

Client

Saudi Aramco

Project

Essential dredging works threatened the survival of a unique nearshore reef located off the coast of Saudi Arabia. Dredging permits could not be issued until an agreed percentage of the reef was relocated out of harms way. This relocation had to be completed within 12 days in June-July (summer) in order to prevent delays to the dredging operation and significant additional costs to the client.

Reef Ball Australia was contracted to conduct the site surveys and rapid relocation of priority coral colonies - the first such relocation ever conducted in Saudi Arabia. A total of 523 colonies ranging in size from 10cm to 130cm were relocated 700m west of the dredge site to an area of similar water quality and depth. The site was selected with input from sediment plume modeling and site surveys.

Moving corals in the summer is not recommended due to the added stress of high temperatures however the local coral species proved resilient and able to survive up to 10 minutes out of water.

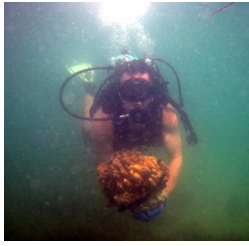
Table 1. Coral species and number relocated.

Relocated Coral	No.	Species
Coral Heads (20cm – 70cm max dia)	286	~80% <i>Cyphastrea sp</i> , ~10% <i>Favites sp</i> , ~4% <i>Platygyra sp</i> , ~3% <i>Siderastrea savignyana</i> , ~3% other
Small colonies (<20cm dia)	210	Majority <i>Cyphastrea sp</i>
Large Coral Heads (>100cm dia)	14	60% <i>Cyphastrea sp</i> , 40% <i>Platygyra sp</i>
Large Coral Heads moved just outside of side cast	13	<i>Cyphastrea sp</i>
TOTAL =	523	
Survival at 60 days =	100%	
Survival at 6 months =	95% min	

Benefits to Client

- ✓ Dredging permit issued on schedule and dredging able to commence without delay.
- ✓ Reduced environmental impact and demonstration of best practice.
- ✓ Reef Ball Australia's experience of working in the Middle East combined with its Saudi partner Gothier Contracting meant that all equipment, accommodation, portacabin, transport, dive equipment, airfreight, and boats were sourced with no time or resources required from the client.





Corals were removed using pry bars and chisels, placed in modified crates and carried to a staging area.



Transportation was via a 4WD and boat or underwater using lift bags. Corals were kept covered by wet towels. Max time out of water was 8 minutes. Air temp 40 to 43C, water temp 30 to 33C



Example of replanted coral in the receiving area 700m west of dredge site. A number of the largest coral heads were spaced between the dredge site and receiving area to create a corridor.



Concrete bases were designed to blend in with the natural sand and included small caves/holes. White patches are the marine putty securing the coral fragments and are quickly covered in algae.

Services provided

- Data review and construction of GIS model
- Site survey
- Coral Relocation Plan and Budget
- Mobilisation of equipment and international team of certified coral handlers
- All in-country logistics
- Relocation and stabilization of coral including construction of custom concrete artificial reef units
- Comprehensive report and presentation
- Fortnightly monitoring of relocated colonies including monitoring reports
- Continuous water temperature data via logging temperature loggers
- Final monitoring and report at 6 months.

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CO2 emissions from all flights and concrete used for this project were offset via www.myclensky.com as part of Reef Ball Australia's environmental policy.

