

PRESENTATION

Coral Reef Vulnerability Assessments



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There are two reports for this work:

- **Vulnerability assessment**
- **Restoration report** (including Gender Action plan and environmental safeguards assessment)

These aim to:

- Describe the results of the surveys in terms of resilience and restoration potential of sites
- Address threats to these reefs
- Suggest management actions ahead of disasters
- Create of a restoration plan – how to deal with disasters like cyclones and marine heatwaves



What did we do?



Surveyed many reef sites in each country to describe the populations, threats and restoration potential.



Analysed tens of thousands of photos and videos.



What is there?



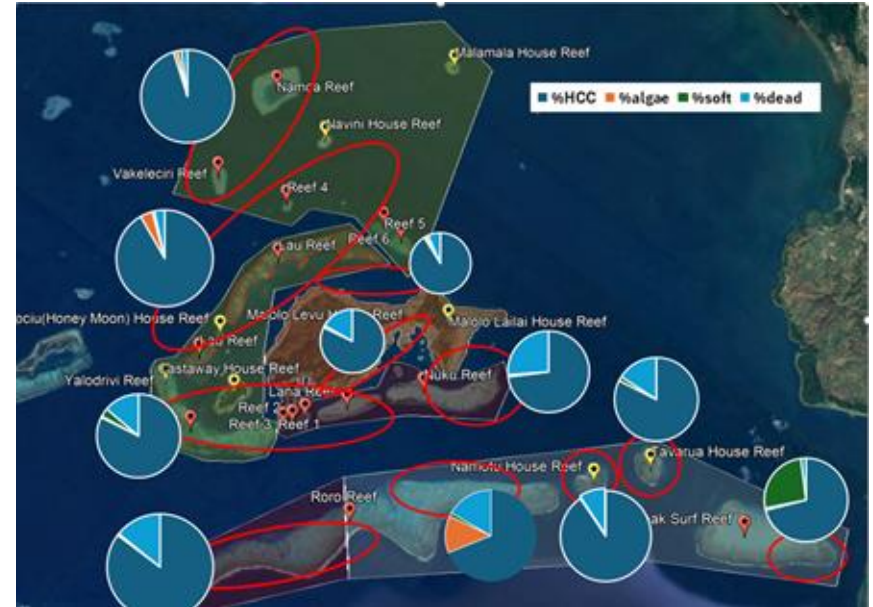
The basics



How much - hard coral, algae, dead coral, soft coral

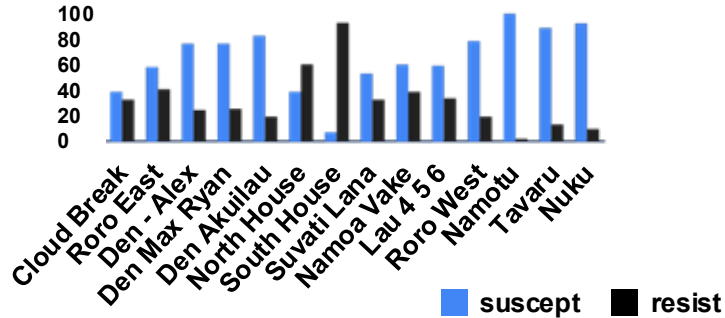


How many and what sort of fishes

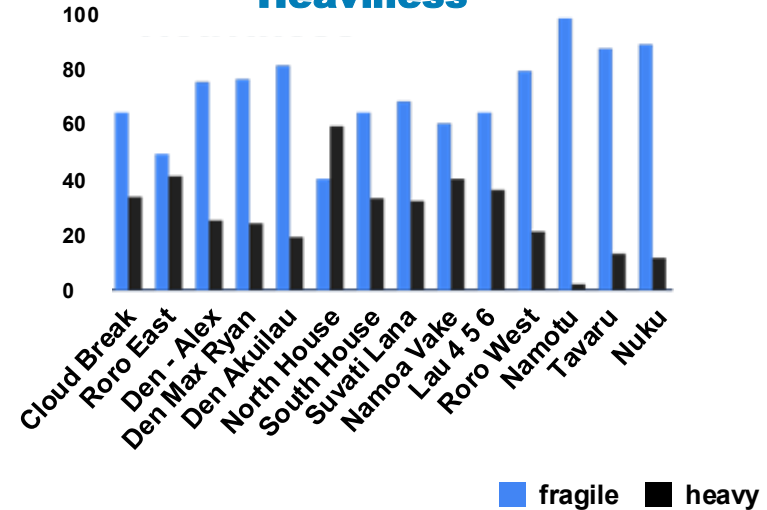


More specific information – how are the reefs likely to respond to threats?

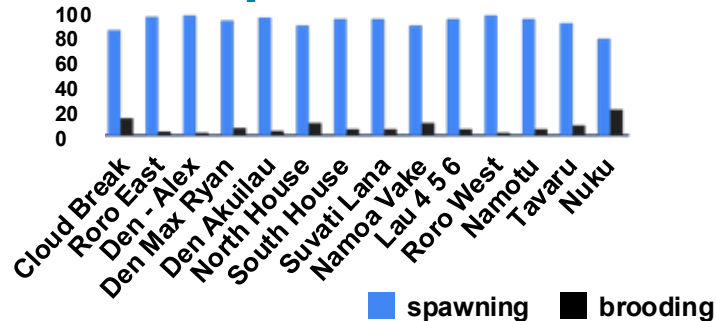
Bleaching susceptibility



Heaviness



Reproduction



What effects these reefs?

- Strong currents
- Water quality
- Fishing and seaweed farming
- Good recruitment of new corals
- Reef use by local communities
- Tourism activities
- Shipping
- Land clearing and construction

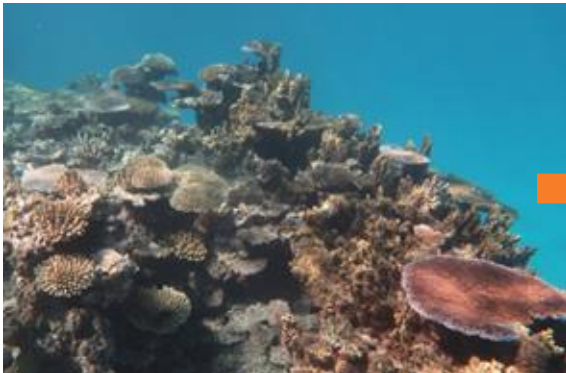


! What are the threats?

- Future marine heatwaves
- Storms, wave surges
- Shipping accidents, anchor damage
- Crown of thorns outbreaks
- Overfishing

Risks to water quality:

- Fast development – risks from sediment from construction
- Sewage from resorts and other developments



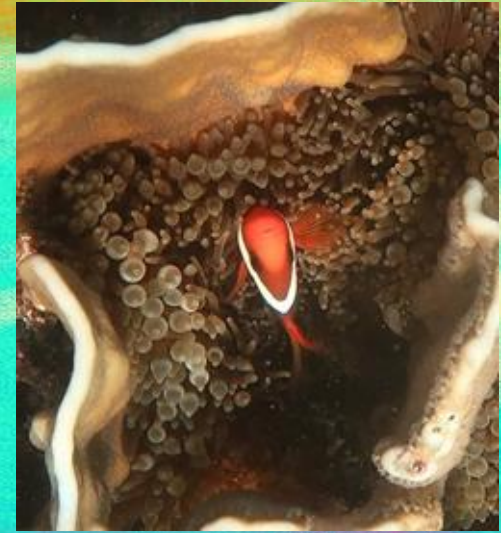
Managing for Resilience

- Controlling fishing to increase herbivores and big fish
- Managing tourism to avoid damage and pollutants
 - good briefings for snorkellers
 - no collection by snorkellers
 - no effluent from boats
 - use of moorings to reduce anchor damage
 - management of boat numbers
- Strengthening enforcement
- Regulating shipping and port development
- Keeping water quality high
 - managing rapid development
 - sewage management
- Monitoring to detect change early



What can we do to protect the reefs?

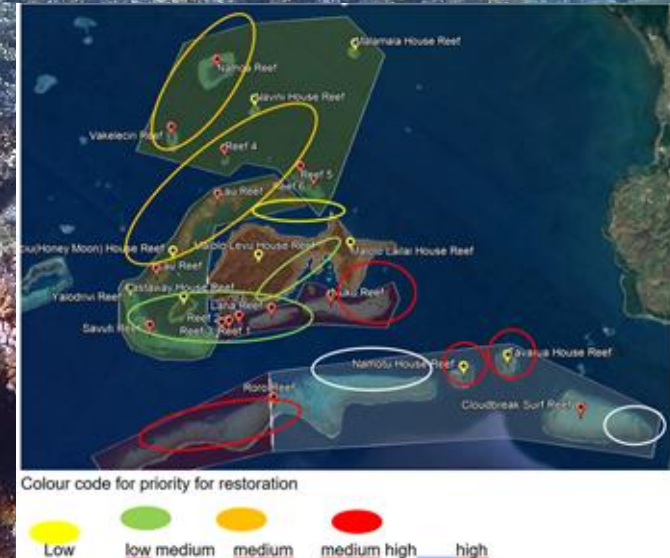
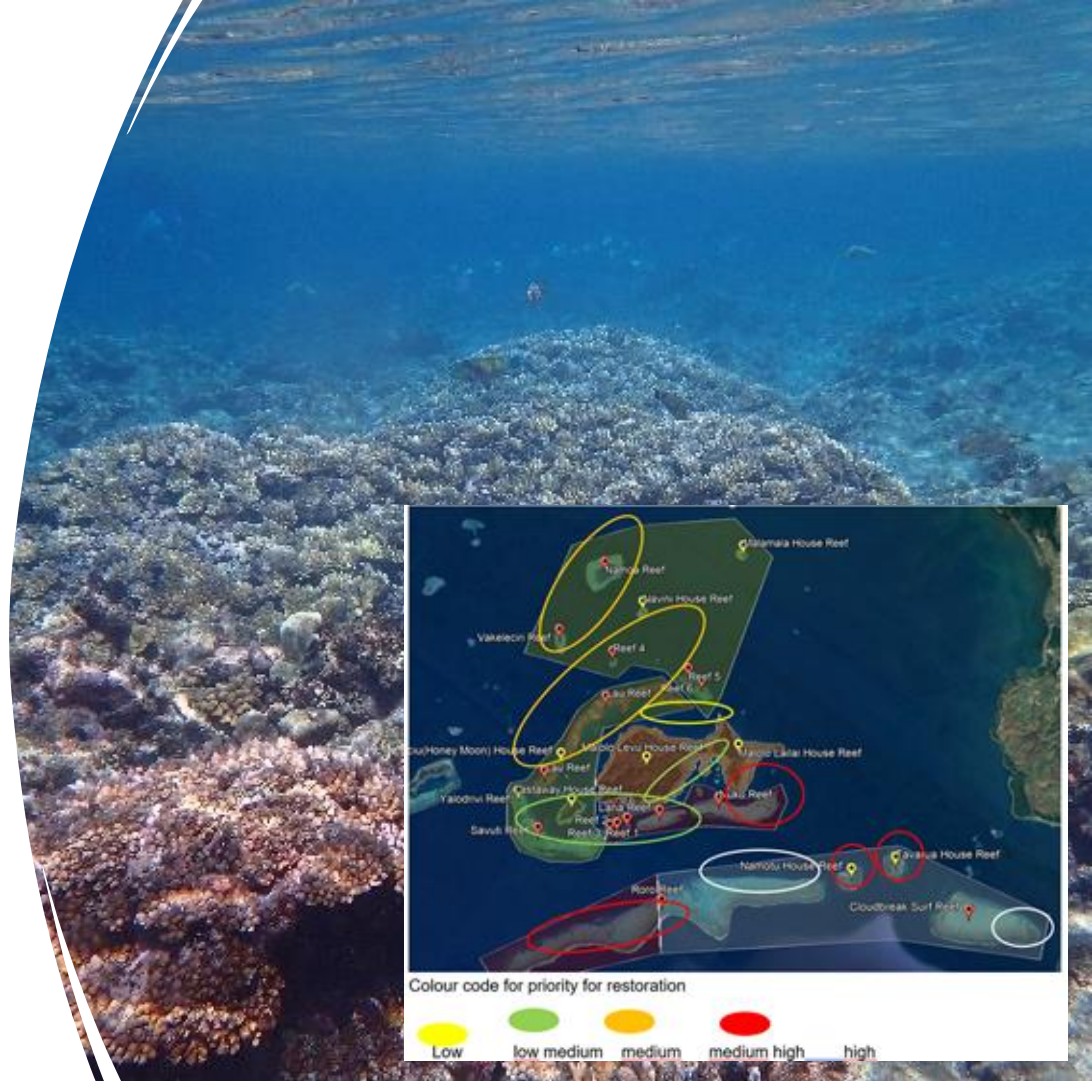
- Manage them well to increase resilience of the reefs.
- Educate the public and visitors on the value of reef protection.
- Monitor so we are aware of changes to the reef
- Be prepared for disasters.



Restoration Potential is based on:

- What sorts of corals present – how many are likely to survive a cyclone / marine heatwave?
- How accessible is the site for restoration? Is it safe? Are there strong currents, big swells?
- How valuable is the site? (coastal protection, what is on the reef, potential as a snorkeling site)
- What is the likelihood of good recovery with no restoration?

Restoration priorities decided





Questions?



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Restoration Planning



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When disaster happens:

- **We have a plan.**
- **There is a great deal we don't know about what will happen with each event.**
- **Preparation must be well considered and in place.**
- **Starting as soon as possible will be vital.**
- **So the plan must be flexible. There must be many contingencies considered.**
- **The plan relies as much as possible on rescuing corals that are damaged, dislodged by event rather than having to use healthy corals from other locations.**

Stages of Restoration



Photo Mars Restoration



Photo - Reef Resilience Network

Ahead of the Disaster

- Make a restoration plan
- Train reef brigades
- Purchase equipment
- Make some equipment
- Organise permits, space for storage, agreements

When disaster happens

- Assess the damage
- Clear debris
- Make prioritisation plan
- Begin rescue work

Monitoring

Monitor the survival/ health of restoration work

Later

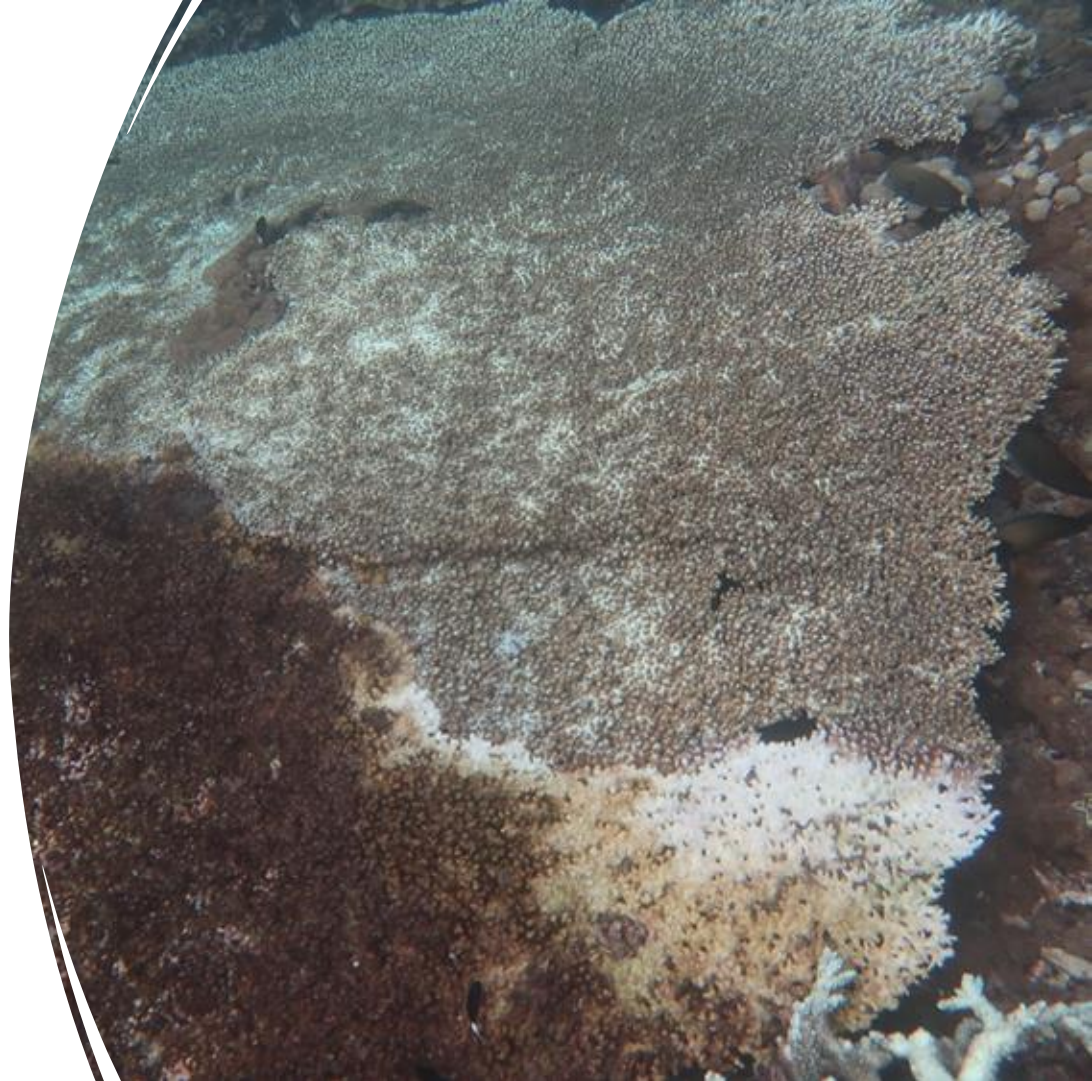
Begin program of later restoration – fill in gaps in space and diversity if deemed necessary.

For a bleaching event, this would be where the actual restoration starts

Ahead of the disaster

Reef brigades – as timing is crucial, need many hands. Train the brigades to understand what will happen, how decisions will be made, learn the skills they need on land and in the water, learn how to do the work safely.

Repeat the training each year.



Ahead of the disaster



Getting the equipment that will be needed



Making some of the equipment



Organising space for storage



Organising permission for work once event happens



Deciding on priority areas within sites for restoration



Start as soon as possible after the event



Assess the damage –
visiting sites for rapid
assessment, recording
debris situation, levels of
damage, fish presence



Prioritisation plan –
How to deal with
debris. How many
sites damaged? How
many safe to work?
Fish domes needed?



Start the debris clearing



Start the rescue work
if cyclone.



Flip back table corals that
have been overturned



Replace dislodged
corals on to reef



Collect fragments of
opportunity (FOO)



Prioritization of Sites and Key Actions



Key questions for decisions:

- Which sites can be reached safely by boat and can safely take snorkelers?
- Consult restoration plan for restoration potential of each site
- How much damage has been sustained compared to intact healthy corals?
- How valuable the reef is in terms of tourism, diversity, uniqueness?
- How difficult it will be to do the work at each site?

Decisions will be made at this stage about the deployment of fish domes.



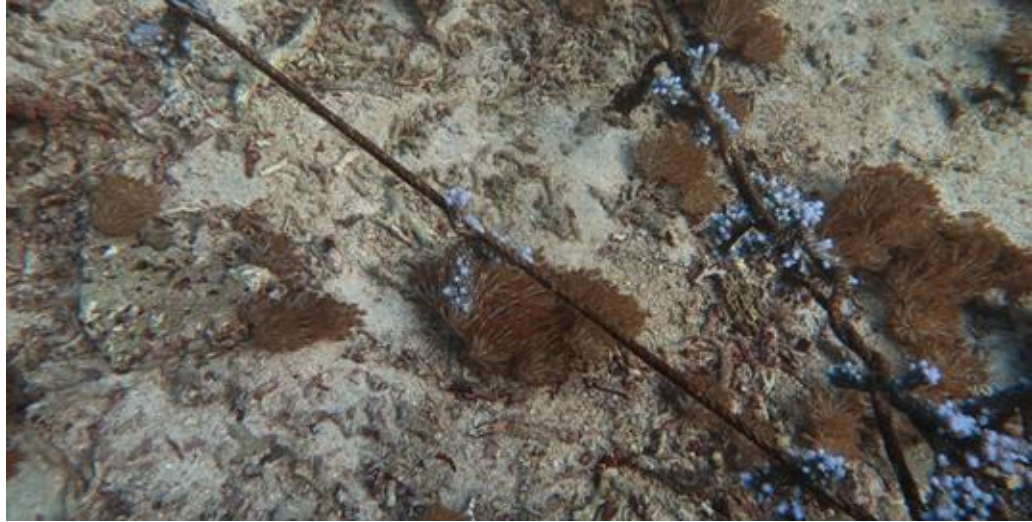
Monitoring

- ★ It is vital to maintain and monitor this initial restoration work to help survival and be ready to decide whether more work needs to be done months ahead.
- ★ Visit sites every 2 weeks for 3 months then 6 at months and every 6 months until 3 years post event.
- ★ The later restoration may begin a few months after the event, so the monitoring would adjust to cover the new work as well.



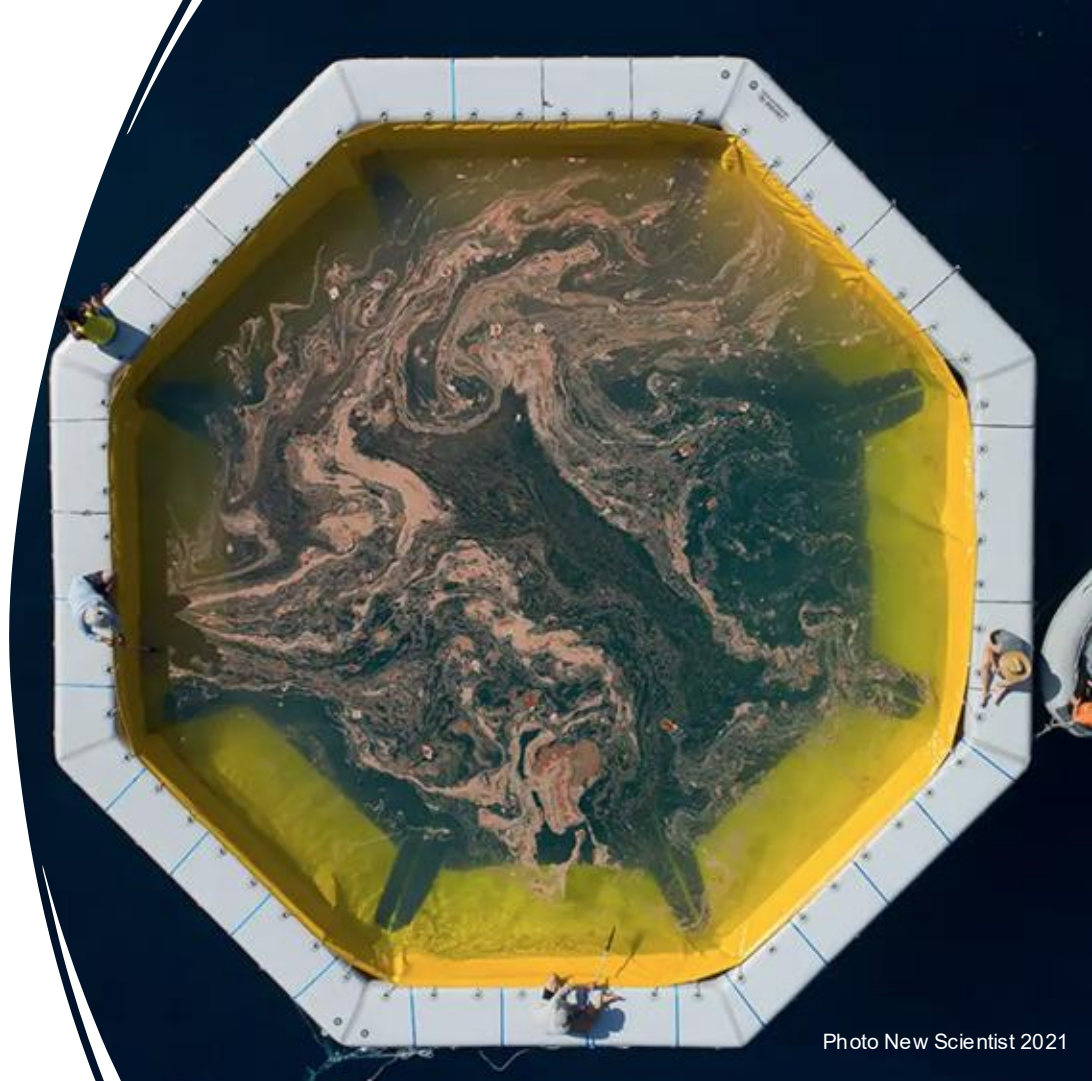
Later Post Disaster Work

- ★ • Use of small pieces of fragments on frames, racks or clips to restore gaps.
- ★ • For a bleaching event, this would occur to assist replacement of dead corals once mortality has settled.



Reproductive Restoration

- ★ Using capture of wild spawn to plant large numbers of competent larvae on suitable reef areas.



Restoration Budgets

- It is difficult to create restoration budgets as there are so many unknowns – how severe will the event be, how many reefs will be damaged etc
- The restoration plans have separate budgets for each of the stages of the restoration activity – prior, immediately after, monitoring, well after the event.
- There are costs for the brigade training and purchase and creation of materials prior and for the monitoring.
- For the other restoration work, the budgets are per hectare of reef restored. This can then be multiplied according to how much reef will be tackled. This will be dependent on the funding and human resources as well as availability of boats etc.



Budget Summary

Activity	Cost (FJD)
• Equipment purchased ahead of event	27 188
• Training of reef brigades (\$18 696 x 5)	93 480
Total for pre-event	120 668
• Immediate post disturbance assessment	28 360
• Equipment and immediate post disturbance per hectare	165 636
• Monitoring and management of restoration (3 years)	91 440
• Restoration work well after the disturbance	176 585
• Reproductive work at spawning time following the disturbance	41 416
Total for post event	503 437
Total for pre + post event	\$624 105*





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