Nested Pixel Plot Design

Description

This design is often used to complement a 30 m resolution satellite image (Joy 2002, Kalkhan 2004). The plot is 30 m x 30 m, covering 900 m² of ground surface. Within this 900 m² there are nine primary subplots, each 10 m x 10 m (100 m²). This allows for analysis at a finer resolution than the 30 m that Landsat images provide. A smaller resolution also provides a better breakdown of the data that is contained within the 900 m² plot. Because hyperspectral images are taken at a finer resolution than 10 m x 10 m, three of the ten meter plots are broken down further into 5 m x 5 m secondary subplots. Within each of these plots and subplots, percent cover of vegetation is recorded.

Equipment Needed

How to Set Up

Methodology

The Nested Pixel Plot design is a 30 m x 30 m plot that can be used to analyze data at multiple resolutions. Data is collected in each of the primary subplots at a 10 m x 10 m scale and then at a 5 m x 5 m scale in the secondary subplots. The plots are always oriented north for consistency and also to align with remote sensed images. A flag is placed in the middle of the plot and GPS coordinates are taken for the center of the plot. Next, the grid is laid out with flags in the center of each of the 10 m x 10 m plots. The soil is examined to get an estimate of soil characteristics throughout the plot. Vegetation cover is visually estimated for each subplot within the plot. For consistency either the same person should collect all of the data or should work with others taking data to ensure that estimates of cover are consistent among data collectors.


Figures
Pixel Plot Nested Sampling*

The Pixel Plot is a sampling process designed with spatial modeling in mind, using nested plots that are all square in shape. It is based on taking a randomly selected GPS location and where that navigation point becomes the plot center of a $225\text{m}^2$ plot ($15 \times 15\text{m}$). The plot consists of the main $225\text{m}^2$ plot, nine $25\text{m}^2$ sub-plots, three randomly placed $1\text{m}^2$ plots, and nine $225\text{m}^2$ super-plots surrounding the main plot. The plot is always oriented to the North. The sampling is widely inclusive, including numerous over-story and under-story variables. The data collected is very intensive and is similar to the data collected in nested cluster plot sampling methods (i.e. Modified Whittaker Plot).

I. Under-story Variables
   A. $1\text{m}^2$
      1. In the three random $1\text{m}^2$ plots, cover percentage and height of the under-story vegetation will be sampled by species, and cover percentages will be recorded for the abiotic variables.
      2. A soil sample will be taken at 10-20cm in each of the three random $1\text{m}^2$ plots.
      3. A count and average height of 1 hour ($<.25''$), 10 hour (.25-1'') and 100 hour (1-3'') woody fuels will be measured in each of the three random $25\text{m}^2$ sub-plots.
   B. $25\text{m}^2$
      1. The presence or absence of under-story vegetation by species will be recorded for the three $25\text{m}^2$ sub-plots coinciding with the three randomly selected $1\text{m}^2$ plots.
      2. A count and average height by species of both seedlings and saplings will be sampled in the three random $25\text{m}^2$ plots.
      3. Depth will be measured for both duff and litter in each of the three random $25\text{m}^2$ plots.
   C. $225\text{m}^2$
      1. The presence or absence of the under-story vegetation by species will be recorded for the entire $225\text{m}^2$ plot.

II. Over-story Variables
   A. $25\text{m}^2$
      1. Using a #20, or for more dense forests a #10 prism, basal area will be estimated from the center point of each of the random $25\text{m}^2$ sub-plots and also for the center $25\text{m}^2$ plot.
      2. For each of the “in” trees DBH, height, and height to live crown will be estimated.
3. A Forest Health Assessment will be completed, noting causes and intensity of any tree disorder, infestation or disease in any of the “in” trees throughout all of the sub-plots.

4. Canopy closure will be estimated from the center of each of the nine 25m$^2$ sub-plots.

5. A tree core will be taken from 3 trees of differing sizes, one tree from each of the three random 25m$^2$ sub-plots.

B. 225m$^2$

1. All downed logs over 3 inches in diameter will be counted by species, with a diameter estimate and marked either sound or rotten within the main 225m$^2$ plot.

2. Dominant cover types and cover percentages will be estimated for each of the nine 225m$^2$ super-plots surrounding the main plot.

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