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ABU DHABI PORTS

FACTSHEET

Abu Dhabi Ports Builds 8-kilometer Breakwater

AED 880 MILLION INVESTED BY ABU DHABI PORTS TO PROTECT CORAL REEFS AT RAS GHANADA

Ras Ghanada Reef is a True Embodiment of Sustaining Marine Treasures

Two leading biologists assigned to monitor the coral reef regularly

Coral reefs are one of the UAE's most bio-diverse natural sites. They are of high environmental importance as they protect the coast from erosion, and are currently an attractive home to various types of fish and their reproduction, in addition to the availability of various and colorful species, which grants the area spectacular views of nature.

Among the many coral reefs that are unique in the UAE, Ras Ghanada Coral Reef is considered the UAE's most vibrant reef – Ras Ghanada is located close to Ghantoot area, which is about 90 kilometers northwest the capital.

Spreading over 25 square kilometers of seafloor, this coral reef teems with more than 20 species of hardy corals and fish that have managed to survive despite the challenges surrounded the area such as the saline waters and hot temperatures that characterize the Gulf waters, in addition to the establishment of several industrial facilities nearby.

Capt. Mohammed Juma Al Shamisi, CEO of Abu Dhabi Ports, expressed the Abu Dhabi Ports' deep interest and commitment to collaborate with the Environment Agency – Abu Dhabi (EAD), the competent authority for developing and protecting the Environment, to protect marine life and conserve the biodiversity, saying: "This reef is a beautiful manifestation of marine life and it is a matter of pride that Abu Dhabi Ports has played a central part in preserving it. We believe in protecting our country's marine environment and will continue to ensure this remarkable ecosystem continues to thrive."

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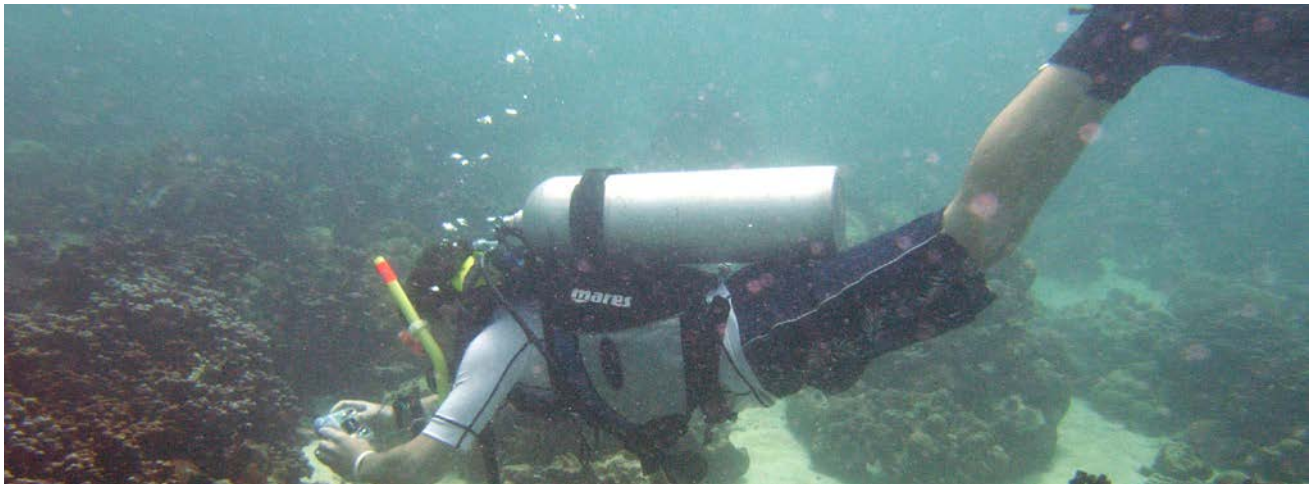

Dr. Shaikha AL Dhaheri, the Executive Director of the Terrestrial and Marine Biodiversity Sector of EAD said: "EAD has been conducting an annual coral reef assessment and monitoring surveys, where 10 sites, including Ras Ghanadha are monitored seasonally to assess the status of the reefs. At each site EAD has been taking images using underwater cameras across the fixed transects that are later imported into a computer-based image analyses software to help determine the coral cover, health and growth.

In addition to coral data, the stations record the temperature change in all monitoring sites to record any anomaly in temperature that can impair the coral cover and health. EADs survey has shown that the corals in Ras Ghanada site has maintained resilient live coral cover throughout the years.

Furthermore, Abu Dhabi Ports has invested AED 880 million to build a 8 km breakwater as well as a trestle bridge in order to not interrupt vital tidal flow across the coral reef. This mitigation measure has been discussed with EAD experts as part of the Environmental Impact Assessment studies.

The assessment on the area mapped out for Khalifa Port prior to its construction showed that the planned location would have left a footprint directly over the reef. To avoid this, Abu Dhabi Ports developed Khalifa Port on an artificial island that is four kilometers away from the mainland, using dredged material to protect the environment, reduce our ecological footprint and changes in water temperatures.

Abu Dhabi Ports has commissioned two leading marine biologists based in the United States, Dr. Sam Purkis and Dr. Bernard Riegl, who are regular visitors at the reef. The two experts examine the coral reef three times a year during which they monitor marine conditions and ensure their preservation and sustainability.

The two experts have been regularly diving, monitoring and reporting on coral reefs in the Gulf since 1995. The pair were commissioned by Abu Dhabi Ports in September 2007 to provide an assessment on the area mapped out for Khalifa Port well before its construction. Taking their notes and recommendation into consideration, the company elected to relocate Khalifa Port to its current position.

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Using advanced satellite seabed mapping technology, Dr. Sam and Dr. Bernard continued to observe how the nearby seagrass meadows and coral ecosystem have responded to the port's development throughout its construction. Upon completion of the port, Abu Dhabi Ports management made the decision to dedicate itself to protecting the reef and continue to assess the corals for any negative impact by setting up 85 monitoring stations that measure water quality, chemistry, and temperature amongst a diverse suite of other indicators pertaining to ecosystem health.

Today, the efforts put into conservation planning for Khalifa Port have contributed to the preservation of the coral reef, say Dr. Sam and Dr. Bernard, marine biologists. They also added that this is a conservation success story for marine biodiversity that would not be possible without the commitment of Abu Dhabi Ports.

Ras Ghanada reef is likely the richest coral ecosystems in coastal Abu Dhabi, perhaps even in the entire south-east Gulf. Beyond the corals, the broader coastal ecosystem is of especially high conservation value given the close proximity of mangroves, seagrass meadows, the corals, and the sandy beach, which is a key sea turtle site. In sum, the entire ecosystem is very impressive and is one of the real biodiversity hotspots in the world," says Dr. Bernard.

Ras Ghanda reef also boasts an exceptionally high cover of live corals, comparable to some of the healthiest reef ecosystems globally. The abundance of fish is also striking, especially when compared to other coral reefs in the Gulf.

Part of what makes this area special is the vast seagrass meadows situated adjacent to the coral area, and the sandy headland and beaches, which are frequented by nesting turtles. "Considerable effort has been maintained to protect these nesting sites, which is extremely commendable given how imperiled turtle populations are in the Gulf, indeed globally" says Dr. Sam.

"The ecosystem is so healthy it is in fact a de facto marine protected area thanks to Abu Dhabi Ports," according to Dr. Sam.

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Artificial barriers and online monitoring systems

Abu Dhabi Ports is also responsible for the expansion of the reef. Through deliberately constructing the environmental breakwaters out of granitic rock instead of the traditionally used concrete, the structures have become living reefs by themselves, transforming into a second self-contained ecosystem of almost the same size as the natural reef.

The biologists are continuing to work closely with Abu Dhabi Ports to protect the reef. A new online seawater quality monitoring system started operating in July 2017, provides a steady stream of data on seawater pH values, Temperature, Dissolved Oxygen, Turbidity, Chlorophyll, and Sedimentation rates. Dr. Bernard and Dr. Sam agreed that this would be of huge assistance in diagnosing any changes in the reef so that pre-emptive action can be taken before ecosystem damage.

Abu Dhabi Ports has further maintained strict regulations against visiting vessels discharging waste water. Instead, by absorbing the cost itself, Abu Dhabi Ports transports the water to a treatment plant before allowing it to be released back to the sea. This helps to keep invasive species from other coastal ecosystems from entering the reef and causing imbalance. As a result of the company's policies, the doctors claim that they have yet to see a foreign species on the reef.

Dr. Sam and Dr. Bernard acknowledge that both the work Abu Dhabi Ports has done and are contemplating doing is of vital importance. "Being so fragile and susceptible to climate change, it is very easy to start to lose reefs. Their demise should serve as a warning that other ecosystems may soon face collapse," mentions Dr. Sam.

Dr. Sam applauded the company's efforts saying, "had the port management not been careful and considerate and taken the measures it had, this coral ecosystem would have likely been severely degraded by 2009".

"We can talk all day about the benefits of coral reefs– they provide protein through fisheries, protect the coastline from erosion and storms. But the main thing is that reefs are beautiful ecosystems. They are UAE's national treasures and Ras Ghanada is a living example of how the country is conserving its natural assets" says Dr. Sam.