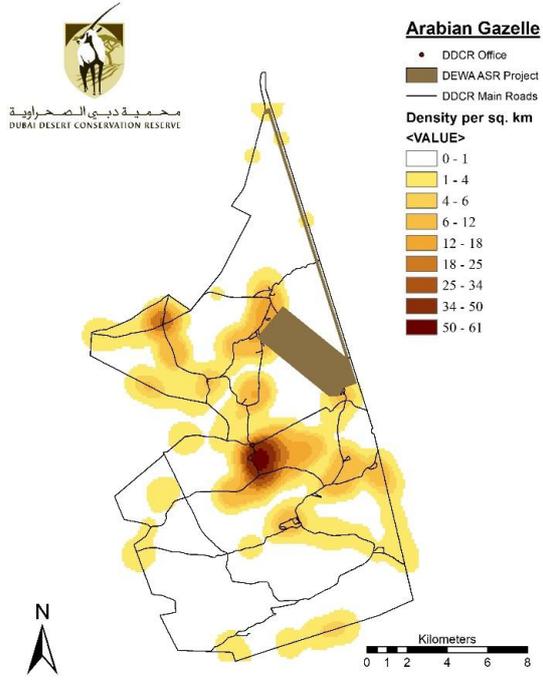


Figure 7 Arabian Gazelle distribution in the DDCR

### DDCR Annual Gazelle Survey 2025

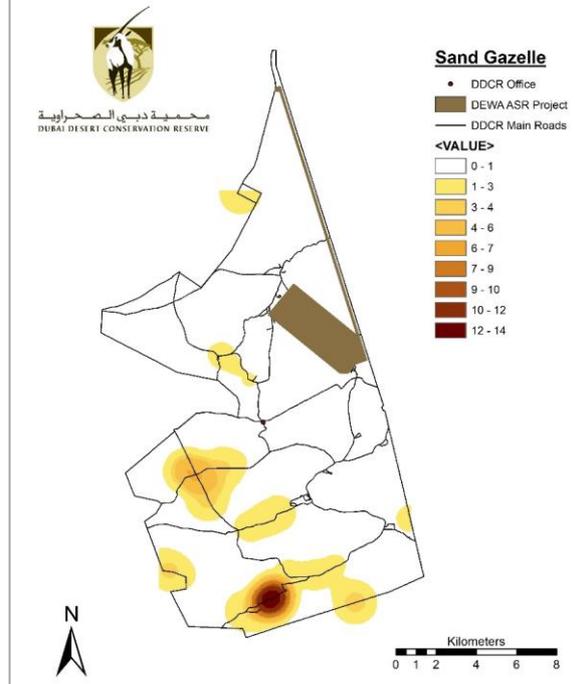


Figure 8 Sand Gazelle distribution in the DDCR

#### ➤ Other encounters

Species selected for monitoring included the Asian Houbara, vulture species (with particular attention given to the Lappet-faced Vulture due to its regular occurrence), and the Pharaoh Eagle-owl, as these taxa contribute to the Major Site Values (MSV) of the reserve.

No Asian Houbara releases have taken place within the reserve during the last three years; nonetheless, multiple observations were documented in 2025. Vulture presence continues to be confirmed through the camera-trap monitoring programme, with detections most frequently occurring during the middle of the day.

Although none of the target species were observed during this survey, incidental records included two Grey Herons, one Osprey, one Shikra, and one unidentified eagle species. Most of these observations were made at or near the site known as *Tawi Manana*, which contains a man-made lake that attracts water-associated and raptor species (Figure 9). The Osprey, which is considered an uncommon species within the reserve, was observed over several weeks and was recorded feeding on fish inhabiting the lake.

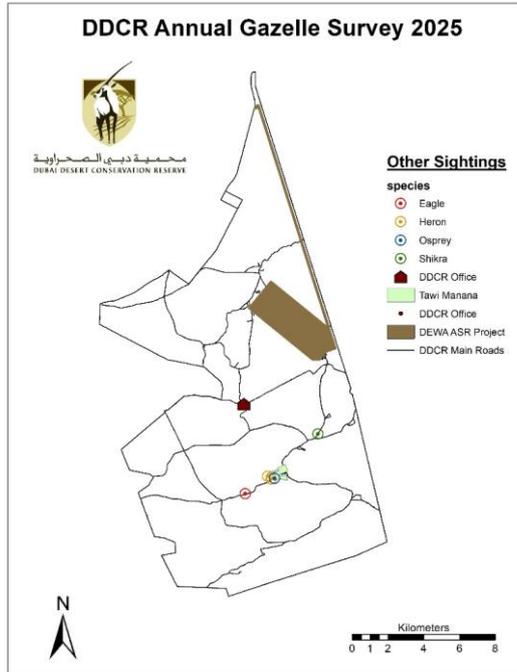


Figure 7 Sightings of other species during the survey

## Conclusion

This year, two surveys are being conducted to allow for seasonal comparison. As a result, the winter survey was postponed by one month, and in 2025 it was carried out in November rather than October, as in 2024. In addition, survey effort was increased through the inclusion of an extra team covering areas around the Al Maha Resort, where gazelles are known to occur. Despite the expanded coverage, results were generally consistent with those of the previous year. This may be partly explained by increased animal movement associated with more favourable weather conditions.

The higher number of records obtained during this annual survey, compared to weekly surveys, highlights the value of broader survey coverage, even though observations remain largely restricted to areas accessible by road.

Conducting surveys in more isolated areas beyond the road network would help provide a more comprehensive understanding of gazelle distribution. Furthermore, there is currently a lack of published studies on the genetic diversity of gazelles within the DDCR; however, an MoU is in place with United Arab Emirates University, and a project is currently underway to investigate the genetics of Arabian and Sand Gazelles.



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