

## 1 Introduction

Information on changes in the abundance and distribution of organisms in the Great Barrier Reef Marine Park is essential for managers and scientists who wish to understand the ecological processes occurring on the reef and how these processes may be affected by human activities.

The Great Barrier Reef Marine Park Authority (GBRMPA) and the Australian Institute of Marine Science (AIMS) have jointly developed a strategy for the monitoring of long-term, regional changes in major biota and nutrients in the Great Barrier Reef Marine Park. The program was established with two broadscale objectives:

- 1 To detect and quantify major changes through time in the distribution and abundance of corals (and other dominant organisms), fishes, nutrients, and the crown-of-thorns starfish.
- 2 To provide managers (and other decision-makers) with information that is pertinent to assessing the 'health' of the Great Barrier Reef.

One subsection of this overall monitoring program is the monitoring of sessile benthos. This element of the monitoring program is designed to monitor broad inter-regional differences and to detect major changes at reef level. Currently, 56 reefs in the Great Barrier Reef Marine Park are monitored, with surveys carried out once per year. The AIMS/GBRMPA benthic monitoring program has three main objectives:

- 1 To detect and quantify major spatial and temporal changes in abundance of sessile benthos.
- 2 To determine the status of sessile benthic communities on selected reefs.
- 3 To quantify changes in the status of sessile benthic communities through time and interpret such changes in terms of 'reef health'.

Video equipment has been used increasingly to monitor abundance and distribution of benthic marine organisms in Australia and overseas. The AIMS/GBRMPA benthic monitoring program uses video techniques. GBRMPA recognises three main advantages of video techniques over traditional techniques in benthic monitoring:

- 1 Field work for video-monitoring can be carried out by personnel who are not expert in the taxonomy of benthic organisms.
- 2 Video-monitoring requires less field time than traditional techniques.
- 3 Video-monitoring provides a permanent record of the benthos that can be re-examined at any time in the future.

However, for certain groups of benthic organisms traditional monitoring techniques have the advantage that they allow higher taxonomic resolution than video-monitoring.

In addition to the AIMS/GBRMPA program, two other programs involving video-monitoring of benthos are coordinated by GBRMPA. Both of these programs are directed specifically towards monitoring locations that are subject to heavy human use (as opposed to the AIMS/GBRMPA program which is directed towards monitoring the Great Barrier Reef Marine Park in general).

The first of these programs is carried out by the regional offices of the Queensland Department of Environment (QDoE). Locations of significant management concern are selected for this video-monitoring program by QDoE and QDoE staff establish transects and carry out the videoing.

The other monitoring program involving video-monitoring is Commercial Activities Monitoring (CAM). This involves monitoring at specific sites associated with commercial developments involving structures and/or the possibility of significant impacts. Monitoring within CAM is usually undertaken by consultants and employs a 'Before and After Control and Impact' (BACI) experimental design. The exact monitoring technique used in CAM depends to some extent on the preference of the consultant involved, with both traditional and video-monitoring techniques currently in use.

This manual has been produced in order to introduce QDoE staff to the techniques of monitoring sessile benthos using video equipment. However, it may also be useful to other organisations or individuals with an interest in this subject.

The following methods have been adapted from those in the AIMS 'Standard Operational Procedure: Sessile Benthic Community Surveys Using the Video Technique' (by C.A. Christie and S.J. Neale).