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Applications of Statistics in Wildlife Research

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Abstract

Statistics play a vital role in Quantitative estimation of wildlife and in their Management. The population of Wildlife is continuously changing due to limited availability of food, water and shelter which has resulted in extinction of species. There is urgent need to know the exact number of wild fauna so that management of animal population can be done. This paper will help wildlife biologist to analyse data and to help in drawing conclusions from collected data this in turn will help researchers to conserve wild fauna from being threatened or endangered and in making policies for their conservation.

Keywords: Wildlife, Management, Data, Statistics, Population.

Introduction

Statistics play an important role in estimating the sizes of wild life populations and in knowing the trend of population growth. Both flora and fauna are found in wilderness. Sampling and analyzing data can help in management of animal species. Observation, collection of data, hypothesis, and application of tested principles of the hypothesis is an integral part of statistics. It is very essential to understand and get conception about statistics for the management and conservation of wildlife population.

Methodology

There are five steps to conduct a statistical analysis in wildlife research
Step 1 identify and describe the nature of data you want to analyse
Step 2 establish relationships between data analysed and sample population.
Step 3 create a hypothesis for the same
Step 4 prove if the hypothesis is valid or not
Step 5 Use predictive analysis to determine future trends and possibilities

Very important question faced by many wildlifers is how to collect data? By studying the habitat of wildlife animals along with their behavioral patterns data can be collected. commonly used methods of data collection are total count, index count, sample count, distance sampling. All these techniques have proved very effective in sampling Depending upon the species to be counted and the objective of our study and area size the choice how to do counting is chosen. The data can be collected on foot, from vehicle or from aircraft which depends on study site. Data collection includes gathering, measuring and analysing data. Data is of two types primary and secondary data. Primary data is data collected by researcher. It is first hand data.

There are five common data collection methods namely. Closed ended surveys and quizzes, Open ended surveys and questionnaires, 1-on-1 interviews, focus groups and direct observation. Secondary data is information that the researcher has tasked other people to collect observation during study.

These collections offer a wealth of information and serve as a baseline to guide conservation, restoration and species replacement efforts. In a statistical study sampling methods refer to how we select members from the population to be in the study. Identifying the right sample can be done by various sampling methods such as simple random sampling, systematic sampling, stratified sampling and many others.

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The scientific approach to wildlife management includes gathering observation, hypothesis and application of tested principles of the hypothesis for better evaluation of objectives.

Hypothesis testing is a form of statistical inference that uses data from a sample to draw conclusions about a population parameter. First a tentative assumption is made called null hypothesis and is denoted by H_0 .

An alternative hypothesis denoted by H_a which is opposite of null hypothesis is then defined. The common choices for level of significance are $\alpha = 0.01$. and $\alpha = 0.05$. The distribution of data is very important part. Wildlife observation is all about the practice of noting the occurrence and abundance of animal population. If samples follow a normal distribution pattern parametric test are used. In a normal distribution mean, mode and median all coincide at central peak. Generally, samples follow a normal distribution pattern if their mean is 0 and variance is 1. Non-Parametric Tests do not follow a normal distribution pattern.

After hypothesis has been fixed, Now the next step is to perform data analysis. Some commonly used statistical analysis methods are

1. mean it is very common method and is very simple to calculate. Mean determines the overall trends of the data. It is calculated by adding the numbers in the data set together and then dividing by number of data points.
2. Standard deviation. this tool allows us to analyze the deviation of different data points from the mean of the entire data set.
3. Regression -this tool helps you to determine cause and effect relationships between the variables. It is generally used to predict future events.
4. Correlation- this tool summarizes data and helps to compare results. It measures the extent to which two variables are linearly related.
5. ANOVA -this tool allows you to find out if your survey or experiment results are significant or not. In other words, it helps us to figure out whether we should reject null hypothesis or accept the alternate hypothesis.
6. Probability -this tool allows us to make the right decision in situations where there are observable patterns but also has a degree of uncertainty as uncertainty and randomness occur very frequently in making policies and decisions. The main purpose of probability is to find out the maximum percentage of occurrence of an event. We use probability to get the predictions of what might happen.
7. Graphs -

Conclusions

All wildlife biologist should be statistically trained. For effective wildlife management it is very important to learn quantitative concepts in statistics, which will help them to plot graphs and also to tabulate frequency curve and tables so that proper conclusions can be drawn. Statistics also leave the reader with a solution, an insight, and questions for further study or a call to take necessary action or steps.

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