



Why scientists sample

Background reading for teachers

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

Why sample?

Underwater surveys are limited by area, dive time and safety, so reef monitoring always uses samples. MCP monitors reefs along about 70 km of coastline from Dumaguete to Santa Catalina, in both marine protected areas and unprotected sites.¹

Random and stratified sampling

Random sampling gives every unit an equal chance of selection, which avoids selection bias. Stratified random sampling divides the area into zones that differ (for reefs, often depth or habitat) and samples randomly within each, which usually gives a more precise estimate when zones differ a lot. MCP's methodology uses stratified random sampling, with 30 m transect lines laid over continuous reef, across three depth ranges, repeated seasonally. That comes to at least 2,016 surveys a year.¹

The practice map

The map is practice data, drawn so that urchins are much denser on the shallow reef flat. The true total is 274. Because the zones differ so much, stratified sampling is usually more accurate here, which is the point students should discover for themselves.

Exam links

GCSE biology specifications include a required practical on estimating population size with quadrats and investigating distribution with transects. Examples are AQA required practical 9 and Edexcel core practical 9.5, which uses quadrats and belt transects.^{2, 3} The usual calculation is estimated population = (total area ÷ area sampled) × number counted.³

Sources

1. Marine Conservation Philippines. Marine Monitoring. marineconservationphilippines.org/projects/conservation/monitoring/
2. Field Studies Council. GCSE science practical ecology. field-studies-council.org/school-courses/gcse-science-practical-ecology/
3. PMT Education. AQA Biology GCSE, RP9 field investigation notes. physicsandmathstutor.com

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