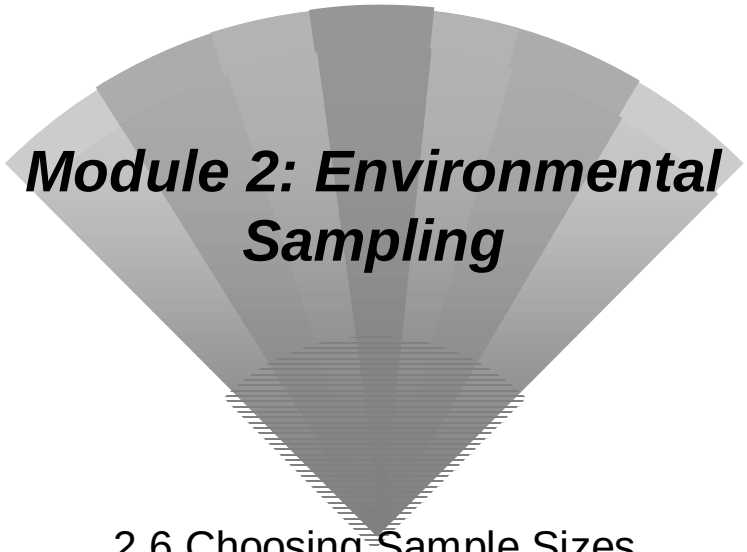
Module 2: Environmental Sampling



2.6 Choosing Sample Sizes

Choosing Sample Sizes

- Choosing an appropriate sample size is a function of:
  - Study goals
  - Degree of precision required
  - Design type
  - Budget
  - and other factors

Choosing Sample Sizes

- Often a high degree of precision is specified and calculations yield large sample sizes
- Iterative calculations are done until sample sizes come into a “reasonable” range
- This is okay since it ultimately leads to either
  - a balance between competing study requirements of cost and precision
  - a realignment of study requirements or resources

Choosing Sample Sizes

- Need to know, estimate, or specify the amount of variability expected in the data (σ) and the precision desired (δ)
- δ is half of the width of a 95% confidence interval on the mean

Choosing Sample Sizes

- For simple random sampling with data from an approximately normal distribution (at least not highly skewed):
- A 95% confidence interval on the mean with width 2δ will result from

$$n = \frac{4\sigma^2}{\delta^2}$$

Choosing Sample Sizes

- A 95% confidence interval on the difference between two means will result from

$$n = \frac{8\sigma^2}{\delta^2}$$

Choosing Sample Sizes

- For stratified random sampling, the n observations must be allocated to strata.
- Proportional allocation gives $n_i/n = N_i/N$
- So $n_i = (N_i/N)*n = w_i*n$

Choosing Sample Sizes

- If σ_i are not expected to be equivalent across strata, and/or sampling costs differ, then set

$$n_i = \frac{N_i \sigma_i}{\sqrt{c_i}}$$

- where c_i is the cost of sampling for strata i