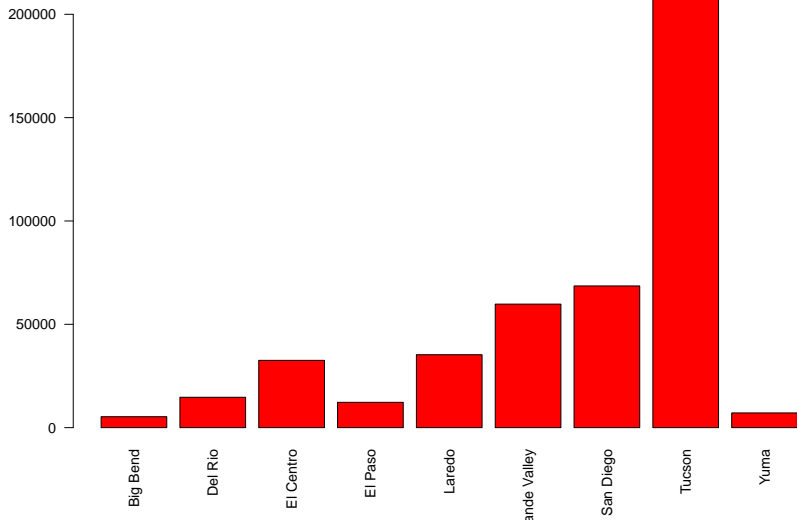


# 2010 and 2017 CBP Apprehensions Analysis

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# 2010 Total Apprehensions

2010 Total Apprehensions by Sector

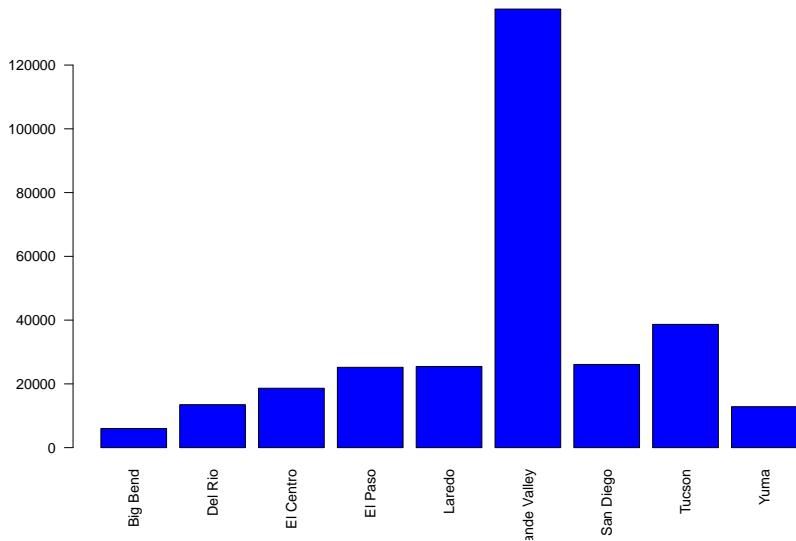


## 2010 Total Apprehensions: Analysis

- ▶ The data shows that Tuscon is sector with the highest total apprehensions in 2010 with 212,202 total
- ▶ On the other hand, Big Bend has the least apprehensions in 2010 with 5,288

# 2017 Total Apprehensions

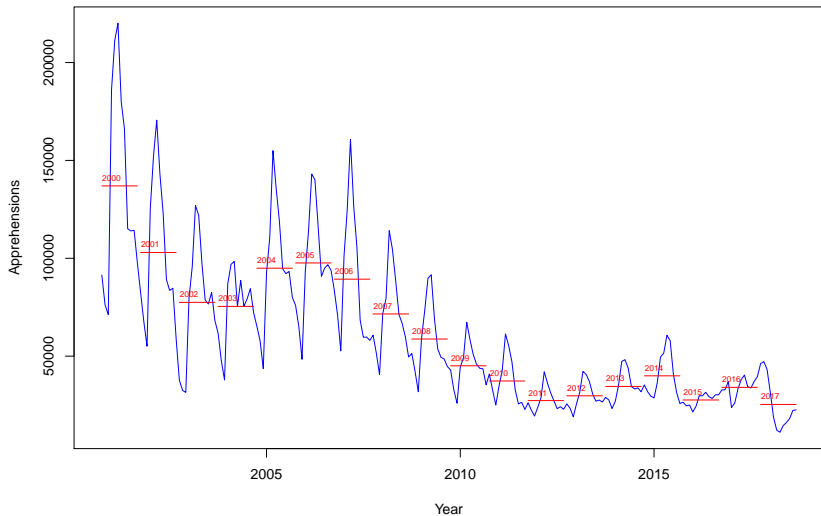
2017 Total Apprehensions by Sector



## 2017 Total Apprehensions: Analysis

- ▶ This barplot identifies the summation of apprehensions in 2017 by each sector. There is a change in the maximum compared to 2010.
- ▶ This time Rio Grande Valley has the greatest total apprehensions, with 137,562 total (230% more than in 2010).
- ▶ While Tuscon had the max apprehensions in 2010, it has 38,657 this year, 81% less than 2010.

# Time Series



## Time Series: Analysis

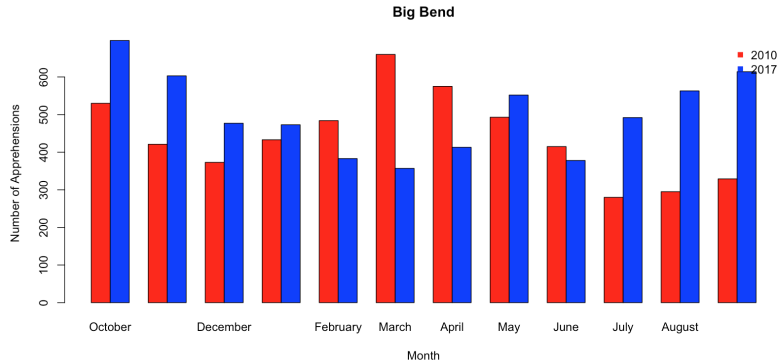
- ▶ Looking at the data, there is a noticeable but gradual trend of the total yearly apprehensions diminishing.
- ▶ 2000 started out with the most apprehensions while 2017 exhibited the lowest apprehensions

## 2010 and 2017 Sector Comparisons

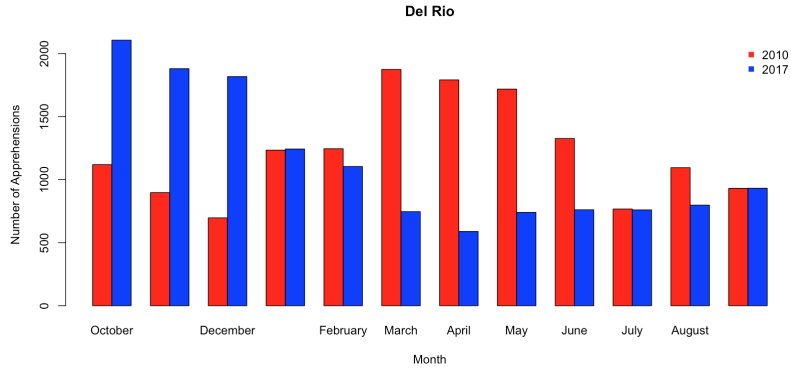
- ▶ the following 9 graphs represent a side by side comparison of each sector's apprehensions in the year 2010 and 2017
- ▶ El Centro, San Diego and Tucson exhibit a decrease in overall apprehensions from 2010
- ▶ El Paso, Big Bend and Yuma exhibit a slight increase in overall apprehensions from 2010
- ▶ Del Rio and Laredo exhibit mixed results, with Del Rio spiking in the winter and falling in the summer and Laredo falling in the spring/summer and increasing during the winter



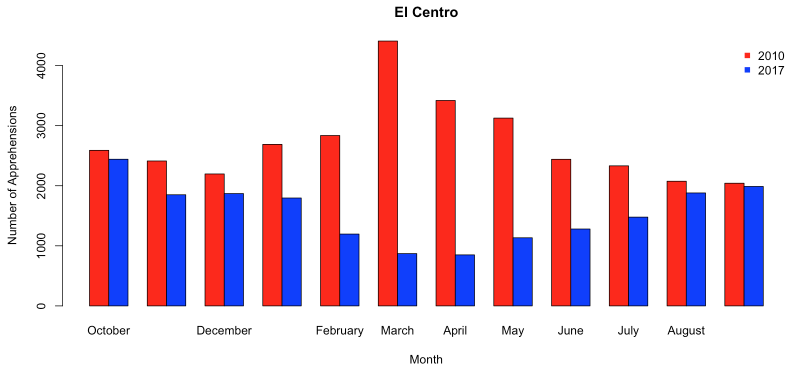
# Big Bend Comparison



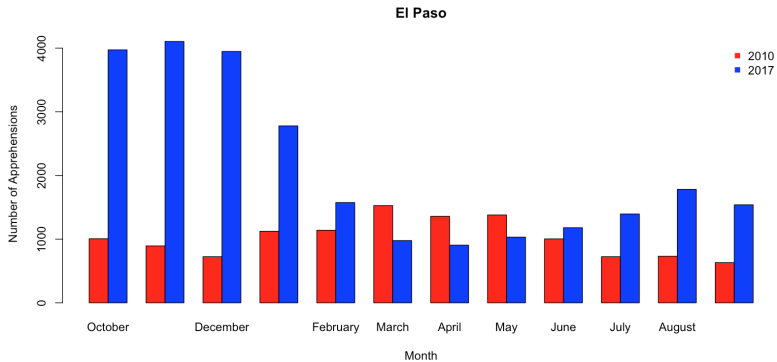
# Del Rio Comparison



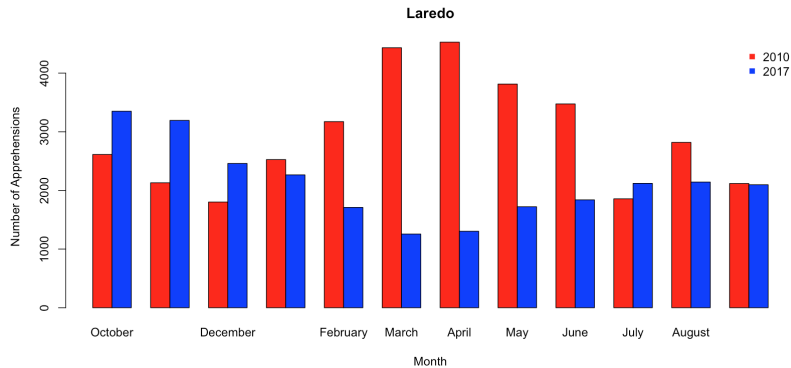
# El Centro Comparison



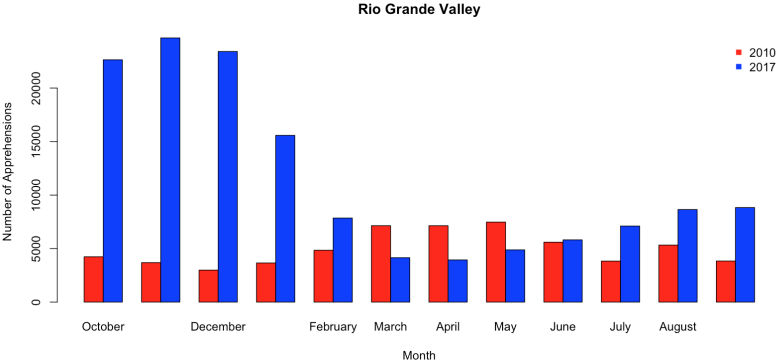
# El Paso Comparison



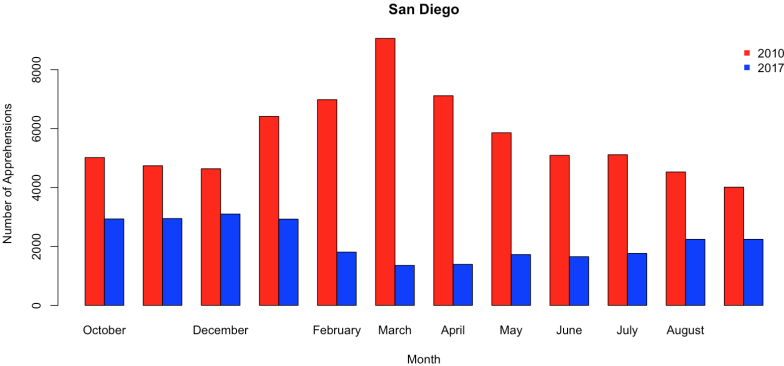
# Laredo Comparison



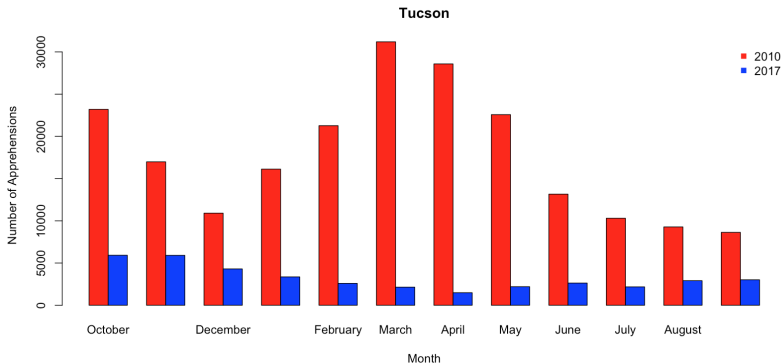
# Rio Grande Valley Comparison



# San Diego Comparison

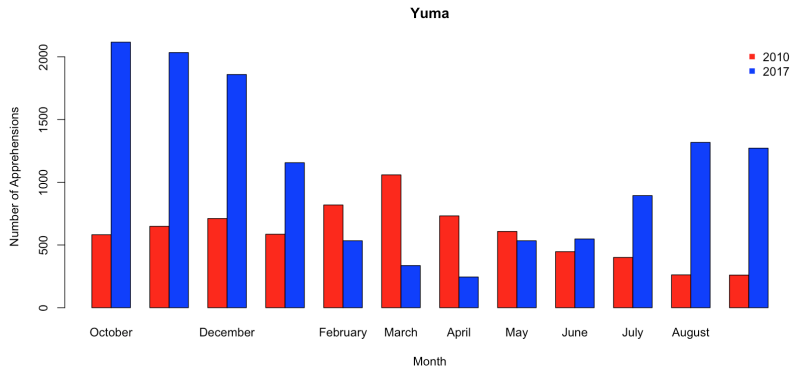


# Tuscon Comparison





# Yuma Comparison



# T Test

- ▶ The following slides are the outputs of each comparison between the 2010 and 2017 respective months
- ▶ The data we're interested in is the t statistic outputted in the second row
- ▶ By comparing all the t statistics from the following tests we can observe that March April and May have the highest T-test values which matches the 2010 CBP total apprehensions data. This makes sense because they have the highest T statistics. Meaning there is a large gap between the apprehensions in 2010 and 2017 with those months
- ▶ Comparatively, October November and December have the lowest T-test values, going into the negative range. This 3 month period has the highest total apprehensions in 2017 but is not too different from it's 2010 data, which is why the t-test values are closer to zero.

## T Test: October Comparison

```
##  
## Paired t-test  
##  
## data: BP2010$October and PB2017$October  
## t = -0.19561, df = 8, p-value = 0.8498  
## alternative hypothesis: true difference in means is not  
## 95 percent confidence interval:  
## -7522.671 6346.226  
## sample estimates:  
## mean of the differences  
## -588.2222
```

## T Test: November Comparison

```
##  
## Paired t-test  
##  
## data: BP2010$November and PB2017$November  
## t = -0.57437, df = 8, p-value = 0.5815  
## alternative hypothesis: true difference in means is not  
## 95 percent confidence interval:  
## -8021.535 4822.424  
## sample estimates:  
## mean of the differences  
## -1599.556
```

## T Test: December Comparison

```
##  
## Paired t-test  
##  
## data: BP2010$December and PB2017$December  
## t = -0.81876, df = 8, p-value = 0.4366  
## alternative hypothesis: true difference in means is not  
## 95 percent confidence interval:  
## -7724.951 3676.729  
## sample estimates:  
## mean of the differences  
## -2024.111
```

## T Test: January Comparison

```
##  
## Paired t-test  
##  
## data: BP2010$January and PB2017$January  
## t = 0.16907, df = 8, p-value = 0.8699  
## alternative hypothesis: true difference in means is not  
## 95 percent confidence interval:  
## -4505.171 5218.060  
## sample estimates:  
## mean of the differences  
## 356.4444
```

## T Test: February Comparison

```
##  
## Paired t-test  
##  
## data: BP2010$February and PB2017$February  
## t = 1.2559, df = 8, p-value = 0.2446  
## alternative hypothesis: true difference in means is not  
## 95 percent confidence interval:  
## -2233.163 7574.497  
## sample estimates:  
## mean of the differences  
## 2670.667
```

## T Test: March Comparison

```
##  
## Paired t-test  
##  
## data: BP2010$March and PB2017$March  
## t = 1.793, df = 8, p-value = 0.1107  
## alternative hypothesis: true difference in means is not  
## 95 percent confidence interval:  
## -1563.07 12488.85  
## sample estimates:  
## mean of the differences  
## 5462.889
```



## T Test: April Comparison

```
##  
## Paired t-test  
##  
## data: BP2010$April and PB2017$April  
## t = 1.7273, df = 8, p-value = 0.1224  
## alternative hypothesis: true difference in means is not  
## 95 percent confidence interval:  
## -1642.025 11444.247  
## sample estimates:  
## mean of the differences  
## 4901.111
```

## T Test: May Comparison

```
##  
## Paired t-test  
##  
## data: BP2010$May and PB2017$May  
## t = 1.6862, df = 8, p-value = 0.1303  
## alternative hypothesis: true difference in means is not  
## 95 percent confidence interval:  
## -1328.549 8556.549  
## sample estimates:  
## mean of the differences  
## 3614
```

## T Test: June Comparison

```
##  
## Paired t-test  
##  
## data: BP2010$June and PB2017$June  
## t = 1.6274, df = 8, p-value = 0.1423  
## alternative hypothesis: true difference in means is not  
## 95 percent confidence interval:  
## -781.4508 4529.8953  
## sample estimates:  
## mean of the differences  
## 1874.222
```

## T Test: July Comparison

```
##
## Paired t-test
##
## data: BP2010$July and PB2017$July
## t = 0.7663, df = 8, p-value = 0.4655
## alternative hypothesis: true difference in means is not
## 95 percent confidence interval:
## -1656.988 3306.321
## sample estimates:
## mean of the differences
## 824.6667
```

## T Test: August Comparison

```
##  
## Paired t-test  
##  
## data: BP2010$August and PB2017$August  
## t = 0.51189, df = 8, p-value = 0.6226  
## alternative hypothesis: true difference in means is not  
## 95 percent confidence interval:  
## -1607.187 2524.298  
## sample estimates:  
## mean of the differences  
## 458.5556
```

## T Test: September Comparison

```
##  
## Paired t-test  
##  
## data: BP2010$September and PB2017$September  
## t = 0.031118, df = 8, p-value = 0.9759  
## alternative hypothesis: true difference in means is not  
## 95 percent confidence interval:  
## -2103.832 2161.387  
## sample estimates:  
## mean of the differences  
## 28.77778
```

## T Test: Total Comparison

```
##  
## Paired t-test  
##  
## data: total2010 and total2017  
## t = 0.71295, df = 8, p-value = 0.4961  
## alternative hypothesis: true difference in means is not  
## 95 percent confidence interval:  
## -35705.54 67664.43  
## sample estimates:  
## mean of the differences  
## 15979.44
```