



Annual Report 2020-21





Chairman's message

Despite the challenges of the global COVID-19 pandemic in 2020-21, the Dubai Desert Conservation Reserve (DDCR) has continued to build on its programs, partnerships and strong body of research to deliver its goals outlined under its strategic management plan 2019-2024.

The DDCR was created to provide a balance to Dubai's growth and rapid urbanisation, by conserving our desert areas and unique wildlife. It is an initiative which the Emirates Group has supported over the past 20 years and one that we see as an investment in our heritage, and in our future.

As tourism activity returns, the Reserve will continue to ensure that desert safaris, one of Dubai's major tourism attractions, remain a high quality experience and leave minimal impact on our natural environment.

This report outlines the key highlights at the DDCR for 2020-21, including the many projects which contribute to preserving and enabling our indigenous flora and fauna and natural eco-system to flourish.

We look forward to sharing more updates as we progress.

C'U'I'

HH Sheikh Ahmed bin Saeed Al-Maktoum Chairman, Dubai Desert Conservation Reserve



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1. Introduction

Over the past year, the Dubai Desert Conservation Reserve (DDCR) has faced challenges posed by the global pandemic which impacted our finances, research work and tourism. However, through the dedicated work of our DDCR team, we have continued to make progress in conserving the incredible species and landscapes of the Dubai inland desert ecosystem.

We remain true to our Vision, Purpose and Goals as we look to a successful future for the natural habitats and species we are working to protect while sharing the amazing environment with visitors to the DDCR.

The reserve covers an area of **225km²** which makes up 5% of the Emirate of Dubai





Vision: 'A desert haven for nature... A living heritage for people'

DDCR's overall purpose

Conserve a representation of Dubai's Inland Desert original landscapes and indigenous fauna and flora, through careful and effective management that promote natural processes for optimum conservation outcomes leading to rewilding of the desert habitat.

Provide an authentic desert experience for people which showcases the beauty and marvel of the natural environment and educates on the intricacies of nature and the living heritage of Dubai.



Strategic management goals

- period are:
- indigenous species
- available vegetation

Our strategic management goals for the 2019 – 2024 planning

Embark and progress on a new rewilding paradigm for regional desert conservation fostering thriving habitats and a diversity of

All species populations, particularly ungulates, are in balance with the natural regenerative properties of the

All management interventions and practices are sustainable and orientated towards natural habitat rehabilitation

The reserve is an IUCN Green List protected area with effective management, good governance and planning that are realising optimum conservation outcomes

The DDCR is a regional leader in biodiversity conservation and building resilience to climate change in arid land ecosystems



The reserve is promoted and recognised as the premier destination for authentic nature-based experiences in the UAE



2. DDCR Governance and Management

The DDCR's governance is in accordance with the Rulers Decree 11-2003 on the establishment of Protected Areas in the Emirate of Dubai. A Memorandum of Understanding has been signed between the Government Authority (Dubai Municipality) and the Emirates Airline, as the designated Management authority.

Underscoring its commitment to supporting conservation efforts, Emirates spent AED 8 million for DDCR over the last six years. Cumulative sponsorship support of Emirates now exceeds AED 28 million since the establishment of the reserve.

The Dubai Conservation Board (DCB) is Chaired by His Highness Sheikh Ahmed bin Rashid Al Maktoum.

represented by

- 5
- 5
- Mr Rahul Sawhney Manager (Asset Management)

Emirates Airline Executive Management is

Mr Ali Al Soori - General Secretary DCB

Mr Devarajan Srinivasan - VP Asset Management

Key responsibilities:

- 5 Work with operational management to formulate and approve a strategic direction for DDCR (DDCR Management Plan 2019 – 2024)
- 5 Due diligence on the induction of new Tour operators
- 5 Revenue management strategies and tacticals
- 5 Approval of annual operational budgets and monitoring of expenses
- 5 Funds management



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The Operational Management team

Greg Simkins-Conservation Manager DDCR

Greg has worked in the field of conservation and protected areas management since 2001. He began his career as a Field Guide with the Emirates Group in 1999 at the newly opened Al Maha Desert Resort & Spa. In 2001 he became a Reserve Officer and was heavily involved in the planning and implementation of ecotourism activities within the protected area of the DDCR, which was created in 2002. In 2003, Greg took on his current role and was appointed Conservation Manager for the DDCR. He is responsible for the overall management of the reserve and has been at the forefront of its development from conception in 2003 to its current international recognition. Greg also plays a major role in implementing the long-term strategy for the DDCR's conservation programs, sustainable tourism and species management, including the re-introduction programs for the Arabian Oryx, Macqueen's Bustard, Arabian and Sand Gazelles.

Tamer Khafaga - Conservation Research Manager DDCR

An ecologist with more than 20 years of experience in ecology and conservation management as well as sustainable development, Tamer previously worked for the Egyptian Environmental Affairs Agency as an Environmental researcher for the St. Katherine Protectorate (May 1998 till August 2006) where his responsibilities included the implementation of biodiversity monitoring and management interventions.

Tamer's current work focuses on conservation and protected area research planning at the Dubai Desert Conservation Reserve.

Tamer is in the process of completing his PhD (Faculty of Science, Malaga University – Spain) with his research focusing on plant functional diversity responses to grazing in an Arabian hyper-arid protected inland desert ecosystem.

Key responsibilities

- Work with executive management to formulate a strategic direction for DDCR. (DDCR Management Plan 2019 2024)
- W Implement all conservation programmes
- W Implement all research and monitoring activities
- Manage sustainable tourism within the DDCR



Moayyed Sher Shah - Conservation Officer DDCR

n ecologist with more than 19 years of experience in ecology and conservation management, Moayyed started his conservation career with the Saudi Wildlife Authority in 2001 working on the reintroduction and monitoring of Asian houbara in Saudi protected areas.

He was also responsible for the long-term monitoring of carnivores and small mammals projects, and worked on several species reintroduction programs including for the Arabian Gazelle program (2011) in Central Saudi Arabia. From 2016 to 2018 Moayyed was part of the Mahazat as-Sayd Protected Area management team managing the ungulates population by conducting regular game counts, assessing body conditions, and translocation and management of surplus animals.

Currently, Moayyed's primary role is to plan, control, develop and regularly monitor the conservation practices and environmental work within DDCR. As part of his work, he conducts new research, plans and implements long-term monitoring programs including the Arabian Oryx monitoring program.

Moayyed is working on finishing his Masters in Environmental Sciences from the University of South Africa with the research topic "Ecology of Sand gazelles during drought conditions in Mahazat as- Sayd Protected Area".





3. Significant Events in 2020-21

September 2020: The DDCR management completes its monitoring program for the Major Site
Values of the Dubai Desert Conservation Reserve
November 2020: Royal Shaheen Events, in partnership with Sand Sherpa, launched Overnight Overnight
Camping in the DDCR

Arabian Oryx herd management

November 2020: 194 Arabian Oryx were relocated from the DDCR to the Oryx enclosures December 2020: 97 Arabian Oryx were relocated from the DDCR to a protected area in Abu Dhabi March 2021: 111 Arabian Oryx were relocated from the DDCR to the Oryx enclosures

Research Collaborations

- MOU signed with United Arab Emirates University. Research will initially focus on remote sensing for habitat detection, vegetation dynamics and change detection, from satellite images.
- Prime Minister's Office Artificial Intelligence Office. Primary research will involve the use of AI to identify wildlife species from a large data base of camera trap images.
- American University of Central Asia. Collaboration for undergraduate students to develop their field survey techniques and assist in the DDCR's long-term monitoring program.

Research Committee Meetings

- The 6th Research committee meeting was held on 5th August 2020
- The 7th Research committee meeting was held on 14th December 2020
- The 8th Research committee meeting was held on 14th March 2021



Workshop Participation

For World Environment Day 2020, Environment Agency Abu Dhabi (EAD) invited the DDCR team to join an online webinar on sustainable rangelands management entitled "Keeping Hyper-Arid Rangelands Alive" (June 4th 2020) – Tamer Khafaga, Greg Simkins & Moayyed Sher Shah.

Interactive webinar entitled "Wildlife Conservation after Corona, Challenges and opportunities in the Arabian Peninsula. The webinar had organised by the Qur'anic Botanic Garden, a member of Qatar Foundation for Education, Science and Community Development, in collaboration with the International Union for Conservation of Nature, Regional Office for West Asia (IUCN-ROWA) (June 23rd 2020) – Tamer Khafaga.

Workshop for the development of IUCN Green List Improvement Benchmarking and Evaluation indeX (IBEX) (22 & 28 October 2020; November 10th 2020) – Greg Simkins & Tamer Khafaga

Workshop - Sustainable Ecotourism in Protected Areas. This seminar is part of the project entitled "Initial steps to establish a network of national reserves in Iraq". Financed by the Global Environment Fund and implemented by the United Nations Environment Program in

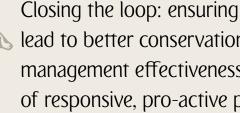
partnership with the International Union for Conservation of Nature and the Iraqi Ministry of Health and Environment, which aims to develop and start implementing a plan to create a national network of protected areas in Iraq. (November 16th 2020) - Tamer Khafaga.

Conferences and Webinars

The Role of Protected & Conserved Areas in Achieving Global Conservation Goals: A major issue for the post-2020 global biodiversity framework concerns area-based conservation and will replace Aichi target 11 and raise global ambition. (July 16th 2020)-Tamer Khafaga.

Exploration of approaches and tools used in Protected Area Management Effectiveness from around the world. An essential component of adaptive management so that protected area objectives and conservation outcomes are met. (July 22nd 2020) - Tamer Khafaga.

The Launch Event and the Panel Discussion of the IUCN Global Standard for Nature-based Solutions (July 23rd 2020) - Tamer Khafaga.





Closing the loop: ensuring management effectiveness assessments lead to better conservation outcomes. Evaluation of protected area management effectiveness (PAME) is recognised as a vital component of responsive, pro-active protected area management and is an

essential component of adaptive management. PAME assessments are primarily important for improving management so that protected area objectives and conservation outcomes are met. (July 23rd 2020) - Tamer Khafaga.

IUCN Green List - achieving success in nature conservation. 💫 (July 29th 2020) - Tamer Khafaga.

Conservation Translocation Specialist Group-SSC "Working with people toward conservation solutions" (August 14th 2020) - Moayyed Sher Shah.

Live Webinar - Introduction to PANORAMA: Solution for a healthy 💫 Planet (August 26th 2020) - Tamer Khafaga.

Nature+ Accelerator Fund: A new market strategy for nature-based Solutions (November 4th 2020) - Tamer Khafaga.

Economic Dimensions of Tourism and Protected Areas during Solution COVID-19 (November 12th 2020) - Tamer Khafaga.

Dubai International Heritage Sports Exhibition and Conference 🂫 (10th & 12th of December 2020) – Greg Simkins.



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Presentations

(May 14th 2020)- Moayyed Sher Shah.

World Environment Day 2020, Environment Agency Abu Dhabi -Keeping Hyper-Arid Rangelands Alive, Presentation - "Plant community structure responses to conservation management in hyper-arid Arabian Desert ecosystems." (June 4th 2020) - Tamer Khafaga.

Qatar Foundation and IUCN-ROWA - Wildlife Conservation after Sorona, Challenges and opportunities in the Arabian Peninsula. (June 23rd 2020) – Tamer Khafaga.

Presentation to Emirates Group's Photography Club "Identifying Wildlife Species in the UAE" (June 27th 2020) – Greg Simkins & Moayyed Sher Shah.

Presentation to American University-Central Asia "DDCR Species ldentification" (February 20th 2020) - Moayyed Sher Shah.

Emirates Environmental Group - 4th Panel Discussion: 💫 UAE – A Biodiversity Haven (September 20th 2020) – Greg Simkins.



General Secretariat for the Conservation of Arabian Oryx - Webinar: Education and outreach programs of Arabian Oryx Conservation institutions in the UAE: Successes and future priorities (September 22nd 2020) – Greg Simkins.

IUCN and the Iraqi Ministry of Health and Environment Seminar on Sustainable Ecotourism in Protected Areas. This seminar was part of the project "Initial steps to establish a network of national reserves in Iraq". Presentation "A case study from the UAE (Dubai Desert Conservation Reserve)" Overview of the reserve, the UAE experience in sustainable ecotourism and Elements of success. (November 16th 2020) - Tamer Khafaga.

World Wildlife Day Emirates Airline employee event: Environment Forum – Preserving Wildlife and Habitats. (March 1st 2021) - Greg Simkins.

Other Activities

Emirates Group's Photography Club Visits to the DDCR - 2 visits (August 10th 2020 & December 18th 2020) Moayyed Sher Shah & Greg Simkins

Sorbonne University Masters 1 student field visit to DDCR (November 5th 2020)





4. Conservation and Environmental Research Work

Research Policy, DDCR Management Plan 2019-2023

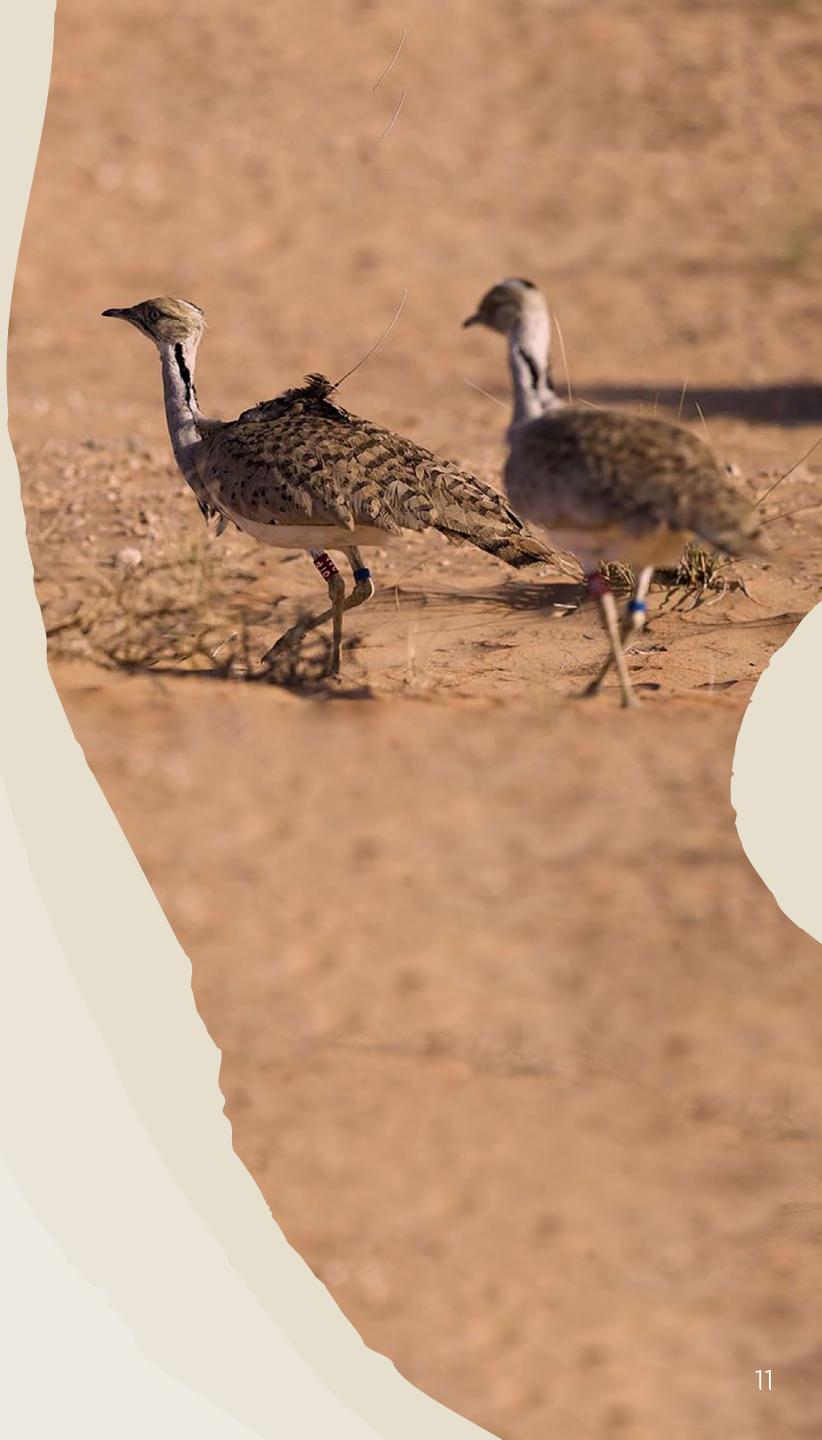
Research conducted within the DDCR should assist in applying sound scientific ecological principles to the decision-making process or/and add new knowledge about the species and habitats of the DDCR. The DDCR will be promoted as a destination for applied research in arid land ecosystems by national and international academic institutions. The DDCR Research Committee will evaluate all research proposals based on relevance to the reserve, ethical, and practical implications.

Research is vital for the effective management of the DDCR and to make informed management decisions as well as in the mitigation against climate change and desertification.

Desert Research Centre 4.1.

The vision of the research centre is to promote and facilitate scientific studies by establishing and running a program to solve environmental challenges with collaborative research on natural, human, social and ecological aspects of the inland hyper-arid desert toward developmental progress. DDCR seeks a leadership position within the UAE and the region by building a robust scientific community connected with the UAE, regional and international stakeholders.

We aim to prioritise the continued integrity of the ecological and social systems, values and resources, by facilitating research and providing study opportunities, logistical and field support within a research-friendly environment for students, researchers and volunteers to address essential questions and gain experience and network skills and to become a centre of excellence in biodiversity research.





The DDCR aims to utilise research collaboration for the following purposes:

- Asian Region.
- protected areas.



Grow functional capacity for effective management and governance of protected areas in the UAE and West

Draw on universities' strengths, expertise, and technical capabilities and other institutions in UAE and internationally to offer the highest quality research products.

Build on the regional opportunities and enhance the chances to demonstrate, guide and support quality research in

Adapt, facilitate and coordinate protected area research and spread research results.

Recognise, adapt, develop and promote excellence and model practice in protected areas research.

Encourage and assist researchers willing to improve their knowledge and skills in protected areas' research activities to find research ideas and opportunities relevant to their needs, and facilitate ongoing learning and sharing through professional networks and communities of practice.



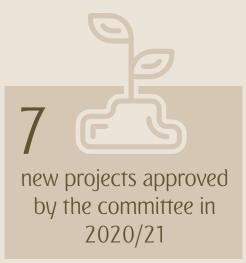
4.2 DDCR Research Committee

Following the establishing of the DDCR Research Centre, DDCR initiated a Research Committee to evaluate all research proposals based on relevance to the reserve; ethical and practical implications with a defined Terms of Reference (ToR) and regular (Bi-annual) meetings to propose, evaluate and guide research activities within the DDCR.

The Research Committee members are from diverse backgrounds and well regarded in their respective fields.

| Name | Affiliation | Institute |
|--------------------|-------------------------------|-------------------------------------|
| Greg Simkins | Conservation Manager | DDCR - UAE |
| Tamer Khafaga | Conservation Research Manager | DDCR - UAE |
| Moayyed Sher Shah | Conservation Officer | DDCR - UAE |
| Gary Brown | Ecologist | Freelance - Germany |
| Brigitte Howarth | Entomologist | Zayed University - UAE |
| Jacky Judas | Ornithologist | Emirates Nature -WWF - UAE |
| Kosmas Pavlopoulos | Geologist | Sorbonne University Abu Dhabi - UAE |
| Andrew Leonce | Computer Science | Zayed University - UAE |
| Stephane Boissinot | Herpetologist | New York University - UAE |
| Janin Tan | Entomologist | Zayed University - UAE |
| Roxanne Whelan | Ecologist -young professional | Freelance |
| David Gallacher | Ecologist | Sydney University - Australia |
| Teresa Navarro | Botanist | Malaga University - Spain |





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4.3 Research Reports

4.4.1 Seasonal Dynamics of Herd Structure of Re-introduced Arabian Oryx in the Dubai Desert Conservation Reserve

4.4 Current Research

4.4.1 Monitoring Program for the Major Site Values of the **DDCR.** DDCR (2020/FL-EC/02)

This program includes the objectives, methodology and expected outcomes of monitoring each of the major site values (MSV) identified in the DDCR Management Plan. The results of this program will provide us with performance measures for each of these MSV and will be used to evaluate our success in achieving successful conservation outcomes. <u>https://www.ddcr.</u> org/media/Monitoring_Program_for_the_Major_Site_Values_of_ the_DDCR.pdf

PROF. RNDR. PAVLA HEJCMANOVA, PHD, CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE ING. SOFIIA PYSHNIEVA, CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE RATION: 2018-2020 he main goal of the research was to identify Chosen timeframe: 2011 year VS 2019 yea opulation dynamics of Arabian oryx (*Oryx* yx) at the DDCR over a selected time in **Management practices:** natural Method of ol

ECT OBSERVATIONS COUNTS ion of the Arabian oryx was done mainly and waterholes during the summer field f 2019. Weekly the group of range

CAMERA PERFOMANCE

| 31 camera traps Summer & winter 2011 & 2019 | 1,395 Total |
|---|--|
| 26 CT were taken for analyses. 50,731 images | Camer the su of 201 |
| Total image collection Records included other animal species, vegetation, people. Oryx registrations Wildlife events At natural CT sites in 2011, there were more oryx registrations in winter - 119 events and only 38 in summer. In summer 2019 there have been only 9 events recorded. At improved CT sites in 2019 | 4,47 Arabi These furthe Freq Occas Natura every every While of visi 4 days. |
| pattern was vice versa. 342 events in winter and 475 events in summer. | Impro visited |
| Charts represent the 24-hours d morning, 12:00 - midday, 18:00 number of oryx registrations per | - evenin |
| W 18:00 06:00 21 | 011 |
| | |

(CZ), grants CIGA 20185008, in part by Dubai De



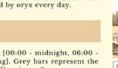
SEASONAL DYNAMICS OF HERD STRUCTURE OF **RE-INTRODUCED ARABIAN ORYX IN THE DUBAI DESERT CONSERVATION RESERVE**

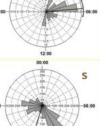
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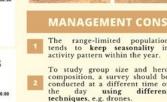
8 images

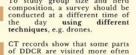
images were taken analyses.

uency of visits CT sites were









AGE-SEX STRUCTURE

CAMERA TRAPS

(CT) SURVEY



animal ecology including a wide range of social groups and individuals.

3

| Main Gamber Values Monitoring States Automations Automatio | | DDCR Monitoring Plan | | | | | |
|---|-----------|--|--|--|---|---|----------------------------------|
| 13 Araban Ory Ory Araba Cases Manifering of Araban Ca | | | Aim | Methods | Timelines | Performance Measures | Thresholds |
| Image: Section Group of years Numbering of Ablain Or years Ansatz Ansatz 10 Provide Control Provide Control The Optimized Control T | 1 | Fauna | | | | | |
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| Image: section in the section is another section is the se | 1.1 | | have a better understanding of the Arabian oryx population and their requirements | | | Body Condition Score Breeding Effort | 3 Min. replacement |
| Image: section of the sectio | | | | | | breeding choire | init. replacement |
| 12 Another brokes during Initiality of control in the DOX Outer to buse a batter understanding of the Adabase gatelie population and their understanding of adab batter management during of adapter batter during during batter batter during during batter dur | | | reserve. To aphieve this similation in the importative to implement a long term monitoring program in | | | Population Size | 200 - 300 |
| 1-3 Sand Gazelie Coordination Monitoring of Sand Gazelie Integring the same all imposition of the same approximation of the same approximatin same approximation of the same approximation of the | 1.2 | - | order to have a better understanding of the Arabian gazelle population and their requirements and subsequently to utilise this understanding to make better management | Distribution Assessment | Annual (January) | | |
| 1-3 3-bit decide backets membra is backets membra is backets Annual panary Research 1-3 marks bit decide backets marks Continues of the state understanding to make better management decides for the backets Monoment Studies Continues (Frazing Guta Packets) Packets 1-4 Lappet Faced Vulture Annual panary Annual panary Research Continues Packets Continues Packets Packets Packets Continues Packets Pac | | | | Species Weekly Counts | Weekly (Every Tuesday) | Population size | 100 -200 |
| Image: Control Control DOCR Moments Studies Control on Practing Data Practice Practemathy Practemathy Practice Practice Practemater Practice Practi | 1.3 | - | have a better understanding of the Sand gazelle population and their requirements and | Distribution Assessment | Annual (January) | Breeding effort | Incr. Population |
| 1-4 Lappel-Faced Vulture Transverse and identify their home-range, breading and nosting sites. Convex Tragong (Vulture Reture) Continue. | | | | Movement Studies | Continuous (Tracking Data) | | |
| Lapper-s aced values Monitoring of Lapper-Laced values Image: Comparison of the status of the Lapper-Laced value population values in the DCR Continuous Continuous Continuous Continuous 1-5 Planzah Eagle Owl Bubs Monitoring of Pharash Eagle Owl Bubs Continuous Continuous Continuous Planzah 1-5 Planzah Eagle Owl Bubs Monitoring of Pharash Eagle Owl Bubs Monitoring of Pharash Eagle Owl Bubs Continuous Continuous Planzah 1-5 Planzah Eagle Owl Bubs Monitoring of Pharash Eagle Owl Bubs Continuous Continuous Planzah Eagle Owl Bubs Continuous Planzah Eagle Owl Bubs <t< th=""><td></td><td></td><td></td><td>Observations</td><td>Continuous</td><td>Population Size (visiting)</td><td>20 - 40 individuals</td></t<> | | | | Observations | Continuous | Population Size (visiting) | 20 - 40 individuals |
| Image: Torgot practicities Volture in the DDCR reserve and identify their home-range, breading and nosting sites. Connex trapping (values Restaured) Continuous Restaured 1-5 Planach Eagle Oxil Bubo oscoliphus Monitoring of Pharach Eagle Owil in the DDCR Amail Contracting of the population status of the Phanach eagle oxil within the DDCR and to learn more about their diet and breeding ecology. Next Survey (Pharach Eagle Oxil) Certinuous (Tracking Dail) Planach DDCR 1-5 Pharach Eagle Oxil Bubo oscoliphus Monitoring of Pharach Eagle Oxil in the DDCR Came a trapping (Valuer Points) Continuous Planach DDCR Planach DDCR Planach DDCR Planach DDCR Continuous Planach DDCR Plana | 1.4 | | | Camera Trapping (Water points) | Continuous | Roosting | Roosting site identified |
| Image: Control | 1.4 | Torgos tracheliotus Vulture in the DDCR | reserve and identify their home-range, breeding and roosting sites. | Camera Trapping (Vulture Resturant) | Continuous | Breeding | Breeding site identified |
| 1-1 Pharabe Eagle OM Bub ascolupture Monitoring of Pharabe Eagle OW in the DDCR Calm a better understanding of the population status of the Pharabe Eagle OW Within the DDCR and to learn more about their diet and breeding ecology. Next Survey (Pharabe Eagle OW) Annual (Pab - May) Revert Diet Analysis 1-5 Macqueer's Bustard Chemydots macqueerin Monitoring of Pharabe Eagle OW in the DDCR Monitoring of Pharabe Eagle OW in the DDCR Monitoring of Pharabe Eagle OW in the DDCR Continuous Continuous Continuous 1-5 Macqueer's Bustard Chemydots macqueerin Monitoring of the Macqueer's bustard in the DDCR Monitoring of Pharabe Eagle OW in the DDCR Monal (Pa-May) Monitoring of Pha | | | | Movement Studies | Continuous (Tracking Data) | | |
| 15 Pharaoh Eagle Owl Bub socilaphus Monitoring of Pharaoh Eagle Owl in the DDCR Cain a batter understanding of the population status of the Pharaoh eagle owl within the DDCR and to learn more about their diet and breeding ecology. Diet Analysis Every three months Annual Diet Analysis Every three months Annual Distribution Assessment Annual (January) Population Distribution Assessment Annual (January) Population Distribution Assessment Annual (January) Population Distribution Assessment Annual (Distribution Assessment) Every three years </th <td></td> <td></td> <td></td> <td>Survey (Pharaoh Eagle Owl)</td> <td>Every three months</td> <td>Population Size</td> <td>5 - 10 Pairs</td> | | | | Survey (Pharaoh Eagle Owl) | Every three months | Population Size | 5 - 10 Pairs |
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| Image: bit is the DDCR Monitoring of the Macqueer's bustard in the DDCR and surrounding area. Macq | | ascalaphus Owl in the DDCR | DDCR and to learn more about their diet and breeding ecology. | Diet Analysis | Every three months | | |
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| Gravel Plains Interdunal and gravel plains reserve with sets of priorities and objectives. | | Gravel Plains interdunal and gravel plains | | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | Species Distributions | |
| 3 Flora | 3 | Flora | | | | | |
| Mapping the change in the natural Ghaf groves over time is an essential aspect of conservation of the DDCR natural | | | | Drone Survey (Ghaf Groves) | Annual (January - May) | Trees population | Not declining |
| 3.1 Ghaf Groves Prosopis cineraria Ghaf Groves Drone Survey in resources. Current drone-based methods can estimate the change in biomass, but monitoring at the species level current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will explore the viability of tradking changes of individual current yrequires on-ground observations. This project will be approved will be tradking changes of individual current yrequires on- | 3.1 | Ghat Groves Drone Survey | resources. Current drone-based methods can estimate the change in biomass, but monitoring at the species level currently requires onground observations. This project will explore the viability of trading changes of individual tree plants over time across the two Ghaf groves, by capturing information from each temporal survey and | | | Tree health (NDVI) | |
| combining into a single database format. | | | combining into a single database format. | | | | |



4.4.3 Assessment of forage productivity and carrying capacity. DDCR (2012/FL-EC/01)

To investigate and recommend strategies to manage and restore the rangelands and conserve their biodiversity in the Dubai Desert Conservation Reserve.

- and rainfall.
- support on a sustainable basis.
- appropriate conditions for this process.

4.4.2 **Quantitative analysis of the Hyper-arid vegetation** changes under grazing pressure in the Dubai Desert Conservation Reserve. DDCR (2020/FL-EC/02)

Implement a continuous practical and efficient vegetation monitoring program by applying analytical tools for effective data interpretations. As vegetation is the base of the food pyramid, the expected data and information are indispensable for managing the Dubai Desert Conservation Reserve (DDCR). This study will evaluate the current state of the DDCR vegetation, and it focuses on the assessment of density, cover, and biodiversity of the flora in the DDCR and follows the continued monitoring and repeated vegetation studies of 2004 (El Alqamy, 2004) and 2009 (Khafaga, 2009). To present the results by mapping the vegetation and defining the linkage between different floral communities, using multivariate analysis combined with GIS techniques.

Update: this project is in the stage of writing a comprehensive report as part of the conservation research manager's PhD thesis, which will be submitted to the University of Malaga.



Quantification of the forage productivity and evaluation of the impact of important determining factors, such as soil

Estimation of the rangelands carrying capacity, that is, the maximum possible stocking of livestock that a rangeland can

Assessing the response of soil and vegetation to different grazing management practices for optimal rangeland use.

Assessment of the possibility of restoring the degraded rangelands with indigenous forage plants and defining the most



in the DDCR. DDCR (2016/FN-EC/01)

that habitat.

- range and habitat selection.

4.4.4 Monitoring of the Arabian Oryx (Oryx leucoryx)

To gain an understanding of the ecology of the Arabian Oryx within the DDCR, in particular, we will look to determine their home range and which habitats, within that home range, they prefer and finally which plant species they utilise within

Gain a better understanding of the movements of Arabian Oryx through the use of GPS collars and so collect data on their home

Gather data on activity patterns (i.e. time spent grazing, resting) or moving) of the Arabian Oryx in relation to factors such as habitat, temperature, sex and life phase.

Gain an understanding of the dependence of the Oryx herd on The second the provided feed and how this can affect their behavioural and distributional patterns.

Study the grazing habitats of the Arabian Oryx to establish grazing preferences in relation to plant species and growth form.

Update: During the reporting period, out of the six Arabian Oryx secured with GSM/GPS collars in DDCR, four collars were retrieved. Locations and other data related to the movements of the collared Arabian oryx were successfully recovered from the collars. Data analysis will be completed in July 2021, and the results will be shared in the form of a poster presentation.

Arabian Oryx can live up to 7(







4.4.5 **The Genetic Study of the Arabian Oryx population in**

Dubai. DDCR (2018/FN/01)

Over the past 20 years, the breeding of Arabian Oryx has been very successful, both in Dubai and around the world. Bringing the species back from the state of Extinct in the wild and classified as Endangered by the IUCN Red List to having healthy re-introduced populations in several countries have led to a downgrade of its endangered status to Vulnerable. However, it is important to now change the objective from reproduction to a sustainable population with the most genetically diverse and viable population possible to ensure their long-term survival.

This research aims to achieve the following:

- Ascertain the genetic diversity of the Oryx population found within the Dubai Emirate.
- Utilise the genetic data to develop a strategy to improve the genetic quality of Dubai's Arabian Oryx population.
- Contribute to the regional efforts for the conservation of Arabian Oryx.

Update: During the Arabian Oryx Relocation and sorting project, 38 tissue samples were collected. Further samples will be collected in September 2021 and then they will be sent for analysis.

4.4.6 Monitoring of arid rangeland ecology using unmanned Aerial Vehicles (UAVs) desert drones over Dubai.

DDCR (2014/EC/01)

To establish a base in this emerging field within DDCR for the civilian use of aerial photography from Unmanned Aerial Vehicles (UAVs) and demonstrating its values for arid rangelands conservation. Collecting accurate, inexpensive data to:

- health of an arid ecosystem.
- endangered species

Monitor grazing pressure on rangelands and estimate botanic

Estimate and monitor the population of protected and

Arabian Oryx, gazelle species, foxes, Gordon's wild cats, Houbara bustard, birds of prey and Spiny-tailed lizards.

- Feral and invasive species, e.g. Prosopis juliflora
- Evaluate the extent of damage caused by off-road recreational driving.
- Increase the accuracy of ecological maps and consequently habitat classifications.

Update: The research project has been developed to use AI and ML with deep neural networking to detect single and multiple animals (Ungulates). This research is supervised by a professor from Loughborough University (LU) and three PhD students under his direct supervision. There is an MoU signed between both LU and DDCR.

824 Highest count of Arabian Oryx in 2019

17

4.4.7 UAV (Unmanned Aerial Vehicle) - Machine Learning for Bio-diversity Monitoring and Tracking at Scale.

Zayed University (2019/FN-EC/05)

The need to protect the environment has taken centre stage in recent years as the damage to the Earth's natural ecological balance has become increasingly tangible. Natural reserves are set to protect biodiversity. Understanding the populations of animals and vegetation living inside the reserve is a key parameter to secure the equilibrium and the continuity of the ecosystem. We propose investigating the problem of biodiversity monitoring and tracking using machine learning techniques for useful mining information from complex data, image/videos. Deep learning methods have proven to be efficient in the image processing field. Their introduction in this area has reshaped the way images are processed and understood. The novelty in this project is two-fold: it is the first time that the performances of existing algorithms will be evaluated in such large magnitude and diversity of experiments, which will support the investigators to propose new algorithms. The second novelty resides in the application of the approach in the area of biodiversity tracking and monitoring in the desert. In fact, the investigators are not aware of any existing efforts that suggest the application of image mining in the desert. The investigators intend to work closely with the DDCR to help detect and monitor the different species, their evolution, movement, and gender. This will directly help the DDCR better estimate the number of animals, predict their evolution, understand their moves, and understand the density of those animals. The project is expected to be beneficial for wildlife and biodiversity.

Update: This research project runs in parallel with the above project of using Al and ML with deep neural networking to detect animal sexes (Ungulates). This research is supervised by a professor from Loughborough University and three PhD students under his direct supervision. There is an MoU signed between both LU and DDCR.





4.4.8 Unmanned Aerial Vehicle (UAV) – Environmental Protection. Zayed University (2019/EC/06)

As humans, we generate a large amount of plastic, and it is common practice to dispose of unwanted waste improperly in the form of litter and illegally dumped garbage. Littering has become a significant problem in many societies and contexts. Deep learning methods have proven to be efficient in the image processing field. Their introduction in this area has reshaped the way images are processed and understood. A large number of works have been performed, and many methods have been proposed to tackle different aspects of the problem. The novelty in this project is two-fold: it is the first time that the performances of existing algorithms will be evaluated in such large magnitude and diversity of experiments, which will support the investigators to propose new algorithms. The second novelty



resides in the application of the approach in the area of litter identification in the desert. In fact, the investigators are not aware of any existing efforts that suggest the application of image mining in the desert. The investigators intend to work closely with the DDCR to help detect and monitor litter in three key areas; along the boundary fence, camp areas and driving routes throughout the reserve. This will directly aid the DDCR in coordinating litter recovery as well as issuing fines to parties who have violated the regulations regarding litter. In addition to a potential monetary gain and reduction in resources deployed to patrol the reserve, the wildlife will benefit from reduced exposure to harmful objects which they may mistake for food.

Update: This research project is running in the stage of field data collection.





4.4.9 **Pathogen Risk Assessment of Arabian Felines.**

UAE University (2019/FN-EC/07)

Arabian felines (Arabian leopards, cheetahs, wildcats, sand cats and caracals) are either regionally extinct, critically endangered or their populations are worryingly declining in the Arabian Peninsula. Thus, the International Union for Conservation of Nature (IUCN), claimed the need to carry out further research on the factors that may threaten these five felids.

Felid conservation will increasingly need to include assessments of disease risks and strategies for disease management to be successful since it is known that most wild-feline populations are at risk of exposure to new pathogens due to deterioration of many of their inhabited ecosystems, as well as the fact that historic geographic barriers have been bridged, which might imperil population health. At the same time, due to the gravity of these animals' situation in the wild, they are held and bred in captivity at centres worldwide.

Such captive breeding programmes are essential in maintaining genetic diversity and saving these species from extinction, since their reintroduction may be the only means of restoring their populations in the wild. Nevertheless, captive animals are more likely to contract diseases because animals live in close proximity to each other. Whereas in nature diseases that are caused by parasites comprise one of the major problems resulting in even morbidity and mortality in these animals, in captivity the effects range from sub-clinical to death.

In this framework, this project would aim to determine the types, prevalence, and intensity of parasitic, bacterial and viral infections in the wild and captive Arabian felines located in the United Arab Emirates and Oman. Very little has so far been published on pathogenic diseases of these felines in the Arabian



Peninsula either in the wild or in captivity, and a study of this scope in such a field would be the first of its kind. The results obtained will constitute baseline data and a vital reference for future research in such a neglected area. Moreover, the knowledge obtained from this project will, inevitably, be used in future reintroduction and reinforcement projects of these species in both countries.

Update: A total of 11 carnivore faecal samples were collected during systematic surveys in DDCR, of which none of them was from felines. One faecal sample which was collected from a Feral cat trapped at the DDCR will be sent to be analysed by next-generation sequencing. The sample will be pooled with another two from Jebel Hafeet to get an initial representation of which pathogens circulate amongst feral cats located in protected areas where wild Arabian felines live. Moreover, 16 blood samples were collected from feral cats captured at DDCR.



4.4.10 Statistical Evaluation of Atmospheric Forecasting System at DDCR. Sorbonne Abu Dhabi (2019/EC/08)

Sorbonne University Atmospheric Forecasting System (SUAFS) is an integrated combination of advanced models able to provide detailed weather desert forecasts on various temporal scales over the Arabian Peninsula and the greater UAE areas.

The following predictions currently available by SUAFS (http:// forecast.psuad.ac.ae) are:

- Weather forecast for 72 hrs ahead (3 days)
- Desert dust forecast for 72 hrs ahead (3 days)

SUAFS is operational since July 2018 and an annual archive of weather and desert dust forecasts are almost available for evaluation. This research proposal offers a unique opportunity to initiate the framework for an important collaboration with DDCR in terms of environmental warnings and monitoring. Thus, the main aim of Phase-1 is to validate SUAFS forecasts against the atmospheric measurements obtained from DDCR meteorological stations. The entire records and data of the main atmospheric parameters from the network of the meteorological stations of DDCR, as well as the neighbored available stations, will be utilised for comparison with SUAFS forecasts. The extracting statistical scores will be helpful to identify the forecast errors of the system and their propagation into the period of the simulation. The results of this research work will lead SUAFS forecasts to achieve greater accuracy and reliability especially over the area of interest.

These results will be the base of Phase 2, which focuses on the air quality monitoring and dust forecasting for the DDCR. All the results will be available to the DDCR and SUAD and a report with all the data will be submitted. Phase-1 will also act as a preparatory phase for attracting additional funding to launch the demanding Phase-2.



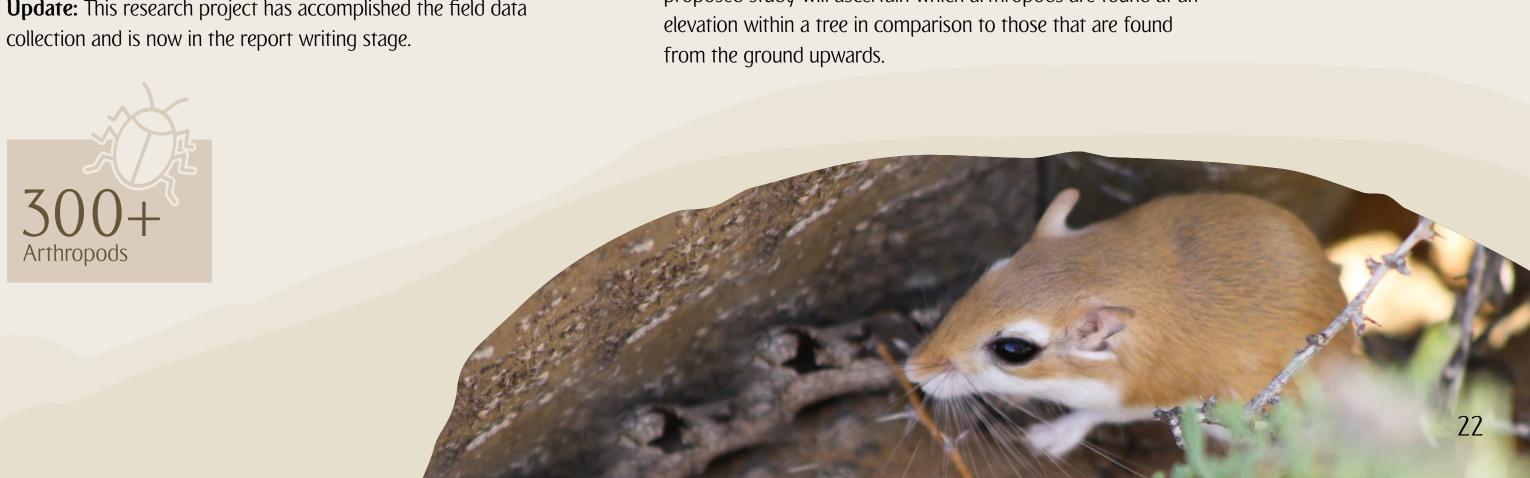


4.4.11 **Resources Partitioning and Populations of Small** Mammals in A UAE Desert Ecosystem.

(2020/FN-EC/09)

This project is part of an undergraduate research study about gerbils found in the UAE desert ecosystem. The student wants to study the specific niche requirements of two gerbil species. The objectives are to find out if different species of gerbils show evidence of resource partitioning in the field, find out if there is a seasonal variation, and determine whether there is a difference in their behaviours according to where they are located.

Update: This research project has accomplished the field data



4.4.12 Arthropod Diversity in Ghaf Groves. Zayed University.

(2018/FN-EC/02)

Arthropods are frequently sampled using a passive collection method called malaise trap. Such a trap can collect flying, crawling, walking and jumping arthropods. A similar trap is used for sampling arthropods aerially (e.g. in trees) called a SLAM (Sea Land Air Malaise). A preliminary study from October 30th 2017 until April 3rd 2018 at the DDCR in a Ghaf Grove showed clear differences in arthropod diversity and abundance between samples collected using a malaise trap and SLAM trap. The proposed study will ascertain which arthropods are found at an

4.4.13. Post Translocation Changes in the Behaviour and Population Dynamics of Antelopes in Arid

Environment. (2020/FN-EC/08)

The intentional movement of antelopes from one protected site to another - known as translocation - has been practised in the Middle East region for over 30 years. It has proven its effectiveness in saving the rare Arabian Oryx (Oryx leucoryx). Often, to ensure the animals' fitness and survival, managers have to provide food and water for the ungulates, especially in the condition of scarce vegetation cover in the desert. What impact do these management measures and new environmental conditions having on the antelope? Direct human presence, as well as the presence of man-made structures or activities in proximity to animals, may influence the animals' natural behaviour by altering their space use pattern and habitat selection (Cable 2013; Lone et al. 2015; Jobson et al. 2020), flight response (Stankowich 2008; Lima et al. 2015; McCance et al. 2015; Uchida et al. 2019), drive changes in migratory routes (Found & St. Clair 2016) and self-directed behaviour (McDougall 2012). The animal habituation to external support might play a negative role in their long-term survival and form altered behaviour patterns in the young generation. Moreover, animals' interaction with manmade structures, response to human or vehicle approaches, and habituation to anthropogenic disturbance will affect antelope temporal space-use patterns. It is therefore important to detect early signs of habituation

in wildlife and adjust management measures accordingly, to guarantee that antelopes will survive after the management support is reduced or minimised.

Another interesting direction of the research is the alteration within the population dynamics parameters in response to changing animals' density in the area. We will focus on the following parameters. Age-sex structure (e.g., calf:adult female, adult female:adult male ratios). This parameter is densitydependent and used to monitor ungulate populations - their age structure, recruitment, survival, and reproductive rates (Harris et al. 2008). What group organisation pattern is prevalent at the range-limited areas with interventional management should be discovered.

The focus species of the current research is the Arabian Oryx (Oryx leucoryx), re-introduced into the Dubai Desert Conservation Reserve (225 km2, fenced). The founder population on the site was born in captivity. There are several factors in the reserve that potentially influence the behaviour of antelopes: artificial barriers (fence), feeding supplies, constant human presence, human recreation area, roads. The management team is well-aware of potential hazards and limitations on the facility type from a conservation perspective and therefore, implement several effective counteractions.

We aim to expand our understanding of the impact of translocation and management measures on behaviour patterns



and population dynamics of the Arabian Oryx in managed breeding facilities, by investigating the dynamics of population parameters within the range-limited population of desert antelope with regard to the translocation activities, performed on these individuals. Complex understanding of demographic parameters (survival rate, mortality rate, group size, age-sex structure, etc.) and factors (environmental, demographic, social) playing a role in the Oryx population development will help to predict the species population's future on the translocation site. The second aim is to understand the behaviour strategies of the desert antelope at the translocation sites in response to particular anthropogenic influence. Such behavioural parameters (activity pattern, strategies in dealing with human presence) will provide crucial information on preserving the natural behaviour of the species within conservation management strategy.

Such a complex understanding of demographic and behavioural parameters will provide crucial information for species conservation management strategy. Moreover, it will assist in identifying potential hazards both for the animal population on the site and for human actors working there. Finally, it might provide solutions on how to maintain the natural behaviour of rare ungulates. The project duration is 2021-2023 and aims to result in several scientific publications, conference presentations and publishing of guidelines.



4.4.14. Monitoring Long-term Vegetation Dynamics and Responses to Hydroclimate Changes Using Satellite Remote Sensing. (2021/GE-EC-FL/02)

Seasonal dynamics and interannual variation of vegetation growth are strongly related to temperature variations in most terrestrial biomes, but water moisture is a significant factor in determining vegetation production in arid and semi-arid regions. Studies using satellite remote sensing have been widely used to demonstrate that vegetation productivity and associated ecohydrological processes are strongly influenced by hydroclimate changes in dry climate zone. Despite its importance, there are few studies on the changes in vegetation growth, and the resulting responses to climate and environmental changes in dryland ecosystems, particularly within the UAE. This investigation will use satellite remote sensing data records to assess long-term trends in temperatures, precipitation, soil moisture, and the metrics related to vegetation growth and productivity. We will examine vegetation growth responses to hydroclimate changes derived from precipitation and soil moisture over the Dubai Desert Conservation Reserve (DDCR). The multi-sensor satellite data records would include daily air and land surface temperatures, daily accumulated precipitation, surface and root-zone soil moisture, vegetation index, gross primary productivity, and evapotranspiration as

well as the quality of the water bodies and their biota that existing within the studied area. This research will provide a better understanding of long-term trends in climate changes and vegetation growth, spatial and temporal patterns of these variables, and the seasonal response of the vegetation growing season cycle and soil moisture feedbacks to hydroclimate change and provides important insights for future climate and environmental feedbacks and their consequences on biogeochemical dynamics in arid or semi-arid ecosystems.

4.4.15 Habitat Mapping and Change Detection in the Dubai Desert Conservation Reserve (DDCR) Using Remote Sensing and Geospatial Data Analysis. (2021/EG-EC/01)

The main objective of this project is to utilise remote sensing and geospatial data analysis to support and inform the efficient management of the DDCR. The project is expected to include the major work packages described below. The habitat mapping efforts in the DDCR will focus on understanding the relationships between land use and habitat changes. The several outcomes are expected to help to define and describe the anthropogenic influences on the reserve from existing upland watersheds, and environmental stressors related to climate change for more concerted monitoring efforts of the reserve.





4.4.16. Air Dust Sources in UAE: Understanding Processes that Control Spatial Distributions of Dust Emissions. (2021/GE-AS/01)

Desert dust mineralogy has recently attracted great attention, because of its influence on ocean productivity through the available iron content, its effect on the ice nucleation process, radiation and the climate. Also, the human health impact depends? on the iron content of dust particles, and thus from their mineralogy. Concerning the mineralogy of dust particles, only a few works try to estimate the impact of mineralogy, each one on a different aspect (e.g., radiation, biochemistry etc.). The main reason is the lack of reliable information, which could provide the necessary minerals mass fraction of desert dust.

The aim of the project is the investigation of the mineralogy in the broader UAE area, which will cover all the potential dust sources in the region of interest. This will be realised with soil measurements, and in-situ sampling methods, which will be deployed in order to analyse the geochemical characteristics of outcrops and associated alluvial fans and dunes in the United Arab Emirates (UAE), the Sultanate of Oman and the Kingdom of Saudi Arabia (KSA) areas. The outcome will primarily provide the essential information for the parameterisation of dust particles chemical and physical processes. The soil measurements will also set the foundations for future studies related to the impact of dust composition on the radiation budget, cloud physics (clouds seeding), ocean productivity, the climate and human health. Additionally, the compatibility with existing databases of dust mineralogy and satellite products will be tested against the soil measurements, revealing their potential for future development of a mineralogical database in the greater Middle East. SUAD will be the principal investigator (PI) with three collaborated departments (Geography and Planning, Science and Engineering and IT) University of Sharjah, Harokopio University and Dubai Desert Conservation Reserve (DDCR) the co-PI of this project.

4.4.17. Investigation of Mars Analogues Research Sites (InMARS): Sedimentological and Soil Environmental Analysis on Undisturbed Desert Environment. (2021/GE/01)

The future settlement of Mars will require overcoming several significant drawbacks and the creation of life support systems. Food production with conventional agriculture will be one of the life support systems. However, humans have a legacy of cultivating in harsh environments. Arabian Peninsula and especially UAE along with other countries in the area have developed a long-standing history in cultivating in such harsh environments with afalaj systems and artificial soil terraces being some of the examples of endeavour. In addition, UAE geology has a unique characteristic which is the extensive ophiolite nappe with basalt, peridotites and gabbro. The weathering of such type of rocks is producing mineralogy in analogy to Mars soil. Especially, desert environment with natural undisturbed dunes such as in Dubai Desert Conservation Reserve (DDCR) is good candidates as a simulant environment for Mars landscape and soil type. Thus, we will investigate the soil type and we will compare it geochemically, mineralogically and physically with Martian analogue composite soils. Further, we will investigate the environmental state (heavy metals) in the desert environment in order to draw conclusions on possible environmental natural hazards from sediments originated from similar rocks such as on Mars.



Reserve. (DDCR) (2021/GE-SE/01)

Sorbonne University Abu Dhabi has an interest to develop archaeological and geoarchaeological research in the broader DDCR area. The submitted research project will be directed by Dr. Caroline Autret, archaeologist and Head of the Department Archaeology and History of Art of Sorbonne University Abu Dhabi (SUAD). It is a collaborative project scheduled to start in September 2021. Partners are Prof. Kosmas Pavlopoulos, geologist-geomorphologist, and Dr. Haifa Ben Romdhane, sensing and GIS specialist, from the Geography and Planning Department of SUAD, as well as and Tamer Khafaga, environmental specialist from DDCR, Dr Brigitte Howarth, a specialist in Desert ecology from the American University in Dubai, and Dr. Daniel Moraitis specialist in geochemistry from the University of Sharjah.

The ArGeCH-DDCR Research Project is an innovative research project as survey and archaeological/geomorphological research has never been done in the DDCR area. With the



help of students from various Departments of SUAD, this multidisciplinary scientific team will develop and support archaeological surveys into the context of the paleoenvironmental evolution in the broader DDCR area and understanding the interplay between human occupation and environmental/climatic variability of the past.

As DDCR is a protected and relatively undisturbed area, it will provide the researchers and the post-graduate students the opportunity to study the archaeological and environmental analogues of the past as a key for our understanding of both ancient desert environment occupation and the future climate change. The ArGeCH-DDCR project also aims at raising the awareness of the students to the value of areas such as DDCR and their importance for heritage preservation and valorisation, and hence the importance of protecting and promoting cultural heritage sites in the Dubai Emirate and the UAE in general.







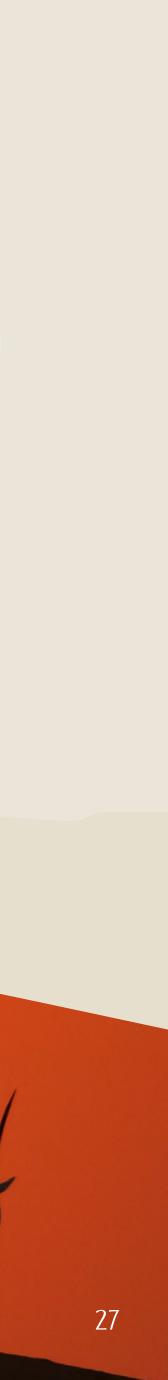
October 1st -20th 2020, field guide Pubudu Lakmal from Al Maha Desert Resort and SPA carried out "Survey of Leptien's Spiny-tailed Lizard (STL) in DDCR." A total of 300 STL burrows were recorded during the survey. 220 active burrows and remaining inactive. A complete report with analysis from the survey will be submitted in June 2021.

July 12th -24th 2020, field guide Sonaid from Al Maha Desert Resort and SPA carried out " Survey for Body Condition

4.5 Intern, Undergrad student & Volunteers Projects

Scoring of Arabian Oryx in DDCR" and assisted in the entry of 20, 000 camera trap images and identify them to species level for DDCR camera traps survey 2020. The report will be submitted soon.

February 19th - 28th 2021, American University of Central Asia
- Kyrgyzstan. A week visit to study and practice field techniques.
Comprehensive Arabian Gazelles counts were conducted and the report will be submitted soon.



5. Wildlife Re-introductions

Ungulate populations policy:

In line with the DDCR's accepted Purpose and as an ecological imperative, the policy is to significantly reduce and then regulate ungulate populations to restore the natural balance and aid the recovery of the desert ecosystem.

This will be accomplished by a tested, phased and carefully monitored program of reducing and subsequently regulating the ungulate populations that will involve a combination of translocation, controlled eradication and natural predation of the Oryx and two gazelle species, with consequent adjustments to their supplementary feeding.

The populations of Arabian Oryx in the Reserve have reached unsustainable numbers and continue to grow exponentially. The reserve's carrying capacity is undetermined but evidence of overgrazing is evident with damaging impacts on the natural vegetation. The situation has arisen as the Arabian Oryx have no natural population regulators such as food restrictions (supplementary feed is provided), migration or predators. Excessive populations create risks of disease transmission, mortality from aggression and lead to the overall loss of biodiversity as other species are displaced through loss or change in habitats and overutilisation of resources.

It has, therefore, been necessary to implement a project to remove some Arabian Oryx from the DDCR into two adjacent enclosures and then stop the continued breeding by the separation of males and females.

The DDCR Oryx enclosures and sorting facilities have been completed this year and the project has been implemented. Starting in November 2020 until March 2021, 348 Arabian Oryx were moved to the new enclosures. These animals were then weighed, tagged and males and females separated and then released back into the enclosures, 216 females into the south enclosure and 132 males into the north enclosure. Further relocations to the enclosures are planned for September 2021.

- as of March 2021.
- March 2021 is 420.



Due to the relocation of 348 Oryx to the enclosures and a further 77 that were moved to a protected area in Abu Dhabi, the Arabian Oryx population on the DDCR has decreased by approximately 40%, leading to an estimated population of 470

The Arabian Gazelle population is distributed across the DDCR with concentrations of animals at the irrigated areas and some groups at the feed stations. The estimated population as of

The Sand Gazelle populations within the DDCR have remained in the range of 100 to 140 since 2014. The estimated population from weekly counts, as of March 2021, is approximately 100. The numbers of Sand Gazelle are most likely underestimated due to the widespread distribution making them difficult to count accurately. A focused survey for Sand Gazelle will be carried out in 2021 to get a more accurate estimation.

MacQueen's Bustard Reintroduction

This project is done in conjunction with the National Avian Research Centre (NARC) and the office of HH Sheik Mohammed bin Rashid al Maktoum Since the first release in 2010, a total of 3101 individuals have been released up into the DDCR. Due to logistical complications caused by Covid-19, no MacQueen's Bustards were released over the past year but 1 female is still being monitored, via satellite tags and regular sightings of birds without satellite tags are reported by the DDCR staff.





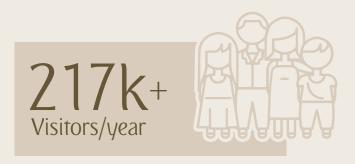


6. DDCR Visitors

Visitor Management Policy, DDCR Management Plan 2019-2024

As a premium tourism destination, the DDCR will continue to deliver a range of authentic and quality experiences for visitors by enforcing regulations and limiting visitor numbers to levels that do not undermine the Reserve's inherent values. In line with the DDCR's stated Purpose, high impact visitor activities will be strictly restricted to existing designated areas while low impact nature-based visits and activities will be promoted and encouraged with greater access to the Reserve.

Visitors to the DDCR are all through Tour Operators that hold a concession agreement with the Reserve or as guests of Al Maha Desert Resort.



Tour Operator Routes in the DDCR

Legend

- Alpha CampAlpha RoutesAlpha Buffer Area
- Arabian Adventures Camps
- —— Arabian Adventures Routes
- Arabian Adventures Buffer Areas

 Travco Camps
- ____ Travco Routes
- Travco Buffer Areas
- Nara Camps
- Nara Routes
 Nara Buffer Areas
- Platinum Heritage Areas
- DDCR Gates
- DDCR Boundary

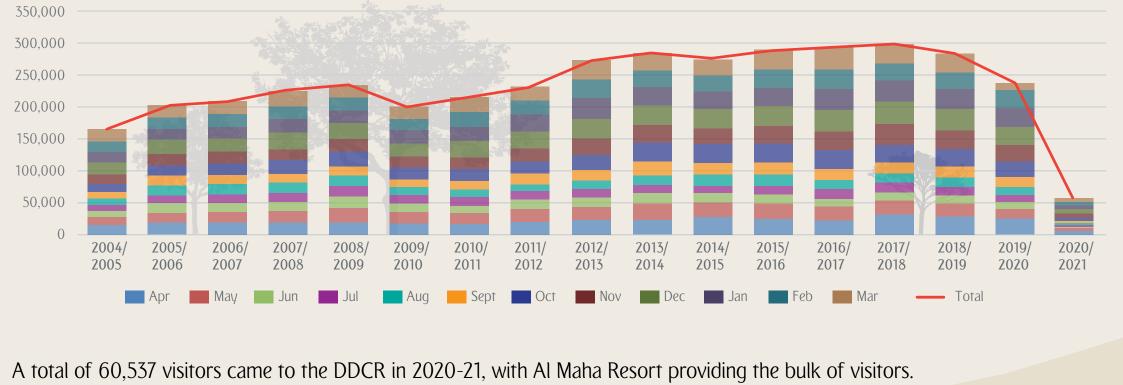
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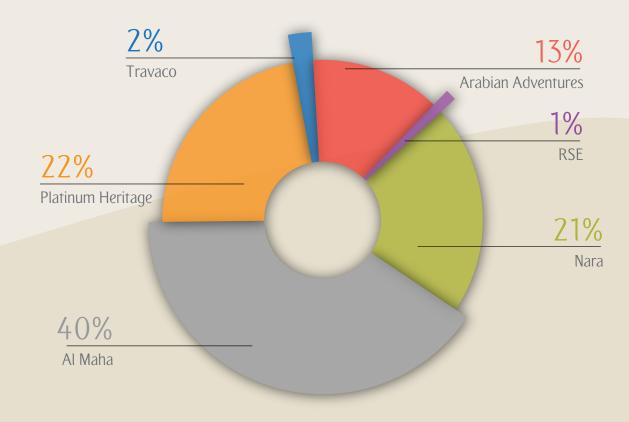


Due to the global pandemic of Covid-19 and the resulting restrictions on international travel. The number of visitors to the DDCR had drastically decreased from the previous year (2019-2020), with finishing a 75% reduction from the previous year.



Dubai Desert Conservation Reserve - annual visitors

Tour operator summary 2019-20





Fauna DDCR Monitoring Plan for Major Site Values - Summary

Arabian Oryx (Oryx leuoryx)

Aim

Monitoring of Arabian Oryx in the DDCR, maintain a healthy, optimum and self-sustaining population of Arabian oryx in the reserve. To achieve this aim it is imperative to implement a long-term monitoring program in order to have a better understanding of the Arabian oryx population and their requirements and subsequently to utilise this understanding to make better management decisions for the DDCR.

Methods & Timelines

| Species Weekly Counts | Weekly (Every Tuesday) |
|-------------------------|----------------------------|
| Body Condition Scoring | Annual |
| Distribution Assessment | Annual (January) |
| Movement Studies | Continuous (Tracking Data) |

Performance Measures & Thresholds

| Population Size | 200 - 300 |
|----------------------|------------------|
| Body Condition Score | 3 |
| Breeding Effort | Min. replacement |

Arabian Gazelle (Gazella Arabica) Aim

Maintain a healthy, optimum and self-sustaining population of Arabian gazelles in the reserve. To achieve this aim it is imperative to implement a long-term monitoring program in order to have a better understanding of the Arabian gazelle population and their requirements and subsequently to utilise this understanding to make better management decisions for the DDCR.

Methods & Timelines

| Species Weekly Counts | |
|-------------------------|--|
| Distribution Assessment | |

Performance Measures & Thresholds

Population Size



| Weekly | (Every Tuesday) |
|--------|-----------------|
| Annual | (January) |

200 - 300

Sand Gazelle (Gazella marica) Aim

Maintain a healthy, optimum and self-sustaining population of Sand gazelle in the reserve. To achieve this aim it is imperative to implement a long-term monitoring program in order to have a better understanding of the Sand gazelle population and their requirements and subsequently to utilise this understanding to make better management decisions for the DDCR.

Methods & Timelines

| Species Weekly Counts | Weekly (Every Tuesday) |
|-------------------------|----------------------------|
| Distribution Assessment | Annual (January) |
| Movement Studies | Continuous (Tracking Data) |

Performance Measures & Thresholds

| Population Size | 200 - 300 |
|-----------------|-------------------|
| Breeding Effort | Incr. replacement |



Lappet-Faced Vulture (Torgos tracheliotus) Aim

Gain a better understanding of the status of the Lappet-faced vulture population visiting the reserve and identify their home range, breeding and roosting sites.

Methods & Timelines

| Observations | Continuous |
|--------------------------------------|----------------------------|
| Camera Trapping (Water points) | Continuous |
| Camera Trapping (Vulture Restaurant) | Continuous |
| Movement Studies | Continuous (Tracking Data) |

Performance Measures & Thresholds

| Population Size (visiting) | 20 - 40 individuals |
|----------------------------|--------------------------|
| Roosting | Roosting site identified |
| Breeding | Breeding site identified |

Pharaoh Eagle Owl (Bubo ascalaphus) Aim

Gain a better understanding of the population status of the Pharaoh Eagle Owl within the DDCR and learn more about their diet and breeding ecology.

Methods & Timelines

| Survey (Pharaoh Eagle Owl | Every three months |
|--------------------------------|--------------------|
| Nest Survey (Pharaoh Eagle Owl | Annual (Feb - May) |
| Diet Analysis | Every three months |
| Camera Trapping (Water points) | Continuous |

Performance Measures & Thresholds

| Population Size | 5 - 10 Pairs |
|-----------------|--------------|
| Breeding Effort | 2 - 5 Nests |



Macqueen's Bustard (Chlamydotis macqueenii) Aim

To have an established breeding population of Macqueen's bustard in the DDCR and surrounding area. Macqueen's bustards are released annually during the winter months by NARC.

Methods & Timelines

| Annual (January/February) |
|----------------------------|
| Weekly (Every Tuesday) |
| Annual (January) |
| Continuous (Tracking Data) |
| Annual (October/November |
| Annual (Feb - May) |
| |

Performance Measures & Thresholds

| Population Size | 25 - 50 individuals |
|-----------------|---------------------|
| Breeding Effort | 1 - 5 Nests |



Arabian Wildcat (Felis lybica lybica) Aim

To have a better understanding of the population status of the Arabian wildcats that exists in DDCR and collect morphological data. As the main threat to Arabian wildcats, the feral cats will be eradicated from the DDCR.

Methods & Timelines

| Trapping - monitoring | Annual (January) |
|-----------------------|-----------------------------|
| Trapping - Survey | Every three years |
| Camera Trapping | Annual (January - February) |
| Trapping (Feral Cats) | Continuous |

Performance Measures & Thresholds

| Population size | Presence |
|-----------------|----------|
| Feral Cats | |



7.1 Major Projects in 2019-2020

Outreach and Public Awareness Policy, DDCR Management Plan 2019-2024

Concerted efforts will be made and resources mobilised to raise local, national and international awareness of the DDCR's natural and heritage significance, its conservation purpose and social values. The aim is to build wide public understanding and support for the Reserve's conservation and will involve designing and implementing awareness, outreach programs and marketing campaigns. The target audiences will be local and international visitors, tour operators, local communities and senior decision-makers.

The desert visitor centre will be a place for people to enhance their environmental awareness and connect them with the unique desert habitat of the DDCR. Visitor centres are facilities that prepare visitors physically; mentally and spiritually to experience special places.

Better visitor experience leads to better word of mouth which lead to the better success of DDCR visitor activities. The visitor centre will aim to achieve the following;

To connect the DDCR visitor with the authentic desert experience.

for schools and higher education.

support for its conservation.

visitor centre was postponed until 2021.



- Enhance the visitor experience by adding a new activity that visitors can experience before or after visiting the reserve.
- To be used as a platform to develop an educational program
- To better understand DDCR visitors' motivation and needs to identify the opportunities to provide a better experience.
- To raise the visitor's awareness of the desert values and to elicit
- **Update:** Due to the global pandemic, the building of the DDCR



8 DDCR Affiliations



IUCN Green List of Protected Areas

The IUCN Green List of Protected and Conserved Areas is the first global standard of best practice for area based conservation. It is a programme of certification for protected and conserved areas that are effectively managed and fairly governed. The DDCR is a Candidate Site for the IUCN Green List.







محمية دبي الصحراوية Dubai desert conservation reserve

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