CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Sana Hadyeh

Project Number
S1411

Project Title
T.R.E. Method of Forestry

Abstract

Objectives/Goals
My investigative question is which small sample surveying sampling method has the best representation of a larger whole population to manage the growth of trees; transect surveys, radial surveys, equilateral surveys, or all 3 combined? A forest is too large to count every tree. Sample surveys of smaller areas may need to accurately represent a much larger population area. My question examines what percentage of the larger population can be represented by smaller transect, radial, and equilateral survey samples. With previous knowledge about radials and transects, I decided to design a new method, called equilaterals. This method expands in the forest at a 90 degree angle.

Methods/Materials
I constructed 4 models of 24 scaled down #hectares#. Each hectare represents 2.4 acres or 10,000 sq. meters. I then labeled them. On model 1 I drew 2 transects, 2 radials, and 2 equilaterals. On model 2, I drew 6 transects. On model 3, I drew 6 radials. On model 4, I drew 6 equilaterals. Each representative sampling area was equal to 1 hectare in size. I randomly created a forest of 200 trees per model. I determined the mean average of each smaller sample, and compared them to means of the larger populations. I determined validity with a t-test in each case at a 95% confidence level.

Results
Percentage of small samples that met the T-test @ 95% confidence level.

Model 1: Combination of all three sampling methods	21.20%
Model 2: Transect sampling method	29.68%
Model 3: Radial sampling method	8.48%
Model 4: Equilateral sampling method	76.34%

Conclusions/Discussion
Surprisingly, the equilateral methodology had by far, the best representation of the larger whole population at 76% accuracy. This is surprising as the surface area represented was equal in all sampling methods.

Summary Statement
This project mathematically examines the validity of three sampling methods used in field biology studies.

Help Received