



# REEF FISH CITIZEN SCIENCE DATA ASSESSMENT

## Summary & learnings

The regional report cards recognise the significant contributions that citizen science can make to fill data gaps and provide complementary local insights.

One important data gap that report cards want to address for estuary and marine environments is for fish communities.

A project to explore the use of existing citizen science data to address this gap was undertaken, with goals including:

- The potential development of a coral reef fish metric for regional and other report cards.
- An increased understanding of coral reef and marine health.

The wondrous complexity of coral reefs and the many creatures that call them home, pose a formidable challenge for scientists.

Ultimately, the complexities of merging intricate data sets hindered confident data analysis.

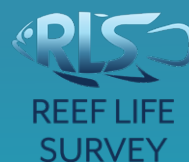
However, the study has contributed valuable insight into reef ecosystems, and furthered an understanding of the challenges and opportunities that come with utilising Citizen Science initiatives in reporting and monitoring frameworks.

This important information may be considered in future programs, and be utilised to shape future Citizen Science efforts to broaden their application to include report cards, where this has been identified as a program goal.



**Valuable citizen science datasets were provided from three major sources.**

These impressive programs are among the largest contributors of coral reef fish data available and help shape our understanding of marine life.



### The Reef Life Survey Program

Tracking the health of vital Reef ecosystems around the world.



### The Reef Authority 'Eye on the Reef'

A leading monitoring and assessment program for Reef visitors and users.



### Reef Check Australia

Using citizen science to inspire positive action for our reefs and oceans.

## KEY POINTS

# Context

- Each research program was designed for a **different end goal** and ultimately, the three datasets were not compatible to be integrated for a new outcome.
- The report has enhanced understanding of **key points to consider** for Citizen Science programs that aim to provide data to regional and other report cards.
- The report highlighted interesting findings that help **further our understanding** of Reef life and coral fish communities.
- None of the data sets contained sufficient **monitoring frequency** or **resolution** to be **used alone** for report card indicator development.
- The report highlighted **data gaps** and **areas of opportunity**.

## Key reef fish finding

“We found that the communities of fish on our inshore reef systems were markedly different from those on the outer reefs. We expected that, but we were surprised at how quickly the fish communities also changed when we compared reefs from north to south, both inshore and offshore. It appears that each individual reef has its own unique fish community structure.

“It was also clear that despite hundreds of fish surveys having been conducted over many years, each successive year produced species that hadn’t been recorded by these programs in the past. Once again, testament to the amazing diversity of the reef.”

- Dr Greg Vinall



## KEY RECOMMENDATIONS AND LEARNINGS

# Report Cards

The below learnings and considerations are in the context of Citizen Science projects that seek to incorporate data into regional and other **report cards**.



### 1 Standardisation of methodologies (where appropriate and possible)

Each contributed dataset was created for a different purpose and, individually, each provides a wealth of vital information.

However, for the purposes of inclusion in integrated reporting and report cards (regional or other) the need for a level of standardisation in data was highlighted.

- Encourage coordination and collaboration among Citizen Science providers, particularly at the outset of a program or at a program design review point.
- From a reporting perspective, there is value in uniformity in data collection techniques, especially in terms of taxa recording, to enhance the comparability and reliability of data across programs.

### 2 Coordination and collaboration: sampling and reporting

Where possible bring Citizen Science data providers together, so uniformity of data collection can be maximised. Through this work, further opportunities for cross-program coordination and collaboration for selecting and establishing site locations were identified.

- Sample sites consistently and frequently at regular intervals (many sites did not have enough regular data for inclusion, due to the opportunistic nature of citizen science sampling e.g. one-off while diving for pleasure).
- Advocate for increased consistency in monitoring frequency, potentially utilising statistical analysis to develop a recommendation on the number of times a reef should be sampled annually.
- Acknowledge the challenge of establishing benchmarks due to the lack of control sites and insufficient regular monitoring at some sites.
- Consider how data is recorded and reported across programs.

- Evaluate iconic indicator species, considering factors such as ecological significance, threatened status, and relevance to the coral reef system. What do iconic indicator species tell us? Statistics suggest community structure is more revealing, but much more complicated to assess.

### 3 Citizen Science empowerment and investment in Citizen Science guidance

This study has reinforced that different citizen science programs were designed with different goals and methods. Further data applications in report cards would benefit from collaborative design.

It has also highlighted strong potential for scientists and citizen scientists to work together.

- Recognise the significant opportunity for collaboration between scientists and citizen scientists.
- Considerations of optimal sampling frequency, timing and location could strengthen data applications.
- Encourage the integration of citizen science data into broader scientific research by addressing the skepticism some scientists may have.
- Explore partnerships with organisations to bridge the gap between citizen science initiatives and scientific applications, potentially offering guidance and support for effective data collection.
- Opportunity to design tailored programs with large groups of potential citizen scientists, for example recreational fishers.

## 4 Exploration of continued technology integration (maps and apps)

**Current platforms and emerging technology offer potential to strengthen data collection.**

- Explore opportunities around ways to better leverage and link citizen science program data (such as through RIMReP).
- Understand how new technologies could be utilised, for example smartphone cameras and cloud-connected marine electronics and mapping technology.

## 5 Coral Reef complexities

**Findings highlighted rapid changes in fish communities over short distances, emphasising the complexity of coral reef systems.**

- Recognise the complexity of Coral Reef ecosystems and the need to consider species seasonality and movement in data interpretation.
- Consider incorporating temporal factors into sampling strategies, possibly by sampling reefs multiple times a year to account for variations in species presence.
- Recognise the usefulness of citizen science data in explaining to the community and stakeholders the complexities of coral reef systems, and the challenges in obtaining fish indicators.

## 6 Focus needed on our inshore reefs Current data has a strong offshore focus, with the monitoring of inshore reefs an opportunity to explore moving forwards.

- Recognise the need for more comprehensive monitoring of inshore reefs to balance the current focus on offshore reefs by tourist-centric programs (noting this should not necessarily be up to the tourist providers, whose focus is likely to remain on providing valuable information on the outer reef).
- Recommend the identification and monitoring of specific reefs in inshore zone/s annually to establish benchmarks and gather consistent data.

## 7 Ongoing collaboration and major projects of interest There is exciting opportunity to strengthen the vision for how the data should/could/would be used in the context of report cards.

- Citizen science programs could consider working closely with end data users in the design and delivery of programs to ensure data applications.
- Monitor and assess the outcomes of major existing projects like the [IMR Reef Fish](#) Monitoring Program project, especially regarding fish indicators.
- Consider how citizen science data can complement or augment the findings from IMR and other major projects, leading to a more comprehensive understanding of marine ecosystems.



## A WAY FORWARDS

Learnings from this project, alongside other research findings, could be considered in the design for future programs to meet priority data gaps for reporting on regional waterway health.

Collaborative programs that engage both scientists and citizen scientists have widespread potential to contribute to the monitoring and conservation of reef and marine environments.

We now have a much better understanding of how sampling protocols can be modified for future integration into regional and other report cards.



# REGIONAL REPORT CARD PARTNERSHIPS

Working together across the Great Barrier Reef



The Facilitating the Passage of Estuarine and Marine Fish Data into Regional Report Card Partnerships project is funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation.



Great Barrier Reef Foundation