



Counting fish and measuring diversity

Background reading for teachers

This reading gives you the background for each slide, with sources you can check.

Fish surveys

Underwater visual census along belt transects is the standard way to count reef fish. MCP's volunteers survey fish along 30 m transect lines and must pass training in species identification and survey methods, which takes 2 to 4 weeks, before surveying.¹ The 5 m belt width used in the practice is a teaching simplification; real protocols set the width by species group and visibility.

Density

Density standardises counts to a fixed area, usually per 100 square metres or per hectare, so surveys of different sizes can be compared.

Simpson's diversity index

The version used here, $D = 1 - \sum n(n-1) / N(N-1)$, gives the probability that two fish picked at random belong to different species. It rises with both the number of species and how evenly individuals are spread between them. A site dominated by one species has a lower D, even if it has many fish.

The practice data

The belts are drawings made for this lesson, not real counts. They are designed so the protected site has more fish, more even numbers and some large predators (groupers), while the fished site is dominated by small damselfish. With these numbers, D is 0.81 at the protected site and 0.66 at the fished site.

Sources

1. Marine Conservation Philippines. Marine Monitoring. marineconservationphilippines.org/projects/conservation/monitoring/

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