***Storm and Climate Data Record (SCDR)***

Implementation Plan

Date of record:

Jan 1, 2017 to Dec 1, 2019

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## I. Introduction

### 1.1 Overview and purpose

This Storm and Crime data report will provide the Miami police department with information regarding the number of and rising loss of crimes that occur during storms compared to the loss due to crimes not committed during storms. Information from January 1, 2017, to December 1, 2019 will be analyzed to help the department obtain predictions on when future crime outbreaks may occur and how to minimize the loss that incurs as a result.

### 1.2 Define why you need data analysis

Data analysis is needed to ensure that data is usable. Through analysis, the data is run through and checked to ensure it is from a legitimate source, it was transferred correctly, and that there are no syntax errors. Data analysis helps users look at and understand the data, allowing them to make accurate and helpful conclusions.

## II. Data Preparations

### 2.1 Name data sources

The data that we will be using is coming from the Miami police department. It consists of crimes that occurred in Miami between January 1, 2017 – December 1, 2019 during and not during storms, as well as the loss that occurred.

### 2.2 Filter through unnecessary data

The SCDR will analyze the rising loss of crimes during storms compared to the loss of crimes not during storms. Unnecessary data includes type of storms or types of crime, since this will not affect the loss caused. These attributes can be filtered out of the data set. The relevant columns used will be date, loss, and storm status.

### 2.3 Define your parameters

The parameters for this analysis will include the crimes that occurred during storms and not during storms, the date of the crime, as well as how much loss occurred due to the crime committed.

### 2.4 Identify measurement priorities

The measurements that will occur during this analysis include measuring the loss of crimes each month that happen during storms and not during storms. Overall, our main priority will be to calculate the loss that incurs during the crimes that are committed during storms and compare it to the loss of the crimes not committed during storms.

### 2.5 Ensure collected data fits the need

The data collected and provided by the Miami police department contains data on the crimes that were committed between January 2017 and December 2019. Crimes committed during storms, crimes not committed during storms, as well as the monetary loss that occurred are provided, so one can be confident that this data is fit for the analysis.

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## III. Data Analysis

### 3.1 Identify scripts used

Install.packages(“ggplot2”);

Install.packages(“dplyr”);

# Load required libraries

library(ggplot2)

library(dplyr)

# Read in the CSV files

crimestormdataQ <- read.csv("crimeStormQ.csv")

crimenostormdataQ <- read.csv("crimenostormQ.csv")

# Add a monthly date column starting Jan 2017

crimestormdataQ$Date <- seq(as.Date("2017-01-01"), by = "month", length.out = nrow(crimestormdataQ))

crimenostormdataQ$Date <- seq(as.Date("2017-01-01"), by = "month", length.out = nrow(crimenostormdataQ))

# Add labels for merging later

crimestormdataQ$StormStatus <- "Storm"

crimenostormdataQ$StormStatus <- "No Storm"

# Combine both datasets and keep relevant columns

combined\_data <- bind\_rows(

  crimestormdataQ[, c("Date", "Loss", "StormStatus")],

  crimenostormdataQ[, c("Date", "Loss", "StormStatus")]

)

# Convert Loss to cumulative totals in thousands

combined\_data <- combined\_data %>%

  group\_by(StormStatus) %>%

  arrange(Date) %>%

  mutate(CumLoss = cumsum(Loss) / 1000)

# Plot the results

ggplot(combined\_data, aes(x = Date, y = CumLoss, color = StormStatus)) +

  geom\_line(size = 1.2) +

  labs(

    title = "Victim Loss From Crimes for Jan 2017 - Dec 2019",

    subtitle = "Cumulative Loss in Thousands of Dollars",

    x = "By Month by Year",

    y = "Victim Loss (K$)",

    color = "Crime Condition"

  ) +

  theme\_minimal()

### 3.2 Run the scripts to analyze the data and validate the output

A screenshot of a computer

Description automatically generated

The output validates that the monetary loss caused by crimes is higher during storms than when there are no storms. While relatively similar in 2017, by the end of the year 2019, the cumulative loss due to crimes not committed during a storm was about $18,000, compared to the $50,000 loss due to crimes committed during storms. This validates our previous research and assumptions that crimes committed during storms are more destructive and cause more loss than those not committed in storms.

## IV. Drawing Conclusions

### 4.1 Present the results of the analysis to stakeholders

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From the above visualization, we can see that by the month of December 2019, the loss due to crimes committed in storms was more than double the loss due to crimes not committed in storms. In addition, the loss from crimes in storms had a steep increase from about $5,000 in January 2017 to $50,000 in December 2019. Conclusions can be made that new regulations and precautions should be taken, specifically during storms, to help reduce the number of crimes committed, as well as the loss that incurs due to it.

### 4.2 Determine whether the problem was addressed, including any challenges and limitations

The problem we were trying to determine was finding out how much loss is caused by crimes that are committed during storms compared to the loss that is caused by crimes not committed in storms. We found that the loss increases dramatically when the crime is committed during a storm. Limitations of this analysis include the fact that the data set only includes data from three years. A longer time frame could help give more insight into whether this is a new trend or a consistent pattern. In addition, there is some lack of knowledge on why the loss is increased when the crime is committed during a storm.

### 4.3 Report potential new findings

New findings from this research suggest that crimes committed during storms incur a bigger monetary loss than those crimes committed not during a storm. This could be due to several factors, such as less police presence during a storm, less civilians around making criminals feel more confident in committing a crime, as well as inclement weather causing challenges for police to respond to crimes. As these findings suggest that loss increases when there is a storm, this gives the Miami police department the ability to consider new ways to combat this issue.

References

*Redirecting*. (2025). Snhu.edu. https://learn.snhu.edu/content/enforced/1918668-DAT-375-10002.202551-1/course\_documents/DAT%20375%20Project%20Two%20R%20Tutorial.pdf?\_&d2lSessionVal=1p6OHUKvcast1YFPryKDFSBOE&ou=1332091&ou=1918668

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