Relation of Severe Weather Events on Public Health and Economy

Synopsis

It was found that severe weather events indeed had a huge impact on society in recent years. Floods were found to have cost most significant economy damage, which attributed to more than 150 billions US dollars of property damage. Tornados were found to have made most number of death and injuries, with almost 97,000 injuries or fatalities in recent years.

Data Processing

Performed steps:
Load the data from csv file
Remove some unused variables to save memory
Remove original data to save memory
Calculate the damage
Using levels(), it was found that the exponential has lots of values that were not explained in the documentation. These values were ignored. Only K, M, B were understood as 1000, 10^6 and 10^9, respectively.
Property damage & crop damage were summed up to get the total damage
Calculate total fatalities and injuries

```
# Load the data
storm_data_raw <- read.csv("~/Downloads/Data/repdata-data-StormData.csv")

# Remove unnecessary columns
good_columns <- c("EVTYPE",                  # Event type
                  "FATALITIES", "INJURIES",  # Fatalities & Injuries
                  "PROPDMG", "PROPDMGEXP",   # Property damange & its exponential
                  "CROPDMG", "CROPDMGEXP")   # Crop damage & its exponential
storm_data <- storm_data_raw[,good_columns]
summary(storm_data)
```

```
##                EVTYPE         FATALITIES          INJURIES
##  HAIL             :288661   Min.   :  0.0000   Min.   :   0.0000
##  TSTM WIND        :219940   1st Qu.:  0.0000   1st Qu.:   0.0000
##  THUNDERSTORM WIND: 82563   Median :  0.0000   Median :   0.0000
##  TORNADO          : 60652   Mean   :  0.0168   Mean   :   0.1557
##  FLASH FLOOD      : 54277   3rd Qu.:  0.0000   3rd Qu.:   0.0000
##  FLOOD            : 25326   Max.   :583.0000   Max.   :1700.0000
##  (Other)          :170878
##     PROPDMG          PROPDMGEXP        CROPDMG          CROPDMGEXP
##  Min.   :   0.00          :465934   Min.   :  0.000          :618413
##  1st Qu.:   0.00   K      :424665   1st Qu.:  0.000   K      :281832
##  Median :   0.00   M      : 11330   Median :  0.000   M      :  1994
##  Mean   :  12.06   0      :   216   Mean   :  1.527   k      :    21
##  3rd Qu.:   0.50   B      :    40   3rd Qu.:  0.000   0      :    19
##  Max.   :5000.00   5      :    28   Max.   :990.000   B      :     9
##                    (Other):    84                     (Other):     9
```

```
# Remove original data to save space
remove(storm_data_raw)

# Calculate the total damage
levels(storm_data$PROPDMGEXP) <- c(
  "1", "1", "1", "1", "1", "1", "1", "1", "1", "1", "1", "1", "1",
  "1000000000", "1", "1", "1000", "1000000", "1000000")
```

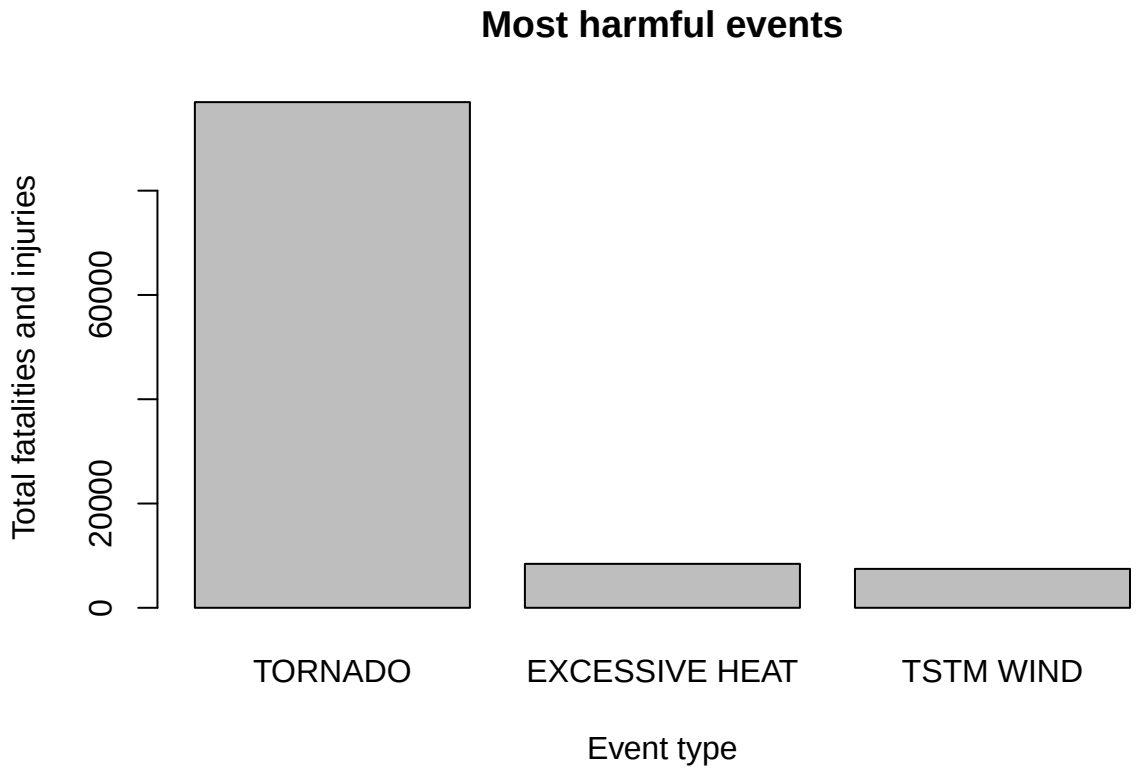
```
levels(storm_data$CROPDMGEXP) <- c(
  "1", "1", "1", "1", "1000000000", "1000",
  "1000", "1000000", "1000000")
storm_data$PROPDMG <- storm_data$PROPDMG *
  as.integer(as.character(storm_data$PROPDMGEXP))
storm_data$CROPDMG <- storm_data$CROPDMG *
  as.integer(as.character(storm_data$CROPDMGEXP))
storm_data$DAMAGE <- storm_data$PROPDMG + storm_data$CROPDMG

# Calculate total injuries & fatalities
storm_data$HEALTH <- storm_data$INJURIES + storm_data$FATALITIES
```

Results

Impact on Population health

Across the United States, which types of events (as indicated in the EVTYPE variable) are most harmful with respect to population health?

```
total <- sort(
  tapply(storm_data$HEALTH, storm_data$EVTYPE, sum),
  decreasing = T)
barplot(head(total,3),
        main="Most harmful events",
        xlab="Event type",
        ylab="Total fatalities and injuries")
```



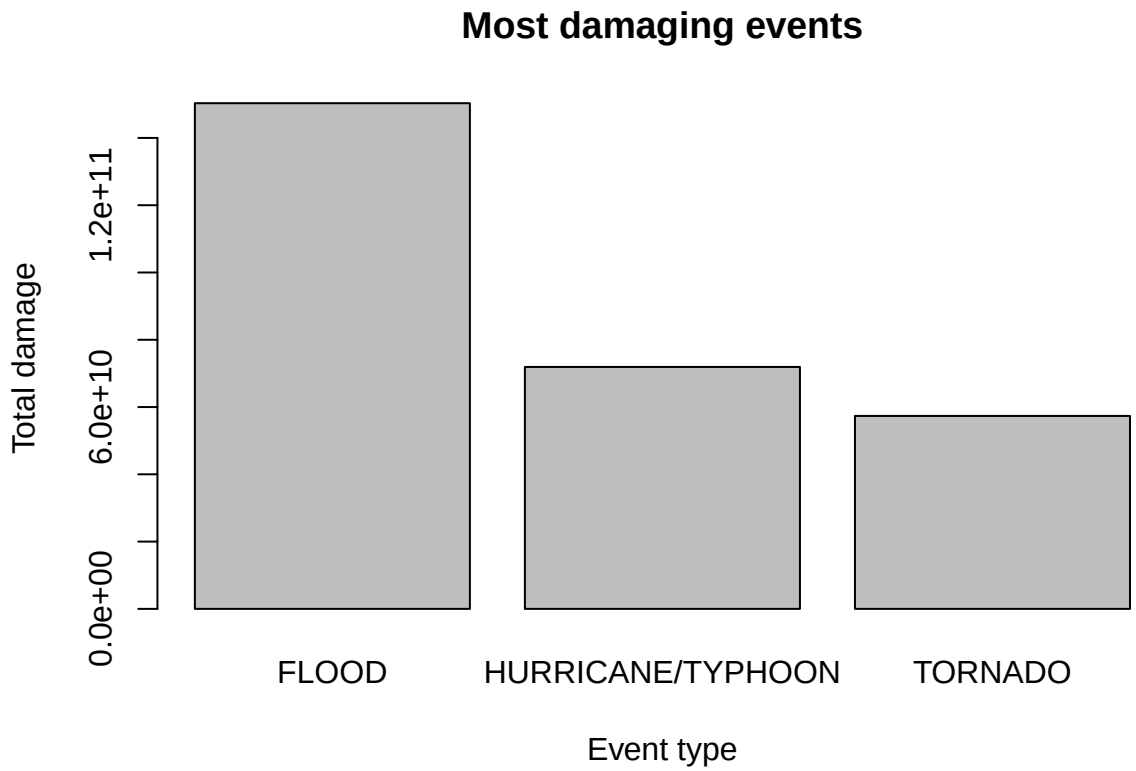

```
max(total)
```

```
## [1] 96979
```

From the figure, it was found that Tornado has caused the most number of injuries and fatalities (96,980 fatalities and injuries), significantly more than any other type of events.

Impact on Economy

```
total <- sort(
  tapply(storm_data$DAMAGE, storm_data$EVTYPE, sum),
  decreasing = T)
barplot(head(total,3),
        main="Most damaging events",
        xlab="Event type",
        ylab="Total damage")
```




```
max(total)
```

```
## [1] 150319678257
```

From the figure, it was found that Flood has caused biggest damage (around 150 billions US dollars), much higher than any other events.