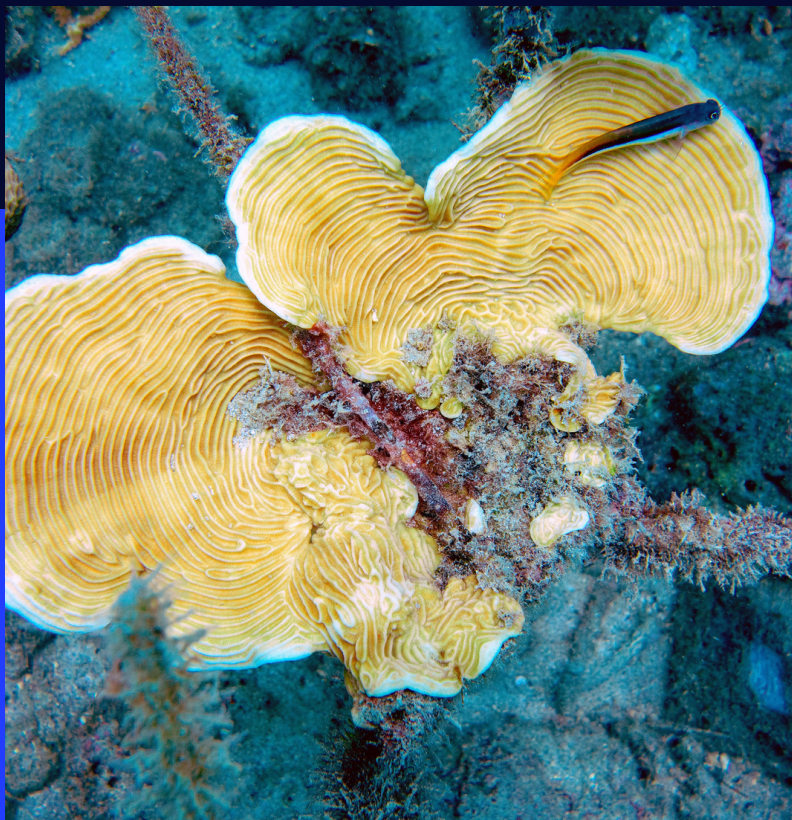# TECHNICAL ASSESSMENT OF REEFWATCH MARINE CONSERVATION PROJECT IN ANDAMANS & KARNATAKA

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Team, Impactdash**

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Background

ReefWatch Marine Conservation is involved in the following areas of work supported by GMM Pfaudler

- Restoring and rehabilitating corals in the Andamans
- Addressing marine conservation through research, restoration technology, awareness building and capacity building and help underprivileged communities in Karnataka

Artificial reef showing healthy growth of Sub Massive and Branching corals

REEFWATCH PIONEERED THE REEF RESTORATION IN THE ANDAMANS

The Andamans project had 4 primary objectives namely:

- Creating artificial reefs using metal frames & recycled material

- Using technology to facilitate faster restoration

- Creating coral nurseries

- Improving awareness among local stakeholders and wider audience

The Karnataka project had the following 2 objectives:

- Monitoring marine megafauna stranding in Karnataka

- Providing rehabilitation requisite for injured and stranded marine megafauna

Background

S.NO	STRUCTURE NAME	DATE OF PLACEMENT
1	Torpedo	November 2017
2	Flower	November 2017
3	Wave	November 2017
4	Dome	November 2017
5	Sombrero	April 2018
6	Donut	April 2018
7	Habitat	April 2019
8	Hillock 1	April 2019
9	Hillock 2	April 2019
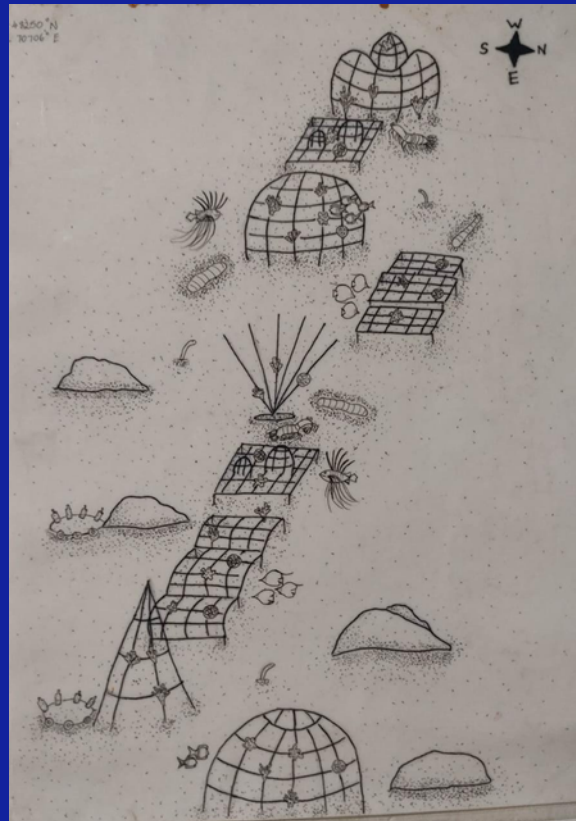
Schematic of the Artificial reef structures

An Indian Vagabond Butterflyfish (*Chaetodon decussatus*)

A pair of resident red lionfish (*Pterois volitans*)

Methodology

All project documentation including proposals and donor reports was thoroughly reviewed for methodologies and protocol definition. This was then further tracked to the level of success in field implementation and its final outcomes. A ranking system of activities was conducted for each objective.

Field Methods

The reef monitoring protocol being followed by the ReefWatch field team was overseen by the assessment team for one dive.

Three research dives by the assessment team to assess the growth rates and presence of reef-associated species.

The percentage cover of live coral and the presence of other indicator species were noted

Measurements of coral growth
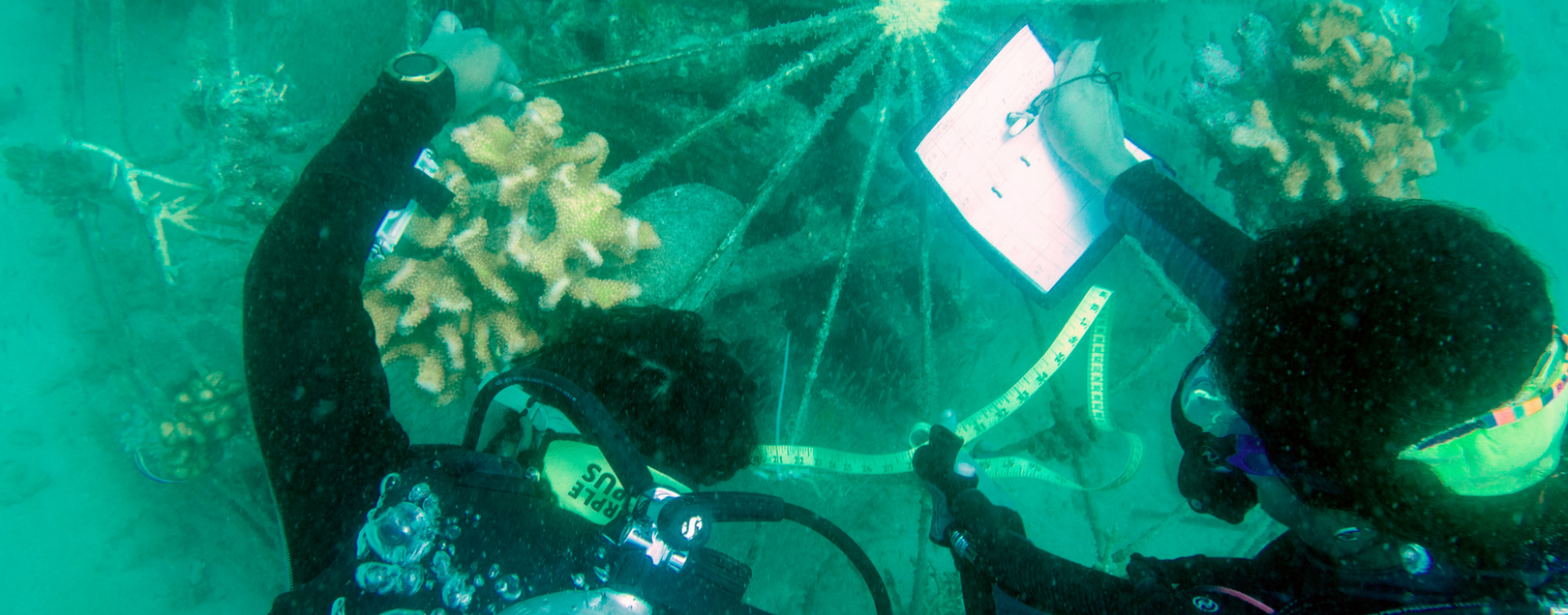
Observing cryptic species and other coral associates

Field Assesment

Standardized monitoring protocol as prescribed by Shaver et al (2020) was used to monitor the progress made in terms of reef restoration and recovery at the sites managed by ReefWatch.

Each reef structure was examined at the sites of coral attachments.

Each coral fragment was assessed for conditions including size, stage of attachment and if the coral was live/dead.

Additionally, transects were carried out along the structures followed by the adjoining reef to observe reef-associated species like fishes. This measure was used to indicate the success of the structures replicating a natural reef system.
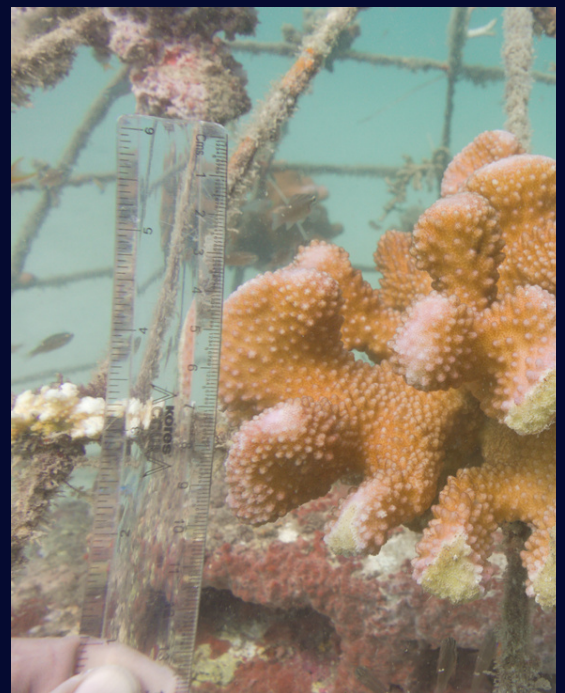
Field measurements of the
size and percentage coral cover

Rescued olive ridley sea turtle in Karnataka

Desk Assessment of Karnataka Coastal Conservation Project

A desk assessment of the field protocol and rehabilitation techniques was reviewed based on the project report and the results of the successful rescue operations carried out by the field team.

This was additionally supported through telephonic conversation with the field team to check on the outreach and training modules carried out as part of their operations.

**Successful release of stranded marine megafauna (Jan 2019-Mar 2023)**

Marine Megafauna	Number of individuals released
Olive ridley sea turtle	15
Green sea turtle	2
Hawksbill sea turtle	1
Masked Booby	4
Sea gull	1

Artificial structures are home to numerous schooling glassfish

Field Results

	Artificial Structure	Natural Reef
Genera	21	25
Species	23	35
Functional Groups	6	7
Total individuals	112	230
Herbivore - species	3	7
Piscivore - species	3	4
Corallivore -species	0	5
Macroinvertivore - species	12	14
Omnivore/Detritivore - species	2	4
Planktivore - species	3	1
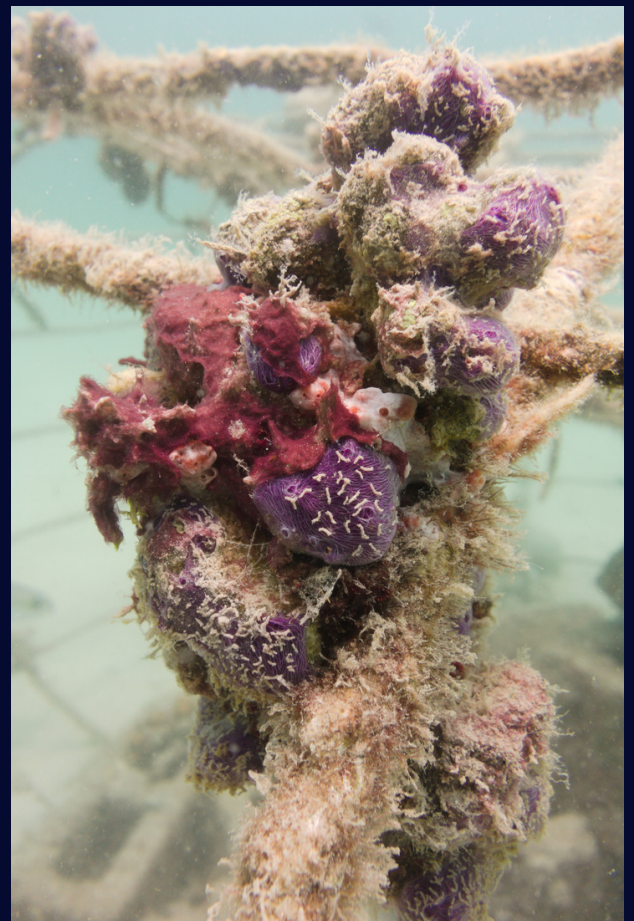
Some colonies have been overgrown by algal turfs and sponges, a phenomenon seen commonly on natural reefs

Top view of Dome showing the growth and establishment of various coral species

Field Results

After examining the structures in detail, the number of different types of species associated with natural reef systems was comparable between the structures and the natural reef.

Furthermore, there was a high rate of live and successful coral attachment to the structures that were placed with minimal dead and bleached fragments.
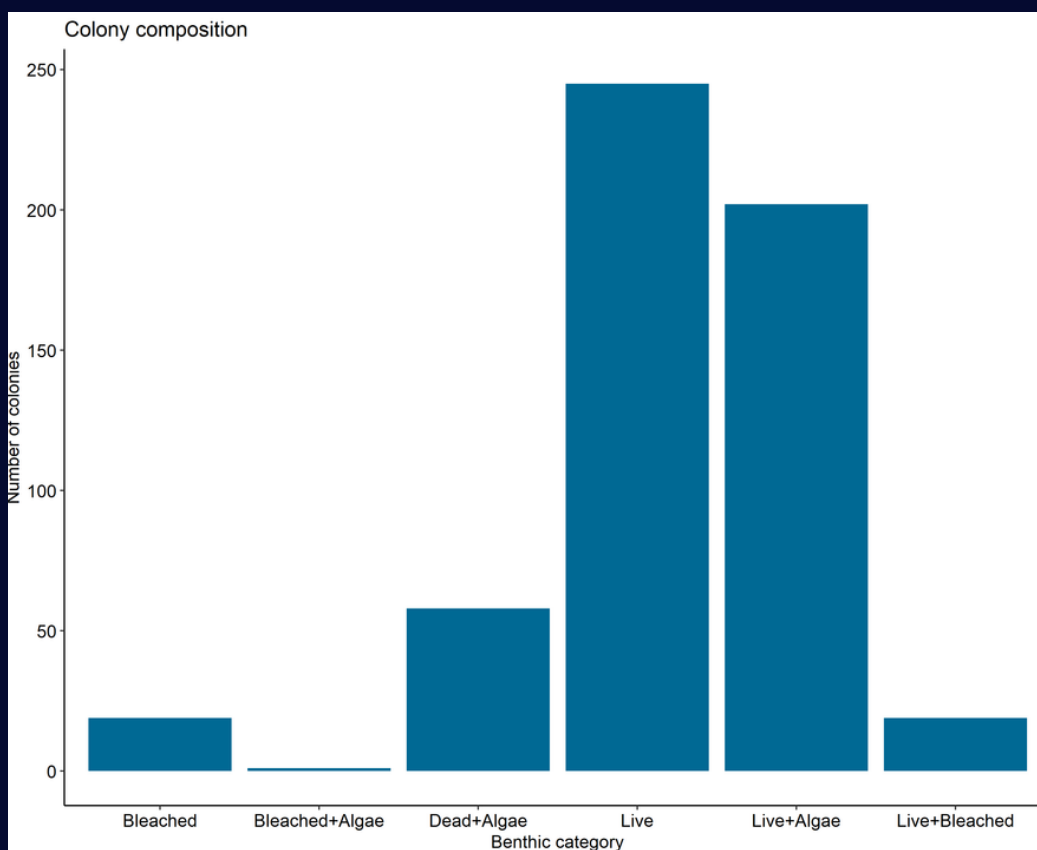
Coral composition is dominated by Live coral or Live coral covered in part by algae. Very few colonies were dead or bleached

The artificial reefs are also home to cryptic species of fish such as combtooth blennies (*Mimoblennius sp.*)

Overall assessment Results Andamans

Coral Reef Restoration: Andamans

Criteria and Rating – Evaluation Report Quality	Good or Excellent	Satisfactory	Correct but weak/Potential for improvement
Meeting the needs	■		
Relevant scope for replication by other agencies		■	
Reliable data	■		
Credible findings	■		
Clear reporting		■	

The ranking system was prepared based on the applicability of the expertise and technology utilised by the ReefWatch team in terms of the environmental need for the intervention and the quality of monitoring data and reporting the outcomes to the donor agency. This combined the information derived from the desk and field assessment for the 4 primary objectives of the proposed project.

Olive ridley sea turtle being treated in Karnataka

Overall assessment Results Karnataka

Marine Megafauna Stranding Monitoring and Rescue

Criteria and Rating – Evaluation Report Quality	Good or Excellent	Satisfactory	Correct but weak/Potential for improvement
Meeting the needs	■		
Relevant scope for replication by other agencies	■		
Reliable data	■		
Credible findings	■		
Clear reporting	■		

The ranking system was prepared based on the applicability of the expertise and technology utilised by the ReefWatch team in terms of the conservation need for the intervention and the quality of monitoring data and reporting the outcomes to the donor agency. This combined the information derived from the desk and telephonic interview for the 2 primary objectives of the proposed project. The scope of the project has exceeded their primary objectives from monitoring to include rescue action, awareness generation and in-field protection of sea turtle nests in Karnataka.

Salient Points

- 9 artificial reef structures have been placed since 2017 with the successful attachment of coral fragments

- ~40 coral-associated species were observed at the artificial reef and ~23 species of reef fishes during field surveys which indicate the structures are in the process of acting similarly to natural reefs

- Trained ~10 reef monitoring interns and outreach activities reaching ~150 community students

- 224 stranded marine fauna observed in 3 years in Karnataka which included dolphins, whales, turtles and sea birds of which 148 dead and stranded were sea turtles, followed by 60 cetaceans, 7 sea birds and 9 other cases of sea snakes and fishes/sharks.

- 18 turtles were successfully rescued, rehabilitated and released apart from 7 seabirds

- The major causes of stranding were observed to be entanglement in ghost fishing nets, followed by boat-related incidents, internal injuries, parasites, infection and oil spills

Outreach program for community students in Karnataka

Polyps of *Diploastrea heliopora*, a large reef-building coral species, observed at the artificial structures

Recommendations

- Mark and document the updating of protocol to track progress.
    - The field team needs to finalise a monitoring protocol and justify why specific changes were made over the years

- A clear description of man hours in annual maintenance is to be noted and reported.
    - Currently, there is no clear indication of the amount of time and effort being put into the maintenance and monitoring of the artificial reefs

- Develop a better reporting mechanism that tracks annual trends
    - As baseline information on the monitoring protocols are now clearly set in place, this needs to conducted at regular periodic intervals to track specific growth of coral colonies and associates in the artificial reefs

Saw-jawed monocle bream (*Scolopsis ciliata*), a commonly seen species near the structures

Recommendations

- Include details on collaborators and partners
  - Make specific indicators of partner organizations and advisors for specific activities being carried out and the capacity in which they support.

- Develop clearer data and photo cataloguing systems
  - Photographs of the coral colonies being taken using standardised protocol need to be stored and catalogued regularly as this can also provide a good tracking system of coral growth

- Provide a similar protocol manual for veterinary support for marine megafauna
  - The veterinary care being provided for marine turtles as well the standard operating protocol for conducting necropsies of turtles and marine mammals can be prepared into a protocol document that can be shared with other institutions across the Indian coast.

Rescue and Rehabilitation facility of ReefWatch in Karnataka

Conclusion

Recovering slow-growing ecosystems requires long-term support to ascertain the efficacy of the activities, the projects are still at the primary stages of establishment and their ongoing work should be supported in the long-term.
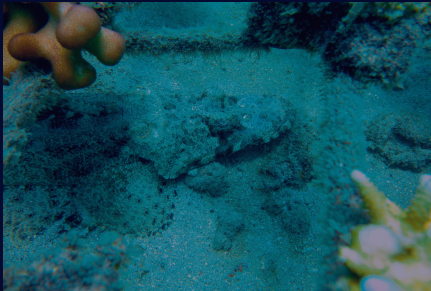
A rare crocodilefish (*Cymbacephalus beauforti*) residing in the Artificial reef structures

HIGHLIGHT 1

Techniques utilized have been adapted to changing technologies and systems

Diverse coral colonies at various stages of establishment

HIGHLIGHT 2

Have developed a unique system that is both a learning system for training govt and other agencies to establish coral reef restoration at other sites

A thriving colony of Pocillopora sp.

HIGHLIGHT 3

Has a long-term vision for reef health and requires long-term support for the activities

Safe release of rehabilitated sea turtle in Karnataka

HIGHLIGHT 4

Improved local support with communities with their outreach programs

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