

LONG-TERM SURVEYS OF ACANTHASTER, CORAL TROUT AND CHAETODONTIDS ON THREE REEFS OFF TOWNSVILLE: 1983-1989.

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SUMMARY

Sea Research have carried out density surveys of crown of thorns stars, coral trout and chaetodontids on three reefs off Townsville: John Brewer, Lodestone and Davies, on a number of occasions since 1983. Initially, surveys were made on a single back reef slope site, but since November 1984 surveys were also made on front reef sites on each reef. Most sites were surveyed three times over a six year period but the back reef site at Lodestone has been visited four times in the same period and that on John Brewer five times. In the latest survey of these sites, in June 1989, lethrinids and lutjanids were also counted.

All counts were made along 10 replicate visually searched strip transects, 50 x 20m in size, positioned haphazardly within each site. The same personnel were responsible for the surveys of all time series.

Crown of thorns devastated coral communities on John Brewer and Lodestone in 1983/84, reaching densities of 200-260 per hectare (ha) at the peak of the infestation. This peak was short-lived, with numbers dropping to less than 10 per ha within 9 months. Davies, on the other hand, did not experience an outbreak until mid-1989 with lower densities of 34-64 per ha recorded at this time. Coral communities were beginning to recover on the front of Lodestone by June 1989, 6 years after the peak of infestation by crown of thorns.

A number of patterns in coral trout density on these 3 reefs were detected by these surveys. Numbers on the front reef were overall 76% less than on the back reef sites. Densities on the three reefs were consistently and significantly different, with overall grand means of 27, 35 and 46 per ha on Lodestone John Brewer and Davies respectively. Fluctuations in density were similar for all reefs, especially a significant drop in density of 21% that occurred between May 1986 and June 1989. Conversations with fishermen working on Davies Reef in mid-1989 suggest that this drop, and a corresponding drop in mean length of coral trout over the same period, was probably due to an increase in commercial fishing pressure on these reefs in recent months, especially on Davies.

The different survey sites supported similar densities of 0+ age class recruits in each of the three mid-year series of counts, but densities were consistently different at some sites. The John Brewer back reef site supported twice as many recruits as most other sites, while the Davies front reef site had half the density of other sites.

There were no changes in coral trout density or length structure over the 6 year period covered by these counts that could be attributed to the effects of crown of thorns infestations on the reefs.

It is postulated that each reef may have a normal carrying capacity for coral trout that is determined by the unique physical and biological characteristics of that reef and that while fishing pressure or recruitment success may cause fluctuations in coral trout density, other factors are acting to bring numbers back toward this carrying capacity. This would explain why numbers within each site were so consistent over the 6 year period covered by these surveys.

The density of chaetodontids was dramatically affected by crown of thorns devastation of coral communities, with numbers on damaged reefs around 20% of those on unaffected reefs. Although Davies Reef was suffering an infestation of crown of thorns in June 1989 numbers of chaetodontids were still relatively high at this time.

This type of strip transect can be used to estimate density of coral trout, crown of thorns and chaetodontids successfully, and to detect changes in space and time, but was not useful for counting lethrinids and lutjanids because of the very high variances that result from the clumped distribution of fishes in these families. It is suggested that a much longer strip transect, between 400-800m long and 20m wide might give a more precise estimate of the density of these fishes, and that tests of such a method be made in the near future.

It is proposed that monitoring of population density of crown of thorns, coral trout, chaetodontids and hard corals be continued and expanded on these reefs to take advantage of the long term data base already established. The advantages to management of being able to base any decisions on a long time series of density data for important reef organisms make such monitoring worthwhile.