

WITH THE PARTICIPATION OF:



UNITED ARAB EMIRATES
MINISTRY OF ECONOMY



UNITED ARAB EMIRATES
MINISTRY OF CLIMATE CHANGE
& ENVIRONMENT



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EXECUTIVE SUMMARY

Coastal Lagoons

Essential ecosystems to scale up Nature-based Solutions in the UAE

June 2024

UAE's coastal lagoons represent the nation's greatest and most diverse natural capital, underpinning key economic sectors, sheltering the region's treasured biodiversity and fortifying climate mitigation and adaptation efforts.

The protection and restoration of these integral ecosystems are a crucial step as we advance towards a nature-positive future.

Nature-based Solutions (Nbs) offer a holistic approach towards the restoration of coastal ecosystems, unlocking multiple benefits for climate, biodiversity and people.

The UAE has an opportunity not only to achieve its climate and biodiversity goals, but to also catalyze its transformation into a global hub for climate smart economic diversification.

Analysis of two promising coastal lagoons in the UAE demonstrate clear potential to scale up Nbs and its associated benefits across ecotourism, public recreation, Blue Carbon and food security among others. Collaboration across the public and private sector will be instrumental in bringing these opportunities to fruition.

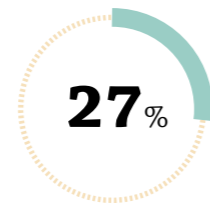
Contributing to UAE's climate and nature goals

By protecting, enhancing and restoring highly productive and valuable coastal ecosystems, NbS can make a significant contribution to national commitments, in support of the UAE's strategic initiative to reach Net Zero by 2050 and the global goal to protect 30% of biodiversity by 2030 as part of the 2022 Kunming-Montreal Global Biodiversity Framework.

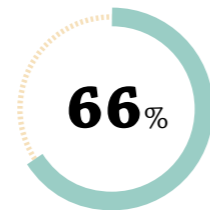
NbS also offer diverse opportunities to strengthen UAE's Nationally Determined Contributions (NDCs) - specifically around climate mitigation and adaptation - in the lead up to COP28, and in accordance with the Paris Agreement's global stocktaking process.



50% of the world's total GDP (\$44 trillion of economic value generation) is moderately or highly dependent on nature and its services¹



In the UAE, 27% of the coastline is coastal lagoons²



In the UAE, 66% of business stakeholders interviewed agreed that their companies depend on the quality and functioning of the marine environment in the Arabian Gulf³

RECOMMENDATIONS TO SCALE UP NBS IN THE UAE

Protect and sustainably manage valuable coastal lagoons, by implementing efficient NbS interventions, such as designation of protected areas, at priority coastal ecosystems

Prioritize coastal lagoons in broader maritime spatial management and Sustainable Blue Economy (SBE) policies, in alignment with scientific evidence

Adopt a holistic approach that encompasses interlinked socioeconomic and ecological factors across land and sea

Ensure projects are designed to address societal challenges such as economic prosperity, food security, health and well-being, in addition to climate concerns

Enable public and private partnerships, to set up and finance a pipeline of bankable projects

A climate smart economic diversification move would build upon the success of UAE's landmark Vision 2021 and the vision laid out in We the UAE 2031, bringing the nation closer to a nature-positive future that is underpinned by sustainable and inclusive economic growth.

Invaluable natural capital of coastal lagoons

UAE's coastal and marine habitats offer tremendous ecosystem services that can be further enhanced through protection and effective management.

Benefits for biodiversity

Biodiversity, the variety of organisms and habitats in an area, is key to how ecosystems function and the services they provide such as the supply of oxygen, recycling of water and nutrients, and pollination of plants - some of which are critical for food security. **UAE's coastal lagoons host important habitats that support the critical life stages of many globally and locally threatened species** of marine

mammals, sharks, rays, bony fish, birds and sea turtles. For example, our drone and underwater surveys demonstrate that these habitats serve as crucial feeding grounds for sea turtles, reproductive areas for rays and fish aggregations². Surveys conducted in Khor Faridah in Abu Dhabi also confirm a strong interconnection between seagrass habitats and biodiversity in the area⁴.

Rich hotspots of biodiversity

Underwater surveys conducted as part of the NbS project confirmed the presence of endangered and critically endangered species such as whiprays (*Himantura spp.*), blacktip reef shark (*Carcharinus melanopterus*), giant guitarfish (*Rhynchobatus djiddensis*), as well as halavi guitarfish (*Glaucostegus halavi*) which are endemic to the Arabian Sea region.



Several of these lagoons have also been identified as **Important Bird and Biodiversity Areas for numerous IUCN Red List Species** including the resident Socotra Cormorants and Greater Flamingos, as well as migrating waterbirds such as the Great Knot and Greater Sand Plover.

¹ World Economic Forum. 2020. *Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy.*

² Mateos-Molina, D., Pittman S., Antonopoulou, M., Carpenter, S., Möller, M., Muzaffar, S. B., Bejarano, I. J. A. Burt (ed). 2023. *A Natural History of the Emirates.*

³ Emirates Nature-WWF. 2019. *UAE's Sustainable Blue Economy report.*

⁴ Emirates Nature-WWF. 2022. *Khor Faridah Marine Megafauna report.*

Coastal lagoons: Essential ecosystems to scale up Nature-based Solutions in the UAE

Invaluable natural capital of coastal lagoons

Positive impact for climate mitigation

Coastal lagoons in the UAE are essential for climate mitigation, adaptation and resilience. They act as 'blue carbon' sinks that sequester carbon from the atmosphere, as well as natural coastal defenses against storm surges and inundation. The UAE is committed to removing carbon from the atmosphere through NbS.⁵

⁵ UAE Ministry of Climate Change & Environment. 2023. *Third Update of Second Nationally Determined Contribution for the UAE.*

⁶ McLeod, E. et al. 2011. *A blueprint for blue carbon: toward an improved understanding of the role of vegetated coastal habitats in sequestering CO₂.* *Frontiers in Ecology and the Environment.*

⁷ Griscom, B. et al. 2017. *Natural climate solutions.*

⁸ Narayan, S. et al. 2016. *The Effectiveness, Costs and Coastal Protection Benefits of Natural and Nature-Based Defences.*

Natural blue carbon sinks

As part of the NbS project, Blue Carbon Accounting surveys were conducted at two coastal lagoons. Analysis of 54 sediment cores shows that the carbon storage potential of these seascapes goes beyond just mangrove forests.

Often overlooked, habitats like saltmarshes, seagrass, mudflats and microbial mats also contribute significantly to carbon capture.

Drivers of carbon storage can vary by location. In the lagoon we analyzed in Abu Dhabi, the primary contributors are vegetated habitats. In contrast, the connectivity between habitats holds greater weight in carbon storage in Umm Al Quwain.

Close proximity to efficient carbon-storing habitats like mangroves can elevate the carbon-capture ability of the entire lagoon system.

This holistic benefit underscores the importance of maintaining and restoring a diverse array of habitats for maximum carbon storage.

x2 times
more cost-effective



Soils found in blue carbon ecosystems in the MENA region **can sequester up to twice as much carbon as boreal, temperate or tropical forests**⁶

of global climate mitigation needed to meet the goals of the Paris Agreement can be provided by Nature-based Solutions⁷

Nature-based coastal protection is **2-5 times more cost-effective** than engineered-structures and yield multiple co-benefits⁸

AREA OF BLUE CARBON HABITATS ANALYZED:

160 km²

TOTAL CARBON IN LAGOONS:

~900,763

metric tons of carbon (MtC) of carbon in living biomass and soil (top 50 cm)

EQUIVALENT TO THE ANNUAL CO₂ EMISSIONS OF OVER

160,000

PEOPLE FROM THE UAE
(WORLD BANK, 2020)



Find more information about the Blue Carbon Accounting survey methodology and findings on this online storymap



Invaluable natural capital of coastal lagoons

Creation of nature-positive economies

Nature is the foundation of our entire economic system. **The UAE coastal area has played an important role in driving the economic growth of multiple sectors such as ports and shipping, seawater desalination, real estate, tourism and recreation, and fisheries.** The continued success of these sectors in the long-term depends on the health of coastal ecosystems and therefore on their protection, restoration and effective management.

Greater financing for NbS and partnerships involving all actors - public and private sectors, academia, NGOs and local communities - are prudent to increase effective protection of nature.

Creating “Bankable” Solutions Nature-based Solutions fall on a broad spectrum:

At one end, are high-impact interventions, such as establishment of Marine Protected Areas and restoration of mangroves, which rely on financing from public spending, philanthropy or impact investments.

At the other end, are “bankable” projects that generate strong Return on Investment (ROI) or savings opportunities for organizations. These are more attractive to commercial investors, and have the potential to drive innovation and close the immense nature funding gap.

Coastal and marine tourism is projected to be the largest value-adding segment of the ocean economy by 2030, with anticipated growth rates of **more than 3.5% globally⁹**

Coastal and marine tourism growth rate
+3.5%

Nature-positive solutions present \$10.1 trillion in business opportunities and could create 395 million jobs by 2030¹⁰

Job creation
395 million

Increased protection of coastal lagoons could result in **net benefits worth \$490 to \$920 billion until 2050¹¹**

Net benefits
\$490 billion

Innovative solutions to improve food security



One of the goals of our NbS project is to advance innovation and sustainability of local food production, ultimately contributing towards small scale business growth. **We are studying the feasibility of enhancing, restoring and cultivating local salt-tolerant plants in coastal lagoons.**

These have the potential to be used in food production as super foods, green salt, fodder and other by-products which can be produced by local communities, in turn creating alternative revenue streams, sparking greater SME growth and entrepreneurship, and supporting economic diversification.

Rise of ecotourism in the UAE

The NbS project aims to create a pipeline of low-impact ecotourism initiatives to promote sustainable business innovation and attract further investments for nature.

Ecotourism is projected to fuel growth of sustainable tourism as the UAE Sustainable Tourism Market report¹² reveals:

Sustainable tourism contributed to more than

5%

of total employment in the UAE in 2022, and this is expected to grow over the next five years

Sustainable tourism estimated to be worth
\$34.6 million in 2022

and expected to reach
\$165 million in 2033

⁹ World Economic Forum, 2017. *Healthy Coral Reefs Are Good for Tourism and Tourism Can Be Good for Reefs.*

¹⁰ World Economic Forum, 2020. *New Nature Economy Report II: The Future of Nature and Business.*

¹¹ WWF, 2015. *Smart investments in ocean health.*

¹² Future Market Insights, 2023. *UAE Sustainable Tourism Market.*

Survey findings:

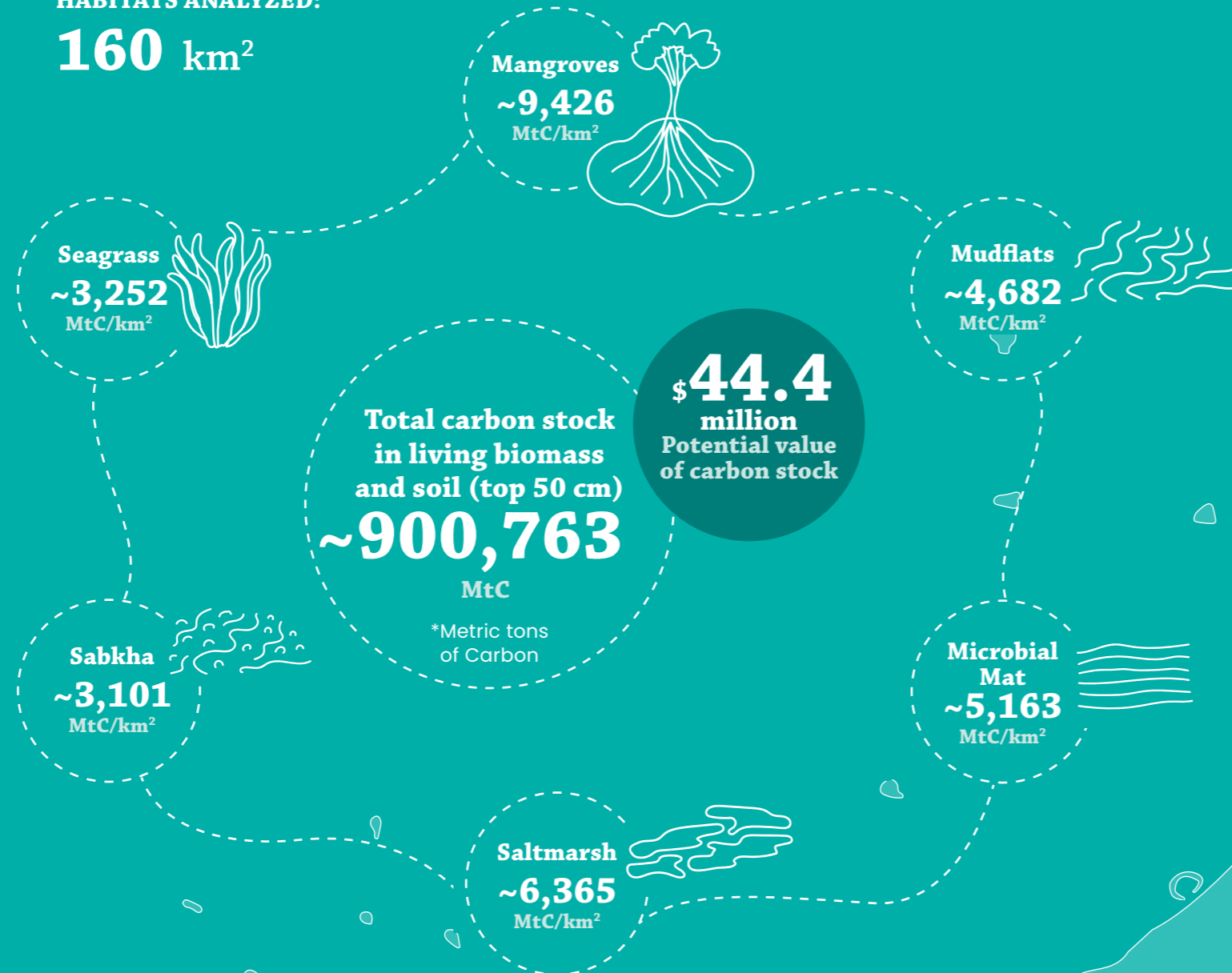
Ecosystem services provided by UAE's most productive coastal lagoons

A robust site-selection process identified two coastal lagoons in the emirates of Umm Al Quwain and Abu Dhabi (Khor Faridah) respectively, as UAE's top priority sites for biodiversity conservation, climate mitigation and Nbs intervention. Interviews conducted as part of the Nbs project reveal that UAE Nationals, residents and tourists consider it important to protect lagoons with marine protected areas, and value the ecosystem services provided to the local economy and biodiversity protection.

HIGHLY PRODUCTIVE BLUE CARBON STOCK

AREA OF BLUE CARBON HABITATS ANALYZED:

160 km²



UMM AL QUWAIN LAGOON

Home to the largest Socotra cormorant nesting colony in the UAE, and possibly the Arabian Gulf region, representing 15–35% of the global population, threatened marine species such as the green turtle (*Chelonia mydas*), and critically endangered marine species such as the endemic halavi guitarfish (*Glaucostegus halavi*) and the giant guitarfish (*Rhynchobatus djiddensis*).

ABU DHABI KHOR FARIDAH

Home to an Important Bird and Biodiversity Area for migrating waterbirds such as the Great Knot (*Calidris tenuirostris*) and the Greater Sand Plover (*Charadrius leschenaultii*), and threatened marine species such as the green turtle (*Chelonia mydas*), Indian Ocean humpback dolphin (*Sousa plumbea*), and the critically endangered Arabic whipray (*Maculabatis arabica*).

Survey findings:

Ecosystem services provided by UAE's most productive coastal lagoons

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conducted as part of the NbS project reveal that UAE Nationals, residents and tourists consider it important to protect lagoons with marine protected areas, and value the ecosystem services provided to the local economy and biodiversity protection.

ENHANCED NATURAL COASTAL PROTECTION

171 km of the lagoon's shoreline is protected from coastal hazards, such as erosion and inundation, by mangrove, tidal marsh and seagrass habitats

47,400 people live within 500m and benefit from this natural coastal protection

ESTIMATED TOURISM AND RECREATION POTENTIAL

17,800 Average annual visitors to the lagoons¹³

\$22.75 million Average annual estimated associated revenue¹⁴

Establishment of conservation areas would increase the visitation and associated revenue to

27,300 annual visitors

\$34.95 million annually

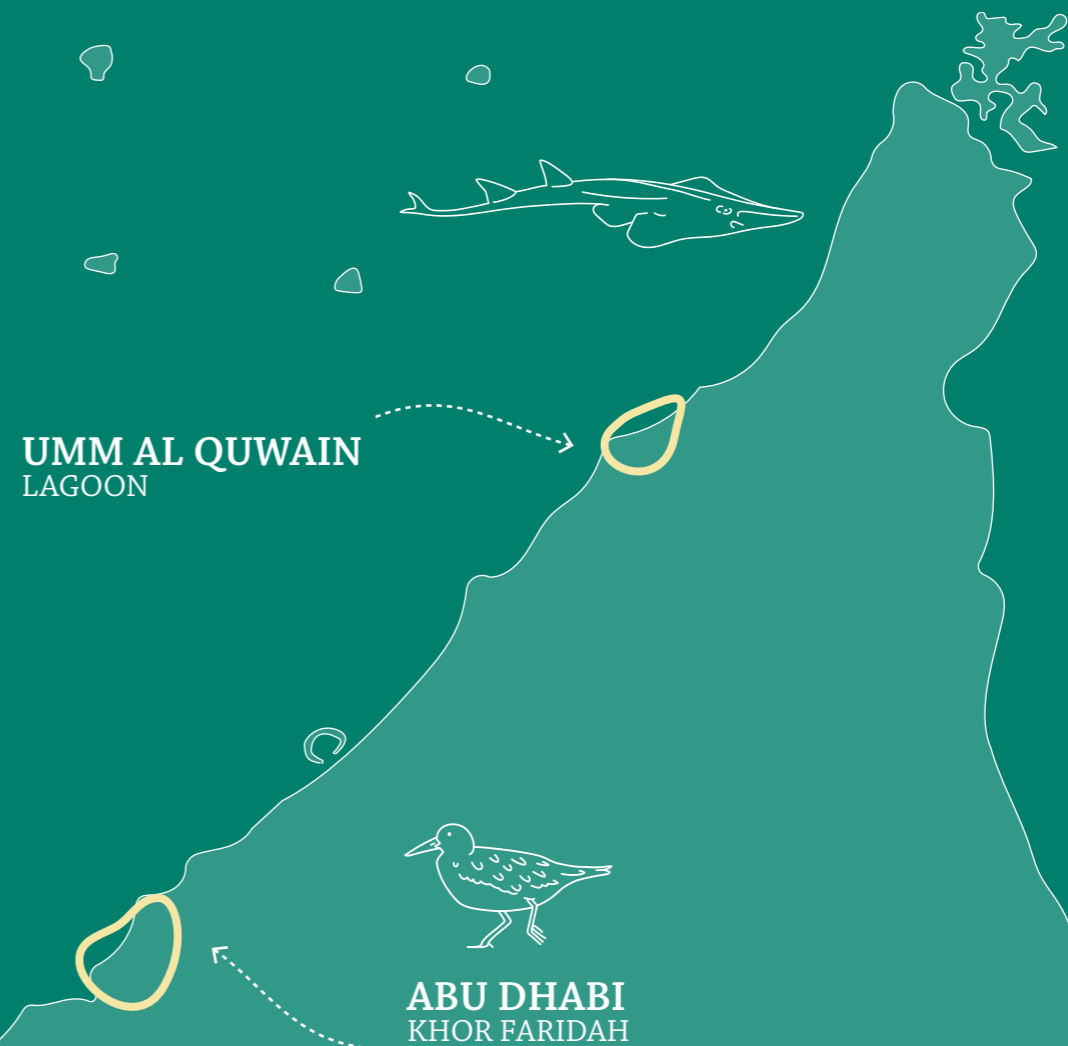
WILLINGNESS-TO-PAY FOR PROTECTING THE LAGOONS

Very few economic valuations associated with marine natural capital exist for the UAE



of UAE Nationals, residents and tourists said it was **very important** to protect the lagoons

AED 40.8 (~\$11 USD) is the average amount interviewees would be willing to pay to visit a protected area



¹³ Based on 2019 average per visitor spending estimates

¹⁴ Based on 2019 average per visitor spending estimates

DEFINITIONS

Coastal lagoons

are typically highly productive and biodiverse ecosystems which exist in transitional areas where land and sea connect. In the UAE, they are usually made up of an interconnected mosaic of habitats including mangroves, mudflats, saltmarshes, seagrass meadows, with some supporting coral and oyster reefs.

Natural Capital

refers to the world's stock of natural resources and ecosystems (identified as assets or "capitals") that provide various benefits and services¹⁵ to humans, also known as ecosystem services. The concept of natural capital underpins the concept of financial capital.

Ecosystem services

are "the benefits that nature provides to people."¹⁶ Examples include the provision of food, water filtration, public recreation, absorption and storage of carbon, soil erosion control and flood regulation.

Nature-based Solutions

are actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously benefiting people and nature.¹⁷

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ABOUT THE NBS PROJECT IN THE UAE

The "Nature-based Solutions (NbS) for Climate, Biodiversity & People" project focuses on the protection, restoration and management of coastal ecosystems, including mangroves, seagrasses, and saltmarshes, to support climate change mitigation, enhance biodiversity and open up new benefits for people by driving a multi-stakeholder effort aiming to unlock finance towards ecosystem protection, Blue Carbon, ecotourism, and food security, among others.

MORE INFORMATION

www.naturebasedsolutions.ae



¹⁵ What is natural capital? World Forum on Natural Capital. <https://naturalcapitalforum.com/about>

¹⁶ World Health Organization. 2005. *Ecosystems and Human Well-being in Millennium Ecosystem Assessment*.

¹⁷ About Nature-based Solutions, International Union for Conservation of Nature. <https://www.iucn.org/our-work/nature-based-solutions>