Sampling Design Tool

An extension for ArcGIS by the NOAA/NOS/NCCOS/CCMA Biogeography Branch

Overview

The Biogeography Branch's Sampling Design Tool for ArcGIS provides a means to effectively develop sampling strategies in a geographic information system (GIS) environment. The tool was produced as part of an iterative process of sampling design development, whereby existing data informs new design decisions. The objective of this process, and hence a product of this tool, is an optimal sampling design which can be used to achieve accurate, high-precision estimates of population metrics at a minimum of cost. Although NOAA's Biogeography Branch focuses on marine habitats and some examples reflects this, the tool can be used to sample any type of population defined in space, be it coral reefs or corn fields.

Necessity

Natural resource managers and scientists must sample populations to identify status and/or monitor trend. Random sample selection of a population (e.g. animals, objects or processes) eliminates sampling biases and corresponding criticisms encountered when samples are selected non-randomly. The analysis of previously collected data provides information critical to efficient sampling design development. Results can improve the allocation of limited resources.
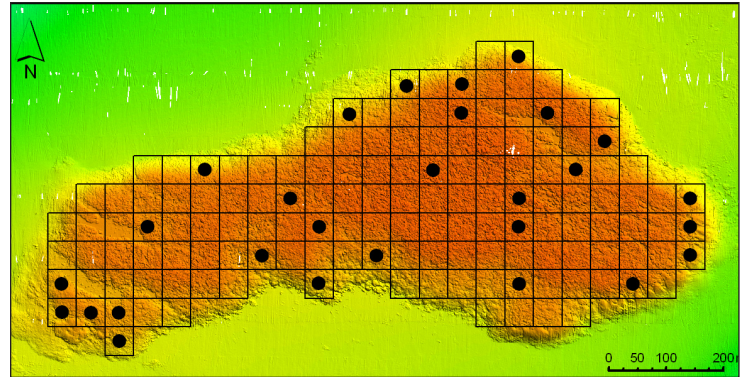
Contact Information

Concept and statistics: charles.menza@noaa.gov
Software development: ken.buja@noaa.gov

NOAA's Biogeography Branch
1305 East-West Highway, Silver Spring, MD 20910
URL: http://ccma.nos.noaa.gov/about/biogeography/

Key Features

Spatial sampling – sampling and incorporation of inherently spatial layers (e.g., benthic habitat maps, administrative boundaries)

Scalable data requirements – data requirements for sample selection can be as simple as a polygon defining the area to be surveyed to using existing sample data and a stratified sample frame for optimally allocating samples

Random selection - eliminates sampling biases and corresponding criticisms encountered when samples are selected non-randomly

Multiple sampling designs – simple, stratified, and two-stage sampling designs

Sample unit-based sampling – sample units are selected from a sample frame

Area-based sampling – random points are generated within a polygon

Analysis – previously collected data can be used to compute sample size requirements or efficiently allocate samples among strata

Computations –mean, standard error, confidence intervals for sample data and inferences of population parameters with known certainty

Output – geographic positions in output simplifies migration to global positioning systems, and sample size estimates and sample statistics can be exported to text files for record keeping

Requirements

The tool was developed for ArcGIS 9.2, SP 6 or higher.