

# Louisville2022

KR

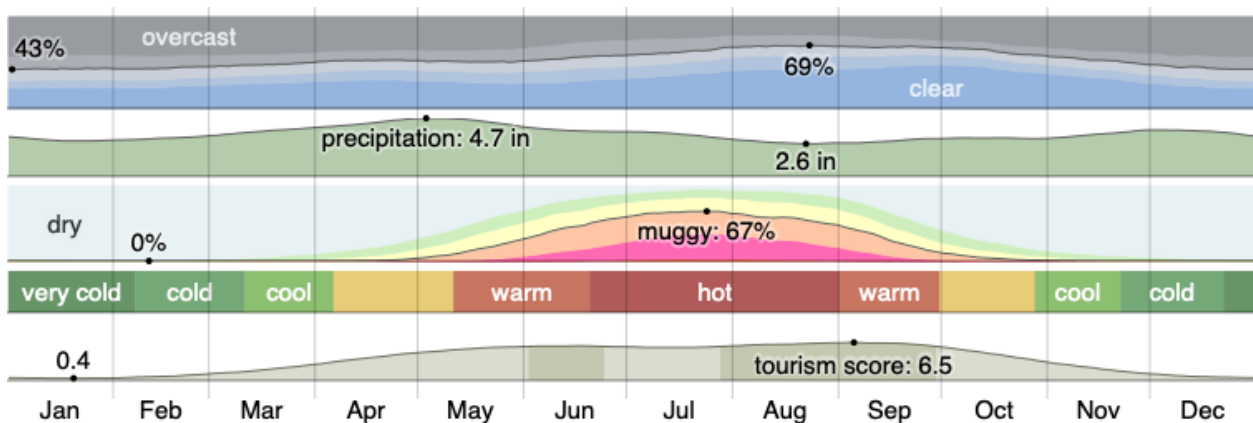
2022-10-10

## Louisville Peace Project Sept 9 - 21, 2022

For the analysis of crime data and its values during the Louisville Peace Project, we obtained the crime raw data from Louisville Metro Crime Data 2022: <https://data.louisvilleky.gov/datasets/louisville-metro-ky-crime-data-2022/explore>

The length of the project was 11 days, thus we considered the data in two ways: as a time series and aggregated in periods of 11 days.

Crime and weather: Crime counts are correlated with weather. Previous studies had established that the higher the temperature, the higher the crime. Looking at the weather in Louisville, September is comparable with May and June. The weather data was obtained from the NOAA National Centers for Environmental Information: <https://www.ncei.noaa.gov/cdo-web/>

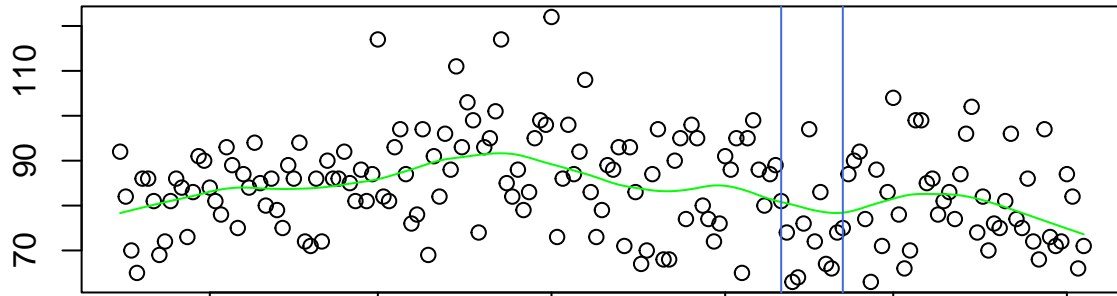


Courtesy of WeatherSpark.com

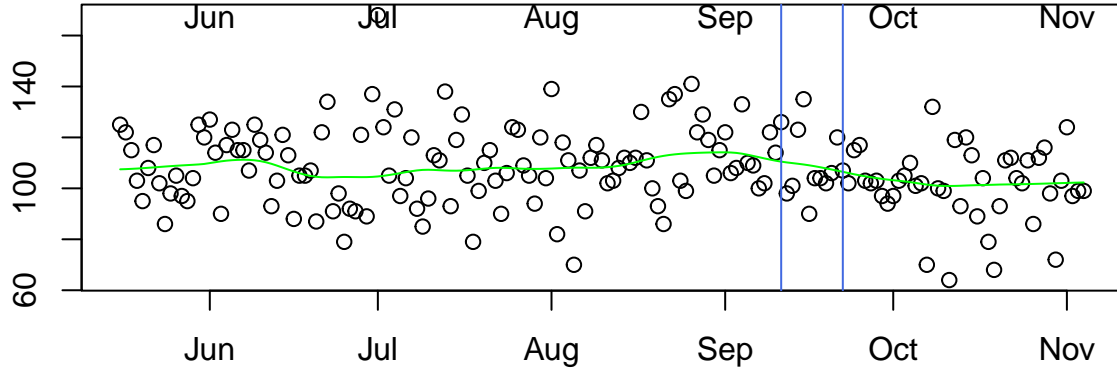
## Plots of Crime Counts

```
##  
## 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
```

### Violent Crime Counts in Louisville

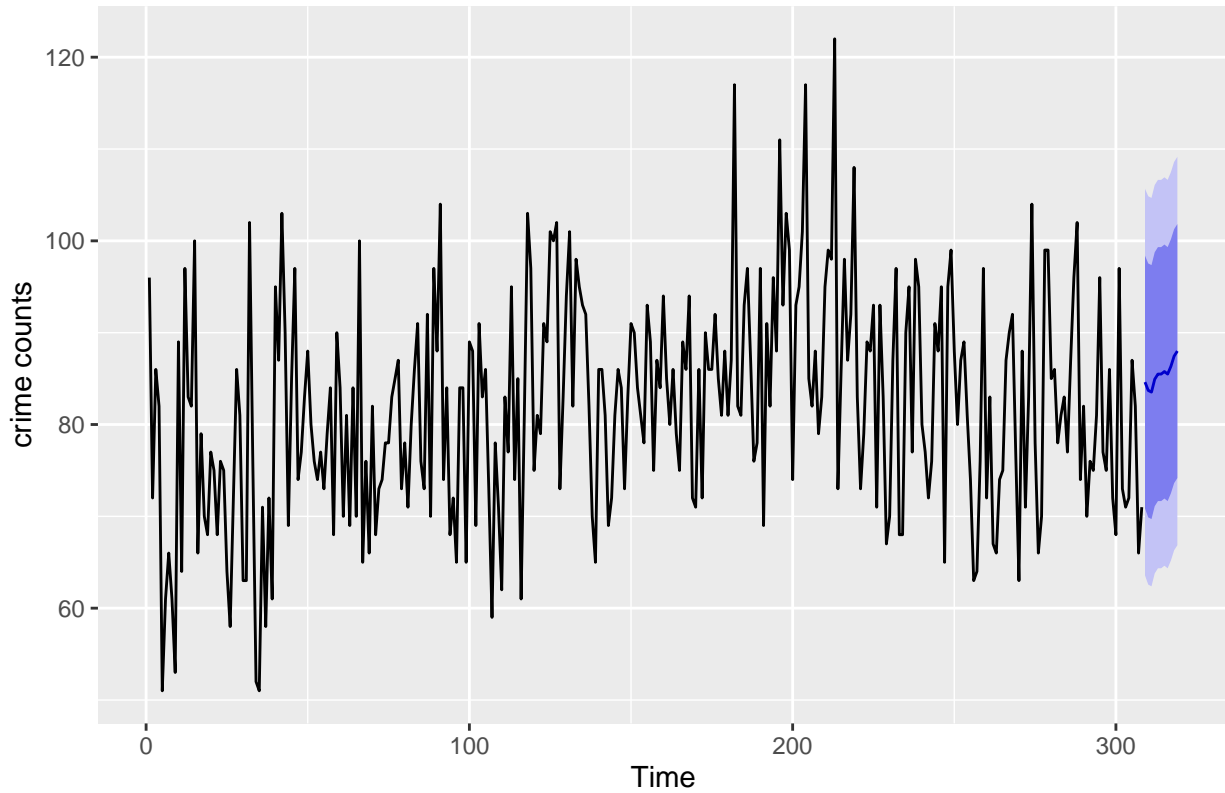


### Non Violent Crime counts in Louisville



```
## Registered S3 method overwritten by 'quantmod':
##   method      from
## as.zoo.data.frame zoo
```

### Forecasts from Regression with ARIMA(1,0,0) errors



```
## [1] "Model: arima (1,0,0) with covariate temperature:"
##          ar1      intercept      TAVG intervention
## 0.0940977 64.8615958 0.2787903 -11.2456617
## [1] "s.e. 0.06 , 2.44 , 0.04 , 3.61"
## [1] "Percent decrease crime vs predicted by model"
##      percent.mean percent.median
## [1,]          0.13           0.16
```

Arima Model Coefficients with standard errors:

	ar1	intercept	average temperature	intervention
	0.0941	64.8616	0.2788	-11.2457
s.e.	0.0569	2.4409	0.0379	3.6112

This result means that the Peace Project intervention was significant in reducing crime during the 11-day period of the Peace Project. The negative sign for the variable “intervention” means that the number of crimes during the intervention were smaller than in the absence of intervention. And with a standard error of 3.6, the effect (-11.25) is larger than 3 standard errors, which means that the effect is highly significant.

Comparing the predicted numbers without intervention vs the actual numbers during the peace project, we observed a mean decrease of 13% and a median decrease of 16%.

### Table of Crime Counts per 11-day periods

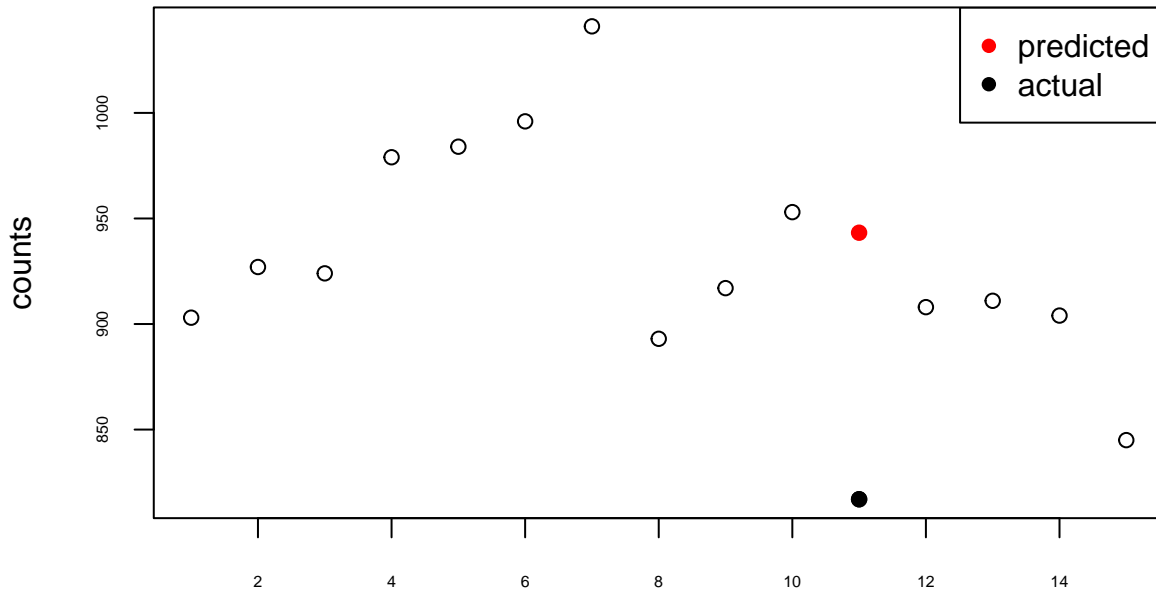
Total incidents	11 day period	violent	non violent	meantemp	
2108	05-24 - 06-03	44	903	1161	73
2240	06-04 - 06-14	61	927	1252	77
2106	06-15 - 06-25	53	924	1129	82
2285	06-26 - 07-06	47	979	1259	82
2239	07-07 - 07-17	54	984	1201	81
2207	07-18 - 07-28	48	996	1163	83
2247	07-29 - 08-08	58	1041	1148	80
2173	08-09 - 08-19	64	893	1216	77
2261	08-20 - 08-30	75	917	1269	79
2235	08-31 - 09-10	41	953	1241	76
2067	09-11 - 09-21	41	817	1209	75
2107	09-22 - 10-02	59	908	1140	64
2061	10-03 - 10-13	55	911	1095	60
2047	10-14 - 10-24	48	904	1095	56
2026	10-25 - 11-04	64	845	1117	59

```
## [1] "predicted sum"
## [1] 940.812
```

We see that when we look at the aggregated sums, the model predicted 940.8 violent crimes during the peace project and the actual number was 817, a decrease from predicted of 13.13%, for the whole city of Louisville.

We observe that the mean temperatures dropped after the the peace project but the violent crime counts increased, supporting the claim of the effect of the peace project reducing crime. In fact we see that the 11-day period of the peace project had the lowest number of violent crimes.

## Violent Crime Louisville



### Percent reduction compared to means:

Compared with all periods:

##	violent	nonviolent
##	-12.59	2.67

Project Stats: <https://www.peacefulcities.org/statsig/>