



UNITED ARAB EMIRATES
MINISTRY OF CLIMATE CHANGE
& ENVIRONMENT



Technical Report

Key Biodiversity Areas of the United Arab Emirates

2024

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**Key Biodiversity Areas of
the United Arab Emirates**

2024

Joint Report by the International Union for Conservation of
Nature and UAE Ministry of Climate Change and Environment

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The Ministry of Climate Change and Environment of Climate Change and Environment will continue to enhance domestic efforts across all fields relating to its functions, so as to achieve sustainable development and to maintain the position as a regional and international leader of action. The Ministry of Climate Change and Environment will continue to support partnerships with governments and non-governmental partners. The Ministry of Climate Change and Environment shall follow the guiding principle established by our wise leaders and continue to build on the achievements over the previous years.

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GLOSSARY

AOO	Area Of Occupancy	IUCN RL	IUCN Red List of Threatened Species
ASL	At Sea Level	IUCN ROWA	IUCN Regional Office for West Asia
AZE	Alliance for Zero Extinction	IUCN SSC	IUCN Species Survival Commission
CR	Critically Endangered	KBA	Key Biodiversity Area
CR (PE)	Critically Endangered (Possibly Extinct)	LC	Least Concern (IUCN Red List Category)
DD	Data Deficient (IUCN Red List Category)	MOCCAЕ	Ministry of Climate Change and Environment
EBSA	Ecologically and Biologically Significant Area	MPA	Marine Protected Area
EEZ	Exclusive Economic Zone	NCG	National Coordination Group
EN	Endangered (IUCN Red List Category)	OECM	Other Effective Area-based Conservation Measure
EOO	Extent Of Occurrence	PA	Protected Area
EPAA	Environment and Protected Areas Authority - Sharjah	PAN	Protected Areas Network
EPDA	Environment Protection and Development Authority	RAK	Ras Al Khaimah
ESH	Extent of Suitable Habitat	RFP	Regional Focal Point
EW	Extinct in the Wild	SDGs	Sustainable Development Goals
GIS	Geographic Information System	SIS	Species Information Service
IBA	Important Bird Area	SSC	Species Survival Commission
IOSEA	Indian Ocean and South-East Asia	UAE	United Arab Emirates
IUCN	International Union for Conservation of Nature	VU	Vulnerable (IUCN Red List Category)
IUCN CSD	IUCN Centre for Science and Data	WCPA	World Commission on Protected Areas
IUCN MED	IUCN Centre for Mediterranean Cooperation	WDKBA	World Database of Key Biodiversity Areas
		WDPA	World Database of Protected Areas

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Executive Summary

A comprehensive review of the Key Biodiversity Areas (KBA) was undertaken by the IUCN Regional Office of West Asia (IUCN ROWA) for the Ministry of Climate Change and Environment (MOCCAE). The global standard for the identification of the KBAs (IUCN, 2022) was followed to identify the sites of global importance for biodiversity in the UAE.

After an extensive literature review and input from national and international experts, a list of nine (9) Global KBA was identified in the country. These sites include “Arabian Oryx Conservation Area at Um al Zumoul, Marawah Marine Area, Al Yasat Marine Area, Al Marmoum Desert Conservation Reserve, Dubai Desert Conservation Reserve, Wadi Al-Helo, Khor Fakan and Shark Island, Wadi Al-Baih, and Siniyah and Khor Al Beidah Island”.

According to the global criteria, all identified KBAs are considered critical sites for a variety of globally threatened and range-restricted species. Seven sites meet the criteria for both globally threatened and geographically restricted species (A1 and B1), while two sites meet the criteria for individual geographically restricted species alone (B1). Some of these sites host a significant proportion of the global population of threatened species, while other sites support the entire global population of range-restricted species. The taxonomic

groups assessed during the identification process included Mammalia, Birds (Aves), Amphibia, Reptilia, Chondrichthyes, Gastropoda, Insecta. Some twenty-two species were considered likely to meet the KBA criteria based on initial KBA scoping. Among these species, eight species were found to meet one or more KBA criteria: *Oryx leucoryx*, *Gazella arabica*, *Gazella marica*, *Dugong dugon*, *Phalacrocorax nigrogularis*, *Asaccus caudivolvulus*, *Asaccus margaritae*, *Ptyodactylus ruusaljibalicus*.

Based on the identification of these sites, KBA proposals were prepared and sent to the KBA Regional Focal Point for review and after amending the comments the proposals was submitted to the KBA Secretariat for approval.

In parallel, it is crucial to emphasize that the journey does not end with the declaration of KBAs. It is of utmost importance to ensure the protection of these globally significant and unique sites and the conservation of the species for which they were identified. Out of the nine KBAs, five are currently fully protected, one site considers partially protected through a protected area while the remaining three KBAs do not have any protection status. Efforts must continue to establish appropriate protection and biodiversity monitoring measures for these sites.

1. Introduction

1.1. Global Criteria for Key Biodiversity Areas

Key Biodiversity Areas (KBAs) are sites that contribute significantly to the global persistence of biodiversity. The KBA Programme aims to identify, map, and promote the conservation of the most important places for nature across the globe. The global standard for the identification of Key Biodiversity Areas (IUCN, 2016) sets out the global criteria with quantitative thresholds that have been developed through an extensive consultation spanning several years. Detailed guidelines have also been developed to help users apply these criteria ([KBA Standards and Appeals Committee of IUCN SSC/WCPA, 2022](#)). A KBA Partnership, comprising thirteen international conservation organisations and funding agencies, has been formed to support the implementation of the KBA Programme.

KBAs are identified based on a globally standardised set of science-based criteria and thresholds that provide an objective, transparent and repeatable approach against which sites can be identified and proposed as globally important for the long-term persistence of biodiversity. This ensures that KBA identification is transparent and consistent in different countries and over time.

Sites qualify as Global KBAs if they meet

one or more of 11 criteria, clustered into five higher level categories (See, Annex III):

- A. Threatened biodiversity
- B. Geographically restricted biodiversity
- C. Ecological integrity
- D. Biological processes
- E. Irreplaceability

The KBA criteria can be applied to species and ecosystems in terrestrial, inland water, and marine environments, and may be applied across all taxonomic groups (other than micro-organisms).

By providing the precise location of places that contribute significantly to the global persistence of biodiversity, KBAs can accelerate efforts to reverse the loss of nature, by ensuring conservation efforts are focused on the places that matter most, and by enabling entities that may have negative impacts on nature to avoid or reduce those impacts in the places they would be most damaging.

KBAs can be used by governments for spatial conservation planning to minimize biodiversity loss and negative impacts. The World Database of KBAs (WDKBA) can be used to guide site-based protection efforts - such as new protected areas and other effective area-based conservation measures (OECMs) - to be focused on the most important places for nature.

It can be used by:

- The financial sector to ensure financial flows avoid nature's most sensitive places.
- The corporate sector to ensure their impacts on biodiversity are avoided or reduced to the greatest extent possible.
- Donors and NGOs to ensure conservation effort is focused where it will have greatest impact for nature.

Many entities are already using the KBA data - some on a daily basis - to influence their decisions - and this use is expanding rapidly. The KBA data are also useful for

international environmental conventions and provides the basis of several indicators for the Sustainable Development Goals (SDGs) as below:

- Indicator 14.5.1 Coverage of protected areas in relation to marine areas.
- Indicator 15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type.
- Indicator 15.4.1 Coverage by protected areas of important sites for mountain biodiversity.



2. The approach

The process of the selection of the Key Biodiversity Areas has followed a series of steps. The approach as illustrated in

Figure 1 included a wide involvement of technical expertise, and a national consultation process.

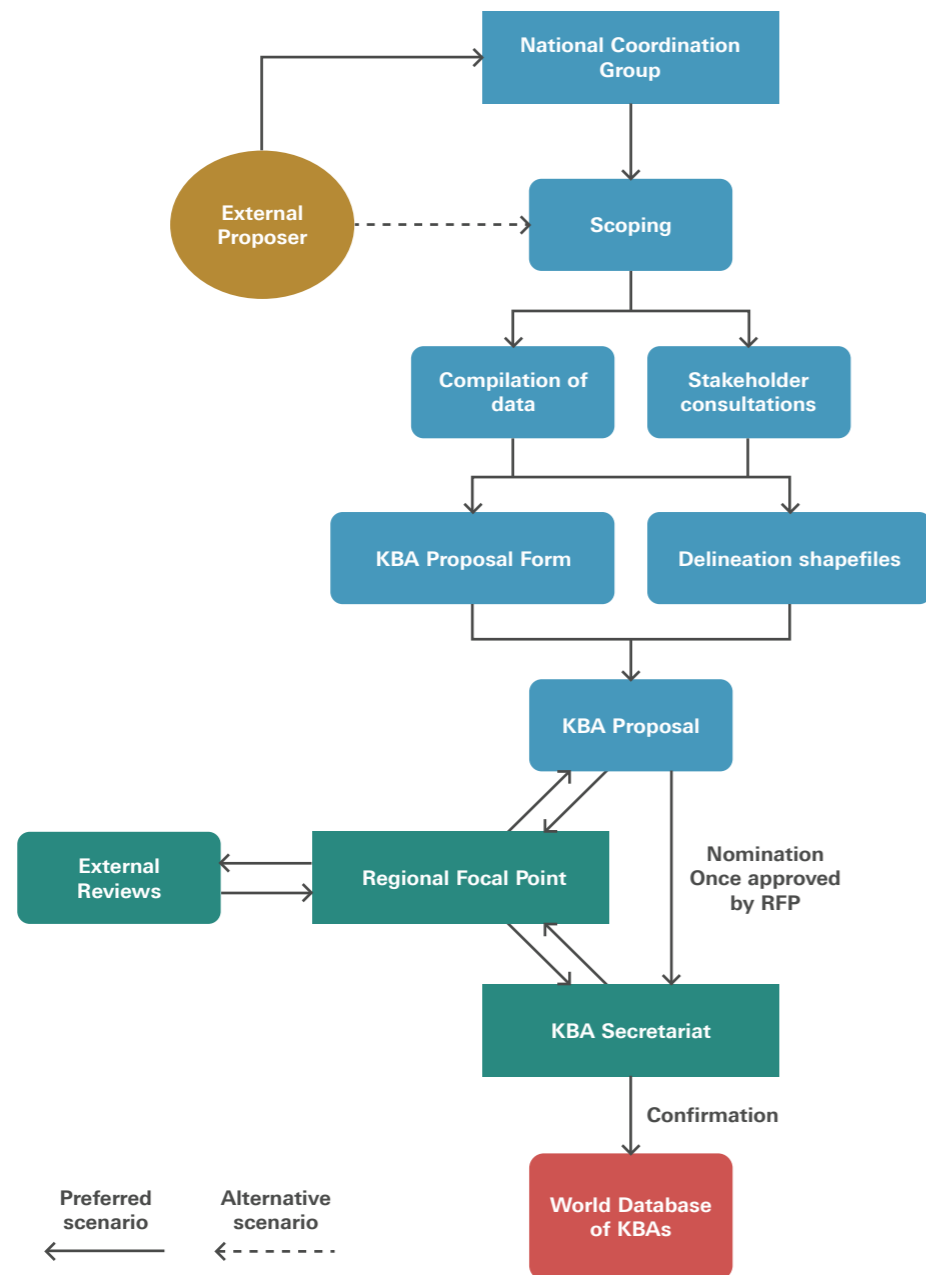


Figure 1 included a wide involvement of technical expertise, and a national consultation process.

2.1. National Coordination Group

A KBA National Coordination Group was established, comprised of teams from various environmental agencies and municipalities across the UAE, along with national experts. This group was deemed essential for the initiation and successful execution of the entire process. In September 2021, a Virtual KBA Training Workshop was organized by the UAE Ministry of Climate Change and Environment (MOCCA) in collaboration with IUCN regional offices. During this workshop, representatives from key governmental departments, conservation NGOs, and other stakeholders in the UAE were engaged. An introduction to the concept of KBAs was provided, an overview of spatial planning tools and biodiversity data was given, the process of establishing an NCG was explained, and steps for KBA identification and assessment in the UAE were outlined.

2.2. Scoping

Data and literature were acquired from national reports, scientific publications, online sources, and contributions from experts. An ongoing consultation process was led and coordinated by MOCCA to gather expert inputs. Potential KBAs were presented to experts during an Online National KBA Validation Workshop, and feedback was collected. Furthermore, an

Online National Consultation Workshop was held on March 30th, 2022, where the global KBA guidelines were discussed, and the first draft proposal of the KBAs report was reviewed.

2.3. Filling KBA proposal Forms

Criteria based on global threats, restricted-range species, and species listed in the WDKBA were utilized to select potential trigger species. As a result, 22 potential trigger species were identified, and their geographical distribution maps were developed (See Annex VI). All species recorded in the UAE were compiled into a checklist, which was then refined. The global standard for the identification of Key Biodiversity Areas (IUCN, 2016) was used as the guiding document, and specific criteria, including Threatened Species, Individual Geographically Restricted Species, and Demographic Aggregations, were applied for KBA identification.

2.4. Delineation of the Key Biodiversity Areas

The delineation process was prepared by the IUCN team and was shared with MOCCA and experts for review and modifications. Initial boundaries of the proposed KBAs were defined using spatial datasets of potential trigger species. Stakeholder knowledge and data were

incorporated to identify areas, and the boundaries were adjusted to ensure the maximum coverage of trigger species.

2.5. Regional Focal Point Review & KBA Secretariat Approval

After the delineation, the proposed KBAs were subjected to a regional focal point review. Following this review, approval from the KBA Secretariat was sought to ensure that all guidelines and criteria were met and that the proposed KBAs aligned with global standards.



3. Results

A total of nine (9) sites were identified and approved by the KBA secretariat as

Global KBAs, as shown on the map below (Figure 2). The approved KBAs include:

	KBA Site	Emirate	Ecosystem	Protection Statues
1	Arabian Oryx Protected Area	Abu Dhabi	Terrestrial	100% protected
2	Marawah marine area	Abu Dhabi	Marine & Terrestrial	100% protected
3	Al Yasat marine area	Abu Dhabi	Marine & Terrestrial	100% protected
4	Al Marmoum Desert	Dubai	Terrestrial	100% protected
5	Dubai Desert Conservation Reserve	Dubai	Terrestrial	100% protected
6	Wadi Al-Helo	Sharjah	Terrestrial & Freshwater	21-30% protected
7	Khor Fakan and Shark Island	Sharjah	Terrestrial	Not protected
8	Wadi Al-Bih	Ras Al Khaimah	Terrestrial	Not protected
9	Siniyah Island and Khor Al Beidah	Umm al Quwain	Marine & Terrestrial	Not protected

Among these sites, five are fully protected under declared protected areas, covering 100% of their area. One site is partially protected, with 29.68% of its area covered by a PA, and the remaining three sites are currently unprotected sites.

The average coverage of KBAs by Protected Areas in the UAE is now 98%, which is higher than the average global coverage ([BirdLife International, 2023](#)).

Out of the nine identified KBAs, seven sites trigger the criteria of hosting both threatened and geographically restricted species (A1 & B1), while two additional sites trigger the criteria of hosting Individual geographically restricted species (B1). For more detailed information about the criteria, areas, and the Emirates where each KBA is located, please refer to Annex I.

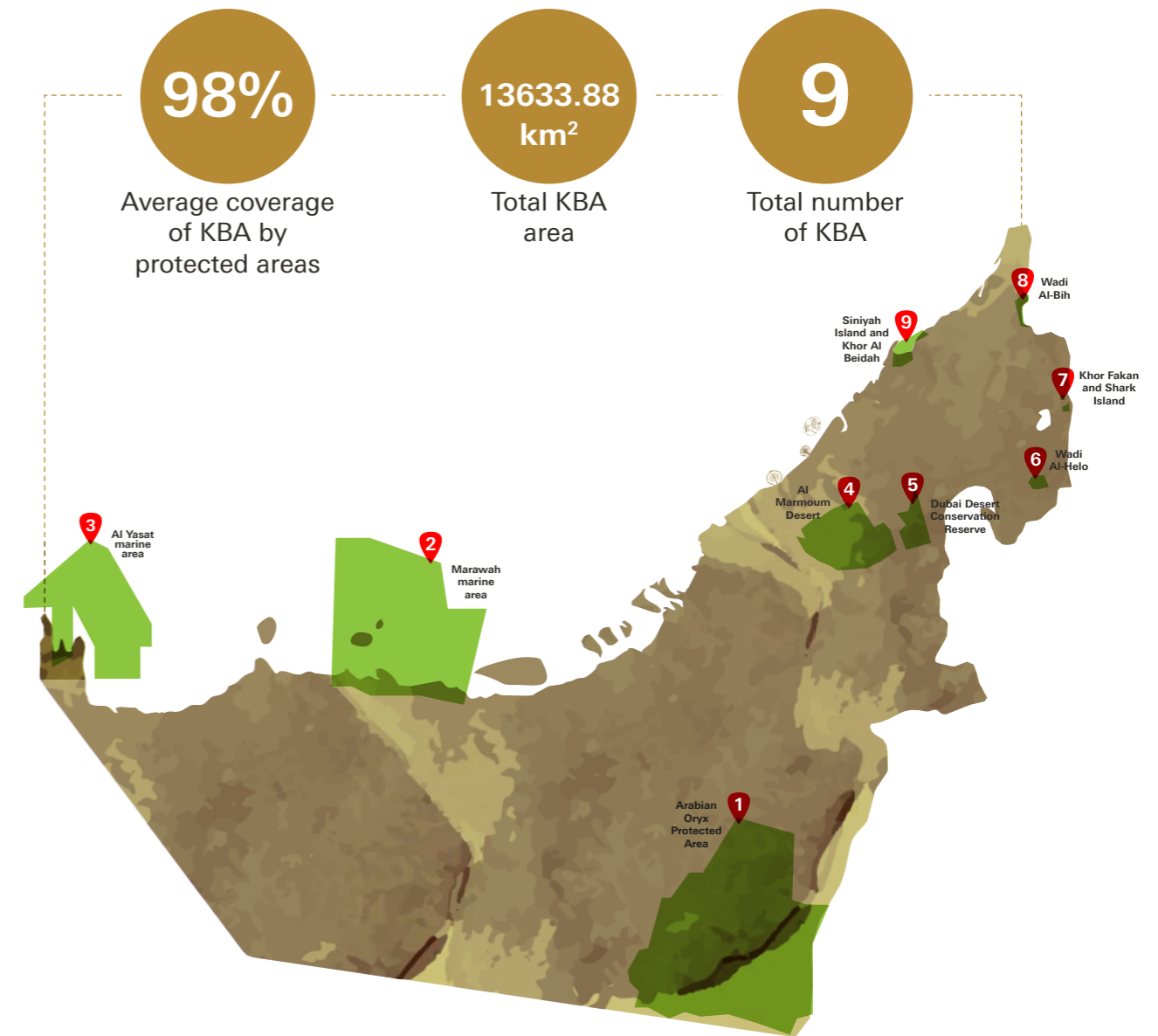


Figure 2: Key Biodiversity Areas of the UAE (Source: IUCN)

3.1. Arabian Oryx Conservation Area at Um al Zumoul

General Description

The KBA is Situated at the north-east end of the Rub Al Khali sand desert in the south-east of Abu Dhabi Emirate and has an area of 5,947 km² mainly dominated by sand dunes and sand sheets of sparse

vegetation cover dominated by shrubs. It is the largest KBA and the largest protected area in the UAE.

Delineation Rationale

The delineation of the KBA follows the boundaries of the Arabian Oryx Protected Area (Figure 3).

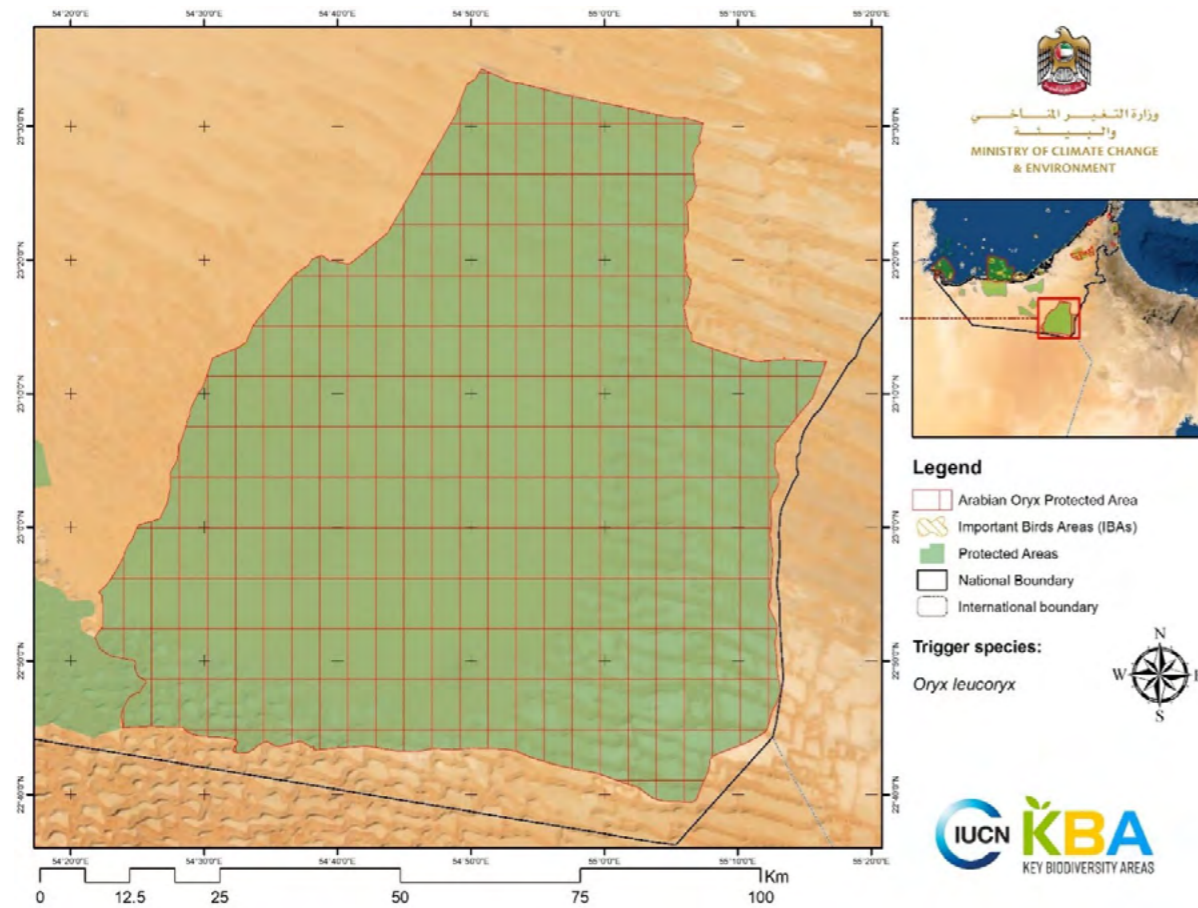


Figure 3: Arabian Oryx Conservation Area at Um al Zumoul (Source: IUCN)

Criteria Triggered: Criterion A1b & B1

Arabian Oryx *Oryx leucoryx* is a globally threatened species (Vulnerable) that has a free-roaming wild population in the KBA. The global population estimate of the species 2,700 – 3,070 individuals (IUCN

SSC Antelope Specialist Group, 2017), and the latest survey of the area in 2021 produced a total of 835 individuals (Pesci, et al., 2019), making the population in the KBA one of the largest free-roaming wild populations of the species in the world (Table 1).

Species	Estimated Population (Global)	Estimated Population (KBA) ¹	Population %	Percentage Threshold	Assessment parameter
<i>Oryx leucoryx</i> Arabian Oryx	2,700 – 3,070	835	30.93%	≥1%	(i) number of mature individuals.

Table 1: Trigger species calculations against assessment parameters for Arabian Oryx Conservation Area at Um al Zumoul

¹ Global estimation was made based on the recent census available from: Elhassan, E.E. (2019). The assessment of the Arabian Oryx (*Oryx Leucoryx*) distribution and the effect of habitat fragmentation in Al Marmoom Desert Conservation Reserve. was based on information from the Natural Resources Conservation Section Environment Department, Dubai Municipality, Dubai, United Arab Emirates; the available data at the general secretariat for the conservation of the Arabian Oryx (www.arabianoryx.org) and discussions with (David Mallon, chair of the IUCN SSC Antelope, Personal comm. Feb 2023). Based on these discussions, an estimation of the current global population can be founded in Annex V)

The population and range estimate for this species needs to be updated in the next LR Red List assessment. The Arabian Oryx was formerly found in most of the Arabian Peninsula, north of Kuwait and Iraq. Al Marmoom is a free-ranging population of Oryx in the UAE; management is considered low as they are not totally dependent on supplementary food provided especially during the winter season. Veterinary services are limited to minimal preventive actions and some individuals are only examined if symptoms of infectious diseases are identified. No vaccinations are provided to the herd (Elhassan, 2019). The Oryx population in Al Marmoom was therefore considered to be lightly managed and concluded it should be included in the population size as “wild” in the UAE National Red List workshop (2018). In line with the above, the map showing the current range should be modified accordingly to include successful reintroductions.

Threats

ArabFor such an area of large expanse, there are no major documented threats that are affecting the area as a whole.

However, some scattered activities across the area could be having an impact on the natural continuity and integrity of the site (Table 2).

Level 1 Threat	Level 2 Threat	Level 3 Threat	Timing	Scope	Severity
Agriculture and (includes forest grazing)	Livestock farming and ranching		Ongoing	Some of area / population (10-49%)	Slow but significant deterioration
Invasive & other problematic species, genes & diseases	Invasive non-native/ alien species/ diseases		Ongoing	Affects the minority of the population (<50%)	Slow but significant deterioration
Invasive & other problematic species, genes & diseases -- problematic native species/diseases - named species	Problematic native species/ diseases		Ongoing	Affects the minority of the population (<50%)	Slow but significant deterioration
Natural system modifications	Other system modifications		Ongoing	Affects the minority of the population (<50%)	Slow but significant deterioration
Energy production and mining	Oil and gas drilling		Ongoing	Affects the minority of the population (<50%)	No declines

Table 2: Threats on Arabian Oryx Conservation Area at Um al Zumoul

Existing conservation efforts

Although the KBA is part of a protected area with a variety of conservation activities and ecological monitoring in place. The Sheikh Mohamed Bin Zayed Arabian Oryx Reintroduction Programme to enhance the numbers of oryx in the wild, was launched in the area in 2007 with the introduction of 160 animals. Subsequent releases created a self-sustaining breeding population which has steadily risen to almost 1000 individuals. EAD undertakes regular aerial surveys in addition to ground monitoring to census the Arabian Oryx. Individuals and herds are counted and mapped along with, identification and mapping of important animal and plant species such as the Sand gazelle (*Gazella marica*), the Ghaf (*Prosopis cineraria*) and the Silem (*Acacia ehrenbergiana*). Several ranger's station spread over this large protected area, further helps in patrolling and detecting and reporting any violations or incidents.

Additional biodiversity values

Environment Agency – Abu Dhabi regularly undertakes biodiversity assessment and monitoring of the area using standardized methodology. Nearly 100 species have been recorded during the monitoring which includes 23 species of invertebrates, 10 species of reptiles, 51 species of birds, four species of mammals and 11 species of plants. Many of these species are of national and regional importance. Among reptiles, the Arabian toad-headed agama (*Phrynocephalus arabicus*) and Schmidts's fringe-toed lizard (*Acanthodactylus schmidti*) and the Desert monitor (*Varanus griseus*), a CITES App. I listed species have been recorded. While among birds the Greater-hoopoe lark (*Alaemon alaudipes*) and Brown-necked raven (*Corvus ruficollis*) have been regularly recorded along with many migratory species during winter months. Among the mammals, beside the two large antelopes, the Cheeseman's gerbil (*Gerbillus cheesmani*) are the common smaller rodent species.



Source: Environment Agency – Abu Dhabi

3.2. Marawah Marine Area

General Description

The site includes numerous islands and a coastline stretching over 120 km, including a variety of critical habitats for wildlife: seagrass beds, coral reef communities, macroalgae outcrops and mangrove vegetation. It includes a large expanse of shallow marine waters no deeper than 10 m, making it suitable for dugong grazing.

Delineation Rationale

The KBA delineation follows the boundaries of Marawah Marine Biosphere Reserve, which is the largest Marine Protected Area (MPA) in the UAE. Four previously declared Important Bird Areas (IBAs) are incorporated within this wider KBA. Among these, one site – Umm Amim – is recorded in the WDKBA as a Legacy/Regional KBA, while the other three sites are Bu Tinah, Salahah island and Marawah island. Additionally, the KBA encompasses the Mubarraz West and Khasbat Al Reem Islands (Figure 4).

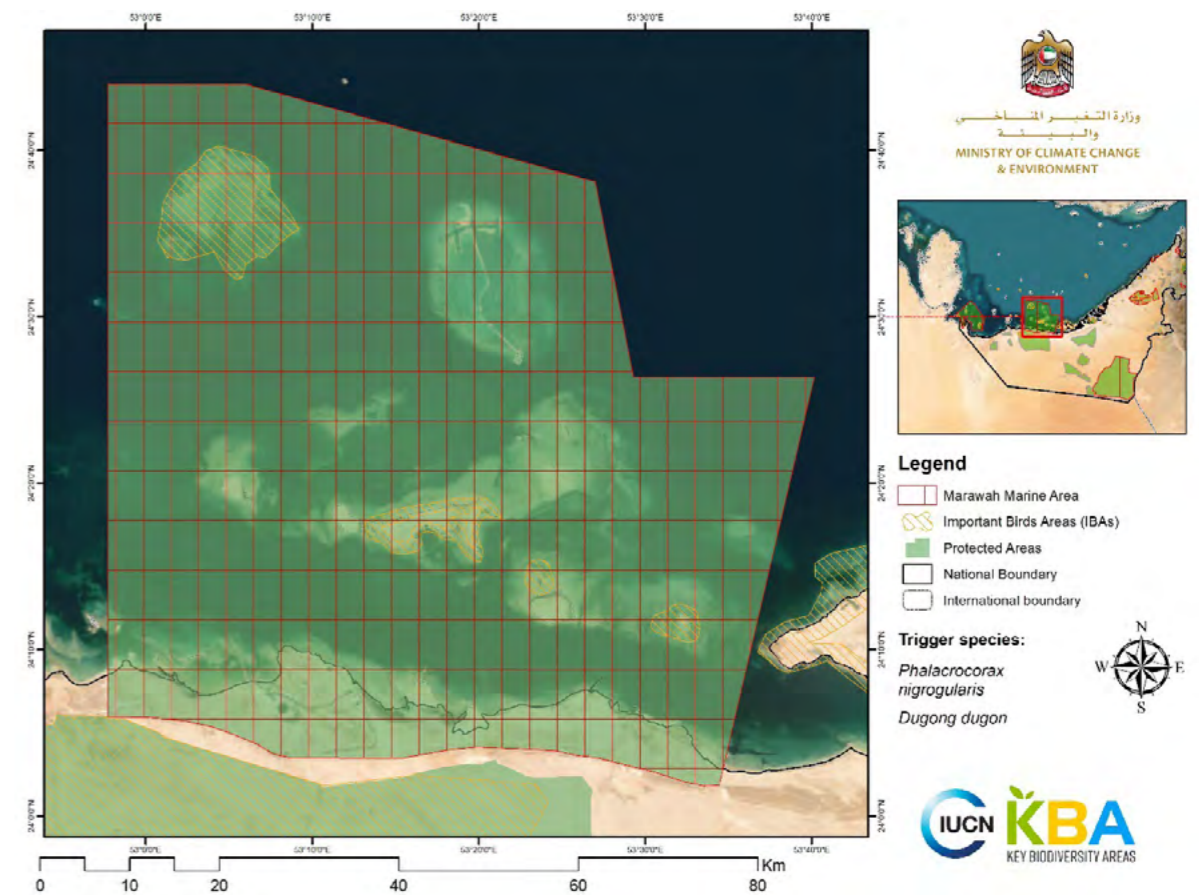


Figure 4: Marawah Marine Area (Source: IUCN)

Criteria Triggered: Criteria A1b & A1d:

The area is a globally important location for the globally threatened Dugong *Dugong dugon*. The latest surveys have shown that the area hosts not less than 1% of the global population of the species, with a breeding population of

855 – 1,329 pairs (Das, 2015). Also, the area includes the island of Bu Tinah, which hosts a breeding population of 20,000 mature individual (10,000 pairs) (Khan et al., 2022, unpublished report) of the globally threatened Socotra Cormorant *Phalacrocorax nigrogularis* (Table 3).

Species	Estimated Population (Global)	Estimated Population (KBA)	Population %	Percentage Threshold	Assessment parameter
Dugong <i>Dugong dugon</i>	100,625	855 – 132,9	1.08%	≥1%	(i) number of mature individuals.
Socotra Cormorant <i>Phalacrocorax nigrogularis</i>	220,000	200,00	9.09	≥1%	(i) number of mature individuals.

Table 3: trigger species calculations against assessment parameters for Marawah Marine Area

Threats

The area is a globally important location. The area is facing a variety of anthropogenic threats directly linked to ongoing commercial developments that is causing disturbance and intrusions to different parts of the site (Table 4). Boat traffic and fishing activities are observed within the Marawah Marine area, and attention is given to their interactions

with wildlife. Occasionally, seismic surveys are conducted, which can introduce underwater sounds, potentially influencing the behavior of marine megafauna and fish. Dredging activities, while not within the MMA but in nearby areas, might lead to some sedimentation, which is monitored for its potential effects on marine water quality, seagrass meadows, and coral reefs.

Level 1 Threat	Level 2 Threat	Timing	Scope	Severity
Residential and commercial development	Housing and urban areas	Ongoing	Affects the minority of the populations (<50%)	Causing or likely to cause relatively slow but significant declines (<20% over 10 years or three generations; whichever is the longer)
Human intrusions and disturbance	Work and other activities	Ongoing	Affects the minority of the populations (<50%)	Causing or likely to cause relatively slow but significant declines (<20% over 10 years or three generations; whichever is the longer)

Table 4: Threats to Marawah Marine Area

Existing conservation efforts

The site has an existing Marine Protected Area management plan that includes vessel speed regulation, regular monitoring of species and habitats and assessment of projects with activities such as dredging, land filling and seismic survey. In addition, Under the Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (IOSEA), conservation management plans for both Dugong and the sea turtle species are in place. Federal laws 23 and 24 of 1999 protect wildlife and their critical habitats of the area. The area is monitored regularly by rangers for wildlife sightings, habitat

status and report threat and incidences at sea, if any. There are non-government entities that respond to wildlife incidences and emergencies immediately.

Additional biodiversity values

The site qualifies as a KBA at regional level because it hosts important breeding populations of the Crab-plover *Dromas ardeola* (LC), Bridled Tern *Sterna anaethetus* (LC) and White-cheeked tern *Sterna repressa* (LC). The site also provides suitable habitat for sea snake species, dolphins, and sea turtles (Green Turtle, Hawksbill Turtle, and Loggerhead Turtle).



Source: Environment Agency – Abu Dhabi

3.3. Al Yasat Marine Area

General Description

A large expanse of shallow waters not exceeding 20 m in depth making it suitable for Dugong, with three main islands along the westernmost borders of the UAE with Qatar and Saudi Arabia. The islands are up to 36 m above sea level in the south-east Arabian Gulf, 35 km north of Abu Dhabi mainland and 70 km west of Sir Bani Yas Island. The islands are fringed by coral reefs, which are the main breeding islands for Socotra Cormorant.

Delineation Rationale

The delineation follows the boundaries of Al Yasat Marine Protected Area. Within this KBA, four Important Bird Areas have been incorporated, testifying to its importance for avian biodiversity. Notably, Ghagha Island and Yasat Island meet the criteria for Global KBA designation, while Faziya and Muhaimat Island as existing IBAs fulfil the criteria for Regional KBAs. Moreover, the site includes Umm Al Hatab Island, which has recently been confirmed to meet the Global KBA criteria for the Socotra Cormorant (Figure 5).

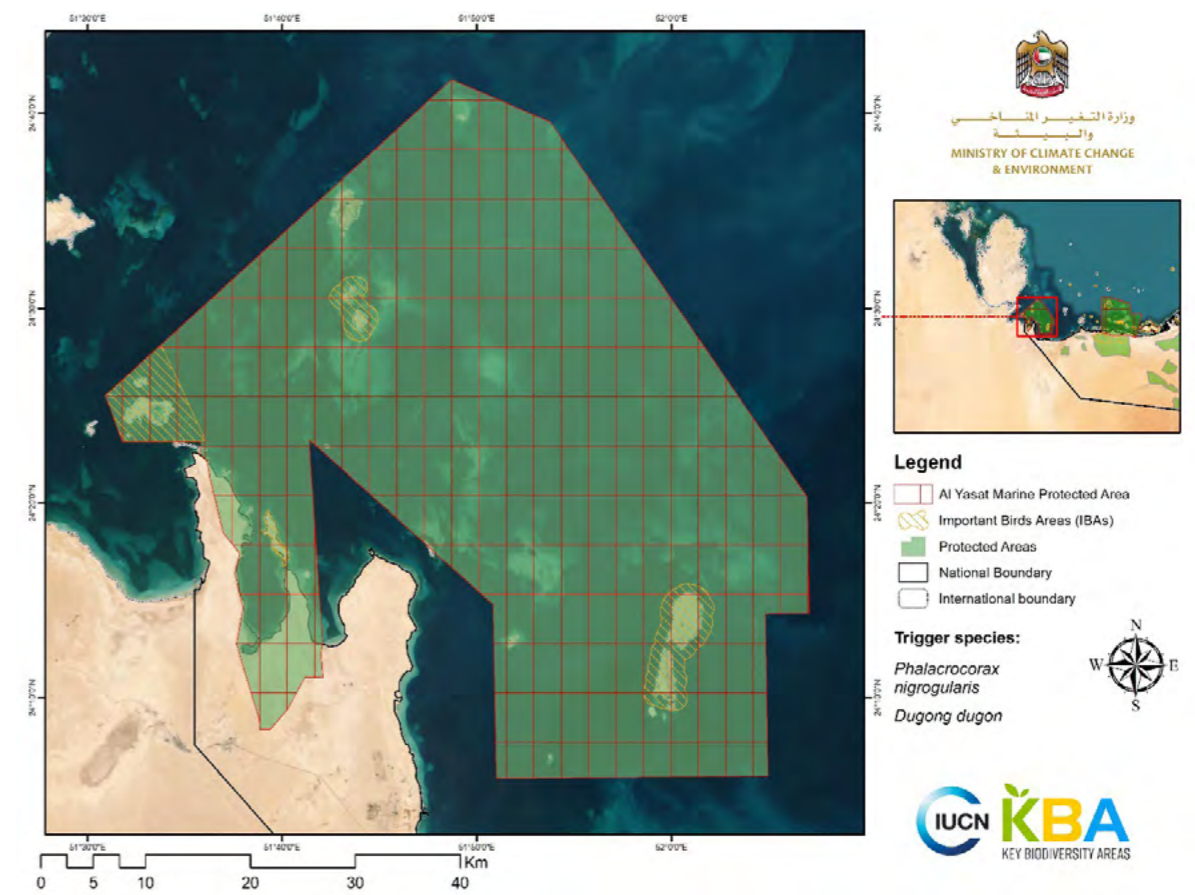


Figure 5: Al Yasat Marine Area (Source: IUCN)

Criteria Triggered: Criterion A1b & A1d, B1

Socotra Cormorant *Phalacrocorax nigrogularis* is classified as a globally threatened species (Vulnerable). The species is known to breed at sandy and gravel islands and islets along the Arabian Gulf, the Arabian Sea (Oman and Yemen) and in Socotra Archipelago (Yemen) (IUCN, 2021). The global population of the species is estimated to be 220,000 mature individuals (BirdLife, 2019) while the breeding population at the KBA was recorded to be more than

10,000 individuals (Khan et al., 2020), which makes up 13.32% of the global population of the species recorded to be breeding at two of the islands in the KBA; Ghagha and Umm Al Hatab Islands (*The breeding population fluctuates between islands between years*). Furthermore, the KBA serves as a globally important location for the Dugong *Dugong dugon* (VU), another globally threatened species. Recent surveys have revealed that the area hosts a breeding population of 223-347 pairs (Das, 2015) which fulfils KBA criterion A1d, (Table 5).

Species	Population (Global)	Population (Site)	Population Percentage	Percentage Threshold	Assesment Parameter
<i>Phalacrocorax nigrogularis</i> Socotra Cormorant	220,000	293,00	13.32%	≥1%	(i) number of mature individuals
<i>Dugong dugon</i> Dugong	100,625	223 - 347	0.28%	≥0.2%	(i) number of mature individuals

Table 5: Trigger species calculations against assessment parameters for Al Yasat Marine Area

Threats

The site corresponds to the boundaries of Al Yasat Marine Protected Area where, despite official legislation, there are currently no specific on-site conservation actions in place for the trigger species (Table 6). In the Yasat marine area, there's occasional boat traffic and, from time to time, some underwater

sounds due to seismic surveys, along with fishing activities. The site benefits from the watchful eyes of the Al Yasat marine protected area (MPA) rangers, who routinely share updates on wildlife sightings and strandings, and ensure guidelines are followed. The MPA has established monitoring procedures that encompass all species and habitats in the area.

Level 1 Threat	Level 2 Threat	Timing	Scope	Severity
Residential and commercial development	Housing and urban areas	Ongoing	Affects the minority of the populations (<50%)	Causing or likely to cause relatively slow but significant declines (<20% over 10 years or three generations; whichever is the longer)
Human intrusions and disturbance	Work and other activities	Ongoing	Affects the minority of the populations (<50%)	Causing or likely to cause relatively slow but significant declines (<20% over 10 years or three generations; whichever is the longer)

Table 6: Threats on Al Yasat Marine Area

Existing conservation efforts

The area is protected under Al Yasat Marine Protected Area and marine rangers enforce protection measures. The site has a management plan that includes protection of the site and reporting wildlife incidents and violations reporting. Additionally regular ecological monitoring are undertaken at the designated KBA. Any developmental project in and around the area goes through the impact assessment and permitting protocol to minimize negative effect of activities on marine species and habitats. Fisheries

regulations, Federal Laws 23 and 24 and MPA management plan are the instruments in place for the KBA.

Additional biodiversity values

The site hosts suitable habitats for dugongs, sea turtles, dolphins, and sea snakes. Additionally, it holds significant regional importance due to the presence of Muhaimat island, which serves as a breeding site for various avian species, including the Osprey, Lesser Crested Tern, Bridled Terns, and White-cheeked Terns.

3.4. Al Marmoom Desert Conservation Reserve

General Description

Al Marmoom Desert KBA is part of the Al Marmoom Desert Conservation Reserve (AMDCR) which is the largest unfenced protected Area in Dubai Emirate for ungulate conservation, mainly the reintroduced free roaming Arabian Oryx. AMDCR covers an area of 950 km², more than 10% of Dubai's land area. The land cover is about 70% sand dunes (some bare, some with tree cover and with shrub cover), 23% gravel plains, and 7% of forest, artificial lakes, and lithified sands. Regarding the species richness, it is a home to nine mammals,

26 reptiles, 258 birds and 47 plant species with annual increase in bird species due to the attractiveness of the site for breeding and migratory species as well.

Delineation Rationale

The delineation of the site originally followed the boundaries of the Al Marmoom Desert Conservation Area, which is an unfenced protected area with a surface area of 950 km². Modifications to the boundaries were made in order to avoid on-site activities such as farming (Modifications to natural habitats) and renewable energy solar project located inside the protected area, because of the range of the trigger species does not cover this area and will not serve the purpose of the KBA (Figure 6).

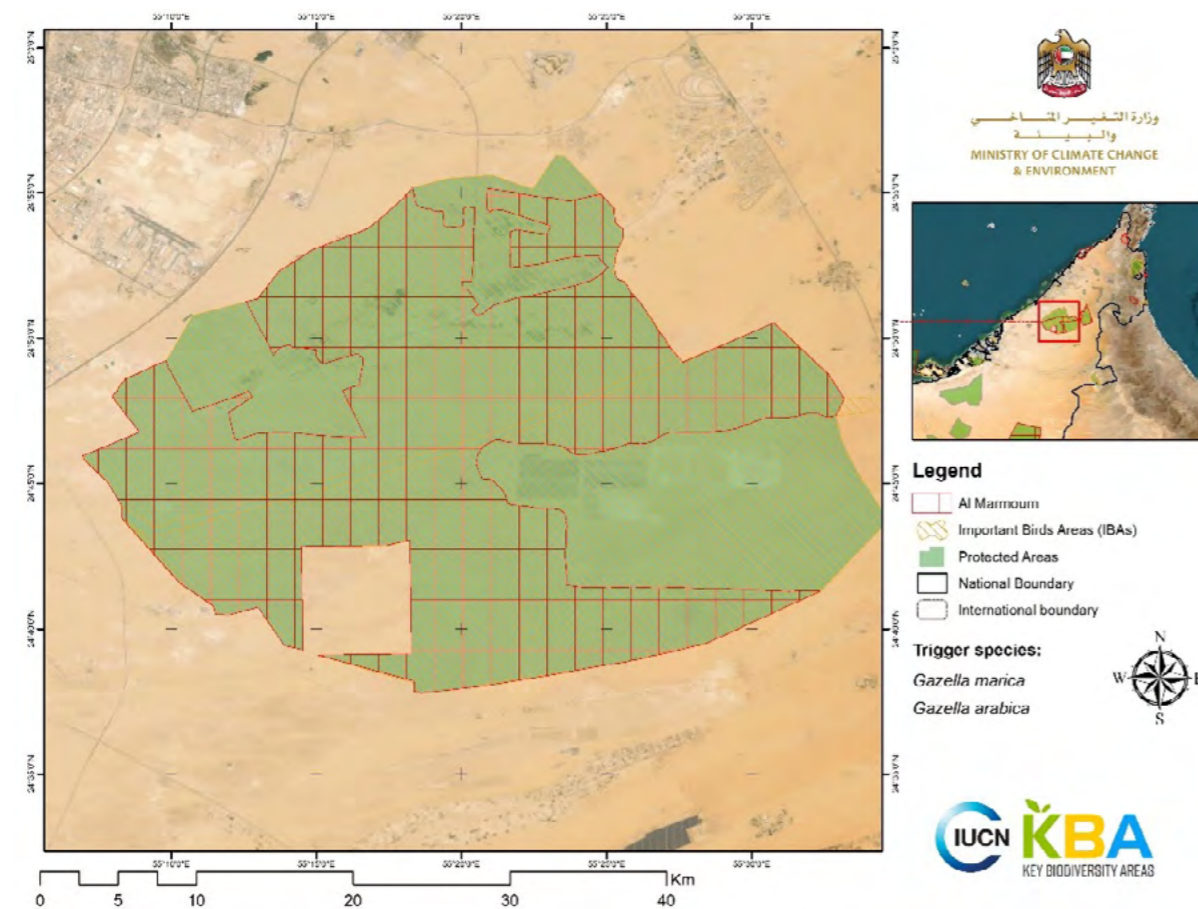


Figure 6: Al Marmoom Desert Conservation Reserve (Source: IUCN)

Criteria Triggered: Criterion A1b & B1

Three trigger species are known to be present in the KBA site, all of which exceeding the threshold for Criterion A1b: "≥1% of the global population size AND ≥10 reproductive units of a VU species" and Criterion B1: "≥10% of global population size and ≥10 RU of any species". Two gazelle species; Arabian Sand Gazelle *Gazella marica* and Arabian Mountain Gazelle *Gazella arabica*, both globally threatened species (Vulnerable), have large free-roaming wild populations in the KBA reaching up to 38.46% and 21%

of the global population of the species respectively. As for the third species, Arabian Oryx *Oryx leucoryx*, it is also a globally threatened species (Vulnerable) that has a free-roaming wild population in the KBA². The global population estimate of the species is 2,700 – 3,070 individuals (IUCN SSC Antelope Specialist Group, 2017), and recent surveys in the area show a population estimation ranging between 600 mature individuals (National Red List workshop., 2018) and 969 mature Individuals (Elhassan et al., 2019) (Table 7).

Species	Population (Global)	Population (Site)	Population Percentage	Percentage Threshold	Assesment Parameter
Gazella marica Arabian Sand Gazelle	1,750 – 2,150	750	38.46	≥1%	(i) number of mature individuals
Gazella Arabica Arabian Mountain Gazelle	5,000 – 7,000	1,260	21	≥1%	(i) number of mature individuals
Oryx leucoryx Arabian Oryx	2,700 – 3,070	600	20.79	≥1%	(i) number of mature individuals

Table 7: Trigger species calculations against assessment parameters for Al Marmoom Desert Conservation Reserve

² The Oryx population in Al Marmoom is the only population of Oryx in the UAE roaming freely, the management is considered low since they are not fully dependent on the supplementary food provided especially during winter season. Veterinary services are limited to the minimum preventative actions were, some individuals are only examined if infectious disease symptoms are identified. No vaccines are provided to the herd (Elhassan., 2019). The total population at this site is estimated to be 1114 individuals, 969 (87%) of them mature (Elhassan., 2019). The population size at the site was extracted from in the UAE National Red List (2018) to allow updating global population estimation. Supplementary resources will stop once the natural habitats are fully recovered or restored.

Threats

The KBA is fully located within the boundaries of Al Marmoom Desert Conservation Area and therefore is a nationally declared protected area managed by Dubai Municipality.

Conservation efforts within this protected area encompass habitat management and species re-introduction programmes. Despite these conservation activities, the KBA faces a range of potential threats due to the activities permitted within the protected area (Table 14).

Level 1 Threat	Level 2 Threat	Level 3 Threat	Timing	Scope	Severity
Agriculture and (includes forest grazing)	Livestock farming and ranching		Ongoing	Some of area / population (10-49%)	Slow but significant deterioration
Invasive & other problematic species, genes & diseases	Invasive non-native/ alien species/ diseases		Ongoing	Affects the minority of the population (<50%)	Slow but significant deterioration
Invasive & other problematic species, genes & diseases -- problematic native species/diseases - named species	Problematic native species/diseases		Ongoing	Affects the minority of the population (<50%)	Slow but significant deterioration
Natural system modifications	Other system modifications		Ongoing	Affects the minority of the population (<50%)	Slow but significant deterioration
Energy production and mining	Renewable Energy		Ongoing	Affects the minority of the population (<50%)	No declines

Table 8: Threats to Al Marmoom Desert Conservation Reserve

Existing conservation efforts

The KBA is fully located within the Although the KBA is part of a protected area with a variety of conservation activities and ecological monitoring, Dubai Municipality carried out daily inspection and monitoring programmes to monitor changes in habitats and species as well as human activities. Annual research and studies were conducted on species and habitats including satellite tracking, breeding ecology, behavioural ecology, habitat preferences, annual census of large mammals and birds which support the management and decision making.

Additional biodiversity values

The site also hosts the following species: Persian Wonder Gecko *Teratoscincus keyserlingii* and Spiny-tailed Lizard (*Uromastix aegyptia leptieni*), both with IUCN Red List category of Vulnerable (VU). One of the highest UAE populations of the endangered Lappet-faced Vulture (*Torgos tracheliotos*) with more than 25 individuals, Vulnerable Greater Spotted Eagle (*Clanga clanga*) and Eastern imperial Eagle (*Aquila heliaca*), critically endangered Sociable Lapwing (*Vanellus gregarius*) beside many other rare species such as Basra reed warbler (*Acrocephalus griseldis*) which only observed twice in UAE.



Al Marmoom Desert Conservation Reserve

3.5. Dubai Desert Conservation Reserve

General Description

The KBA has an area of 225.89 km² mainly comprised of sand dunes, gravel plains and sand sheets of sparse vegetation cover dominated by shrubs. There are also natural

growing Ghaf groves found in the reserve.

Delineation Rationale

The delineation of the KBA follows the boundaries of the Dubai Desert Conservation Reserve which covers a wild-roaming population for the globally threatened Arabian gazelle and the Arabian sand gazelle, (Figure 7).

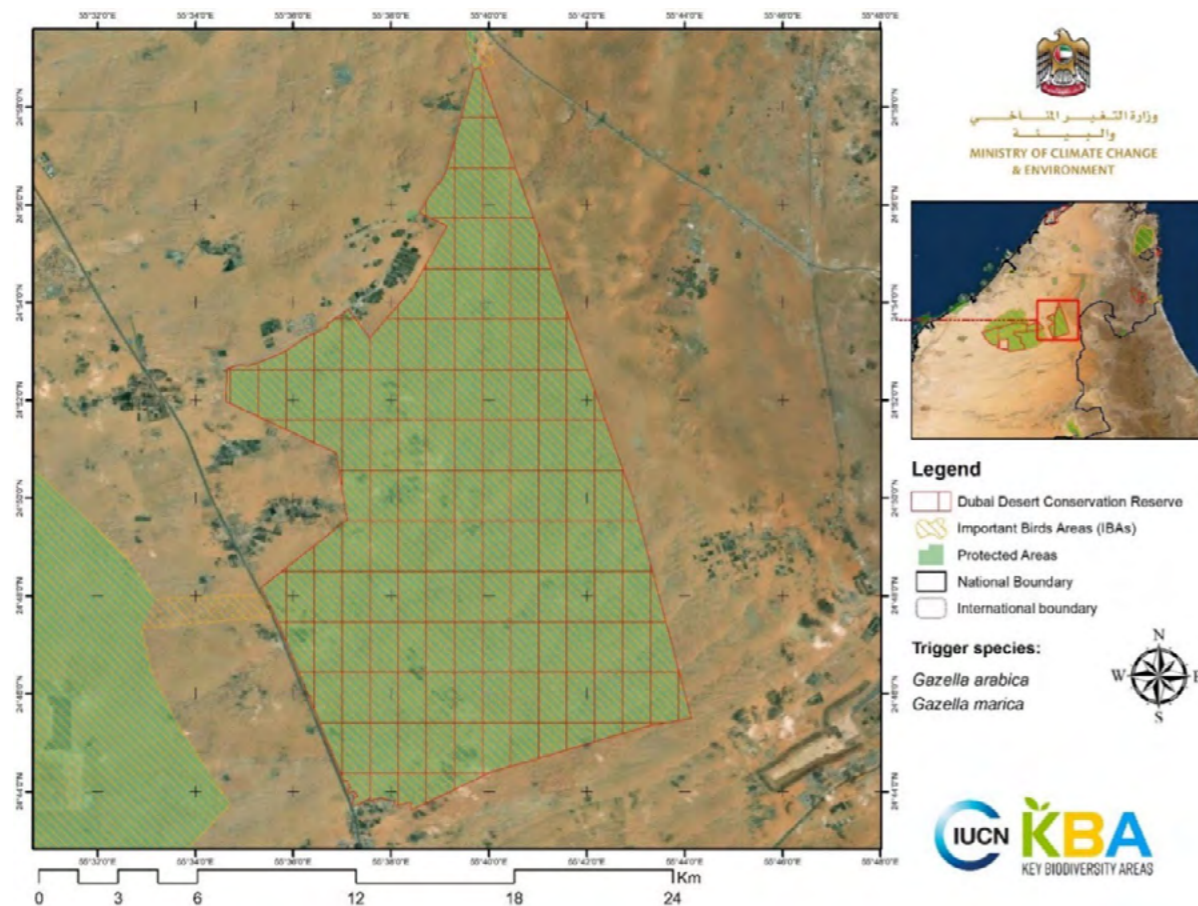


Figure 7: Dubai Desert Conservation Reserve (Source: IUCN)

Criteria Triggered: Criterion A1b & B1

Two trigger species are known to be present in the KBA site, all of which exceed the threshold for Criterion A1b: “≥1% of the global population size AND ≥10 reproductive units of a VU species” and Criterion B1: “≥10% of global population size and ≥10 RU of any

species”. Two gazelle species; Arabian Sand Gazelle *Gazella Marica* and Arabian Mountain Gazelle *Gazella Arabica*, both globally threatened species (Vulnerable), have large free-roaming wild populations in the KBA reaching up to 9.13% to 12.2% of the global population of both species respectively (Table 9).

Species	Population (Global) ³	Population (Site)	Population Percentage	Percentage Threshold	Assesment Parameter
<i>Gazella Marica</i> Arabian Sand Gazelle	1,750 - 2,150	178	9.13%	≥1%	(i) number of mature individuals
<i>Gazella Arabica</i> Arabian Mountain Gazelle	5,000 -7,000	732	12.2%	≥1%	(i) number of mature individuals

Table 9: Trigger species calculations against assessment parameters for Dubai Desert Conservation Reserve

³ The Global Red List population of *Gazella Marica* needs to be updated to include individuals from successful re-introductions such as Al-Marmoom Conservation Reserve. Nevertheless, the global population likely remains below 2000 wild mature individuals. (David Mallon, chair of the IUCN SSC Antelope SG, Personal comm. Feb 2023).

Threats

For such an area of large expanse, there are no major documented threats that are affecting the area as a whole as the area is fenced with controlled access and activities.

However, some scattered activities across the area could be having an impact on the natural continuity and integrity of the site (Table 10).

Level 1 Threat	Level 2 Threat	Level 3 Threat	Timing	Scope	Severity
Agriculture and (in-cludes forest grazing)	Livestock farm-ing and ranching		Ongoing	Some of area / population (10-49%)	Slow but sig-nificant dete-rioration
Invasive & other prob-lematic species, genes & diseases	Invasive non-native/ alien species/ diseases		Ongoing	Affects the minority of the popula-tion (<50%)	Slow but sig-nificant dete-rioration
Invasive & other prob-lematic species, genes & diseases -- problem-atic native spe-cies/ diseases - named species	Problematic na-tive spe-cies/diseases		Ongoing	Affects the minority of the popula-tion (<50%)	Slow but sig-nificant dete-rioration
Natural system modifi-cations	Other system modifications		Ongoing	Affects the minority of the popula-tion (<50%)	Slow but sig-nificant dete-rioration

Table 10: Threats on Dubai Desert Conservation Reserve

Existing conservation efforts

Although the KBA is part of a protected area with a variety of conservation activities and ecological monitoring, the site is considered to be completely protected within the DDCR. The DDCR managed by Emirates Airline in a partnership with Dubai Municipality under an MOU to ensue effective management. The conservation efforts include the re-introduction programs of the Asian Houbara (*Chlamydotis macqueenii*), daily monitoring, camera trapping, dedicated staff from both entities to conduct research and monitoring. Safari tours is one of the main attraction factors, which help in public awareness.

Additional biodiversity values

The site hosts quite high population of the vulnerable Arabian Oryx (*Oryx leucoryx*) including free roaming and enclosure. Also, during winter, the site received one of the highest UAE populations of the endangered Lapet-faced Vulture (*Torgos tracheliotos*) with other vultures including Griffon Vulture (*Gyps fulvus*) and Egyptian vulture (*Neophron percnopterus*). The site biodiversity consists of 18 mammal species, 26 reptile species, 142 bird species, 74 floral species and over 300 arthropod species has been recorded. Monitoring programs are in place for all Major Site Values like Arabian Oryx, Sand and Arabian Gazelle, Spiny-tailed lizard, Pharaoh eagle-owl and Arabian Red Fox.

3.6. Wadi Al-Helo

General Description

The site is a wadi that is part of a watershed along Wadi Al-Helo, flowing into the Sea of Oman south of Kalba. It includes the wadi-sides and rocky-substrate hills ranging in elevation from 362 m.a.s.l. to 566 m.a.s.l., covering the potential species range for the Margarita’s Leaf-toed Gecko *Asaccus margaritae*.

Delineation Rationale

The delineation of the KBA follows the current known national distribution range of the Margarita Leaf-toed Gecko *Asaccus*

margaritae which includes Wadi Al-Helo Protected Area, covering an area of 17.6 km². This area is a nationally designated as a protected area under the Management authority of Environment and Protected Areas Authority (EPAA) of Sharjah. Additionally, the delineation includes the Wadi al Helo Archaeological site and other areas where the species has been observed after being assessed for the IUCN Red List. *Asaccus margaritae* displays a patchy distribution throughout the site, and it is of utmost importance to delineate the entire area to enable the seasonal mobility of its subpopulations (Johannes, Els. Feb 2023. Personal comm.) (Figure 8).

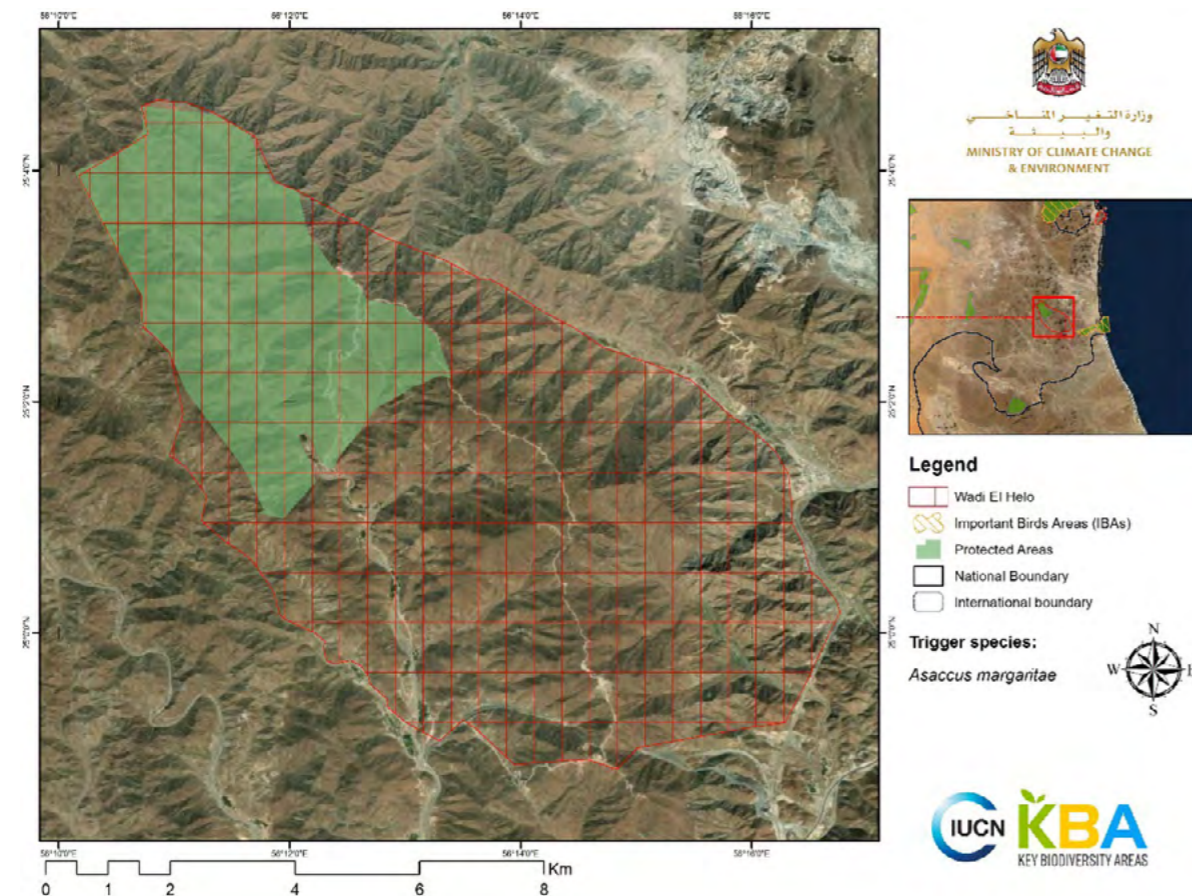


Figure 8: Wadi Al-Helo (Source: IUCN)

Criteria Triggered: Criterion B1

Margarita’s Leaf-toed Gecko *Asaccus margaritae* is a gecko species that was only identified as a stand-alone species in 2016. It has been recorded from two geographically separate locations. The species is not known to exist anywhere outside these two locations. The species

is considered as a range-restricted species. The KBA of Wadi Al-Helo covers around 16.66% of the species’ known distribution and therefore exceeds the threshold of criterion B1: “Site regularly holds ≥10% of the global population size AND ≥10 reproductive units of a species” (Table 11).

Species	Estimated Area of Occupancy (Global)	Estimated Area of Occupancy (KBA)	Area of Occupancy (AOO) %	Percentage Threshold	Assessment parameter
<i>Asaccus margaritae</i> Margarita’s Leaf-toed Gecko	24	4	16.66%	≥10%	(ii) area of occupancy.

Table 11: Trigger species calculations against assessment parameters for Wadi Al-Helo

Threats

The KBA is part of Wadi Al-Helo Protected Area, which has an area of 17.6 km², and which is a nationally designated protected area under the Management authority of Sharjah. No conservation measures or ecological monitoring activities are

reported from the protected area. The area has been facing large-scale modification and degradation of natural landscape as a result of construction activities (Table 12).

Level 1 Threat	Level 2 Threat	Level 3 Threat	Timing	Scope	Severity
Residential and commercial development	Tourism and recreation areas		Ongoing	Unknown	Unknown

Table 12: Threats on Wadi Al-Helo

Existing conservation efforts

Although the KBA is part of a larger protected area, while the KBA falls within a broader protected region, it is essential to note that a formal management plan for this area is still in the works. EPAA is currently working on developing a conservation plan for this site.

Additional biodiversity values

Biodiversity studies still under process and EPAA team is currently working on developing and evaluating the species database in this area.



3.7. Khor Fakan and Shark Island

General Description

The site is a coastal strip with surrounding rocky hillocks and narrow wadis along the eastern coastline of the UAE, with a small rocky island facing the coastline. The site

covers the suitable habitats within the species range for the Emirati Leaf-toed Gecko.

Delineation Rationale

The delineation of the site follows the distribution of the remaining habitat of the type locality for the Critically Endangered Emirati Leaf-toed Gecko (Figure 9).

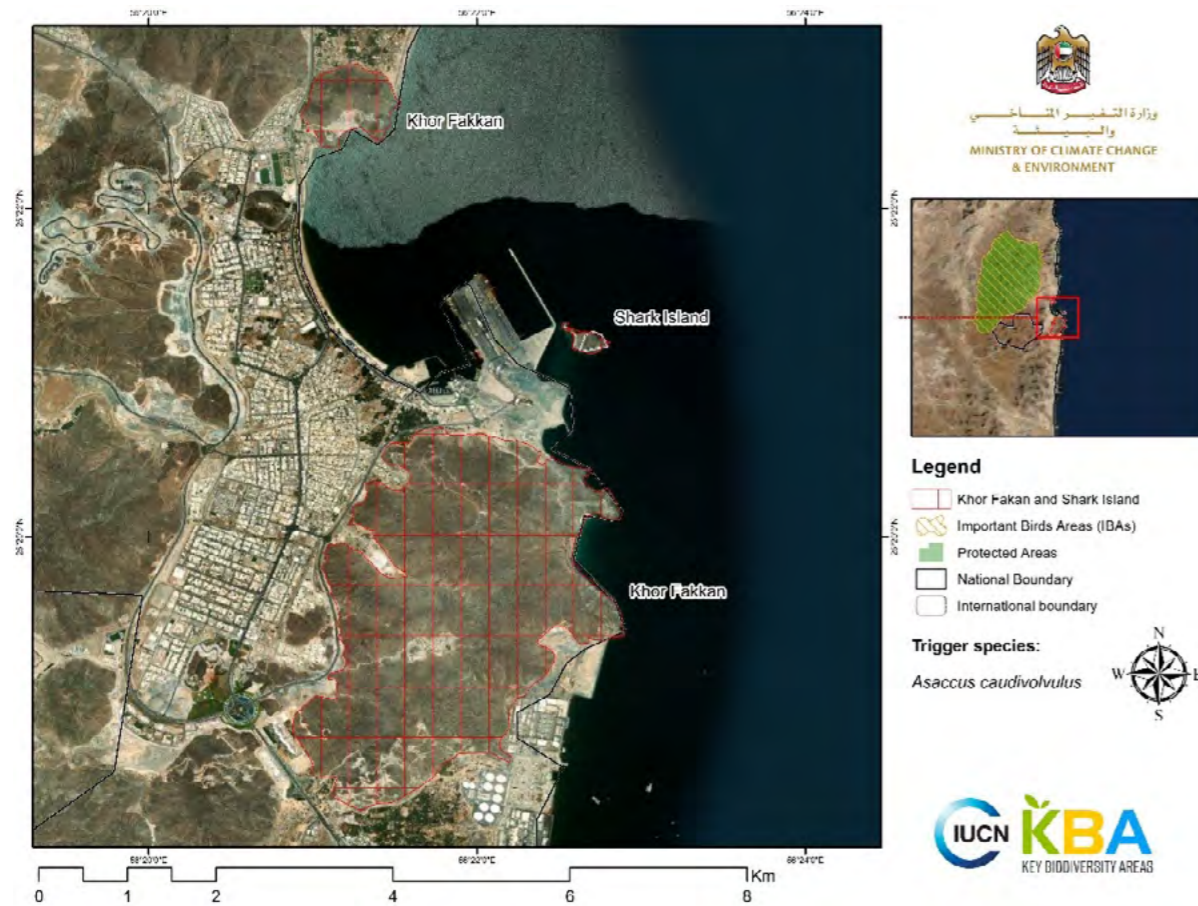


Figure 9: Khor Fakan and Shark Island (Source: IUCN)

Criteria Triggered: Criterion A1a & B1

Emirati Leaf-toed Gecko *Asaccus caudivolvulus* is a globally threatened species (Critically Endangered). Recent surveys in 2022 confirmed the species presence in two localities along the coastline, as well as on an island facing the coastline. However, there remains a possibility that the species occurs in other potentially suitable areas along the same coastal stretch that have not been surveyed due to restricted access caused by development.

This species is found at elevations ranging from sea level up to 20 m. It appears to prefer sea-facing rock cliffs with large boulders. Being strictly nocturnal, all recorded specimens have been observed during the night, skilfully avoiding surveyors' torch beams by retreating into crevices and holes, or quickly crossing boulders. Females breed year-round, laying single eggs multiple times throughout year. The whole global population of the species is confined or adjacent to the location of the KBA (Table 13).

Species	Number of localities (Global)	Number of localities (KBA)	Percentage at site %	Percentage Threshold	Assessment Parameter
<i>Asaccus caudivolvulus</i> Emirati Leaf-toed Gecko	3	1	33.33%	≥1%	(v) number of localities.

Table 13: Trigger species calculations against assessment parameters for Khor Fakan & Shark Island

Threats

The KBA is not protected, and no conservation measures are documented to be implemented in any part of the

KBA. The area has been facing large-scale modification and degradation of natural landscape as a result of construction activities (Table 14).

Level 1 Threat	Level 2 Threat	Level 3 Threat	Timing	Scope	Severity
Residential and commercial development	Commercial and industrial areas		Ongoing	Majority (50-90%)	Slow, significant declines
Residential and commercial development	Tourism and recreation areas		Ongoing	Whole (>90%)	Unknown
Pollution	Industrial effluents	Oil spills	Ongoing	Whole (>90%)	Unknown

Table 14: Threats on Khor Fakan & Shark Island

Existing conservation efforts

Currently Sharjah is working on developing a conservation plan for this site, EPAA is evaluating the threats and monitoring gaps, in addition to propose the site as a protected area so the local rules and regulations of biodiversity conservation in protected areas.

Additional biodiversity values

Biodiversity studies still under process and EPAA team is currently working on developing and evaluating the species database in this area.



3.8. Wadi Al-Baih

General Description

The site is a coastal strip with surrounding mountainous habitat characterised by cliffs, fissures and caves in the Hajar Mountains with the altitude ranging 175 m.a.s.l and 1,315 m.a.s.l. The site is a relatively narrow wadi with a maximum width of 100 m running along steep granite hills..

Delineation Rationale

The delineation of the KBA corresponds to the suitable habitat covering the main locality where the restricted-range species Ruus al Jibal Fan-footed Gecko *Ptyodactylus ruusaljibalicus* is known to exist in the country, and it represents one of the localities in the UAE where the species is found. The site intersects in the North with Wadi Al-Baih basin (Figure 10).

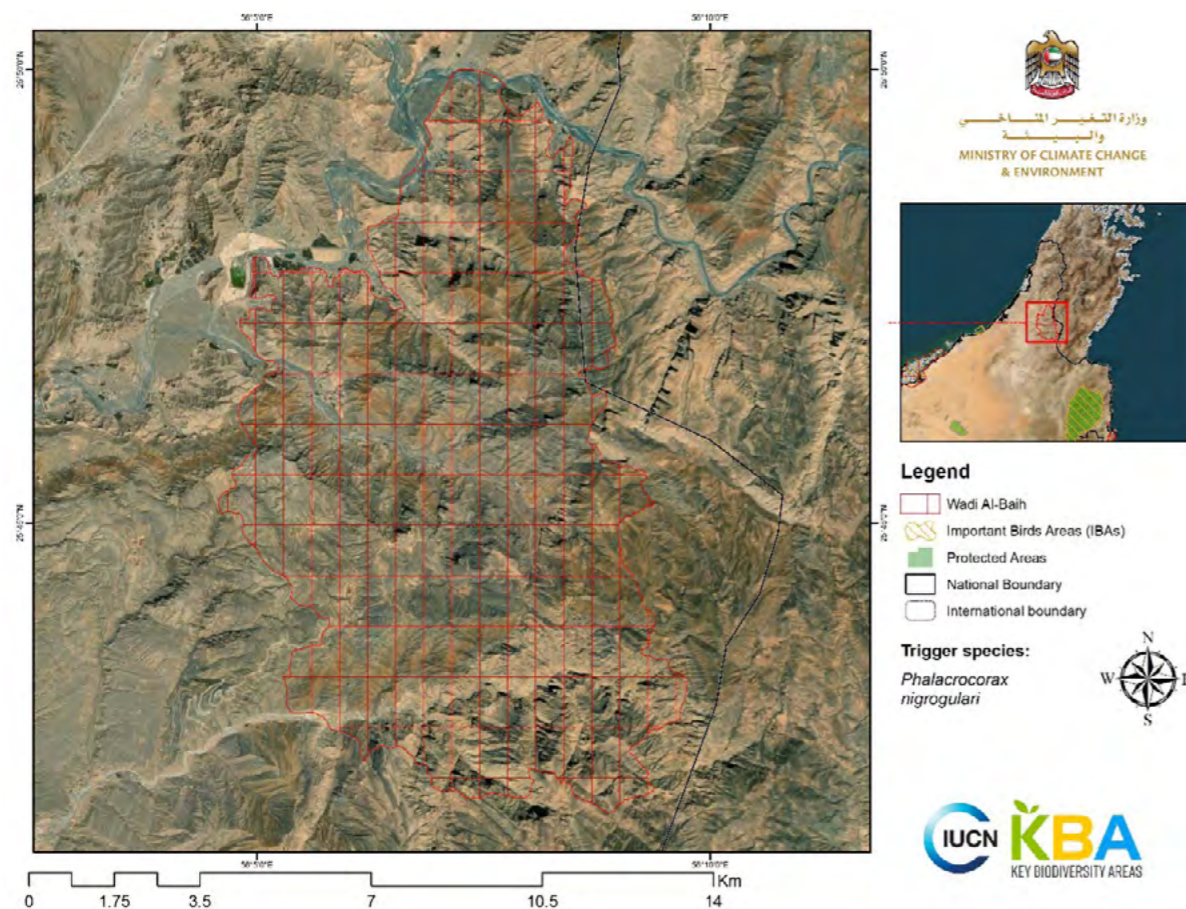


Figure 10: Wadi Al-Baih (Source: IUCN)

Criteria Triggered: Criterion B1

Ruus Al Jibal Fan-footed Gecko *Ptyodactylus ruusaljibalicus* is a gecko species that was only identified as a stand-alone species in 2017. There are 360 records of the species in the Hajar Mountains, within three localities

representing three distinct populations. The species is range-restricted, and it is only known from these records. Based on the number of localities, the site exceeds the threshold of criterion B1: "Site regularly holds $\geq 10\%$ of the global population size AND ≥ 10 reproductive units of a species" (Table 15).

Species	Number of localities (Global)	Number of localities (KBA)	Percentage at site %	Percentage Threshold	Assesment Parameter
<i>Ptyodactylus ruusaljibalicus</i> Ruus al Jibal Fan-footed Gecko	3	1	33.33%	$\geq 10\%$	(i) number of localities

Table 15: Trigger species calculations against assessment parameters for Wadi Al-Baih

Threats

Currently, the KBA is not included within any officially designated protected zones. However, there are general conservation measures in place to protect the environment. Occasional surveys are conducted to monitor the ecological health

and diversity of the area. Furthermore, threatened species are safeguarded under federal law. Additionally, legal provisions are in place to protect critical habitats that are essential for the survival of numerous species (Table 16).

Level 1 Threat	Level 2 Threat	Level 3 Threat	Timing	Scope	Severity
Residential and commercial development	Tourism and recreation areas		Unknown	Unknown	Unknown
Transportation and service corridors	Roads and railroads		Unknown	Unknown	Unknown

Table 14: Threats on Khor Fakan & Shark Island

Existing conservation efforts

While there are no specific conservation activities currently identified within the KBA and its adjacent areas, it's important to note that the site is under the management of the Environment Protection and Development Authority

(EPDA) in Ras Al Khaimah (RAK). The involvement of EPDA, a dedicated environmental authority, suggests that the area is under vigilant oversight and has the potential for future conservation initiatives and protective measures.



Source: Environment and Protected Areas Authority



3.9. Siniyah and Khor Al Beidah islands

General Description

The KBA is considered to be one of the most important and significant coastal wetlands in the country. Khor Al Beidah is a sheltered lagoon north-east of Umm al Quwain, containing intertidal mudflats (up to 400 m wide), islands and sparse mangrove *Avicennia* bounded inland by sabkha and rolling dunes with salt-tolerant scrub. The area is difficult of access. Siniyah Island lies offshore from Khor Al Beidah and is characterized by being a flat thin island with a length of 12 km and width of 1 km, situated 2 km north-east of Umm al Quwain town, and mainly composed of low sand dunes, salt flats, and some shallow hollows, with sparse salt-tolerant scrub.

The area is a complex mosaic of intertidal and subtidal habitat types (Sabkha, halophytes, mangroves, seagrasses, mud flats, algal mats, oyster beds and coral communities) that combine to make this seascape one of the most important of the UAE's coastal lagoons for biodiversity conservation and a hotspot for blue carbon sequestration. Mangroves cover 14.2 km² and mudflats 21.4 km², extensive (11 km²) and dense seagrass beds providing food for green turtles and important nursery habitat for commercial fish species, rays and sharks. These habitats host Critically Endangered (CR) species such as the Red Sea endemic Halavi guitarfish (CR) and the Whitespotted wedgefish (CR).

The site is also critical for the life cycle of threatened species hosting an important foraging ground for Endangered (EN) Green Turtles, the largest breeding area for Socotra Cormorant (VU) in the region and being a nursery for elasmobranchs with a potential Blacktip Reef Shark aggregation. In this composite site, eleven elasmobranch species have been recorded, two species of sea turtles, and 250 species of birds. The site is used for small-scale fishing, and for recreation. The area also includes the last remaining patches of healthy coral communities (1.8 km²) in the northern emirates dominated by *Faviids* and *Porites* spp. colonies with occasional *Acropora* spp.

Delineation Rationale

Siniyah and Khor Al Beidah islands are identified as two separate IBAs. However, following the consultation and discussions with the national experts it was proposed to treat them as one location since they form a continuous indentation to the south of east of Umm Al Quwain, making both sites geographically directly connected and ecologically inter-dependent. The delineation of the KBA was based on merging both original IBAs into a single location following the same 'outer' boundaries of both sites forming a single larger location (Figure 11). Also, this site is one of the major global breeding locations for the globally threatened Socotra Cormorant *Phalacrocorax nigrogularis*.

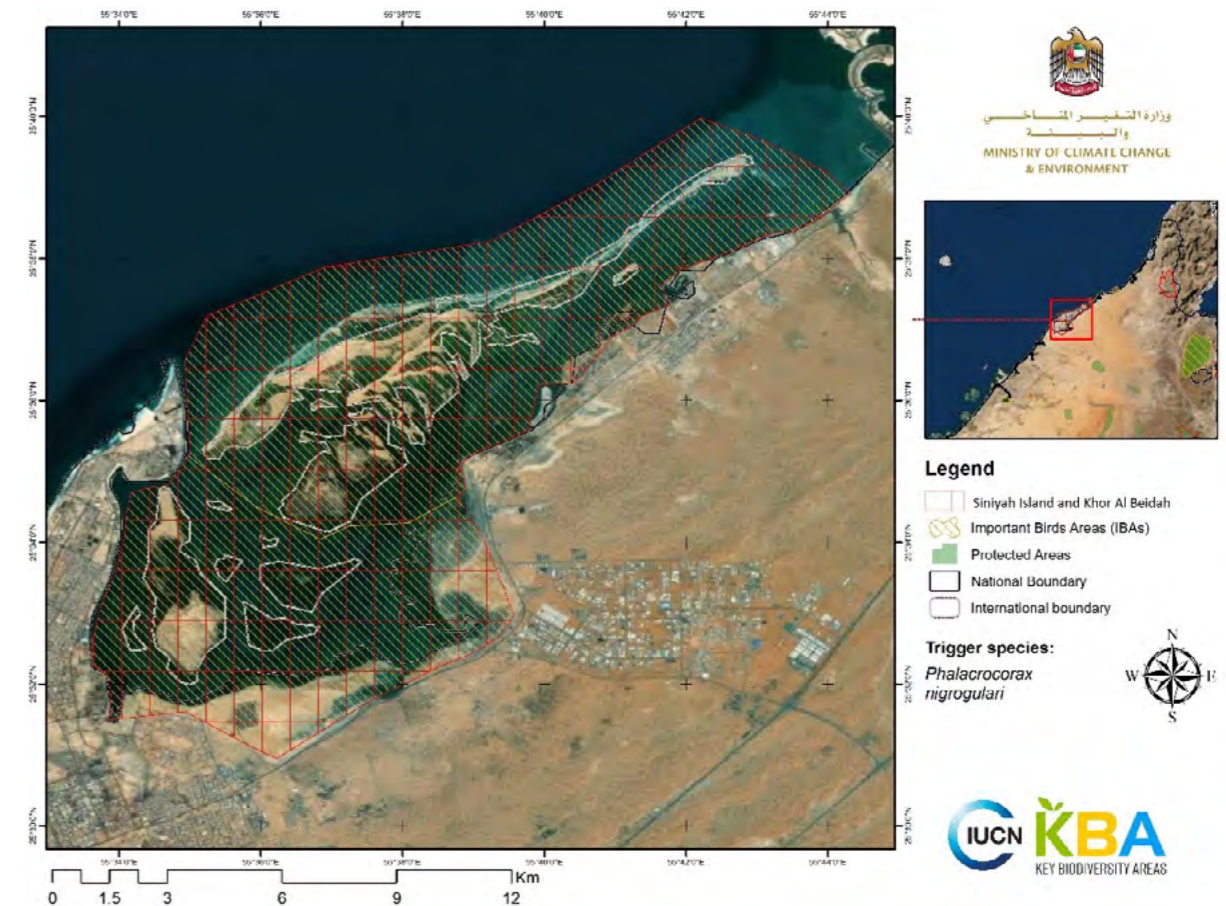


Figure 11: Siniyah and Khor Al Beidah islands (Source: IUCN)

Criteria Triggered: Criteria A1b & B1

Socotra Cormorant *Phalacrocorax nigrogularis* is a globally threatened species (Vulnerable). The species is known to breed at sandy and gravel islands and islets along the Arabian Gulf, the Arabian Sea (Oman and Yemen) and in Socotra Archipelago (Yemen) (Muzaffar, 2020).

The global population of the species is estimated to be 220,000 mature individuals (BirdLife International, 2019) while the breeding population at the KBA was recorded to be between 26,000 to 41,000 individuals (16,750 pairs) (Javed et al, 2020), which makes up 15.22% of the global population of the species (Table 17).

Species	Population (Global)	Population (Site)	Population Percentage	Percentage Threshold	Assessment Parameter
<i>Phalacrocorax nigrogularis</i> Socotra Cormorant	220,000	26,000 – 41,000	15.22%	≥1	(i) number of mature individuals.

Table 17: Trigger species calculations against assessment parameters for Siniyah & Khor Al Beidah islands

Threats

The KBA is not protected. Threats to the site include urban and commercial development (Table 18). The site is

considered to be one of the top-priority sites for conservation in the country (Ben-Lamine et al 2020; Mateos-Molina et al 2020 & 2021).

Level 1 Threat	Level 2 Threat	Level 3 Threat	Timing	Scope	Severity
Residential and commercial development	Tourism and recreation areas		Ongoing	Affects the minority of the populations (<50%)	<ul style="list-style-type: none"> Causing or likely to cause fluctuations. Potential permanent loss of key habitats
Transportation and service corridors	Shipping lanes		Ongoing	Affects the minority of the populations (<50%)	<ul style="list-style-type: none"> Causing or likely to cause rapid declines (20–30% over 10 years or three generations; whichever is the longer) Potential permanent loss of key habitats
Biological resource use	Fishing and harvesting aquatic resources	Unintentional effects: large scale (species being assessed is not the target) [harvest]	Ongoing	Affects the minority of the populations (<50%)	<ul style="list-style-type: none"> Causing or likely to cause relatively slow but significant declines (<20% over 10 years or three generations; whichever is the longer) Potential permanent loss of key habitats
Invasive & other problematic species, genes & diseases	Invasive non-native/ alien species/ diseases		Ongoing	Affects the minority of the population (<50%)	<ul style="list-style-type: none"> Causing or likely to cause very rapid declines (>30% over 10 years or three generations; whichever is the longer) Potential permanent loss of key habitats
Pollution	Industrial & military effluents	Oil spills	Possible in the future	Affects the minority of the population (<50%)	<ul style="list-style-type: none"> Causing or likely to cause very rapid declines (>30% over 10 years or three generations; whichever is the longer) Potential permanent loss of key habitats

Table 18: Threats on Siniyah and Khor Al Beidah islands

Existing conservation efforts

Although the site is not a PA, hunting in the site is illegal without permits, ecological surveys and species monitoring is regular in the site. Species like sea turtles, cormorants are protected under federal laws like law number 24, 1999 on environment protection and development and law number 23, 1999 concerning the exploitation, protection and development of the living aquatics. The area is partially fenced as well.

Additional biodiversity values

The site contains several additional threatened species. The Halavi Guitarfish *Glaucostegus halavi* (CR & endemic to

the Arabian Gulf) was observed in Khor Beidah with a sighting frequency of 21% per drone transect). Whitespotted Wedgefish *Rhynchobatus djiddensis* (CR) was observed at the site, and Khor Beidah hosts an important foraging ground for Green turtle *Chelonia mydas* (EN) (Pilcher et al. (2021) with a relative abundance of 8 female individuals observed/ha (Mateos Molina et al. (2023) In press). *Calidris tenuirostris* (EN) is also observed at the site. Six other IBA species do not meet Global KBA criteria but nevertheless have significant populations at the site; Great Knot *Callidris tenuirostris* (EN), Lesser Sandplover *Charadrius mongolus* (LC), Kentish plover *Charadrius alexandrinus* (LC), Crab Plover *Dromas ardeola* (LC) and the Gangly heron *Egretta gularis* (LC).

4. Conclusions and recommendations

The inaugural assessment of Key Biodiversity Areas (KBAs) in the UAE has marked a significant stride in conservation efforts, pinpointing nine areas of critical ecological value across five emirates. The Project anticipates that as research continues, additional sites may be nominated as KBAs of global importance. For instance, conducting species-specific surveys in Wadi Wurayah Nature Reserve may confirm the presence and population of the Omani Owl *Strix butleri*. It is crucial that this research, especially species-specific surveys and extensive surveys for marine mammals, continues to be a part of the KBA identification and conservation process in the UAE.

One of the critical findings from this assignment is the identification of three new KBAs based on globally threatened reptile species with limited range sizes and vulnerability to human-induced threats. Furthermore, the assessment has cast light on the conservation status of two globally threatened species, the Dugong and the Socotra Cormorant. While the Dugong populations appear stable, Socotra Cormorant numbers are volatile, primarily due to disturbance to the birds during the breeding season and chasing these birds away, given the misconception that they compete with fishermen, emphasizing the need for immediate conservation action.

In response to the findings of the assessment and to address the specific comments provided, the following priority

actions and broader recommendations are proposed:

- Its recommended that all KBA's be protected by law, especial attention should be given to sights that are not yet protected including Wadi Bih in Ras Al Khaimah; Wadi Al-Helo, Khor Fakkan and Shark Island in Sharjah and Siniyah Island and Khor Al Beidah in Umm al Quwain. This inclusion would ensure that these ecologically valuable areas, and especially the breeding grounds for significant bird species, receive the protection they require from disturbance and habitat loss.
- Conduct systematic PAME assessments as a priority action to ensure the three KBAs which are not currently protected to be included within the protected areas network.
- Initiate and support ongoing scientific research and long-term monitoring programs. This should include baseline surveys, species inventories, habitat mapping, and ecological studies to guide evidence-based conservation strategies.
- Formulate and implement management plans tailored to the unique ecological characteristics, threats, and conservation needs of each KBA, with particular focus on those outside existing protected areas.
- Develop and enforce appropriate legal frameworks and management practices to ensure the effective protection and management of KBAs.

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ANNEX B

UAE Circular Economy Council Members

H.E. Mariam bint Mohammed Almheiri
Minister of Climate Change & Environment

H.E. Abdulla Bin Touq Al Marri
Minister of Economy

H.E. Dr. Thani Bin Ahmed Al Zeyoudi
Minister of State for Foreign Trade - MOE

Eng. Ali Al Dhaheri
Acting General Manager - Abu Dhabi Waste Management Center - Tadweer

H.E. Abdulrahman Al Nuaimi
Director General - Municipality and Planning Department in Ajman

H.E. Khaled Al Huraimel
Chief Executive Officer - Beeah

H.E. Eng. Ahmed AlKaabi
Assistant Undersecretary - Ministry of Energy and Infrastructure

Eng. Othaibah AlQaydi
Acting, Assistant Undersecretary of Sustainable Communities Sector, Ministry of Climate Change & Environment

Anis Nassar
Lead, Resource Circularity - World Economic Forum

Eng. Aisha Al Abdooli
Director, Green Development & Environment Affairs Department, Ministry of Climate Change and Environment

H.H. Sheikha Shamma Bint Sultan Bin Khalifa Al Nahyan
President & CEO of UAE Independent Climate Change Accelerators, UICCA

H.E. Omar Bin Sultan Al Olama
Minister of State for Artificial Intelligence

H.E. Razan Khalifa Al Mubarak
Managing Director - Environment Agency Abu Dhabi

H.E. Eng. Dawood Abdul Rahman Al-Hajri
Director General - Dubai Municipality

H.E. Laila Mostafa Abdullatif
Director General - Emirates Nature – WWF

H.E. Omar Ahmed Suwaina Al Suwaidi
Undersecretary - MoIAT

H.E. Nawal Al Hosany
Acting Assistant Undersecretary of the green development and climate change sector – Ministry of Climate Change and Environment

Mrs. Samar Elmnhrawy
SVP HC and Sustainability Services (HO) - Corporate H.O.– Majid Al Futtaim Group

Mr. Patrick Chalhoub
Executive Director - Chalhoub Group

ANNEX C

New Technologies that can support Optimisation of Resources

Artificial intelligence (AI) and Machine Learning (ML) can analyse vast amounts of data, identify patterns and make predictions to optimise complex processes. These technologies can be applied to supply chain management, demand forecasting, resource allocation, scheduling and decision making, enabling more efficient and data-driven optimisations.

The Internet of Things (IOT) devices equipped with sensors and connected to a network can collect real time data on various parameters, such as temperature, pressure, movement and performance. This data can be used to monitor and optimise processes, equipment performance, energy usage and supply chain logistics.

Big Data analytics enables large and diverse datasets to be analysed using advanced analytical techniques that can enable organisations to gain valuable insights, identify inefficiencies, and make data-driven decisions. It can support optimisation efforts in the areas such as demand forecasting, inventory management, route optimisation, customer segmentation and resource allocation.

A digital twin is a virtual replica or simulation of a physical system, process or product. It enables organisations to model and optimize various scenarios, test different strategies and predict outcomes before implementing changes in the real world. Digital twins can be used to optimize manufacturing processes, facility layouts and supply chain operations.

Robotic Process Automation (RPA) involves the use of robots to automate repetitive and rule based tasks. By automating manual processes, organisations can improve efficiency, accuracy and speed while reducing errors and costs. RPA can optimize tasks such as data entry, order processing, inventory management and quality control.

As seen the sharing section, **cloud computing** provides scalable and on-demand access to computing resources enabling organisations to optimize their infrastructure and storage needs. It allows for flexible resource allocation, data sharing, collaboration, and real-time analytics. Cloud-based solutions can support optimization efforts in various areas, including data analysis, supply chain management and business process optimization.

Blockchain technologies offer decentralized and transparent record keeping, enabling secure and traceable transactions. It can be used to optimize supply chain operations, track and authenticate products, streamline financial transactions and reduce fraud or counterfeiting.

Augmented Reality (AR) and Virtual Reality (VR) technologies can optimize training, maintenance and design processes. By providing immersive and interactive experiences, organisations can improve employee training, equipment, maintenance, and design iterations, leading to more efficient and optimized workflows.

Annexes

Annex I: List of sites identified as Key Biodiversity Areas in the UAE

#	KBA Site (English)	KBA Site (Arabic)	Emirate	Trigger species identified	Criteria	Ecosystem	Surface area (km ²) ⁴	Status of Protection	Coverage by Protected Area %
1	Arabian Oryx Protected Area at Um al Zumoul	محمية المها العربي في أم الزمول	Abu Dhabi	• Oryx leucoryx Arabian Oryx	Criterion A1b & B1	Terrestrial	5,971.94	Completely protected	100%
2	Marawah Marine Area	مروح البحرية	Abu Dhabi	• Dugong Dugong dugon	Criterion A1b & A1d	Marine & Terrestrial	4,259.80	Completely protected	100%
3	Al Yasat Marine Area	الياسات البحرية	Abu Dhabi	• Phalacrocorax nigrogularis Socotra Cormorant • Dugong dugon Dugong	Criterion A1b, A1d & B1	Marine & Terrestrial	2,271.32	Completely protected	100%
4	Al Marmoum Conservation Reserve	محمية المرموم الصحراوية	Dubai	• Gazella Marica Arabian Sand Gazelle • Gazella Arabica Arabian Mountain Gazelle • Oryx leucoryx Arabian Oryx	Criterion A1b & B1	Terrestrial	659.04	Completely protected	100%
5	Dubai Desert Conservation Reserve	محمية دبي الصحراوية	Dubai	• Gazella Marica Arabian Sand Gazelle • Gazella Arabica Arabian Mountain Gazelle	Criterion A1b & B1	Terrestrial	225.94	Completely protected	100%
6	Wadi Al-Helo	وادي الحلو	Sharjah	• Asaccus margaritae Margarita's Leaf-toed Gecko	Criterion B1	Terrestrial & Freshwater	63.07	Partially protected	~27%
7	Khor Fakan and Shark Island	خورفكان و جزيرة القرش	Sharjah	• Asaccus caudivolvulus Emirati Leaf-toed Gecko	Criterion A1a & B1	Terrestrial	9.30	Unprotected	0%
8	Wadi Al-Baih	وادي البيح	Ras Al Khaimah	• Ptyodactylus Ruusaljibalicus Ruus al Jibal Fan-footed Gecko	Criterion B1	Terrestrial	78.60	Unprotected	0%
9	Siniyah and Khor Al Beidah Island	جزيرة السينية و خور البيضاء	Umm al Quwain	• Phalacrocorax nigrogularis Socotra Cormorant	Criterion A1b & B1	Marine & Terrestrial	121.41	Unprotected	0%

⁴ The surface area was calculated based on spatial analysis through ArcGIS 10.8.

Annex III: Summary of the KBA criteria and thresholds (Source: KBA guidelines, 2016)

A. Threatened biodiversity		
A1 Threatened species		Assessment parameters
A1a	≥0.5% of global population size and ≥5 reproductive units (RU) of a CR/EN species	(i) no. of mature individuals (ii) area of occupancy (iii) extent of suitable habitat (iv) range (v) no. of localities (vi) distinct genetic diversity
A1b	≥1.0% of global population size and ≥10 RU of a VU species	
A1c	≥0.1% of global population size and ≥5 RU of a species listed as CR/EN due only to past/current decline [= Red List A1, A2, A4 only]	
A1d	≥0.2% of global population size and ≥10 RU of a species listed as VU due only to past/current decline [= Red List A1, A2, A4 only]	
A1e	Effectively the entire population size of a CR/EN species	
A2 Threatened ecosystem types		
A2a	≥5% of global extent of a CR or EN ecosystem type	
A2b	≥10% of global extent of a VU ecosystem type	
B. Geographically restricted biodiversity		
B1. Individual geographically restricted species	≥10% of global population size and ≥10 RU of any species	(i) no. of mature individuals (ii) area of occupancy (iii) extent of suitable habitat (iv) range (v) no. of localities (vi) distinct genetic diversity
B2. Co-occurring geographically restricted species	≥1% of global population size of each of a number of restricted range species in a taxonomic group: ≥2 species or 0.02% of the total number of species in the taxonomic group, whichever is larger	

B3. Geographically restricted assemblages		
B3a	≥0.5% of global population size of each of a number of ecoregion- restricted species in a taxonomic group: ≥5 species or 10% of the species restricted to ecoregion, whichever is larger	(i) no. of mature individuals (ii) area of occupancy (iii) extent of suitable habitat (iv) range (v) no. of localities
B3b	≥5 RU of ≥5 bioregion-restricted species or ≥5 RU of 30% of the bioregion-restricted species known from the country, whichever is larger	
B3c	Site is part of the globally most important 5% of occupied habitat for ≥5 species in the taxonomic group	(i) relative density of mature individuals (ii) relative abundance of mature individuals
B4. Geographically restricted ecosystem types		
	≥20% of the global extent of an ecosystem type	
C. Ecological integrity		
	Site is one of ≤2 per ecoregion with wholly intact ecological communities	composition and abundance of species and interactions
D. Biological processes		
D1. Demographic aggregations		
D1a	≥1% of global population size of a species, over a season, and during ≥1 key stage in life cycle	no. of mature individuals
D1b	Site is among largest 10 aggregations of the species	no. of mature individuals
D2. Ecological refugia	≥10% of global population during periods of environmental stress	no. of mature individuals
D3. Recruitment sources	Produces propagules, larvae or juveniles maintaining ≥10% of global population size	no. of mature individuals
E. Irreplaceability through quantitative analysis		

Annex IV: Participants list for the consultation (validation) workshop

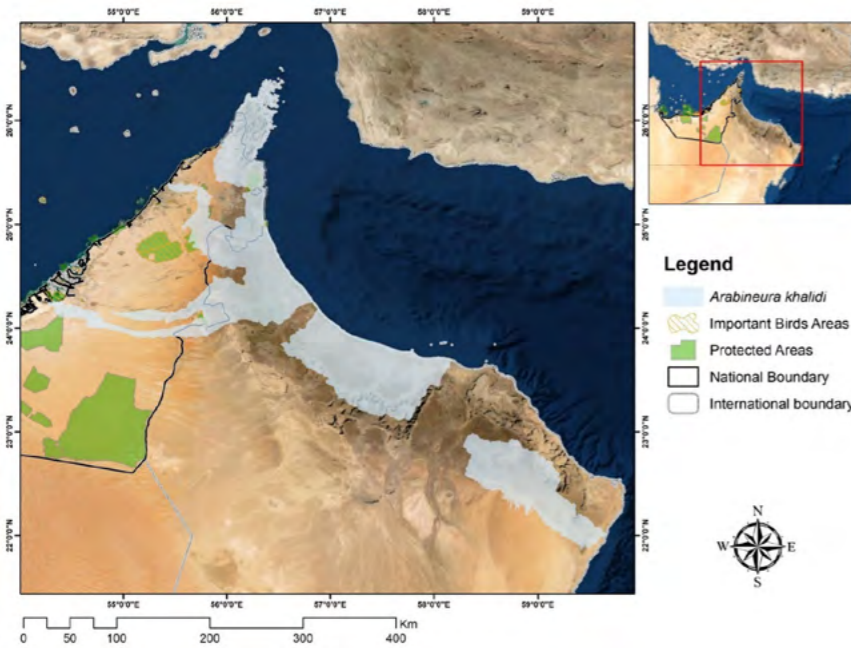
No	Name	Entity
1	Basil Roy	Dubai Desert Conservation Reserve
2	Greg Simkins	Dubai Desert Conservation Reserve
4	Badria Hassan Hussain	Dubai Municipality
5	Esmat Elfaki Mohammed Elhassan	Dubai Municipality
7	Jawaher Lootah	Dubai Municipality
8	Jeruel Cabadonga Aguhob	Dubai Municipality
6	Maral Khaled Chreiki	Dubai Municipality
9	Muna Matar Bilal	Dubai Municipality
3	Suad badaam	Dubai Municipality
16	Dr. Himansu Das	Environment Agency - Abu Dhabi
10	Ibrahim Abdulla Bugla	Environment Agency - Abu Dhabi
12	Maher Kabshawi	Environment Agency - Abu Dhabi
11	Maitha AlHameli	Environment Agency - Abu Dhabi
13	Rashed Alzaabi	Environment Agency - Abu Dhabi
14	Salim Javed	Environment Agency - Abu Dhabi
15	Wadima AlAhbabi	Environment Agency - Abu Dhabi
21	Brendan Whittington-Jones	Environment and Protected Areas Authority - Sharjah
18	Eman Alteneiji	Environment and Protected Areas Authority - Sharjah
17	Fadi Yahmor	Environment and Protected Areas Authority - Sharjah
20	Johannes Els	Environment and Protected Areas Authority - Sharjah
19	Salama Alteneiji	Environment and Protected Areas Authority - Sharjah
22	Fatema Rashed AlHebsi	Environment Protection and Development Authority - Ras Al Khaimah
24	Moustafa Khalifa	Environment Protection and Development Authority - Ras Al Khaimah
23	Sujatha	Environment Protection and Development Authority - Ras Al Khaimah
26	Abdulnasser Obaidat	Fujairah Environment Authority
25	Ali AlHammoudi	Fujairah Environment Authority
27	Fatima Alhantobi	Fujairah Environment Authority
28	Sami Ullah Majeed	Fujairah Environment Authority
29	Aisha Alnuaimi	Municipal Development Department - Ajman
30	Smmaideen	Municipal Development Department - Ajman
31	Mouaz Hamza	Umm Al Quwain Municipality
38	Ahmed Alhemeiri	Ministry of Climate Change and Environment
32	Dr. Nahla Umer Mezhoud	Ministry of Climate Change and Environment

37	Hassina Ali	Ministry of Climate Change and Environment
41	Hiba Alshehhi	Ministry of Climate Change and Environment
39	Maitha Almheiri	Ministry of Climate Change and Environment
40	Nahla noobi	Ministry of Climate Change and Environment
35	Obaid Alshamsi	Ministry of Climate Change and Environment
34	Rashid Mohammed Said AlShihi	Ministry of Climate Change and Environment
36	Reem Almheiri	Ministry of Climate Change and Environment
33	Rumaitha Abdulaziz Alshehhi	Ministry of Climate Change and Environment
48	Amna Alotaiba	Alain Zoo
42	Hessa Alqahtani	Alain Zoo
45	lisa Banfield	Alain Zoo
44	Mouza Alhajeri	Alain Zoo
46	Myyas Alqarqaz	Alain Zoo
47	Reem Alkaabi	Alain Zoo
43	Roberto Lapinski	Alain Zoo
49	Tiffany Claire Delpport	Emirarets Marine Environmental Group
50	Meis Moukayed	American University in Dubai (AUD)
51	John Burt	New York University
52	Sharif Jbour	Birdlife International
53	Munir Virani	Raptor conservation Fund
57	Andrew Gardner	Emirates Nature-WWF
56	Daniel Mateos	Emirates Nature-WWF
54	Marina Antonopoulou	Emirates Nature-WWF
55	Mona Moller	Emirates Nature-WWF
58	Dr Sumitha Thushar	International Center for Biosaline Agriculture, Dubai
60	Mohammad Shahid	International Center for Biosaline Agriculture, Dubai
59	Rakesh Kumar Singh	International Center for Biosaline Agriculture, Dubai
61	Nicole Remonde	Reneco International Wildlife Consultants - Abu Dhabi
62	Joseph Azar	RENECO International Wildlife consultants - Abu Dhabi
64	Eng. Hamda Al Hammadi	Waste Management Agency - Ras Al Khaimah
63	Eng. Wafa Hanoun	Waste Management Agency - Ras Al Khaimah
66	Eng. Hanna Haddad	IUCN Regional Office for West Asia
65	Eng. Natalia Boulad	IUCN Regional Office for West Asia
67	Thomas Starnes	IUCN Biodiversity Assessment and Knowledge Team
68	Dr. Catherine Numa	IUCN Centre for Mediterranean Cooperation
69	Laith ElMograbi	IUCN - Independent Consultant

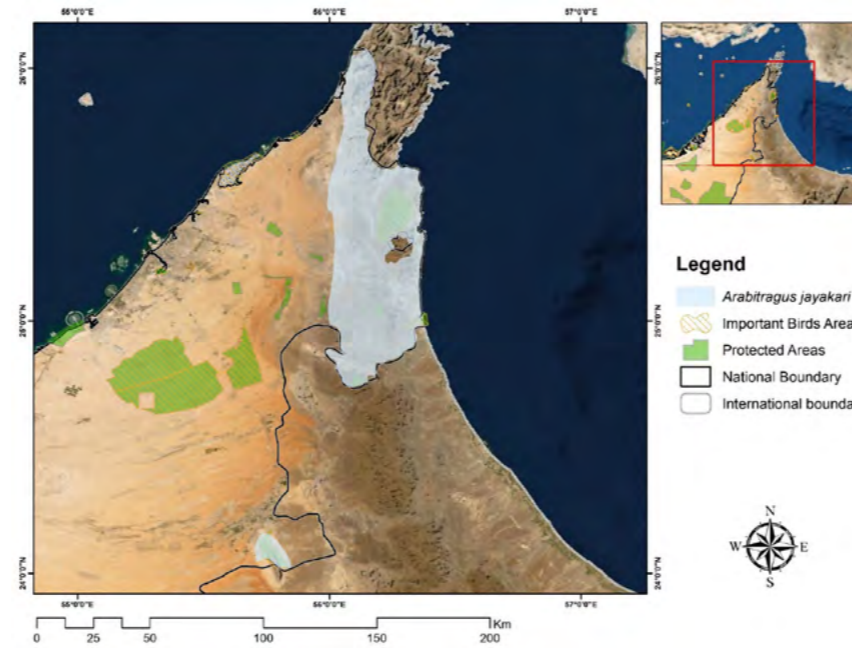
Annex V: Estimation of the current Arabian Oryx global population

Wild & low-managed populations	Sites	Total population	Juveniles	Adults	Females	males	Reference	Comments
According to Pesci 2019	Al Marmoum Reserve in the UAE	3575	393.25	3181.75			Pesci, 2019	Population data from this report don't include 2 low managed population. The population size seems to be higher than estimated in other inventories and the calculation is based on surveys. It is suggested to utilize data from arabianoryx.org and the national Red List workshop at the Sharjah International Workshop for Conservation of Arabian Biodiversity
	Al Wusta Wildlife Reserve in Oman							
	Uruq Bani Ma'arid Protected Area in Saudi Arabia.							
Elhassan, E. E. (2019)	Al Marmoum	1114	144.82	969.18	920.72	48.46	Elhassan, E. E. (2019). The assessment of the Arabian Oryx (<i>Oryx Leucoryx</i>) distribution and the affect of habitat fragmentation in Almarmoom Desert Conservation Reserve. Natural Resources Conservation Section Environment Department, Dubai Municipality, Dubai, United Arab Emirates.	This site is not included in Arabian oryx.org .
Wild and low managed populations from David Mallon (pers. comm. 2022)	Al Marmoum	600					500-700 National Red List SSC SG workshop (2018)	
	Al Wusta	637					https://www.arabianoryx.org/	Dec, 2018
	Uruq Bani Ma'arid Protected Area	125						
	Arabian Oryx Sanctuary, UAE (5500 km ²)	835					https://www.arabianoryx.org/	Dec, 2018
	Mahazat as Sayd reserve, KSA (2244 km ²)	500					https://www.arabianoryx.org/	Dec, 2018
	Infered population size	2697.00						
	Infered population size (Between 2700 - 3070 mature individuals)	2697.00	3066.18					

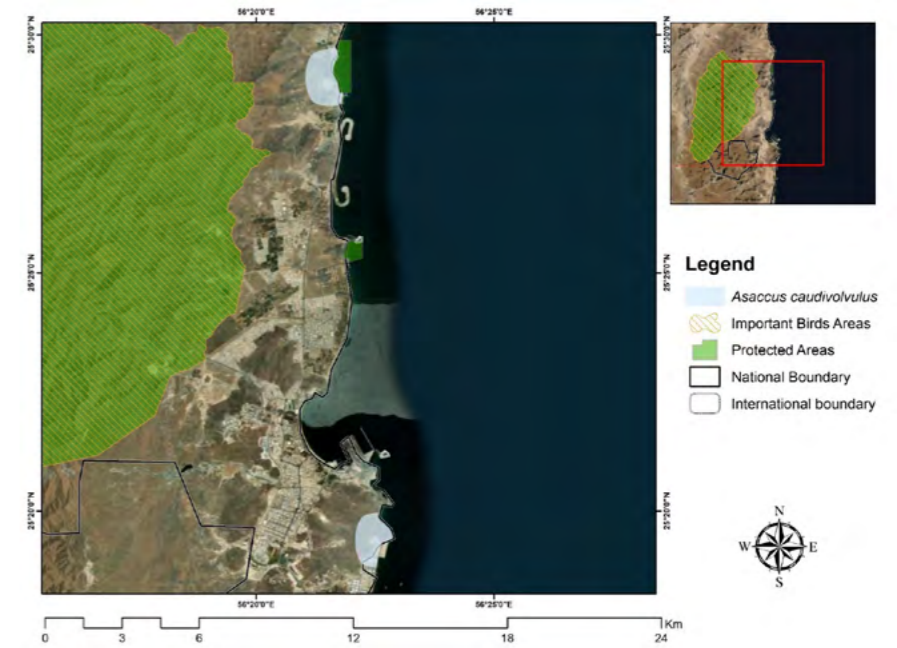
Annex VI: Maps for the 22 potential trigger species identified in the beginning KBA analysis (source: IUCN Red List, MOCCA and data collected from the NCG)



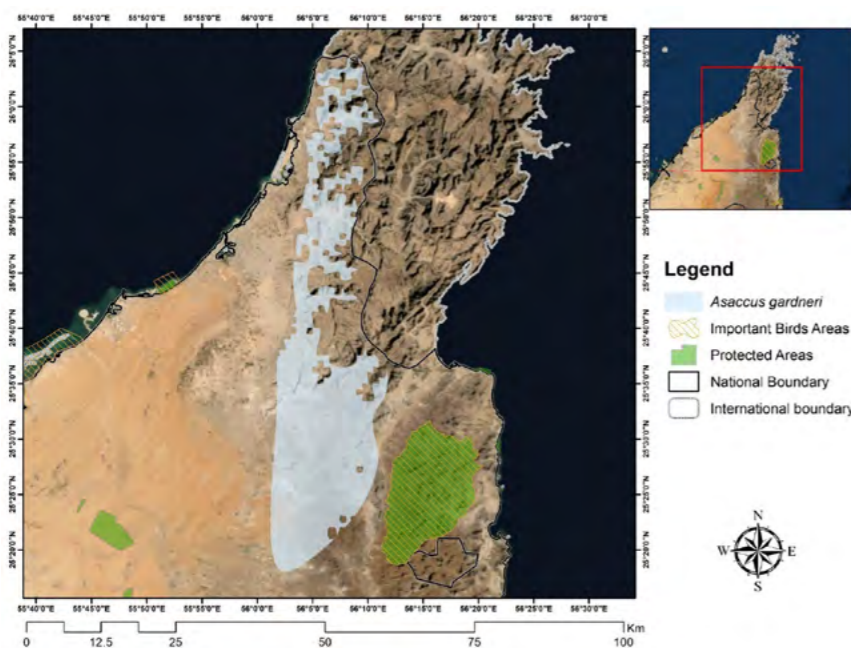
Hajar Wadi Damselfly *Arabineura khalidi*



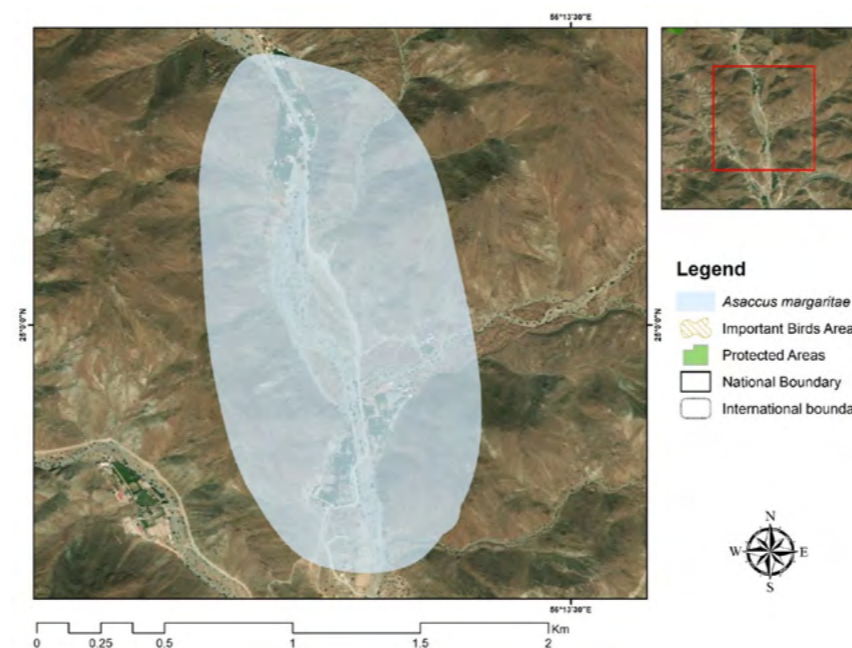
Arabian Tahr *Arabitragus jayakari*



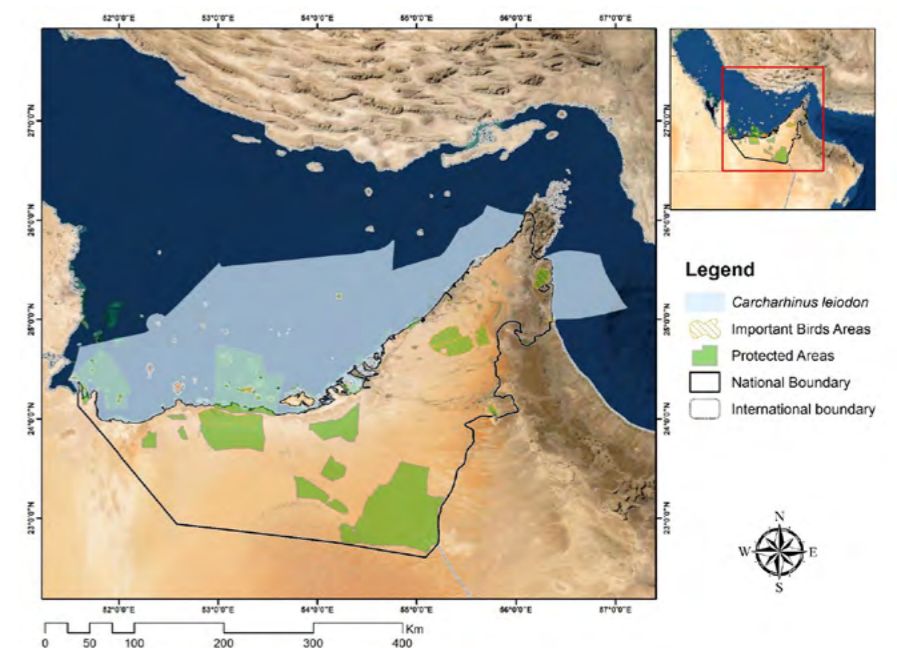
Emirati Leaf-toed Gecko *Asaccus caudivolvulus*



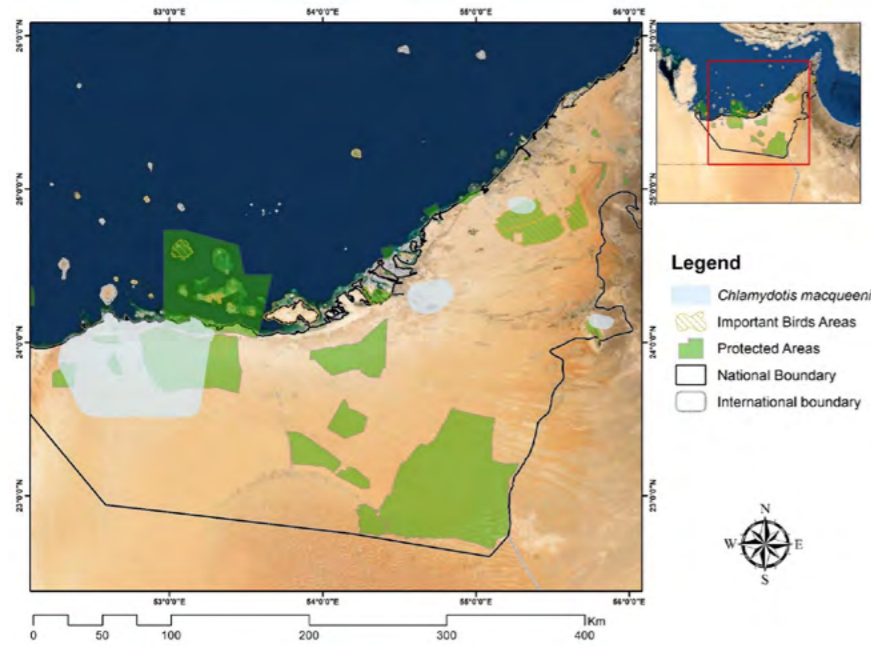
Gardner's Leaf-toed Gecko *Asaccus gardneri*



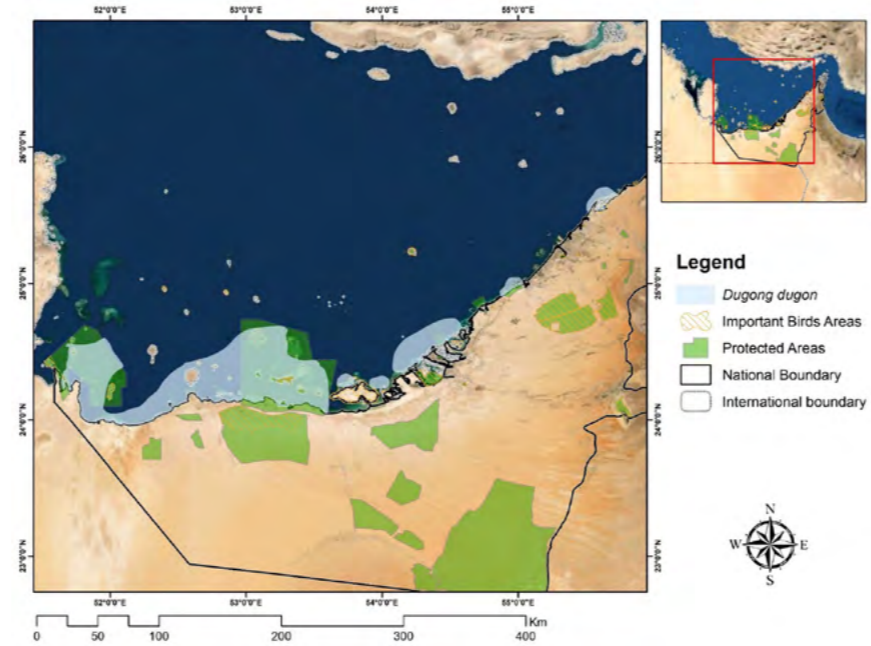
Margarita's Leaf-toed Gecko *Asaccus margaritae*



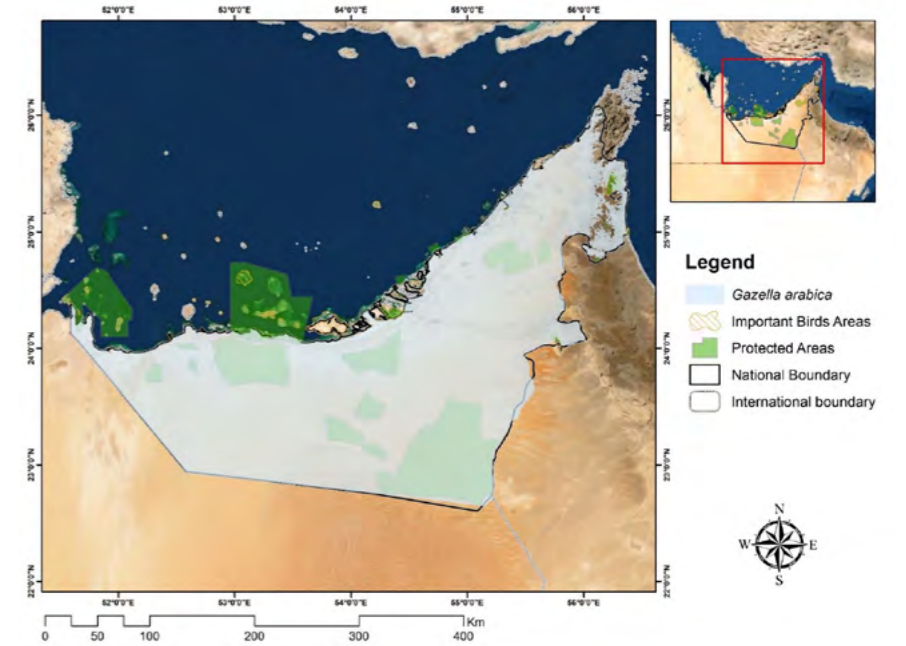
Smoothtooth Blacktip Shark *Carcharhinus leiodon*



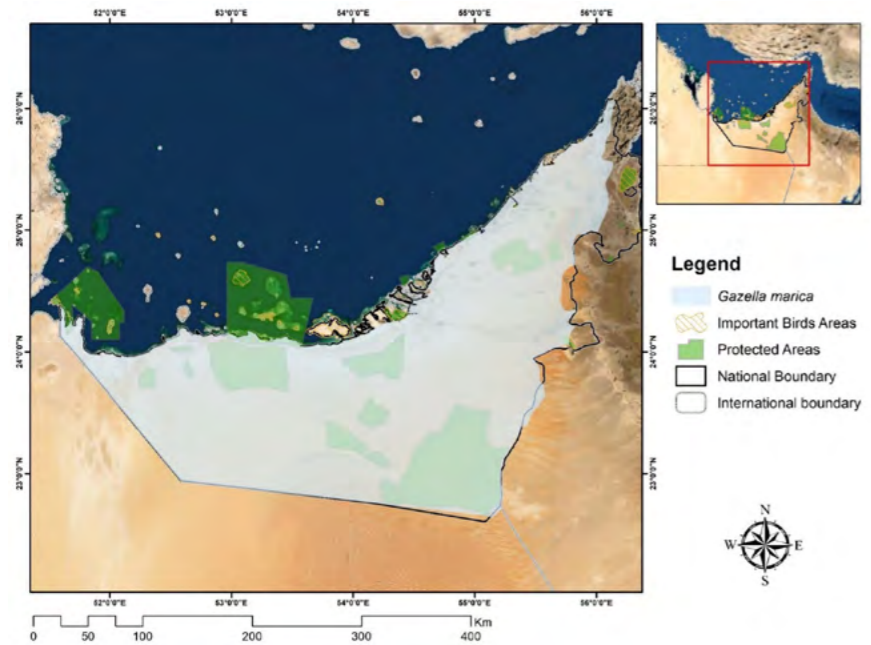
Asian Houbara *Chlamydotis macqueenii*



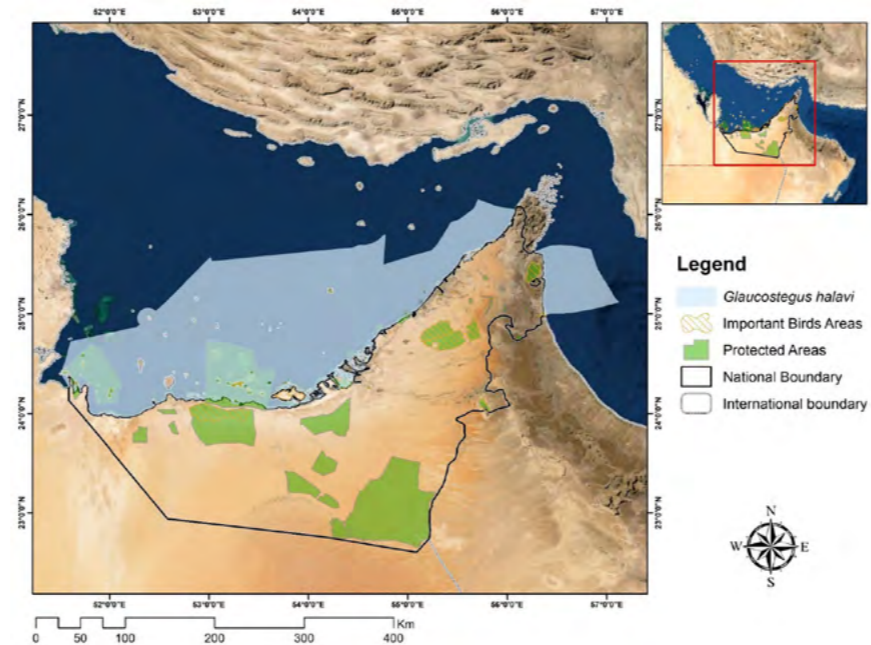
Dugong *Dugong dugon*



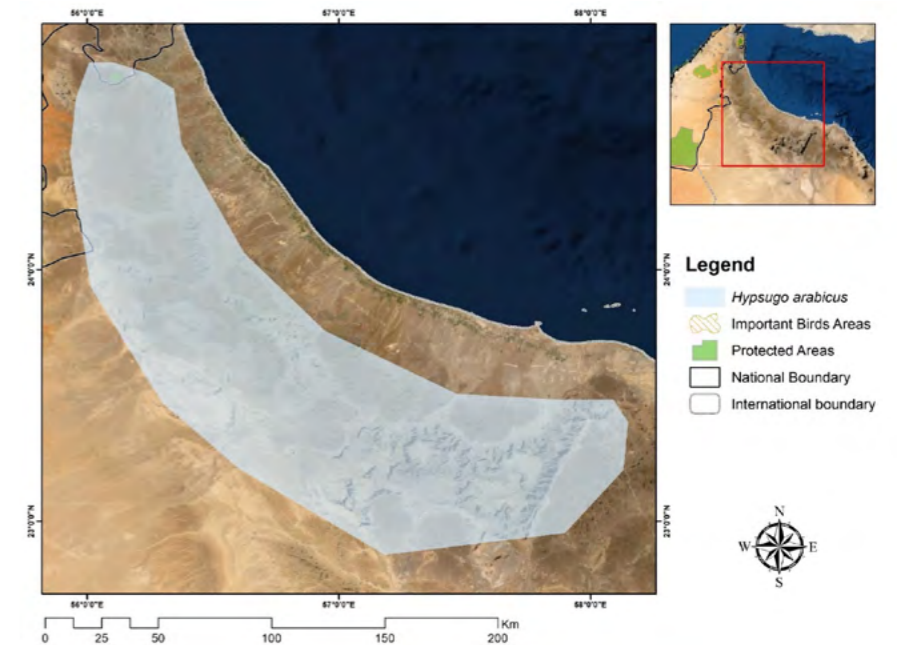
Arabian Gazelle *Gazella arabica*



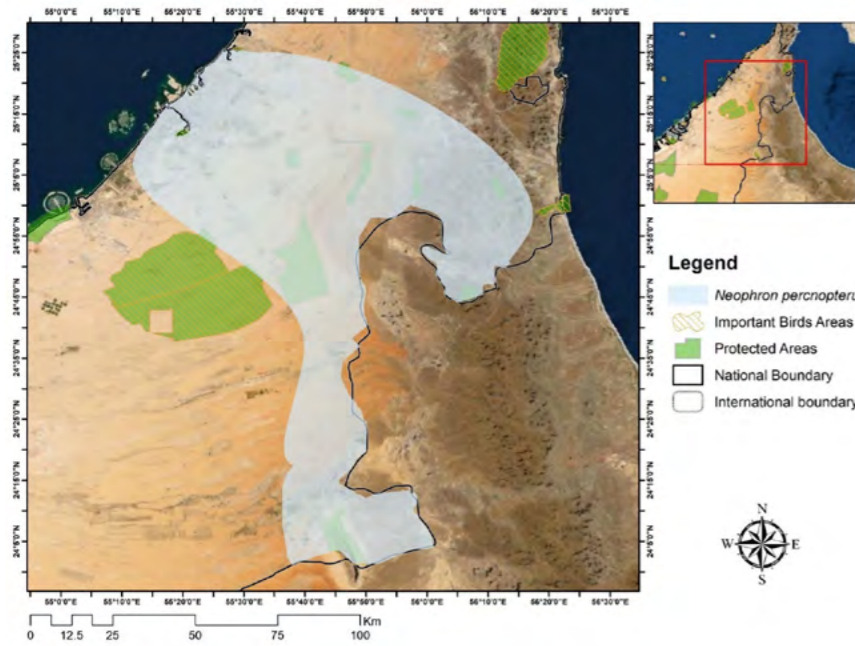
Arabian Sand Gazelle *Gazella marica*



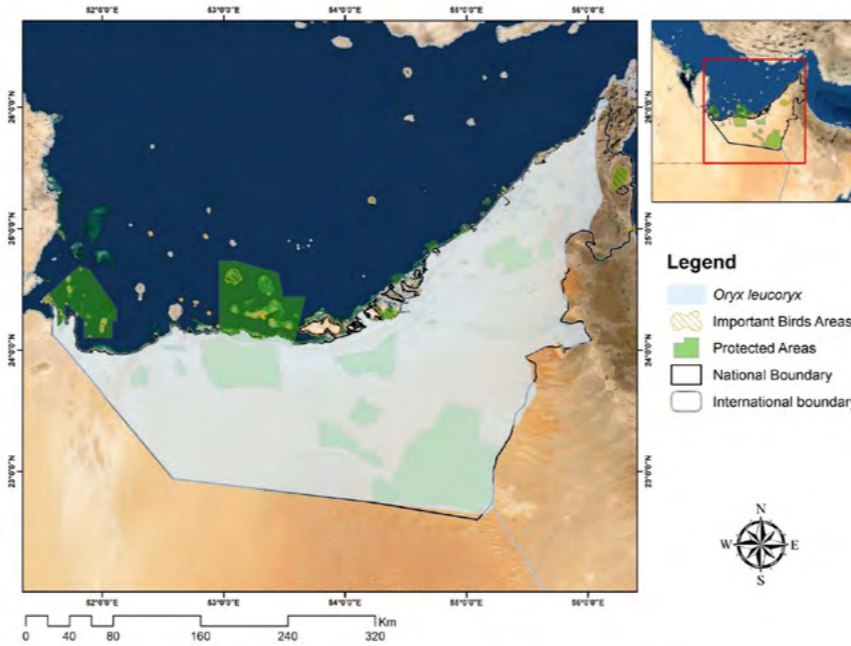
Halavi Guitarfish *Glaucostegus halavi*



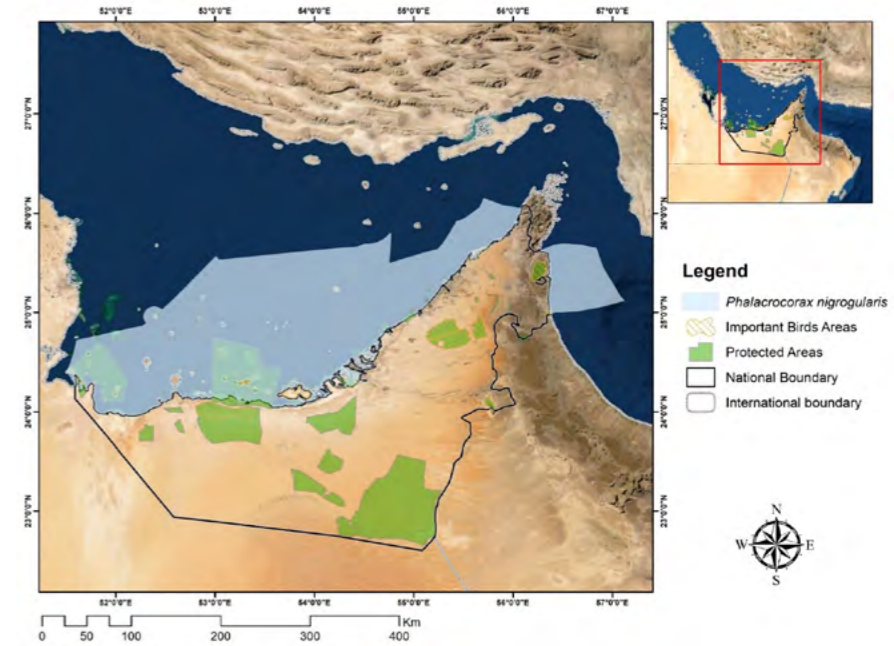
Arabian Pipistrelle *Hypsugo arabicus*



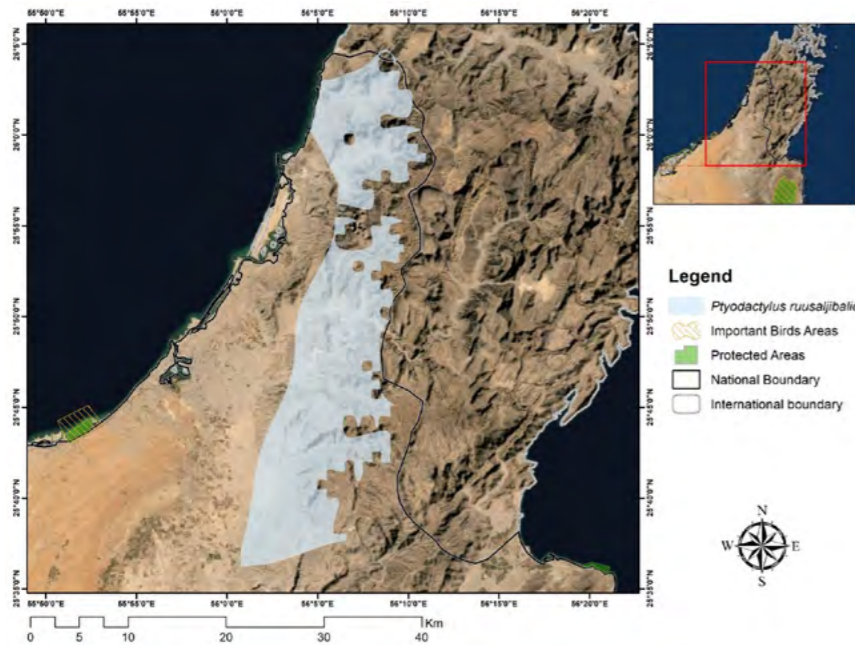
Egyptian Vulture *Neophron percnopterus*



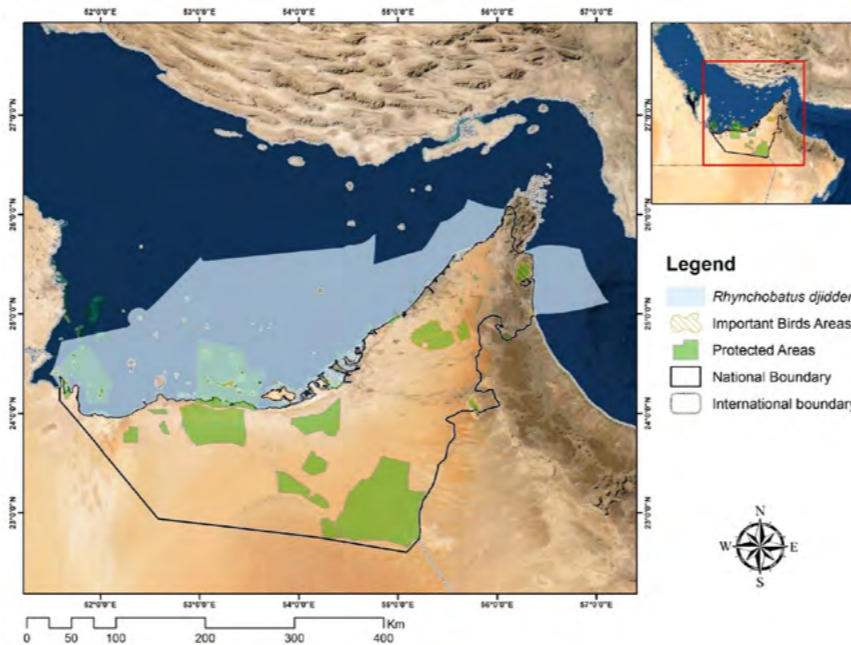
Arabian Oryx *Oryx leucoryx*



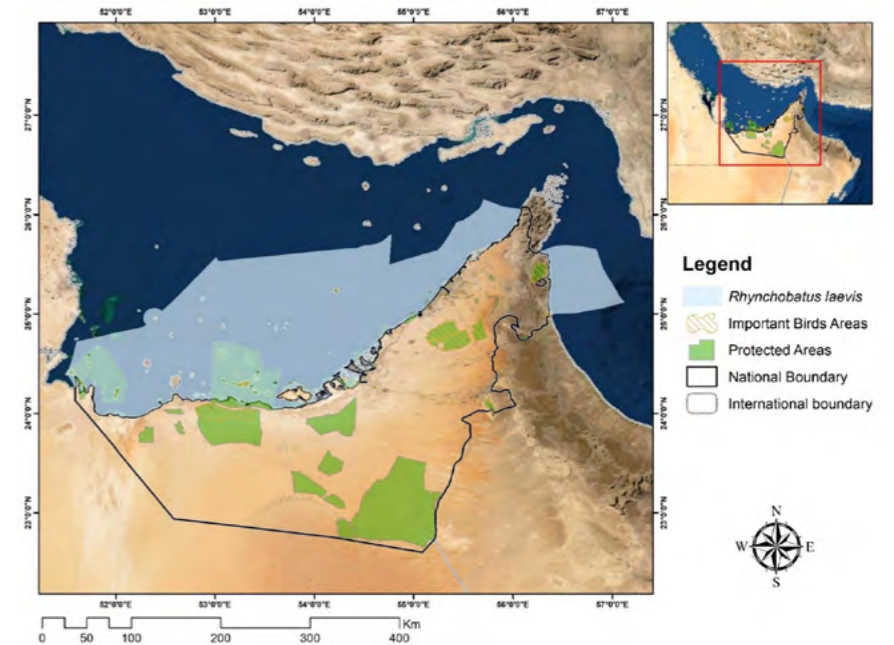
Socotra Cormorant *Phalacrocorax nigrogularis*



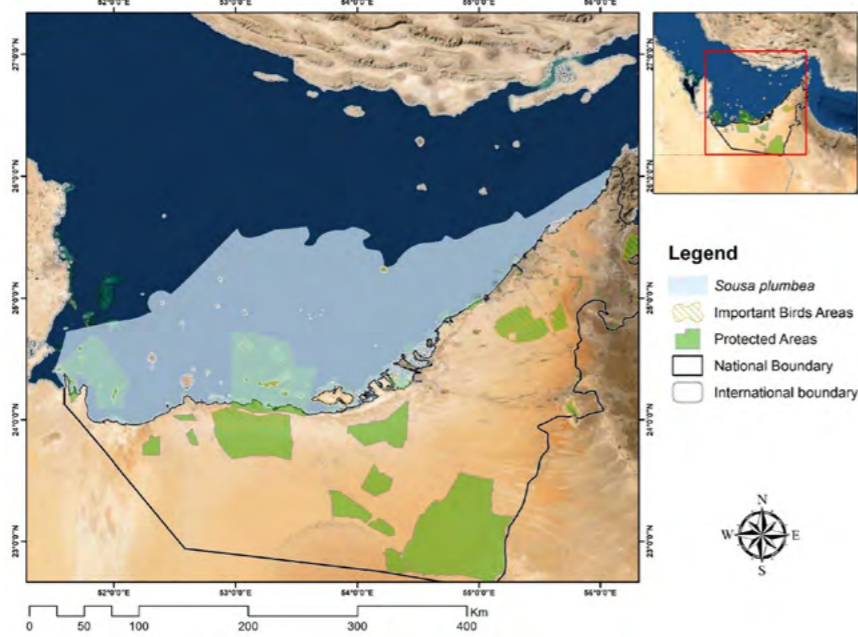
Ruus al Jibal Fan-footed Gecko *Ptyodactylus ruusaljibalicus*



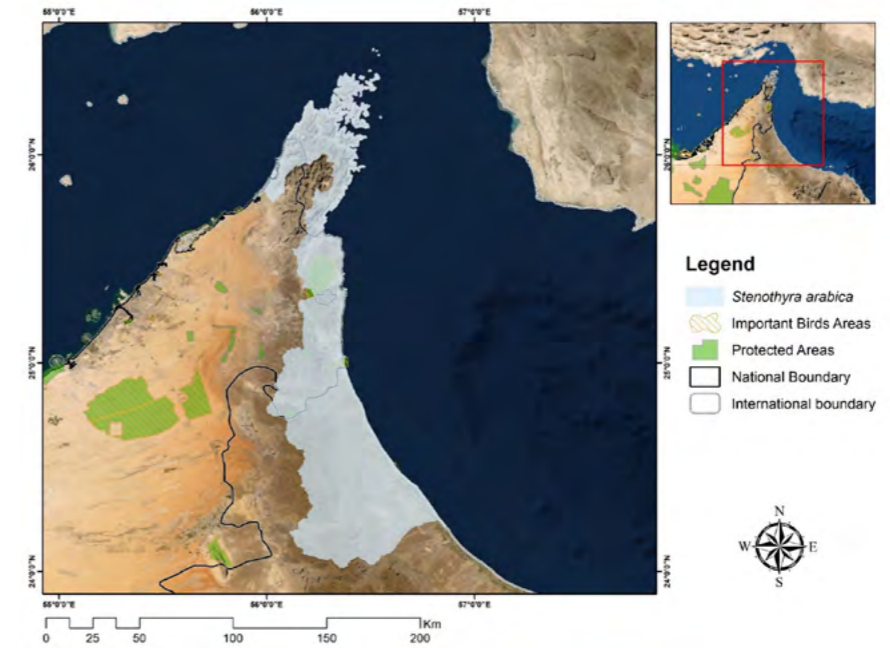
Whitespotted Wedgefish *Rhynchobatus djiddensis*



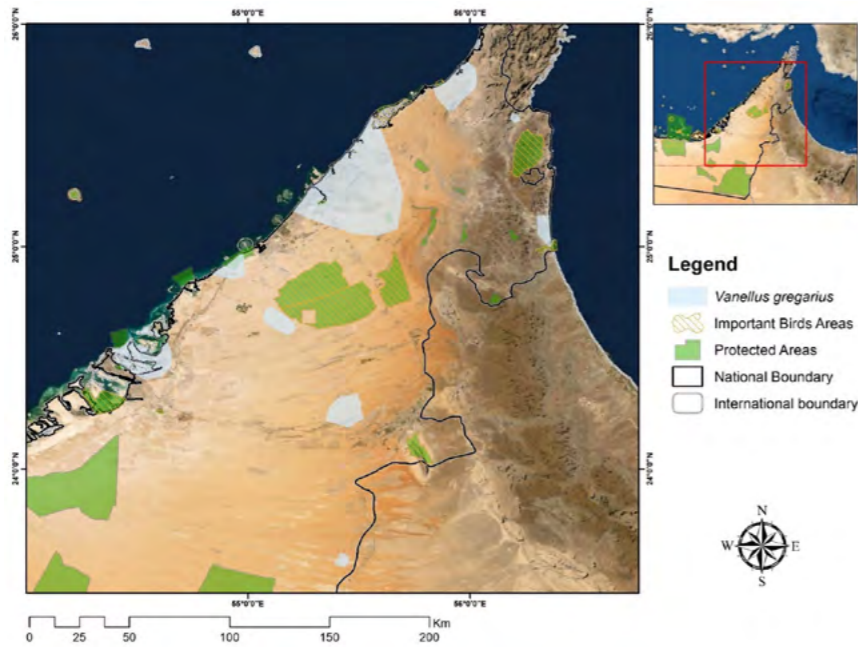
Smoothnose Wedgefish *Rhynchobatus laevis*



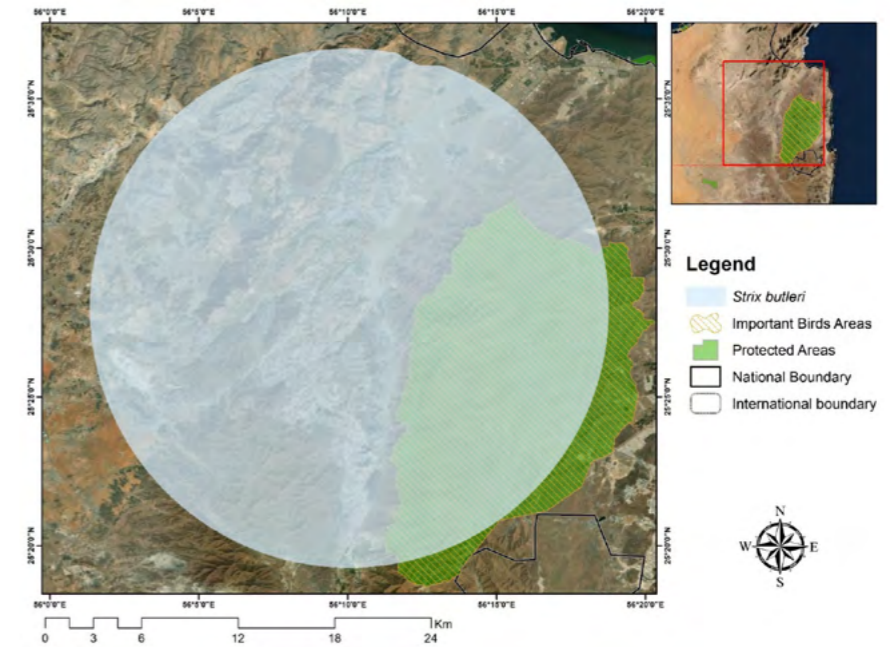
Indian Ocean Humpback Dolphin *Sousa plumbea*



Stenothya arabica



Sociable Lapwing *Vanellus gregarius*



Omani Owl *Strix butleri*

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