An Exploration of The Effects of Severe Weather Events on Human Health and the Economy: NOAA Storm Data, 1950 - 2011

Synopsis

Storms and other severe weather events can cause both public health and economic problems for communities and municipalities. Many severe events can result in fatalities, injuries, and property damage, and preventing such outcomes to the extent possible is a key concern.

This project involves exploring the U.S. National Oceanic and Atmospheric Administration's (NOAA) storm database. This database tracks characteristics of major storms and weather events in the United States, including when and where they occur, as well as estimates of any fatalities, injuries, and property damage.

The report examines the following questions:

1. Across the United States, which types of events are most harmful with respect to population health?
2. Across the United States, which types of events have the greatest economic consequences?

Tornados are found to be the most harmful and costly weather events.

Data Processing

Orginal data can be downloaded from: https://d396qusza40orc.cloudfront.net/repdata/data/StormData.csv.bz2.

```
## set WD on local machine to the location of this Rmd file; setup data dir
zipURL <-"https://d396qusza40orc.cloudfront.net/repdata%2Fdata%2FStormData.csv.bz2"
if(!file.exists("./data")){
dir.create("./data")
}

if(!file.exists("./data/NOAAdata.csv.bz2")){
download.file(zipURL, destfile="./data/NOAAdata.csv.bz2", method="curl")
}
```

Load package dependencies:

```
library(ggplot2)
library(plyr)
```

Load the data. In can take a few minutes:

```
data<- read.csv("./data/NOAAdata.csv.bz2")
```

Create fatalities dataset:

```
data.fatalities<-ddply(data, .(EVTYPE), summarize,Fatalities= sum(FATALITIES,na.rm
=TRUE), Injuries = sum(INJURIES,na.rm =TRUE))
data.fatalities<-arrange(data.fatalities,desc(Fatalities))
```

Create new data colunm showing total damage:

```
data <- mutate(data,COST = PROPDMG + CROPDMG)
```

Create cost dataset:

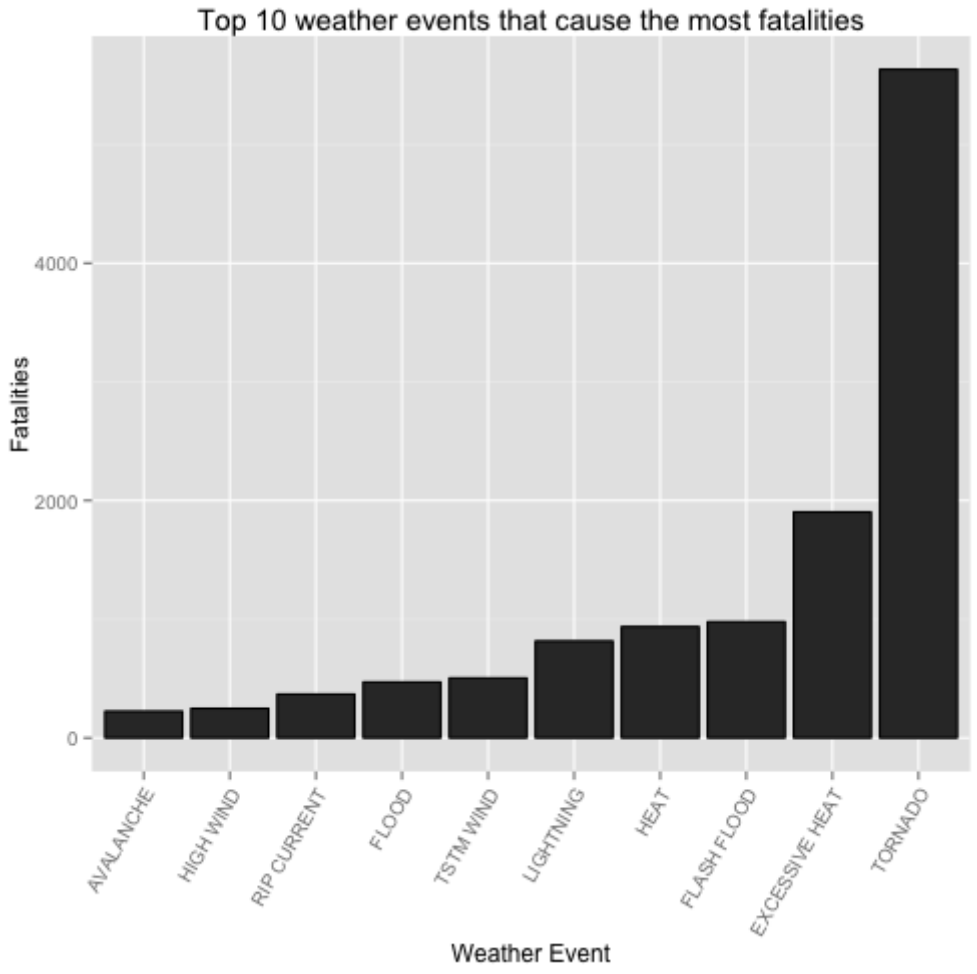
```
data.cost<-ddply(data, .(EVTYPE), summarize,Cost= sum(COST,na.rm =TRUE))
data.cost<-arrange(data.cost,desc(Cost))
```

Results

1. Across the United States, which types of events are most harmful with respect to population health?

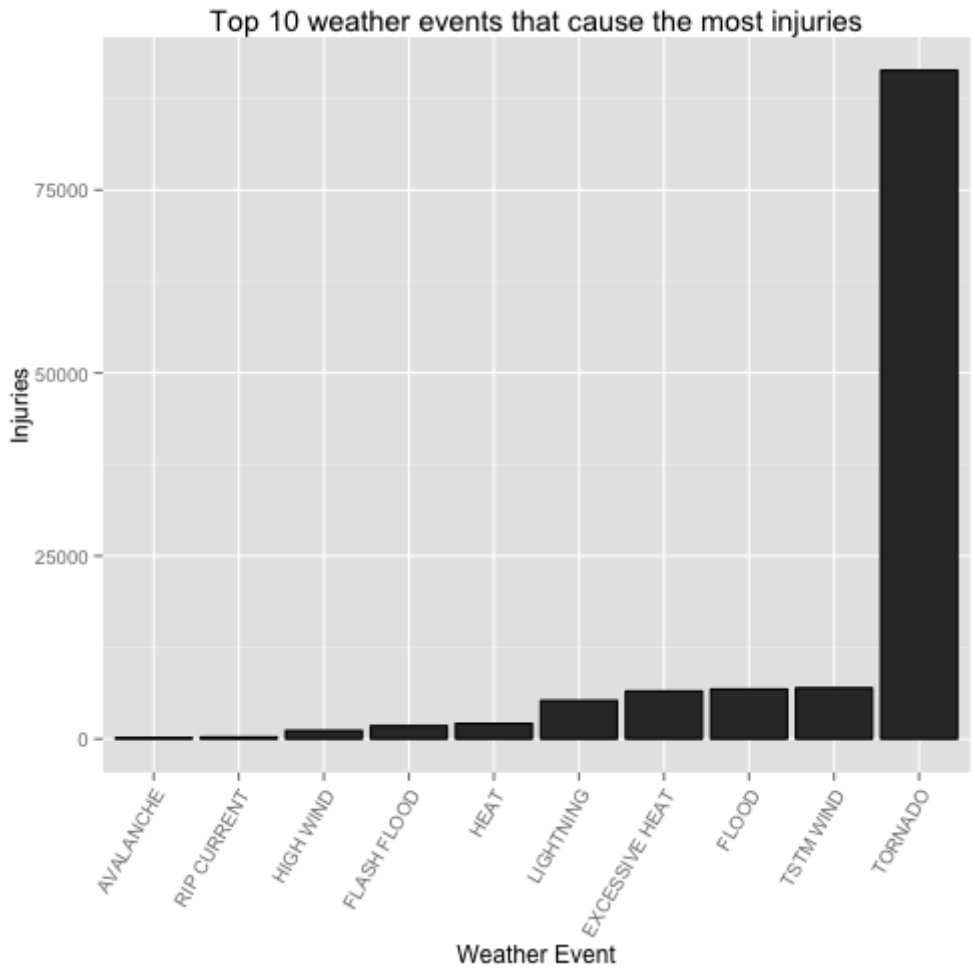
Torandos cause the most fatalities.

```
fatalities.plot<-
ggplot(data=head(data.fatalities,10),aes(x=reorder(EVTYPE,Fatalities),y=Fatalities))+
geom_bar(stat="identity", colour="black")+
xlab("Weather Event")+
ggtitle("Top 10 weather events that cause the most fatalities")+
theme(axis.text.x=element_text(angle=60, hjust=1))

fatalities.plot
```



Torandos also cause the most injuries.

```
injuries.plot<-
ggplot(data=head(data.fatalities,10),aes(x=reorder(EVTYPE,Injuries),y=Injuries))+
geom_bar(stat="identity", colour="black")+
xlab("Weather Event")+
ggtitle("Top 10 weather events that cause the most injuries")+
theme(axis.text.x=element_text(angle=60, hjust=1))

injuries.plot
```

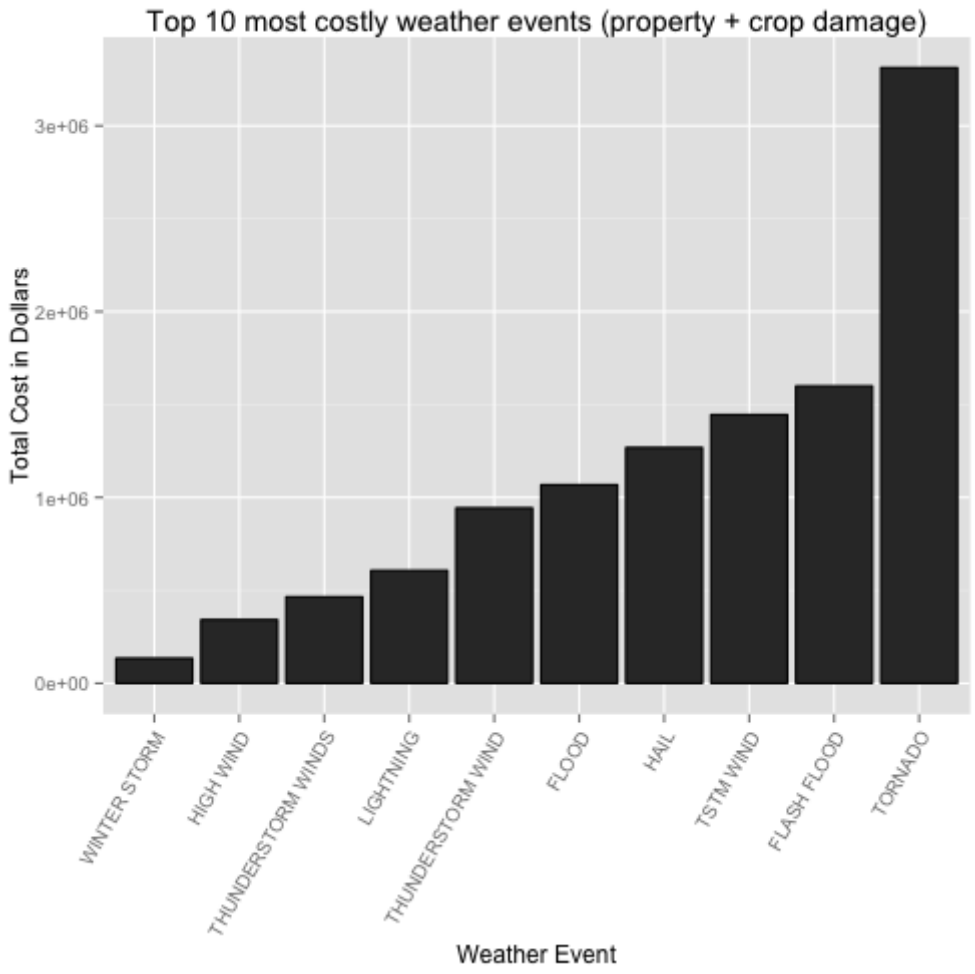


Torandos are the most harmful weather event overall.

2. Across the United States, which types of events have the greatest economic consequences?

Torandos are the most costly weather event.

```
cost.plot<-ggplot(data=head(data.cost,10),aes(x=reorder(EVTYPE,Cost),y=Cost))+
geom_bar(stat="identity", colour="black")+
xlab("Weather Event")+
ylab("Total Cost in Dollars")+
ggtitle("Top 10 most costly weather events (property + crop damage)")+
theme(axis.text.x=element_text(angle=60, hjust=1))

cost.plot
```


Top 10 most costly weather events (property + crop damage)
Total Cost in Dollars
3e+06
2e+06
1e+06
0e+00
WINTER STORM
HIGH WIND
THUNDERSTORM WINDS
LIGHTNING
THUNDERSTORM WIND
FLOOD
HAIL
TSTM WIND
FLASH FLOOD
TORNADO
Weather Event