STATISTICAL TESTS

The major aim of both the length estimation work and the coral trout censusing was to compare size class distributions, the comparison of total numbers of coral trout observed being of secondary importance. Although the expected distribution of the stick lengths was known, the expected distribution of fish in the 'unfished' area was unknown. Moreover, a test was required which permitted comparison of samples obtained by different observers, where again there was no 'expected' distribution. The kind of test required to compare distributions needs to be particularly sensitive to skewness. For these reasons, the non-parametric Kolmogorov-Smirnov test (Siegel, 1956) was chosen. This test permits comparison of two independent samples by comparisons of the cumulative distributions and is sensitive for <u>any</u> kind of differences between distributions. Although the χ^2 test would have been appropriate for comparison of the observed and expected 'stick' distributions, the Kolmogorov-Smirnov test is believed to be more powerful and was therefore used for all comparisons of size class distributions.

In the examination of the appropriateness of the Kolmogorov-Smirnov test, the size class distribution of coral trout in the 'unfished' area observed in the First Workshop (G.B.R.M.P.A., 1978) was reversed to approximate the size class distribution of a 'fished' population.

Size class (cm)	0-20	20-40	40-60	60-80	80-100
'Unfished'	0	30	130	155	47
'Fished'	47	155	130	30	0

Under the Kolmogorov-Smirnov test, the two distributions were significantly different ($p > .05$).

The test is not sensitive simply to the added presence of a smaller size class in the population. This smaller size class may merely reflect recruitment. This was shown when the following distributions were compared and were found to be not significantly different ($p > .05$):

Size class (cm)	0-20	20-40	40-60	60-80	80-100
'Unfished	0	30	130	155	47
'Fished'	20	47	155	130	47

Dividing the 'unfished' population by two and comparing it with 'unfished' population shows that low numbers will not by themselves produce a significant difference ($p > .05$) since the test is based on proportions:

Size clas (cm)	0-20	20-40	40-60	60-80	80-200
'Unfished'	0	30	130	155	47
'Unfished x ½'	0	15	65	78	24

Thus the test appears to be entirely appropriate for the intended purpose, since it will tolerate some variability between distributions, but regards as significantly different, distributions which would approximate 'fished' and 'unfished' populations.