

QUANTIFICATION OF REEF FISHES

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Purpose: Compare methods of quantifying reef fish populations (Report No. 78-8a).

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Accomplishments: Two 100-meter transects were laid out running north to south, one each along the east and west walls of the Salt River Canyon. Each transect was marked off in 10-meter intervals. The methods used were the following:

Quadrat: Stations were established at 10-m intervals along each transect. The diver would count and estimate the size of each individual fish which entered an imaginary 2x2x2 meter cube.

Random Swim: Each diver would swim randomly but slowly in the vicinity of the transect and record species seen in a 50-minute sampling period.

Transect: Two divers positioned themselves on either side of the origin and the transect line. The divers would then swim along the transect and record the number of each species seen. There were three approaches to photography.

(1) *Movie (Cinetransect):* A super 8 mm movie camera with day-night film was utilized. One diver would swim at a leisurely pace for 50 m while exposing 2.75 minutes of movie film, aiming on the transect line. This was done during both day and night.

(2) *Movie (Turret)*: Again, a super 8 mm movie camera was employed. A diver would expose film while slowly panning in a circular fashion (clockwise) for 2 minutes (360°). Each transect was exposed at each end and center of the study area during daylight.

(3) *Still Photography*: A diver would expose four frames of ASA-64 Kodachrome film in each of four compass directions. Each transect consisted of ten stations with four frames each.

Preliminary findings indicate that each of the methods contributes a specific and necessary amount of information on the population level of reef fishes. The random-swim technique was the easiest to employ and probably the least sensitive to error. It became very obvious at the outset that any method that requires a diver to count fishes has a great amount of potential error inherent in it. It may be reasonable to see that, once the relative species abundance has been discerned, some effort may be made toward standardizing the population figures to absolute abundance level. A prior assumption concerning photographic techniques seems to be invalid in our opinion. It is doubtful that even the most careful analysis will correct for a diver's *in situ* ability to identify fish. This study has reinforced some assumptions made in certain collecting techniques. The preliminary analysis indicates that some method which permits the diver to inspect all areas of the reef is essential to comparing reefs on the basis of their fish populations. Methods which restrict the observations of divers significantly underestimate the species diversity levels of reefs. Future attempts

will be made to combine both quantitative and qualitative methodology to make efficient use of the type of information each of these provides.