How to Interpret a Report

Fish surveys conducted using the REEF roving diver method meet several objectives:

- Ability to collect large quantities of presence/absence and relative abundance data
- Indication of species distribution throughout a geographical area based on sighting frequency and abundance
- Specific species presence/absence and abundance lists may be presented for any given region, subregion, zone or site.
- Measures of similarity in species composition may be computed between any combination of geographical areas.

After REEF field surveys have been completed, the forms are electronically scanned. A computer program is then used to process the resulting datafile to generate summary reports. On the top of every report the number of surveys and total bottom time (hours) are given. Two parameters are presented in standard summary reports. These are Den and %SF. In addition, there are two categories of observers for which data may be reported. These categories are novice and expert. The fish identification and survey skills of novice observers have not been documented to be of a high level. Expert surveys are completed by observers with a demonstrated high level of fish identification and survey skills. The number of species recorded by all observers (total) is listed as well as the number of species recorded by expert and novice observers at the bottom of the species list on the report page.

The density index (Den) and percent sighting frequency (%SF) parameters provide a measure of the relative density of species and the frequency with which these species were observed.

Density Index (Den)

Density Index (Den) - This is a measure of how many individuals of a species are observed based on a scale of 1-4. It is representative of the abundance category (1-4) which was most frequently recorded for the species when it was observed. Abundance category weights are **S**ingle=1, **F**ew=2, **M**any=3, and **A**bundant=4.

This weighted density average is calculated as:

$$\text{Den} = \frac{(S * 1) + (F * 2) + (M * 3) + (A * 4)}{\text{(Number of surveys in which species was observed)}}$$

This number indicates which abundance category the species was most often recorded in when it was recorded. For example, Den=2.2 would be reflective of a species that was most often recorded in category 2 (Few) but since the density index is greater than 2, there were some abundances recorded for this species in the other, larger abundance categories (either category 3 or 4). The density index should be used as a density guide. In this survey method, area is not rigorously controlled. It should also be kept in mind that the density (Den) parameter is reflective of sighting distributions in the four

different abundance categories (S, F, M, and A) and different distributions of sightings in each abundance category could potentially give similar values of Den.

Sighting Frequency (%SF)

Sighting Frequency (%SF) - This is a measure of how often the species was observed. It indicates the percentage of times out of all surveys that the species was recorded.

The %SF parameter is calculated as:

$$\%SF = 100 * \frac{S + F + M + A \text{ (for each species)}}{\text{(Number of surveys)}}$$

By simultaneously examining the sighting frequency (%SF) and density index (Den), data summaries can be interpreted for fish species. The Den and %SF scores could be multiplied to provide a measure of species abundance which includes zero observations.

The following table shows an example of how to interpret summary information at the species level.

Example of Data Interpretation

Den	%SF	Explanation
HIGH Den >3.0	HIGH %SF >50	Species is often observed and observed at high densities. Species is seen > 50% of the time and when it is seen the abundance category most often recorded is M or A. Species examples: bicolor damselfish, blue chromis, brown chromis
HIGH Den >3.0	LOW %SF <50	Species is not often seen, but when it is seen, it is observed at high densities. Species is seen < 50% of the time and when it is seen the abundance category most often recorded is M or A. Species examples: silversides/herrings, garden eel
LOW Den . <3.0	HIGH %SF <50	Species is often observed, but always at low densities. Species is seen > 50% of the time and when it is seen the abundance category most often recorded is F or S. Species examples: trumpetfish, rock beauty, foureye butterflyfish
LOW Den <3.0	LOW %SF <50	Species is not often observed and when it is observed, it is at very low densities. Species is seen < 50% of the time and when it is seen the abundance category most often recorded is F or S. Species examples: green moray, saucereye porgy, spotted scorpionfish

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