

Pilot Project

Fitzroy Report Card citizen science integration

There are few examples of citizen science data integration to inform Report Card development. [Fitzroy Partnership for River Health](#) (FPRH) and [Reef Check Australia](#) (RCA) are undertaking a collaborative project to pilot inclusion of RCA reef health survey data from Heron Island as supplementary information in the Fitzroy Basin Report Card.

Project Objectives

- Explore potential alignment of data collected by RCA and [Marine Monitoring Program](#) (MMP) for coral
- Demonstrate integration of citizen science information to complement existing Report Card assessments
- Establish solutions to facilitate automated assessment and reporting of RCA for future Fitzroy reports

Background

Environmental report cards are high level communication products designed to distil complex scientific knowledge along with multiple datasets to determine status and trend of catchment and marine health. An annual environmental report card has been published in the Fitzroy since 2012. As part of this report the [GBR Report Card](#) results are supplied as additional information relevant to the Marine Reporting Zone. These GBR Report Card results are informed by MMP water quality, seagrass and coral data.

Separately, RCA has been monitoring 16 sites at Heron Island, which is a coral cay located on the southern section of the GBR and falls within the Fitzroy Marine Zone. This data collection forms part of a larger collaborative reef research and mapping initiative led by The University of Queensland's [Remote Sensing Research Centre](#).

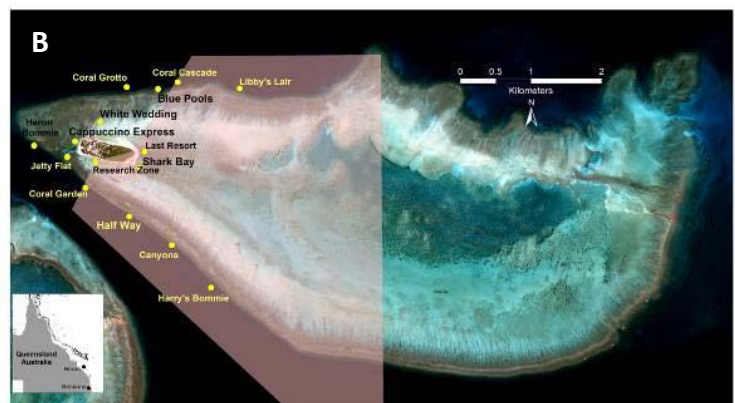
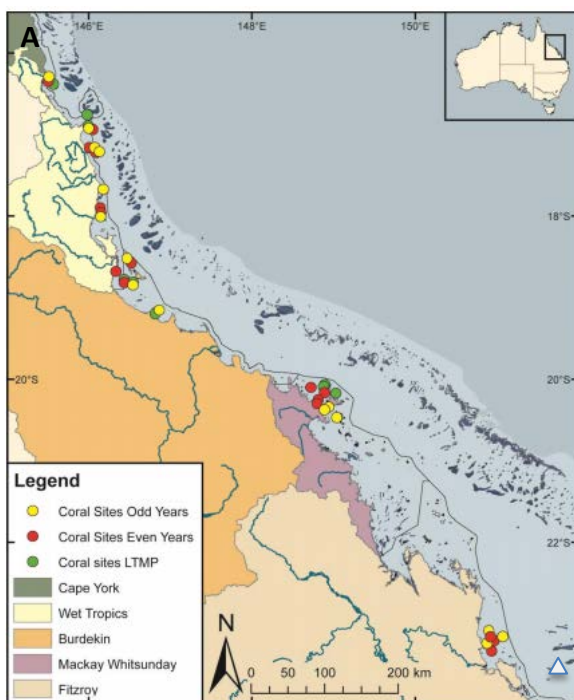


Figure A. Sampling locations of the MMP coral and water quality monitoring. NRM region boundaries are represented by coloured catchment areas. (From: Marine Monitoring Program: Annual report for inshore coral reef monitoring 2014 to 2015.) Location of Heron Island marked by triangle symbol.

Figure B. Reef Check field sites and the conservation zone overlaid on the WorldView 2 pan sharpened image acquired on 1 November 2011 over Heron Reef (Image source: Digital Globe).

Process

Develop and trial a visualisation of RCA data to support the Fitzroy Basin Report Card including:

- Review applicability and alignment of RCA data with the MMP scoring system
- Select indicators, define thresholds & develop visualisation of results using inshore MMP coral threshold guidelines, which is the only assessment framework currently available.
- [Publication of results on FPRH website](#), and establish portal for future data updates

Applicability of categories and indicators

GBR Marine Zone grades are based on condition of three categories: water quality, seagrass and coral. Within the coral category indicators include coral cover, change in hard coral cover, coral community composition, macroalgae cover, and juvenile density. RCA currently collects data relevant to 3 of these indicators: coral cover, change in hard coral cover and macroalgae. The focus of this project is to assess RCA data for these indicators using existing Reef Plan Reporting protocols and then to publish the results online using FPRH report card styling.

Indicator	RCA Alignment with MMP	Details
Live Coral Cover	Direct Alignment	RCA benthic cover categories can be compiled to represent annual averages in hard coral and soft coral percent cover. To be included in Fitzroy Basin Report Card online supplementary data in 2017.
Change in Hard Coral Cover	Alignment, but insufficient level of detail	While annual RCA data could be used to document changes in hard coral cover, this metric uses a comparison of observed changes in coral cover with those expected based on models of coral cover that requires <i>Acroporidae</i> to be separately identified. RCA documents growth forms—but there is potential to include <i>Acroporidae</i> qualifier in the future.
Coral community composition	Insufficient level of detail	RCA does not collect genus level information for coral.
Macroalgae	Minor protocol changes could improve alignment	In order to calculate the proportion of macroalgae compared to all other algae types used for this metric, RCA would need to slightly modify data collection procedures to further delineate algae types.
Juvenile Coral Abundance	Requires addition of indicator	Juvenile coral abundance is currently not included in RCA’s monitoring. This could be explored, but there have been challenges identified in regards to search intensity requirements and observer standardisation.
Additional MMP disturbance indicators	Notable alignment, not included in this case study	RCA surveys collect data relevant for MMP supplementary reporting on disturbance factors including the prevalence of coral disease, crown-of-thorns starfish, <i>Drupella</i> , physical damage, and coral bleaching. Additional RCA invertebrate, fish and condition data could be included as contextual information for reporting (eg factors or sites that are of community interest).

Benefits & Opportunities

This pilot project explores the feasibility incorporating high quality data collected by citizen science groups for use as input data in ecosystem health report cards. It is anticipated that citizen science data can complement report cards in three ways:

1. RCA data could be directly incorporated in the scoring system to fill spatial or temporal gaps. Additional RCA data may be suitable for report card integration with some adjustments in data collection protocol.
2. RCA data could report complementary ‘local sites’ on top of existing site, providing a more complete picture
3. Incorporating citizen science data into this report card provides a test case for expansion beyond the Fitzroy enhances community connection to existing communication products

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PLEASE SEE ATTACHMENT 1 FOR NOTES ON Reef Check Australia QA & QC PROTOCOLS

ATTACHMENT 1

Data quality assurance & quality control

Quality assurance and data applicability are important considerations for ensuring high-quality data that can be utilised for science and management applications. RCA implements rigorous QA and QC procedures for citizen science data sets, including extensive volunteer training, standardised data collection, team supervision and multiple data verification protocols in the field and upon data entry. Detailed information on RCA protocols can be found in [Reef Check Australia Survey Methods](#) (2013).

A simulation study established that the inherent accuracy of the Reef Check point sampling protocol is high ($< \pm 7\%$ absolute), in the range of estimates of benthic cover from 1% to 50%. A field study at three reef sites indicated that, despite minor observer and deployment-related biases, the protocol does reliably document moderate ecological changes in coral communities. ([Done et al 2017](#)).

The same [multi-criteria analysis](#) approach used for report cards was applied to qualitatively score the confidence in each key indicator used in the report card using five standard criteria, scoring a 10.5 (4 bars) if error calculations for coral cover and hard coral change are included.

Maturity of methodology	(1.5) Established methodology in published paper
Directness of measurement	(3) Survey with directly measured data
Spatial coverage/completeness	(1) Less than 10% of population survey data?
Strength of relationship between methodology, indicator reported and measured data	(3) Direct measurement of reported indicator with error
Measured error	(2) Less than 25% error or some components do not have error quantified
	10.5 score out of 13.5 (4 bars)

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Great Barrier Reef Foundation



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