STATISTICS FOR BUSINESS - MNS 601
Special Project

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Part A: Description of Business Context

Write a brief summary of the business context (e.g., manufacturing, marketing, finance, etc.) including the name of the company or organization.

The Utah Division of Wildlife Resources is part of the Utah Department of Natural Resources that manages hunting and fishing opportunities within the state.

Part B: Problem/Issue

State the business problem/issue to be addressed using statistics and why this problem/issue is important to the company/organization.

It is the goal of the Utah Division of Wildlife Resources to maintain a healthy population of game fish in Lake Powell. Maintaining this population ensures that revenue is generated for all levels of government. This revenue comes from sportsmen originating in several states. Data needs to be collected on the population of these fish in Lake Powell. These statistics help to establish regulations on the catch limit of these fish and whether or not these regulations need to be changed or not. To help establish these limits, it needs to be determined if there is a significant difference in the population of fish in different areas of the lake for each species of fish.

Part C: Statistical Procedure

Explain the statistical procedure (NOTE: Focus on ONE statistical procedure only)
　　1. **Independent variable:**
　　　　a) **What is the variable:** Type of fish
　　　　b) **How it is measured, i.e. what units or categories are used (e.g., revenue measured in "dollars"; height measured as "short, average, tall")** Species of Fish
　　　　c) **Level of measurement (nominal, ordinal, interval, or ratio):** Nominal
　　2. **Dependent variable:**
　　　　a) **What is the variable:** Yield

b) **How it is measured, i.e. what units or categories are used (e.g., revenue measured in "dollars"; height measured as "short, average, tall")** Number of fish
c) **Level of measurement (nominal, ordinal, interval, or ratio):** Ratio
3. **Name of the procedure/formula (e.g., ANOVA, Chi-Square, Hypothesis Test using z formula, Regression Analysis, etc.). NOTE: The procedure/formula must be one that was covered in the course**: ANOVA
4. **Describe the statistical rationale/justification for choosing this procedure/formula**: The rationale behind using ANOVA is because the dependent variable is on the nominal level. In addition to this, the dependent variable has 3 or more groups some of which the variables include largemouth bass, smallmouth bass, striped bass, crappie, carp, and shad. However, the dependent variable is on the ratio level since it is a population count.
5. **Describe how the data are collected by the business/organization**: The Division of Wildlife Resources collects samples out on the lake at various sites throughout the lake. These sites include Wahweap, Bullfrog, San Juan, and the Rincoln. Collection methods vary. One method is through electrofishing. A current of electricity is pulsed through the water for a period of about 10 minutes as the fish are collected with nets. This ten minute period is considered a "sample." Three samples are collected at each location. Another method includes gillnetting. The net of 30 feet length is strung out into the water in the afternoon and the fish that get trapped in the net are collected the following morning. Each net is considered a "sample." Each site has about six nets put out on two different nights with a total of about 12 samples collected per site.
6. **Describe how the data are analyzed (i.e., identify the steps in the statistical procedure)**: The null and alternative hypotheses are defined (H_0: There are no differences among the sites with respect to the population of each species of fish. H_1: There are differences among the sites with respect to the population of each species of fish.); an alpha level is set; ANOVA is calculated using the formula: F = (between groups variance) $\div$ within groups variance; the calculated F value is compared to the critical F value (found in the F distribution table); if $F_{calculated} < F_{critical}$ H_0 is accepted and if $F_{calculated} > F_{critical}$ H_0 is rejected.

Part D: Decision/Interpretation

Explain the type of <u>business</u> decision that the company/organization would make as a result of this statistical analysis.

If H_0 were accepted, the Utah Division of Wildlife Resources will use the data to determine if the catch limit needs to be changed for each species of fish. If H_0

were rejected, the Utah Division of Wildlife Resources would collect more samples in order to more accurately establish the population means.