

An underwater scene with light rays and bubbles, serving as a background for the logo.

RRRF

A lifeline for coral reefs

We extend our deepest respect and recognition to all Traditional Owners of the Great Barrier Reef and First Nations Peoples globally holding the hopes, dreams, traditions and cultures of this world



RRAP OVERVIEW

A two-year feasibility study and comprehensive investment case led to the current Reef Restoration and Adaptation Program (RRAP)

RRAP is a ~\$167m collaboration of leading research agencies and universities. It aims to provide managers with safe, socially acceptable, and economically viable options for intervening at scale on the GBR and other reefs, to help them recover from, and adapt to, the effects of climate change

RRAP is funded by the Reef Trust Partnership between the Australian Government and the Great Barrier Reef Foundation, RRAP Partners and private donors



Great Barrier
Reef Foundation



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA



Southern Cross
University

OUR PEOPLE

The largest collective and
integrated effort in the world

350+

Biologists
Data Scientists
Ecologists
Engineers
Geographers
Mathematicians
Social Scientists
Project Managers

RRAP REEF
RESTORATION
& ADAPTATION
PROGRAM



RRAP

RESTORING LOST
DIVERSITY BY

-

deploying stabilising reef
structures

transferring large
numbers of corals onto
highly connected priority
reefs.

HELPING CORALS ADAPT
TO A RAPIDLY CHANGING
ENVIRONMENT BY

-

selectively breeding and
seeding thermally-
tolerant corals using
engineering, as well as
automation to achieve a
scale never
accomplished.

PROTECTING REMAINING
REEFS FROM

-

the threat of coral
bleaching by
investigating, developing
and deploying cooling
and shading
interventions.



STAKEHOLDER AND TRADITIONAL OWNER PARTNERSHIP

Traditional Owners & stakeholders, including Reef communities, are better able to benefit from and adapt to the outcomes of interventions

Developed foundational social science and implemented engagement and partnership models, such as technology community panels and local restoration hubs

Co-designed and started piloting a biocultural value framework. Commenced a Traditional Owner capacity building initiative with formal training qualifications.

Demonstrated best-practice transdisciplinary R&D and engagement



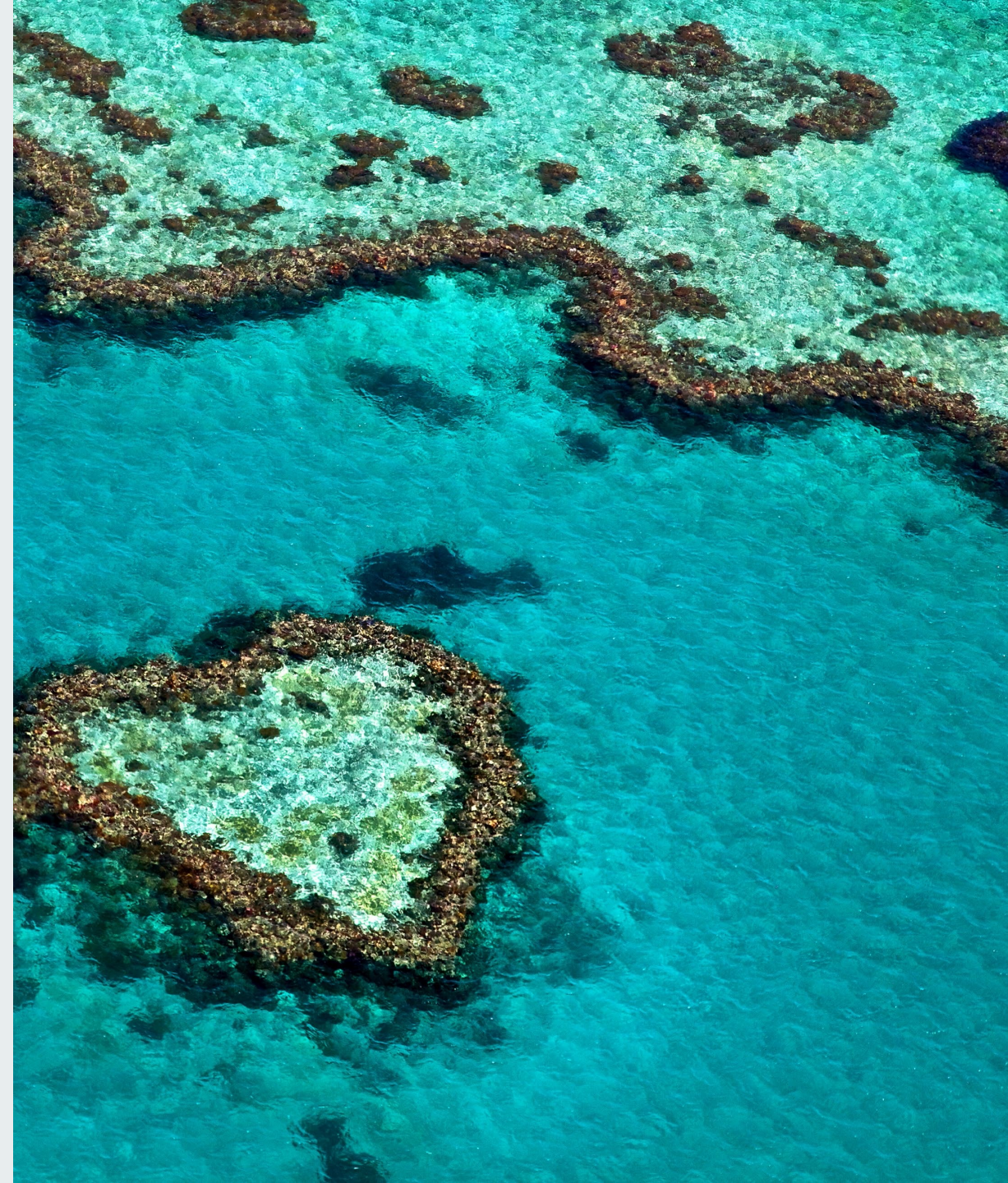
Modelling for decision support

100+ reefs identified for optimal natural larval supply connection

Decision making tools to focus deployment efforts to priority reefs.

Greater resolution of knowledge into key counterfactual and intervention decision-making processes.

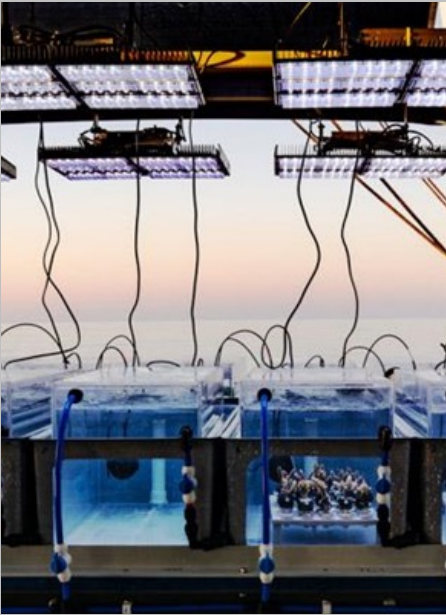
Improved ability to predict stress exposure, recovery potential and reef resilience for the prioritisation of conventional management interventions.



INTERVENTION #1 - PROPAGATION AND RESEEDING OF CORALS WITH IMPROVED TRAITS

Selecting corals and propagating those before diver-less reseeding on target reefs

Targeting 10 to 100 million corals per year of increasing thermal tolerance



AQUACULTURE PROCESSES AND SYSTEMS

Improved aquaculture production yields and scalability across multiple coral species

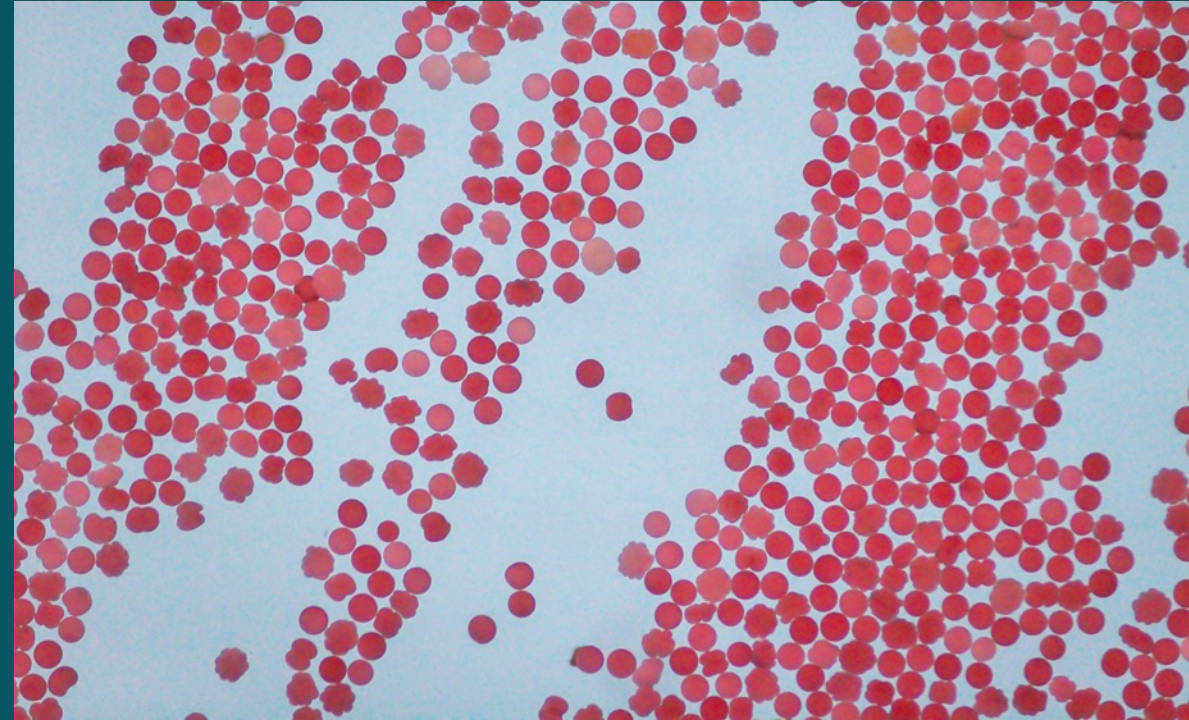
Semi-automated aquaculture processes

AI camera systems to count and monitor coral larvae and settlement

Microbial films and algae identified to induce settlement

Over 70 possible coral probiotics identified to improve coral health

Use of micro-herbivores to improve coral predator control



DEPLOYMENT DEVICES

Designed and optimised low-cost devices to deploy and maximise survival of juvenile corals without reliance on divers

3rd generation design of ceramic carrier devices, with predator-proofing and high retention rates across environmental gradients

Design and testing of modular settlement sheets that can be broken into 'tabs' and inserted into deployment devices

Anti-fouling treatments optimised



IMPROVING HEAT TOLERANCE

Progressed a range of strategies to improve or select for heat tolerance of corals

Improved understanding of the drivers and trade-offs of heat tolerance through cross-breeding

Heat stress tests performed on more than 2000 individual wild coral colonies

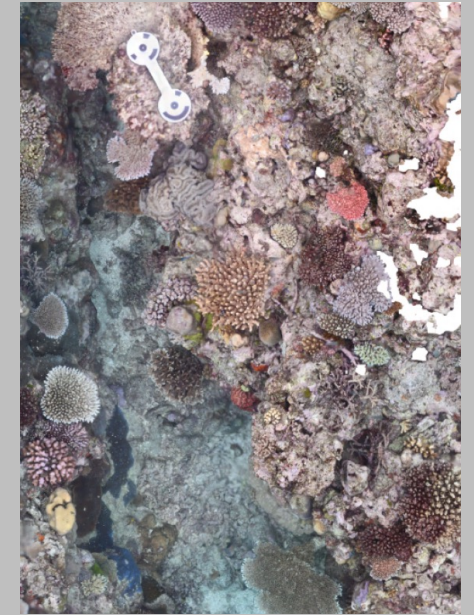
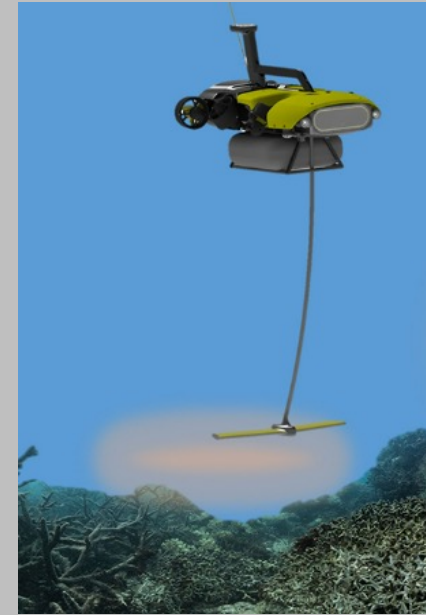
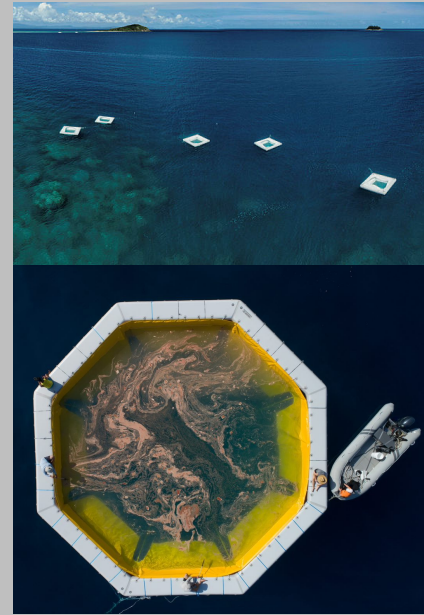
World-first operating procedures for transferring lab-grown heat tolerant symbionts to adult corals



INTERVENTION #2 – WILD SPAWN SLICK COLLECTION AND LARVAL RESETTLEMENT

Collecting spawning slick
and promoting larvae
survival and coral
settlement

Targeting billions of coral
larvae per year with
opportunities for
translocation and treatments



SPAWN SLICK COLLECTION AND LARVAL DISPERSAL

Improved systems and technologies to collect spawning slick, rear and resettle coral larvae

Developed hydrodynamic models optimise collection and larval transfer locations

Demonstrated mass culture of >12 million competent larvae using low-cost, transportable and rugged equipment

Demonstrated AI based automated collection and delivery systems

Developed macro photogrammetric technology to detect and monitor young coral settlers

Successfully delivered intervention by Traditional Owners and industry operators



RRAP PILOT DEPLOYMENTS – 2025 TO 2030
(subject to regulatory approval)

Pilot deployments could start in the 2025-26 summer, targeting 10-15 reefs across 3 locations on the GBR

Seeding of aquaculture-
propagated corals with improved
thermal tolerance

In stationary and mobile
aquaculture facilities, corals
selected based on desired
resilience traits will be mass
propagated and deployed, leading
to an estimated of ~1.8 million
one-year old corals

Spawning slick collection and
larval reseeding

Using the natural reproductive
processes of reef-building corals,
an indicative ~100 million
genetically diverse larvae will be
produced and delivered onto
damaged reefs, to catalyse rapid
recovery of areas with reduced
coral cover and diversity

Enabling activities

Comprehensive monitoring,
modelling and decision-support
program

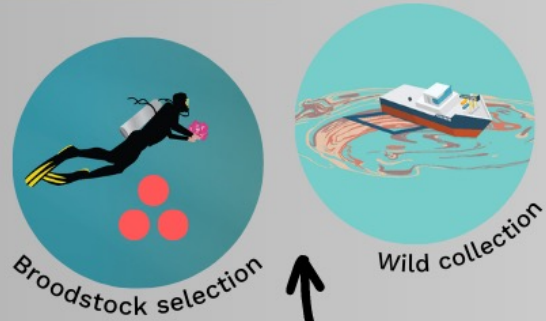
Co-design, engagement, governance
and delivery models involving
Traditional Owners, communities
and industries will be tested

Innovative instruments will be
explored that leverage public
funding and activate private sector
investment

Pilot deployment

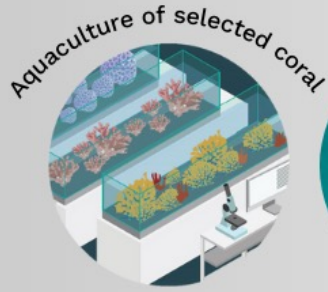
Representation of the pilot deployment design of several million corals across 5-10 reef sites. Three (unspecified) Great Barrier Reef locations, comprised of several connected reefs, will have 5-10 collection and deployment sites per reef.

Ecological intelligence will be collected at sites, to monitor, inform deployment decision making, and source coral colony collection.



Reef-wide source corals

Culture and propagation

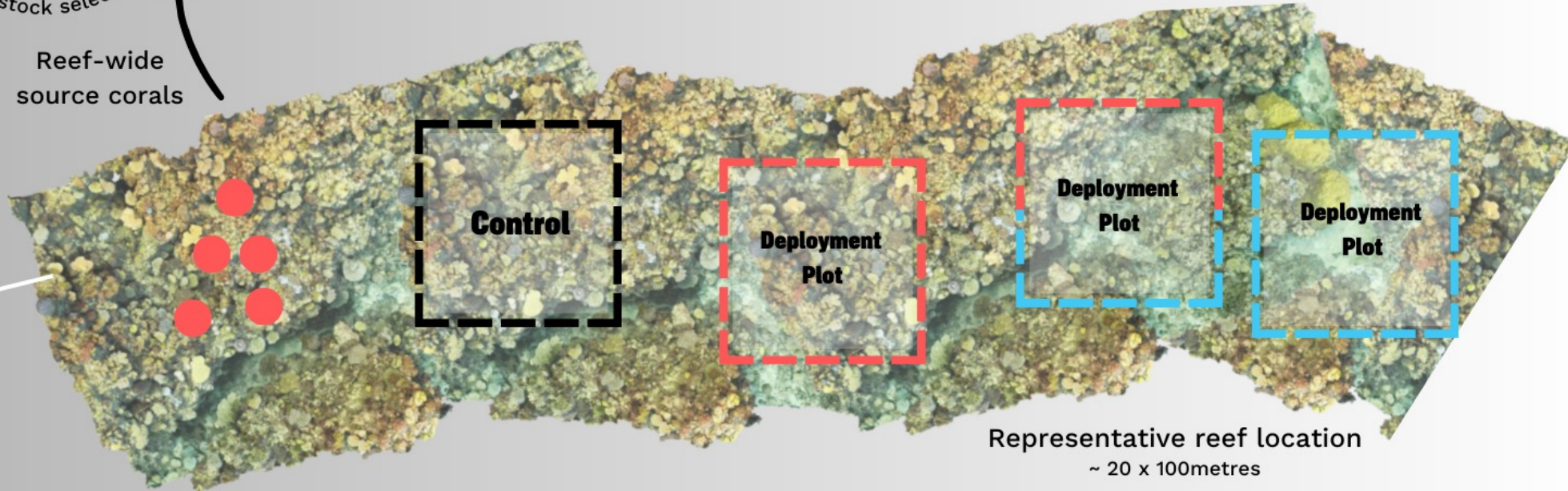


Deployment



Seeding devices may contain coral combinations of both cultured larvae and heat selected juveniles.

Heat selected corals may be hybridised or contain heat-evolved algae.



RRAP PILOT DEPLOYMENTS – 2025 TO 2030 – CONSERVATION AQUACULTURE



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