

Reef Monitoring Training
Fisheries Conference Room, Lami
21 June 2007
9.00am – 5.00pm

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Introduction:

A training workshop was carried out at the Department of Fisheries, Lami, Suva, Fiji Islands, aimed primarily at dept of Fisheries research teams gathering data for Qoliqoli marine resources assessments. Participants were mostly Dept of Fisheries staff actively involved either in gathering biological or socioeconomic data, or in data analysis and report writing. The training concentrated on establishing current methods in use, and the ways in which Fisheries could improve their own data standards and contribute to the GCRMN network. It included monitoring methods, practical identification skills, and simple data analysis and presentation.

Background:

Since 2002, the Fiji Dept of Fisheries has been tasked to make marine resource assessments of Qoliqolis across the Fiji Islands, as part of a programme designed to lead to better marine resource management fro the Fiji Islands. Several monitoring methodologies were proposed for this project, and the one currently in use appears to have been based on one proposed by ProcFish. However, the Fisheries staff present at the workshop did not have a written methodology available. The methodology quoted below was written by Helen Sykes from the descriptions given by the staff at the workshop, and as such may include unintentional inaccuracies.

The GCRMN network relies on contributions from different organisations working across the Fiji Islands. It is hoped that the Fisheries department may be able to contribute data from their surveys to the network, and also to collect data on turtles seen in the areas of survey.

This training will concentrate on methods suitable for description and quantification of shallow coral reef communities, concentrating on standardisation of monitoring methods, practical in-water identification skills, and data analysis and presentation.

Methods:

There are many valid methods for studying and quantifying reef populations. The Fiji GCRMN uses the following suite of methods:

4 x 20m belt and point transects, at 2 depths per site.

- **Fish Belt Transect** (5m wide and 5m high) for family groups Butterflyfish, Groupers, Parrotfish, Snappers, Sweetlips, Moray Eels, Surgeon and Unicornfish, Goatfish, Jacks and Trevallies, plus two specific species, Bumphead Parrotfish and Humphead Wrasse
Fiji Global Coral Reef Monitoring Network and Reef Check Coordinator
Once surveyors gain sufficient skills at this technique, fish identification to species and sizes can be added.
- **Invertebrate belt Transect** (5m wide) for Sea Cucumbers, Crown of Thorns, Triton Shell, Diadema urchins, Tripnuestes urchins, Pencil urchins, Lobster, Coral shrimp, plus any of local importance, such as Trochus Shell, Pearl Oyster etc.
- **Substrate Point Transect**, using AIMS Coral Lifeform categories, recorded at 40 points (every 50cm).

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Training Schedule Thursday 21 June 2007:

- 9.00 am Opening, Overview of GCRMN, Purposes of monitoring
- 9.30 am Discussion of current monitoring techniques in use by Fisheries Dept
(Fisheries staff)
- 10.00 am Introduction to FCRMN methods (Manta Tow, Line & Belt Transects)
- 10.30 am Tea**
- 10.45 am Collection of turtle nesting data (*Merewalesi Laveti, IMR, USP*)
- 11.45 am Review of fish and invertebrate families and identification principles.
- 12.30 am Review of AIMS coral lifeform substrate categories.
- 1.00pm Lunch**
- 2.00 pm Identification practice from underwater photographs.
- 2.30 pm Practical survey practice
Laying and recording Line and Belt transects on land.
- 3.30pm Tea**
- 3.45 pm Data entry onto provided spreadsheets.
Interpretation and presentation of data.
- If time: FLMMA Biological Monitoring Video
- 5.00 pm END**

Participants

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Current Qoliqoli monitoring protocol, in use by Fiji Dept of Fisheries

These surveys are carried out as one-off “Snapshot” assessments, and are not followed up as annual monitoring.

Habitat assessments made using reef walking, manta tow, and local knowledge. Different habitats such as reef slope, reef crest, and lagoon, then surveyed using the following belt transect method:

- 2 depths are surveyed at each site, 5 metres and 10 metres deep.
- A minimum of 2 and when possible 4, 50 metre long belt transects are laid, with 50 metre gaps between lines.

- **Fish transect** is carried out as the tape is being laid:
 - Two surveyors swim in a buddy team along reef, laying tape out behind them
 - Every 5 metres, survey team stops and records ALL fish seen, to species level and size assessment to nearest centimetre. (No standardised transect width, no standardised counting time, all fish seen ahead are counted)
 - Team moves on the next 5 m point and repeats
 - Total of 10 counts made along 50 m transect
 - **Gives 10 counts of fish species, numbers and size in unknown size spots 5 metres apart**

- **Invertebrate Transect** is carried out by a second team (when staff are available)
 - Two surveyors swim in a buddy team, following tape laid by fish team
 - Survey team swims in “zigzags” across a 5 metre wide belt and 5 metre long “block” from the start of the tape to the 5 metre mark, recording all invertebrates seen, to species level.
 - Team repeats in 5 metre wide and 5 metre long “blocks”, from 5 to 10 metres, 10 to 15 metres, etc., for the length of the tape.
 - Total of 10 counts made along 50 m transect
 - **Gives 10 counts of invertebrate species and numbers in 25 m² blocks**

- **Substrate Assessment** is carried out by a third team (when staff are available)
 - Two surveyors swim in a buddy team, following tape laid by fish team
 - Survey team swims around a 5 metre wide and 5 metre long “block” from the start of the tape to the 5 metre mark, recording all corals seen, to species level.
 - Percentage of coral cover is recorded, by visual approximation (no actual quantitative measurement)
 - Team repeats in 5 metres long “blocks”, from 5 to 10 metres, 10 to 15 metres, etc., for the length of the tape.
 - Total of 10 counts made along 50 m transect
 - **Gives 10 counts of coral species and “eyeball” approximation of coral cover in 25 m² blocks**

Comments:

This method is not written down, or was not available at the time of the workshop. It may be that it was misunderstood from the discussions held, or that certain aspects have been altered from the original protocol. The current method bears very little resemblance to that used by most other monitoring programmes in Fiji, but some data could be extracted for GCRMN use without major changes. It is undesirable to make any large changes to any survey method mid-way through a project. In all cases, 4 transects would be better than 2, but by analysing data from 5 metre long 'blocks' 10 data sets are produced from each transect, which allows for good data analysis.

The fish survey is very detailed and gives information from which biomass can be calculated. It requires very specialised surveyors, as identification of every fish species seen on a reef takes a long time to master. If surveyors cannot do this completely accurately, results can be badly flawed. The current fish survey method does not provide the area the fish are counted in, so it cannot provide information as to fish numbers per 100m² of reef. If this last is corrected, data suitable for the GCRMN could be provided by extracting the total numbers of the indicator fish families from the data base.

The invertebrate survey was at first confusingly described, but providing the description above is accurate, it is a reasonable way of collecting data and does give numbers per a measured area of reef. Data suitable for the GCRMN could be provided by extracting the total numbers of the indicator invertebrates from the data base.

The substrate survey causes some concern. In-water coral identification to species level is very difficult, normally done by extremely specialised surveyors, and frequently requires confirmation of samples under microscopy. It is very likely that much of the identification is flawed, and that the data collected is inaccurate for all but the most common and easily identified species. In addition, it is not clear what advantage knowing the coral species is in a Qoliqoli resource assessment. Life form categories would be more relevant, and more accurate, when assessing usefulness as fish or invertebrate habitat.

In contrast with the extremely advanced requirements of coral species identification, the method of assessing percentage cover is very vague. Surveyors swim around the 25 m² "block" and estimate the percentage for each species. No quantitative measurement such as Quadrats, Line or Point Intercept Transects is used. It is felt that this may be a misinterpretation of a more quantitative method. Data gathered in such a way can be utilised in overall description of the reef type, but cannot provide hard data such as could be used in monitoring alterations in coral cover.

Suggestions for improvement

Fish Census

- Restrict counts to a 5 metre wide belt, so that the area counted can be quantified. For example, knowing fish per 100m² would be more useful when extrapolating to the total fish population in a known area of reef.

Substrate Assessment

- Reduce coral identification to life-form category, for accuracy and ease for inexperienced surveyors, with notes as to genus where known.
- Add a quantitative measurement to the method, e.g. 4 x 1 metre² Quadrats every 5 metres, or two 20 metre long Point Intercept Transects along the 50 metre line with a 5 metre gap between them (as per Reef Check / GCRMN method)

Suggested method to improve Fisheries Qoliqoli Survey, and also to contribute data to GCRMN:

2 x 50m belt and point transects, at 2 depths per site.

If time, an additional 2 x 50 m fish transect at each depth

Along each 50 m line, carry out the following:

- **Fish transect** as done at present, one 50 m belt, but restricting observations to 5m wide and 5m high belt, and spending at least 20 minutes (preferably 30 minutes) on each transect. Experienced surveyors continue to collect species and size data. Inexperienced surveyors to collect numbers of family groups:
Groupers (in size categories) , Butterflyfish, Snappers, Sweetlips, Parrotfish, Moray eels, Surgeon and Unicornfish, Goatfish, Jacks and Trevallies, plus endangered species Humphead Wrasse and Bumphead Parrotfish. (If the last two are seen outside the transect they should be noted in comments)
- **Invertebrate transect** as done at present, one 50 m belt subdivided into 5 metre long and 5 metre wide 'blocks'
- **Substrate assessment** done at present if desired, but adding 2 x 20 metre long Point Intercept Transects separated by a 5 m gap, where substrate data is gathered every 50cm to AIMS Life-form categories. (40 points per 20 m transect)
 - Any turtles seen during dive to be noted to: species, depth, reef type, behaviour / activity.