Team 6 Project

2022-11-29

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What each variable means:

X - x-axis spatial coordinate within the Montesinho park map: 1 to 9

Y - y-axis spatial coordinate within the Montesinho park map: 2 to 9

month - month of the year: ‘jan’ to ‘dec’

day - day of the week: ‘mon’ to ‘sun’

FFMC - FFMC index from the FWI system: 18.7 to 96.20

DMC - DMC index from the FWI system: 1.1 to 291.3

DC - DC index from the FWI system: 7.9 to 860.6

ISI - ISI index from the FWI system: 0.0 to 56.10

temp - temperature in Celsius degrees: 2.2 to 33.30

RH - relative humidity in %: 15.0 to 100

wind - wind speed in km/h: 0.40 to 9.40

rain - outside rain in mm/m2 : 0.0 to 6.4

area - the burned area of the forest (in ha): 0.00 to 1090.84

Now, let’s try running multiple visualizations and manipulating the variables to try to better understand what is going on and if we can extrapolate any hypotheses from them:

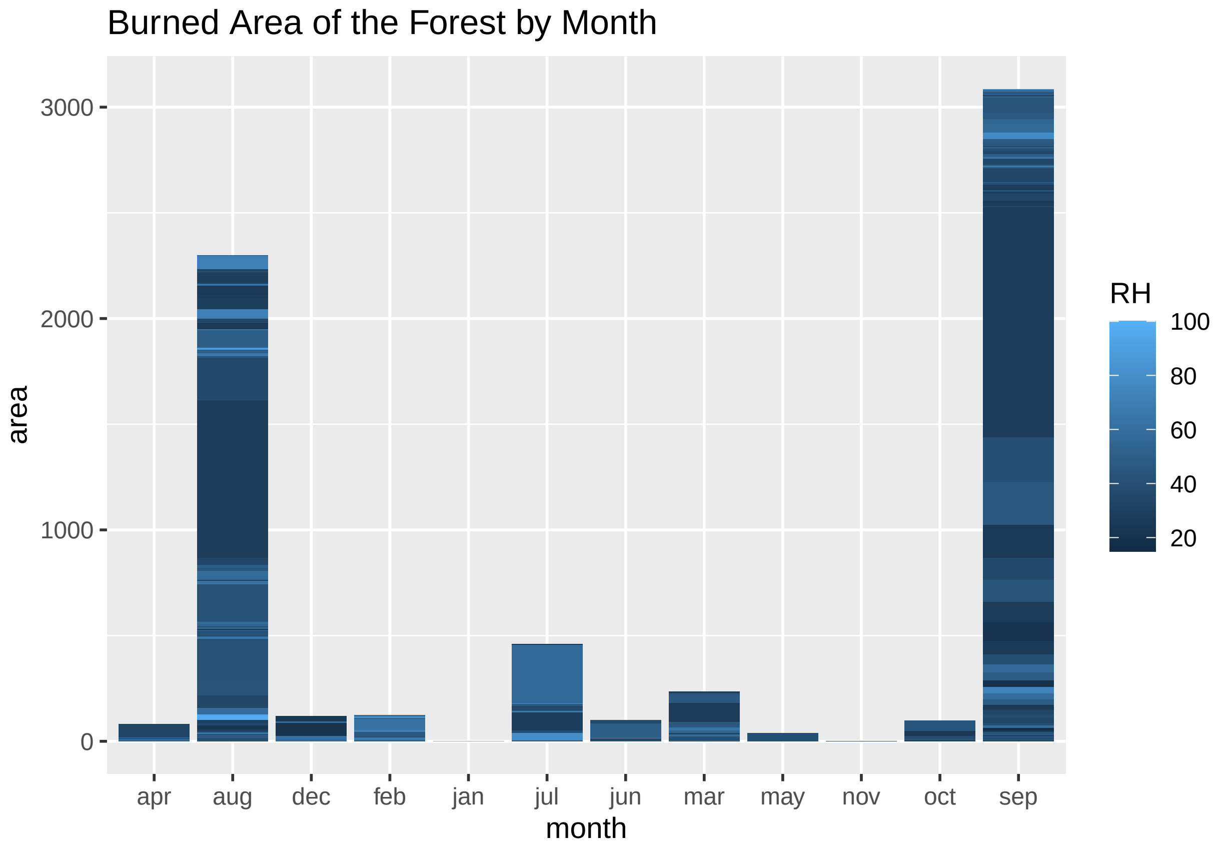
```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(ggplot2)
forestfires <- read.csv("forestfires.csv")

head(forestfires)
```

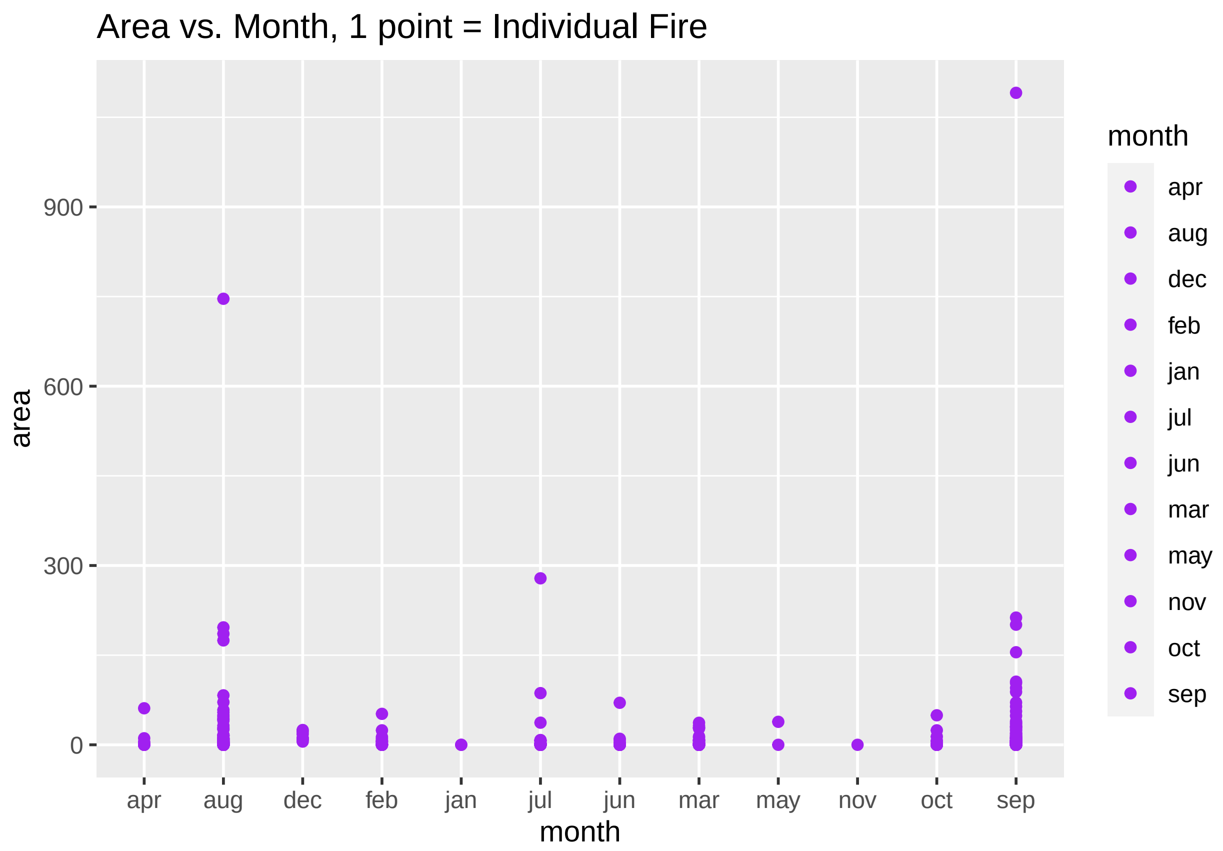
```
##   X Y month day FFMC  DMC    DC  ISI temp RH wind rain area
## 1 7 5   mar fri 86.2 26.2  94.3  5.1  8.2 51  6.7  0.0    0
## 2 7 4   oct tue 90.6 35.4 669.1  6.7 18.0 33  0.9  0.0    0
## 3 7 4   oct sat 90.6 43.7 686.9  6.7 14.6 33  1.3  0.0    0
## 4 8 6   mar fri 91.7 33.3  77.5  9.0  8.3 97  4.0  0.2    0
## 5 8 6   mar sun 89.3 51.3 102.2  9.6 11.4 99  1.8  0.0    0
## 6 8 6   aug sun 92.3 85.3 488.0 14.7 22.2 29  5.4  0.0    0
```

```
ggplot(forestfires, aes(x=month, y=area, fill=RH)) +
       geom_bar(stat="identity") + ggtitle("Burned Area of the Forest by Month")
```



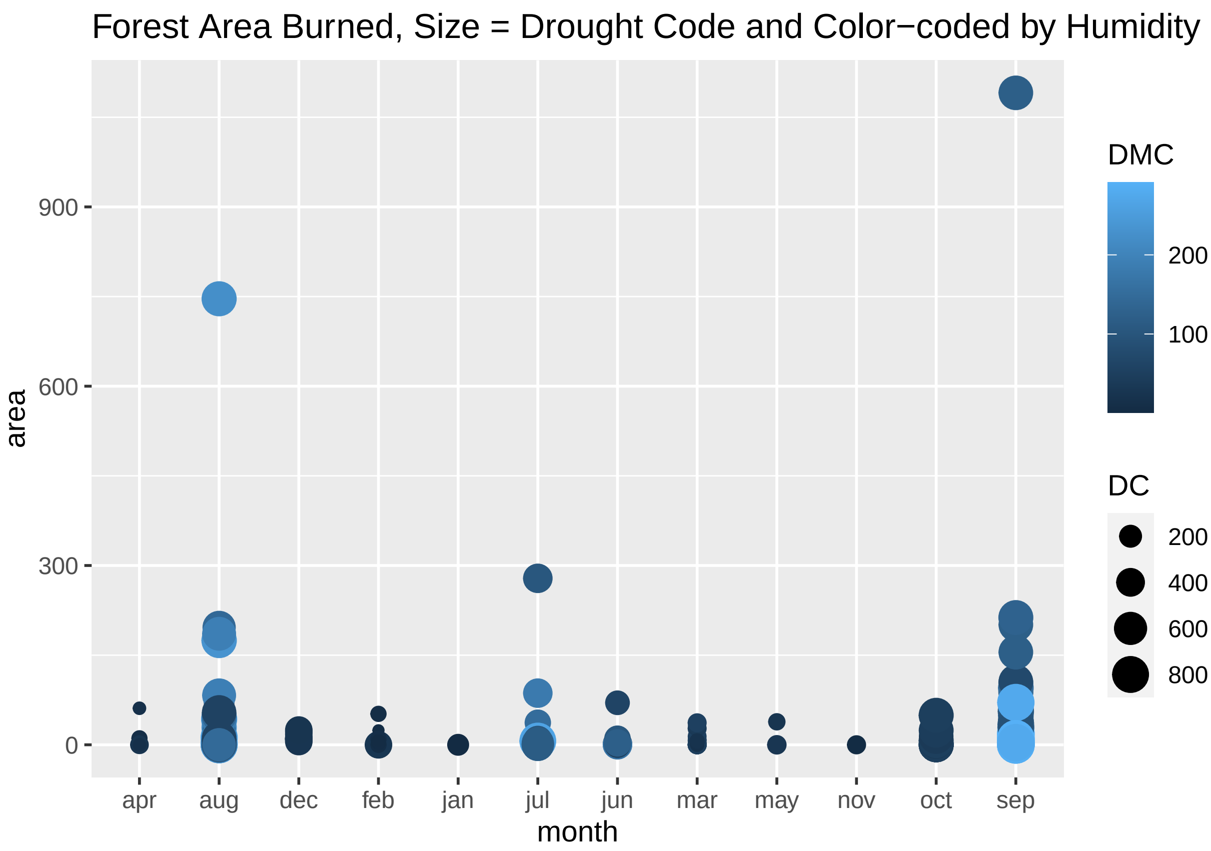
Evidently, September and August are by far the worst months when it comes to burned forest area…current relative humidity does not seem to have as big of an effect as one might think…

```
ggplot(forestfires, aes(x=month, y=area, fill=month)) + geom_point(color="purple") +
  ggtitle("Area vs. Month, 1 point = Individual Fire")
```



This visualiation makes it clear that in our dataset, there are a handful of extreme outliers. Most of the data points are concentrated at or around an area of 0, and only 5 are at or above 200 ha. However, one fire burned about 1090 ha, and the next highest burned almost 750.

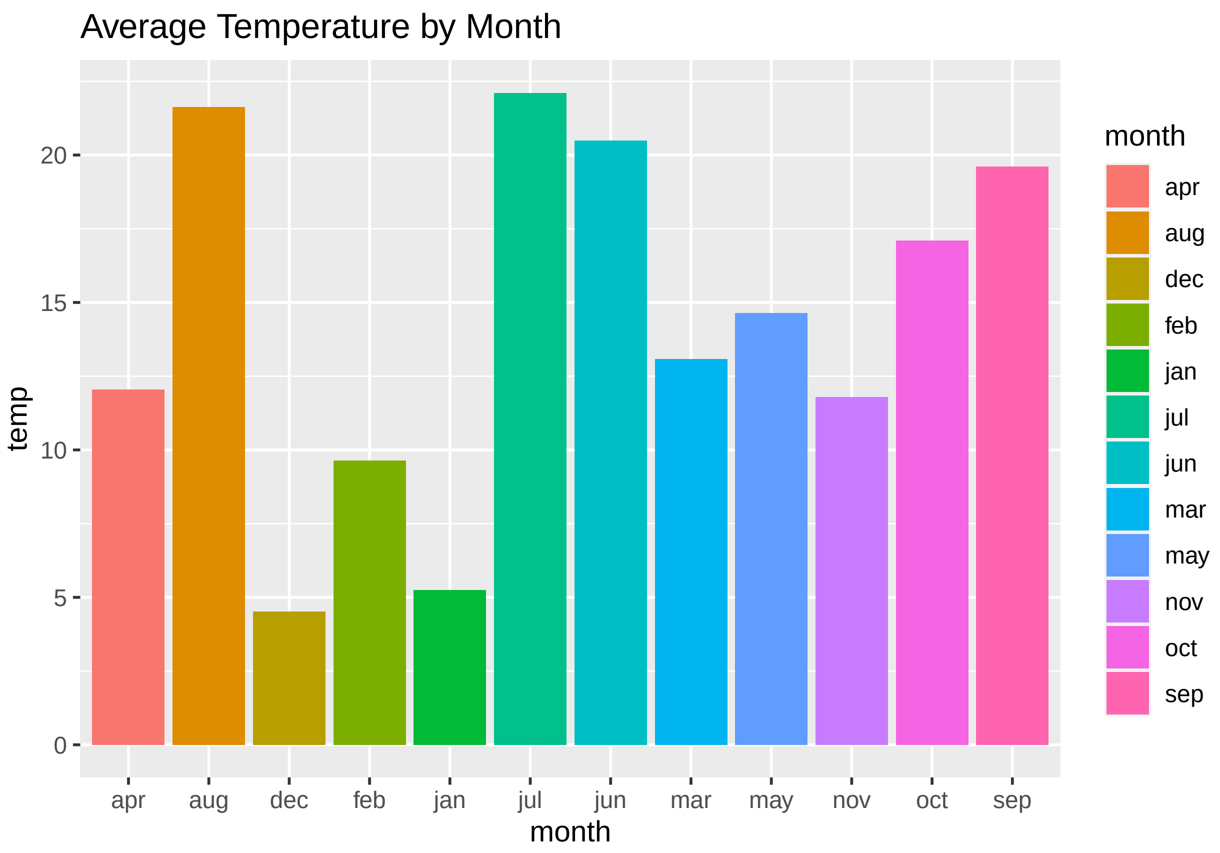
```
ggplot(forestfires, aes(x=month, y=area, color=DMC, size=DC)) + geom_point(stat="identity") +
ggtitle("Forest Area Burned, Size = Drought Code and Color-coded by Humidity")
```



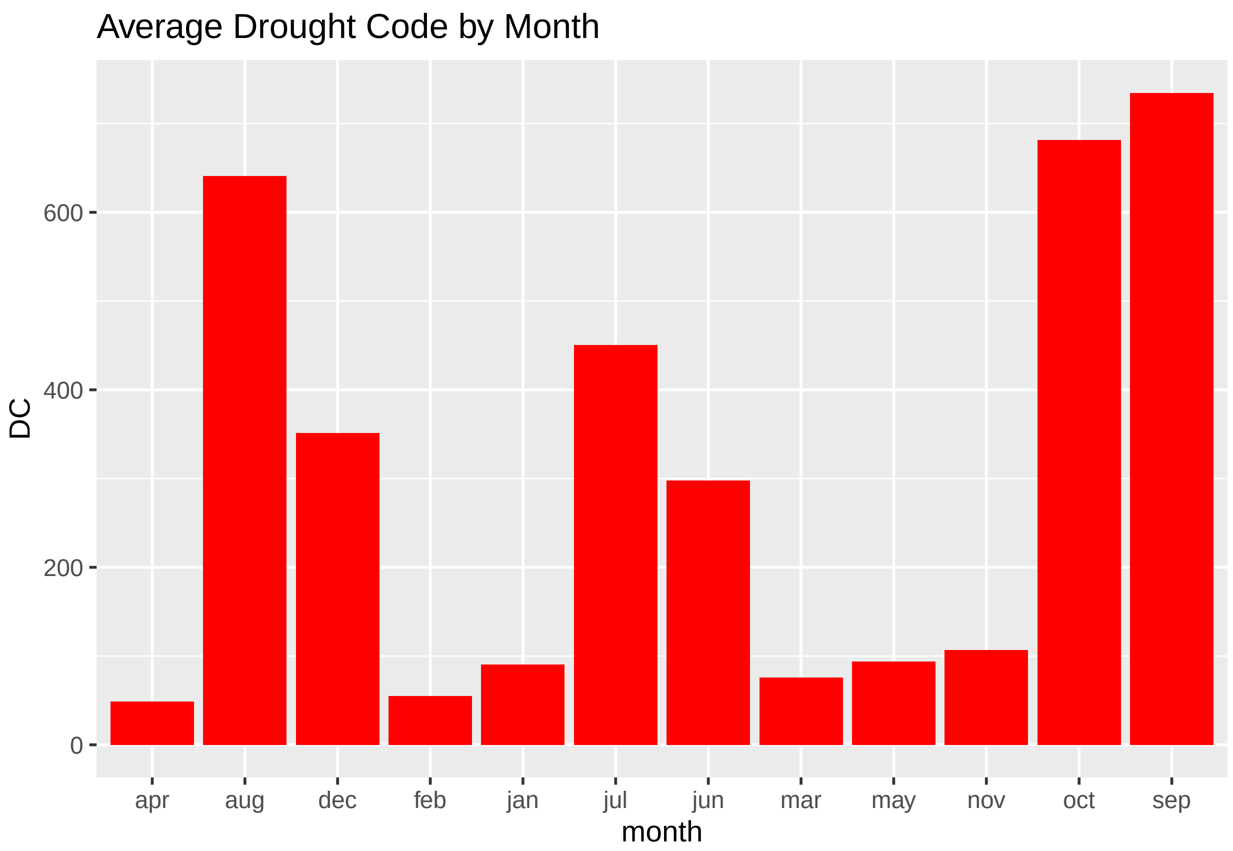
This graph may show some promising/interesting information about DC and DMC. . . the months with the highest DC and DMC seem to be the months with the higher amounts of area burned by fires.

Let's play with the means of some variables by month:

```
ggplot(forestfires, aes(x = month, y = temp, fill=month)) +
  geom_bar(stat = "summary", fun = "mean") + ggtitle("Average Temperature by Month")
```

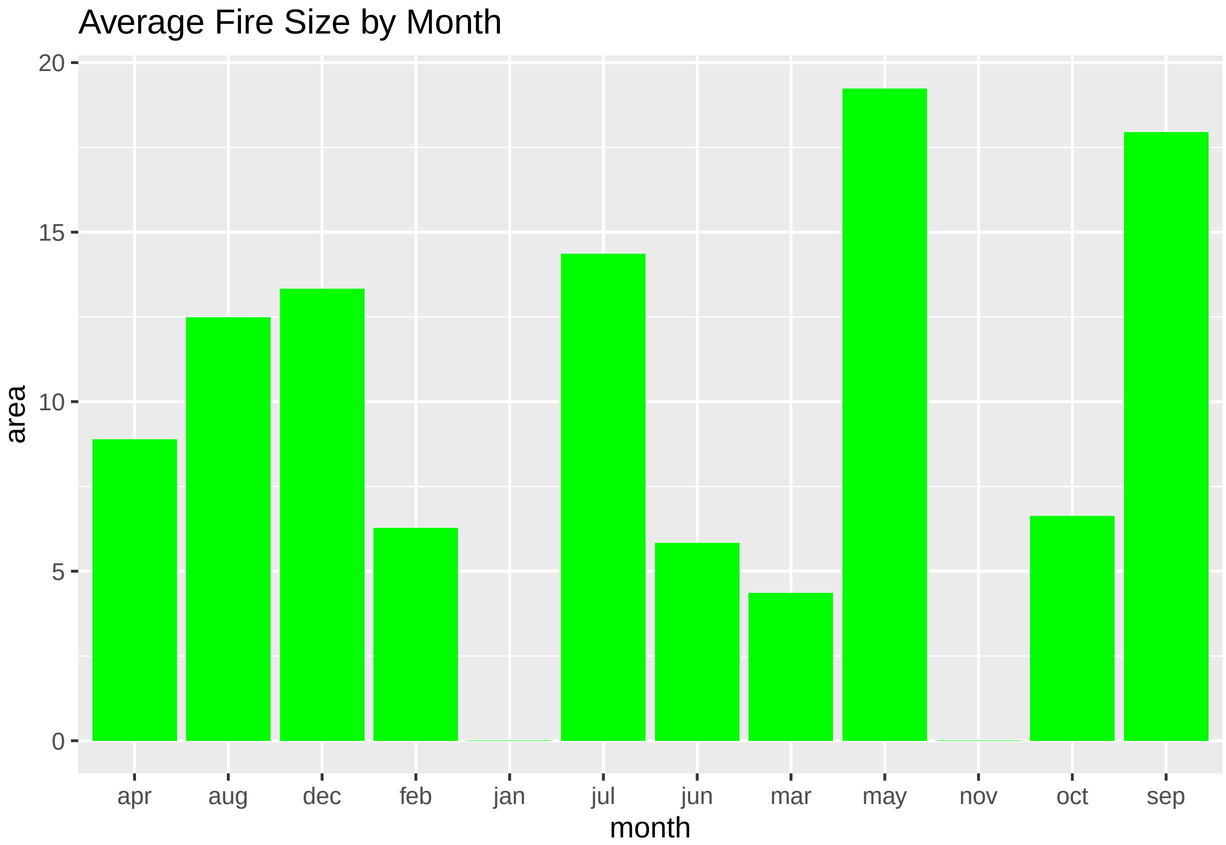


```
ggplot(forestfires, aes(x = month, y = DC)) +
  geom_bar(stat = "summary", fun = "mean", fill="red") + ggtitle("Average Drought Code by Month")
```



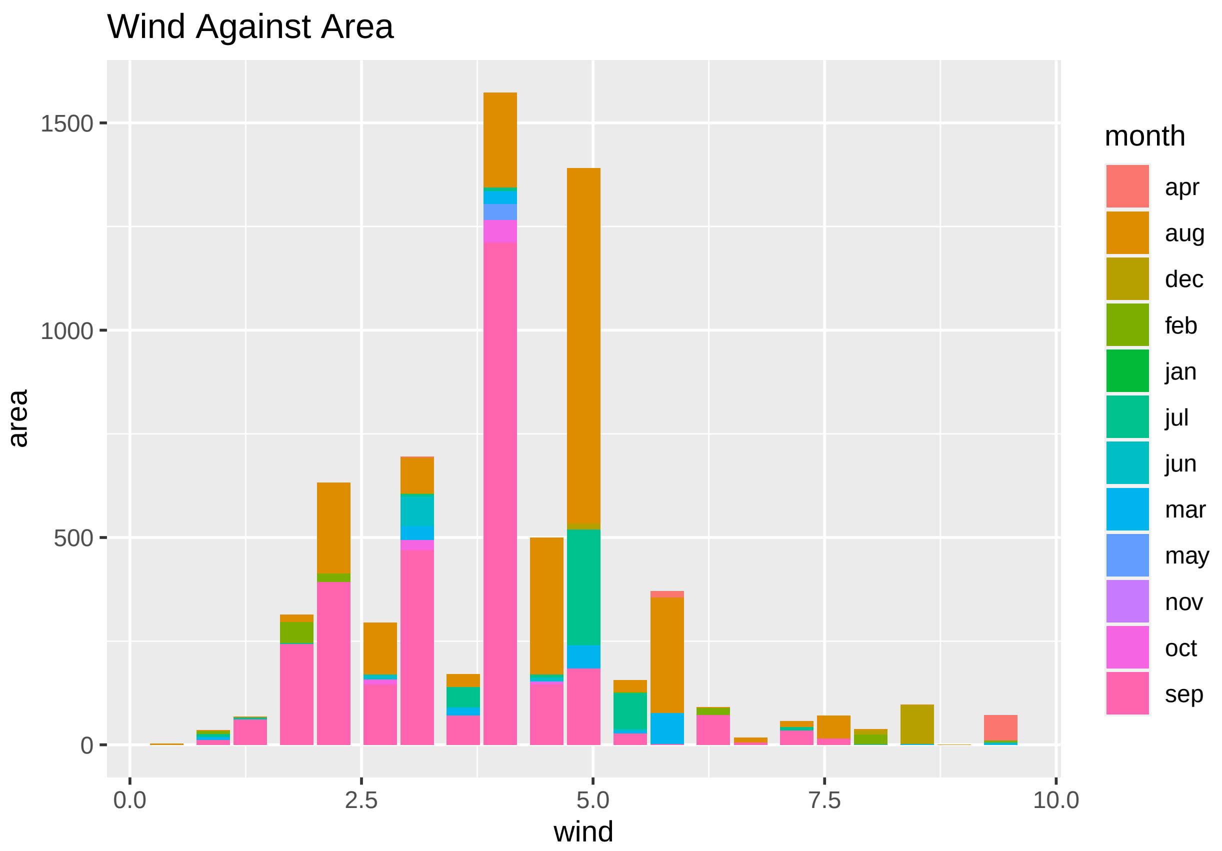
Temperature, and drought code seem to be somewhat related, but in a very particular way. The months following multiple prolonged periods of high temperature seem to have the highest drought cdodes, rather than simply the months with the highest temperatures having the highest drought codes.

```
ggplot(forestfires, aes(x = month, y = area)) +
  geom_bar(stat = "summary", fun = "mean", fill="green") + ggtitle("Average Fire Size by Month")
```



Average fire size does not seem to be avery good measure or representation of anything, and compared with the previous burned area graphs, seems to be a misleading representation of things.

```
ggplot(forestfires, aes(x = wind, y = area, fill=month)) +
  geom_bar(stat = "identity") + ggtitle("Wind Against Area")
```



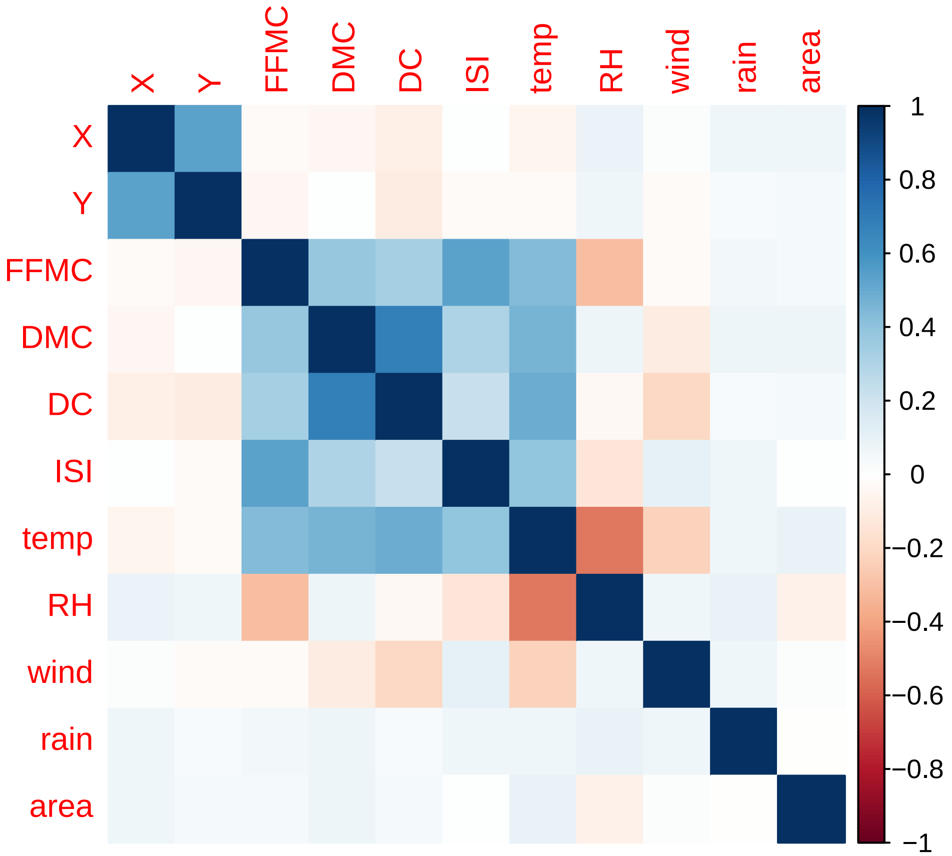
A wind speed of around 2.5-5 km/h seems to be the most likely to lead to higher spread of a fire.

Let's try finding the correlations between each of the variables, and then visualizing them in some correlation matrices:

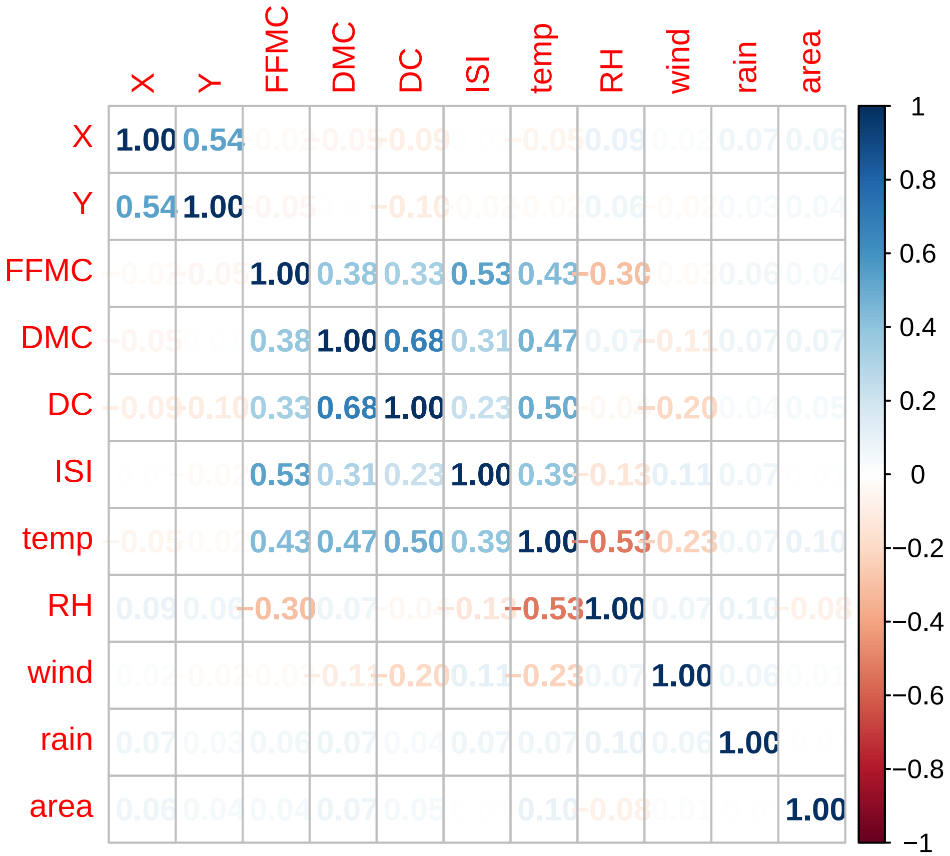
```
library(corrplot)
```

```
## corrplot 0.92 loaded
```

```
forest2 = subset(forestfires, select = -c(month,day) )

mydata.cor = cor(forest2)

corrplot(mydata.cor, method="color")
```



```
corrplot(mydata.cor, method="number")
```



It seems that DMC and DC have the highest correlation out of all of the variables, at 0.68. This perhaps solidifies the observation we made earlier when comparing other visualizations with DC and DMC.