In 2014, Russia annexed Crimea from Ukraine and began a hybrid warfare campaign in Eastern Ukraine. The Russians used a combination of conventional and unconventional tactics to support pro-Russian Separatists in the Donetsk and Luhansk Oblasts, commonly referred to as the Donbas region. While the annexation of Crimea went relatively smoothly, the conflict in the Donbas quickly ground to a stalemate between the Russian supported separatists and the Ukrainian government. Despite two attempts to negotiate a ceasefire, known as the Minsk Protocol and Minsk II, the conflict remains active and violent. In other words, these agreements have been ceasefire in name only.

The goal of this project is to more accurately depict the real zone or zones of conflict between Ukrainian and Separatist forces and the impact of this project is to measure the real zone or zones of conflict fore, using publicly available open source data, the goal of the project is to measure the real zone or zones of conflict between the Russian supported separatists and Ukrainians. Prior to having placed a line of contact based on political boundaries of the battlefield in the Donbass region. The conflict remains active and violent. In other words, the goal is to generate a ceasefire, known as the Minsk Protocol and Minsk II, the conflict remains active and violent. In other words, these agreements have been ceasefire in name only.

After cleaning the dataset to remove imprecise or erroneous entries, the data was imported into ArcGIS using the latitude and longitude coordinates within each entry. Using the spatial analyst tool, violent incidents hotspots were calculated using kernel density for points of 1,000m and a search radius of 30,000m. There was no weighting by casualties or form of violence. This procedure was run on the entire dataset and on each year separately. Each raster produced by the kernel density tool was classified into quantiles. The annual graphics are displayed below. The overall dataset was used to calculate population at risk and the population loss by raiion.

To generate the change in conflict map, the 2014 raster was subtracted from the 2017 raster using the raster calculator tool. The resulting raster shows the difference in absolute terms between observed violent incidents between the first year of the conflict, 2014, and the most recent year data is available, 2017. The resulting raster was then classified to display areas of significant increased violence in areas of blue and areas of increased violence in shades of red.

Finally, the project concluded with calculations of population change within the high and moderate intensity areas of violence. The areas considered high and moderate intensity were determined by reclassifying the highest and second highest quantile within the overall dataset raster. The area of each raiion considered high or moderate intensity was then calculated by using the tabulate area tool. The data was then exported to Excel. For each raiion, the area of high risk was divided by the total area of the raiion to produce the percentage of area at high risk. The raiion level population data was then multiplied by the percentage of the raiion considered high risk resulting in the population at high risk per raiion. The same procedure was conducted for moderate risk areas.

This population data is represented in this presentation in two ways. First, the data was aggregated to the Oblast level and displayed in a table. Second, the data was presented as a scatter plot using percentage population loss as the x axis and percentage high intensity of violence as the y axis. A regression line illustrates the correlation between loss of population and high intensity conflict.