

SUMMARY

We were asked to survey fringing reefs in the Shoalwater Bay region using techniques that would enable value ranking of the reefs for management purposes. It was suggested that the biodiversity and bioconstruction values proposed by Done (1995) could be used as an aid to such ranking. All 24 reefs for which information was required were visited between the 11 and 18 December 1995 and detailed surveys made on 18 of these. Measurements of coral cover were made using two sites of five 20-metre line intersect transects on each reef. Coral diversity was measured by counting the number of species recorded during the transect surveys, and during an additional 30 minute haphazard swim around each location. Estimation of bioconstruction value required measurement of size frequencies, and these were obtained from the transect intersects and also by making additional measurements of large corals during a 90 minute search of each location. This gave biased measures of size frequency, but as the same technique was used on all survey reefs we considered that value comparisons among reefs were valid.

Coral cover was very variable, ranging from 7.3 to 66.3%, but was, on average (grand mean 37.8%), lower than has been recorded from most other fringing reef areas in the Great Barrier Reef region, where grand means have ranged from 50 to 80%. However, the Shoalwater Bay reefs appear to have relatively high coral cover when compared to other fringing reefs within the strong tide region between Mackay and Port Clinton where the maximum tidal range is more than five metres. Coral communities were dominated by acroporids; explanate *Montipora* species on reefs in the southern sector of Shoalwater Bay, and both *Acropora* and *Montipora* species on northern sector reefs. A total of 87 coral species were recorded overall, with a range of 23–58 species counted from individual reefs. Coral diversity was lower than has been recorded from fringing reef areas to the north, where overall totals have ranged from 120 to 143, but was equivalent to the approximately 90 species recorded from the Keppel Islands to the south. Done's biodiversity value was relatively similar for all the survey reefs, suggesting that they are of similar value in a Great Barrier Reef wide context. Mean colony age as calculated from the biased measures of size frequency gave an underestimation of age. Mean age estimates ranged from 9 to 16 years for the Shoalwater Bay reefs (grand mean 12.3 years), but was over 27 years for the Pearl Bay location. Done's biodiversity value gave a good range of values for the survey reefs, and was useful for ranking the relative value of the reefs. As well as calculating this bioconstruction value, we also used a count of the number of coral colonies over 100 centimetres across that were encountered during the surveys on each reef as an additional bioconstruction measure. The number of large colonies encountered on each reef was also very variable ranging from 4 to 63. Our experience suggests that the number of large colonies on the Shoalwater Bay reefs was lower than on most other fringing reefs, with the possible exception of other reefs within the strong tide area mentioned above, and their size was generally smaller.

A number of reef attributes were used to rank the value of these reefs for managers. The most obvious feature of any reef is the percentage of live coral cover, and this was used as one attribute in the ranking process. Done's biodiversity value had limited ability to rank reefs when used in a local context such as within Shoalwater Bay, and as a result we also used a simple count of coral species to rank these reefs. We also used mean colony age, Done's bioconstruction value, and a count of all coral colonies over 100 centimetres across, as further attributes for ranking reef value. The final reef attribute used for ranking these reefs was the subjective aesthetic value, on a scale of 0–5, given to each reef after the survey to put their value in a social context. By combining these seven attributes, an overall ranking of reef value on a 0–5 scale was arrived at. Reef value in the Shoalwater Bay region was very variable, ranging from a low of only 1.83–4.36. Two reefs were considered to have above average value, while three had below average value.

A number of features of these reefs, including the high variability in reef attributes and the possible low mean colony age, suggest that they are subject to relatively high levels of

disturbance. While the highest value reefs are comparable to fringing reefs in other areas, many are of lesser value than most other fringing reefs, with the exception of those reefs in the strong tide area between Mackay and Port Clinton. Like other reefs in this strong tide area, it is possible that the Shoalwater Bay reefs are surviving in a region that is marginal for fringing reef development. Some suggestions of management options are made for the reefs in this region.