Stat 451

Some Sampling Problems

For the following situations, identify the population, the sampling units, and the sampling plan. If it is a multistage sampling plan, identify the population, sampling unit, and sampling plan at each stage.

1. A researcher has a list of all 4-year colleges and universities in the United States.

   (a) The parameter of interest is the proportion of 4-year schools which offer a degree in education. The names of 50 schools are drawn at random from the list and the proportion of these 50 offering such a degree is computed.

   (b) As in (a), but the list is divided into three groups according to enrollment: less than 2000 students, 2000 to 10000 students, greater than 10000 students. Twenty schools are drawn at random from each group.

   (c) The groups in (b) are each subdivided into two groups: those which offer graduate degrees (in any field) and those which do not. Ten schools are drawn at random from each of these subgroups.

   (d) The parameter of interest is the average age of full-time students in all the schools. Fifty schools are drawn at random and the average age of all students at these 50 schools is computed.

   (e) As in (d), except that 100 students are chosen at random from each of the 50 schools and the average age of these students computed.

2. A researcher wishes to estimate the total number of users of a trail head over the course of 15 weeks. She randomly selects 3 Mondays, 3 Tuesdays, 3 Wednesdays, 3 Thursdays, 3 Fridays, 5 Saturdays and 5 Sundays from the whole 15-week period and stations an observer there on each selected day. The observer records the number of trail users for the day.

3. In the previous problem, the researcher would also like to estimate the proportion of trail users who are from out of state. The observer also records where each trail user is from.

4. A researcher is interested in black bears in a certain geographic region, particularly the size of the bears and the amount of time they spend in various habitats during the summer. He sets up traps at five locations scattered throughout the region. He continues trapping until ten bears have been caught. He estimates average size characteristics from these ten bears.

5. A geologist is interested in the surface geology of a certain area. He divides the area up with a grid into 20 equal-sized parcels. Within each parcel, he randomly selects 5 points and obtains measurements at each of these points.