

TABLEAU SOFTWARE

Colorado Statistical Analysis Center

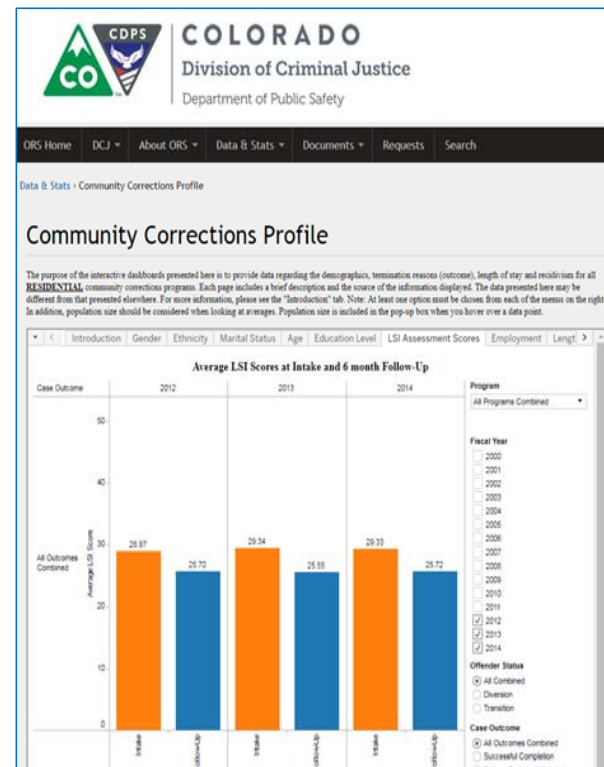
*Kim English, Research Director
Laurence Lucero, Analyst*

Background

- ▶ Became aware of Tableau as method of presenting/interacting with data
 - ▶ Crime statistics web page
- ▶ Used BJS/SAC grant to provide training to SAC staff on Tableau
- ▶ First used Tableau with crime statistics, statewide and by county
- ▶ In 2015, General Assembly mandated studies AND analyses
 - ▶ House Bill 15-1273—Law enforcement contacts on school grounds
 - ▶ Requires disaggregation by **crime type, law enforcement agency, school**
 - ▶ Senate Bill 15-185—Race/ethnicity and gender at major justice decision points
 - ▶ Requires disaggregation by decision point, race/ethnicity, **crime type**

Basically.....we HAD to do something!

- ▶ Laurence began learning Tableau and experimenting with visuals, and working with the Tableau Help Desk to get clarification and get them to fix bugs!
- ▶ We now use Tableau for:
 - ▶ Crime statistics, statewide and county, over time
 - ▶ Community corrections (halfway house system) client profile by program, over time
 - ▶ Length of stay in prison by crime type and gender, over time
 - ▶ Recidivism of various justice populations over time (TV, new crime), over time

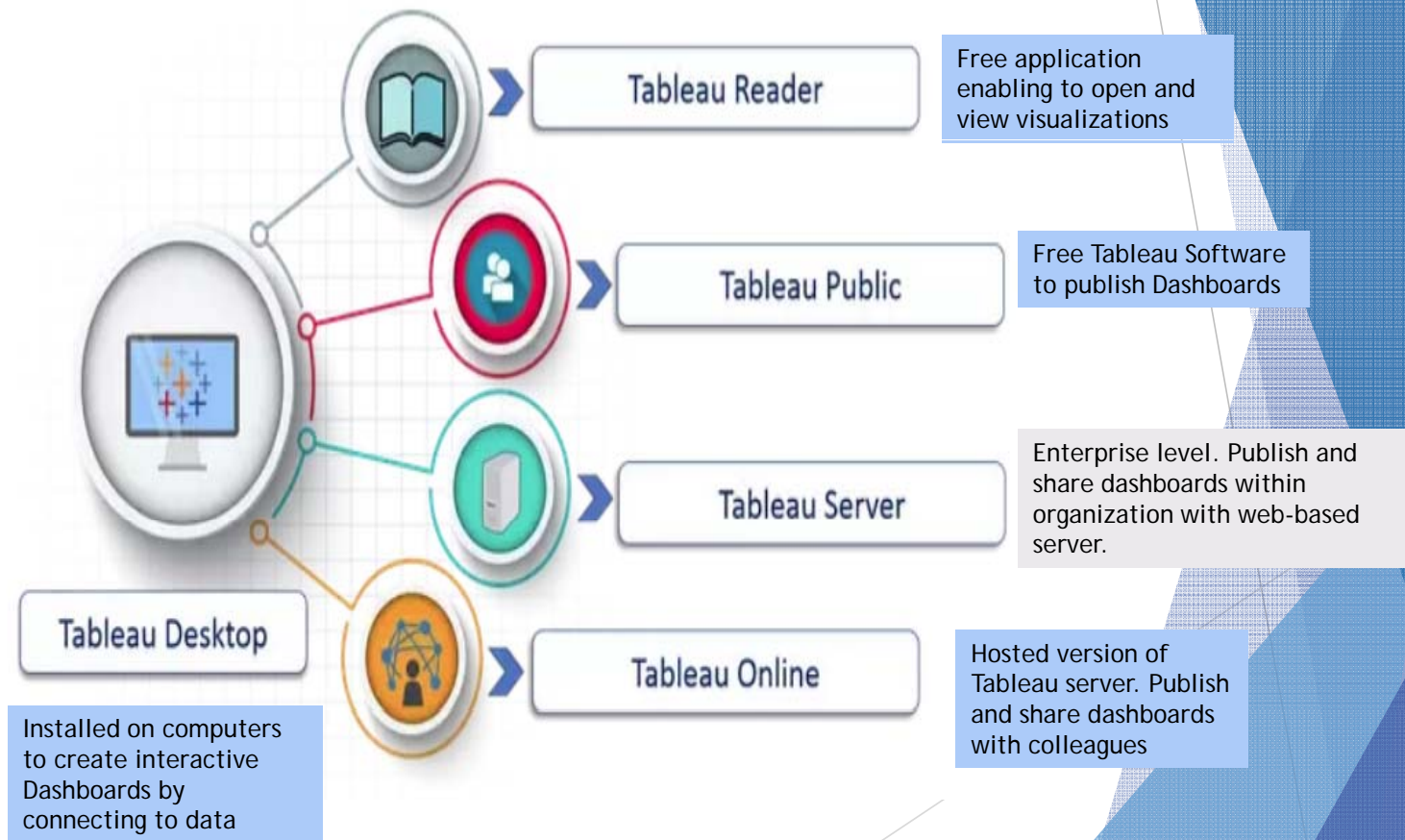


What is Tableau?



Tableau is a software tool which produces interactive data visualization products (graphs, tables, maps etc.) focused on business intelligence

Tableau products



Steps to Construct Visualization

- ▶ Format data to be compatible with Tableau (column = variable).
(Tableau Add-in available for Excel to format data for Tableau).
- ▶ Load data
- ▶ Build graphs in sheets
- ▶ Build dashboard including multiple sheets
- ▶ Publish dashboard onto the "Tableau Public"
There is an option to allow or not the workbook and its data to be downloaded by viewers.
- ▶ An url is generated
- ▶ Url embedded in website

Data

- ▶ Excel, Access, Text file, JSON file, PDF file, Spatial file, Statistical file etc.
- ▶ Variables = column
- ▶ Example:

| Years | Crime | CO Number | CO Rate | US Number | US Rate | Which | Group Year |
|-------|----------|-----------|---------|-----------|---------|---------|------------|
| 1997 | Homicide | 176 | 4.5 | 18208 | 6.8 | Violent | 1995-1999 |

Tableau Sheets and Dashboards

Live Demonstration

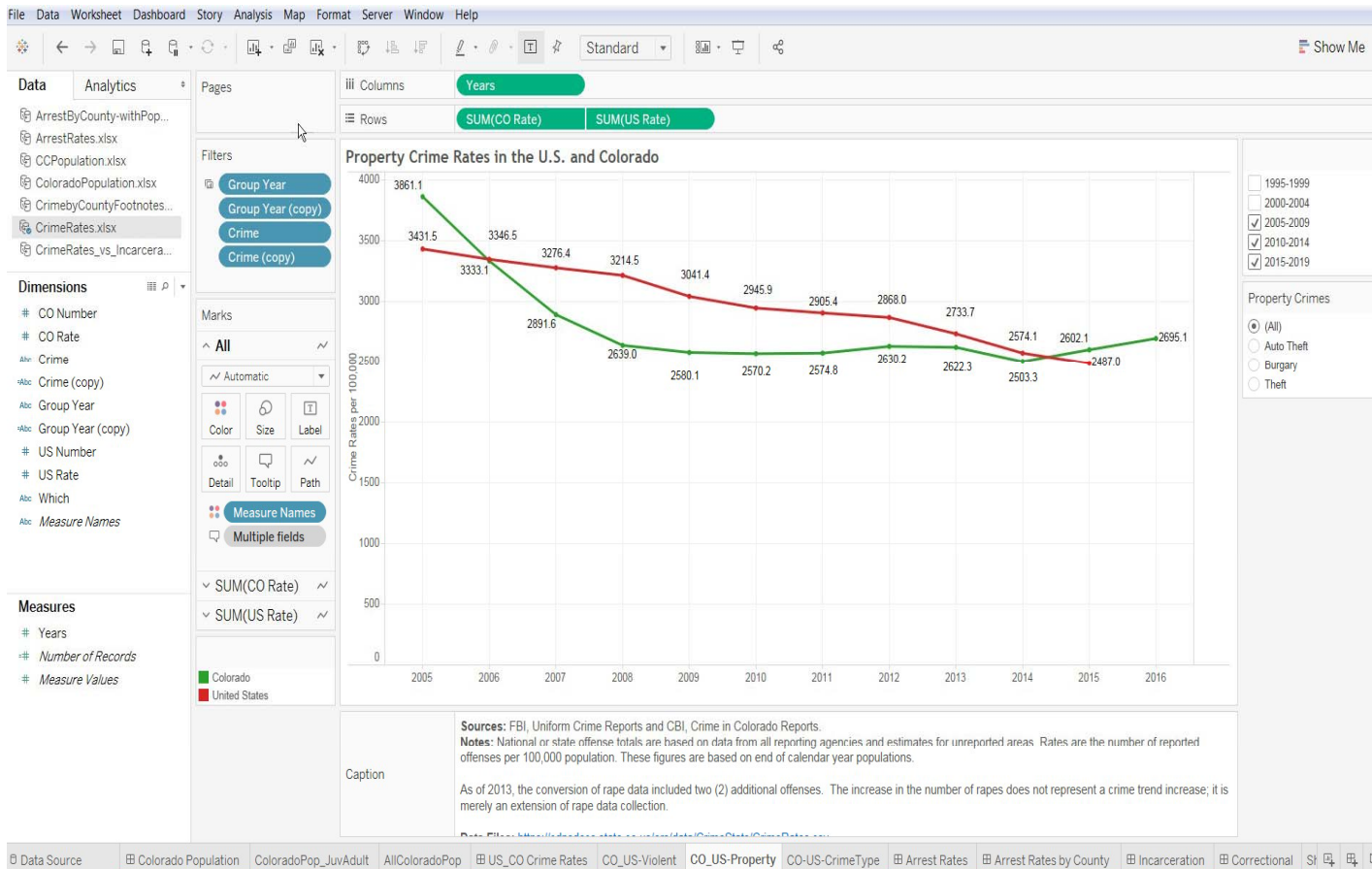


Tableau Sheets and Dashboards

Live Demonstration

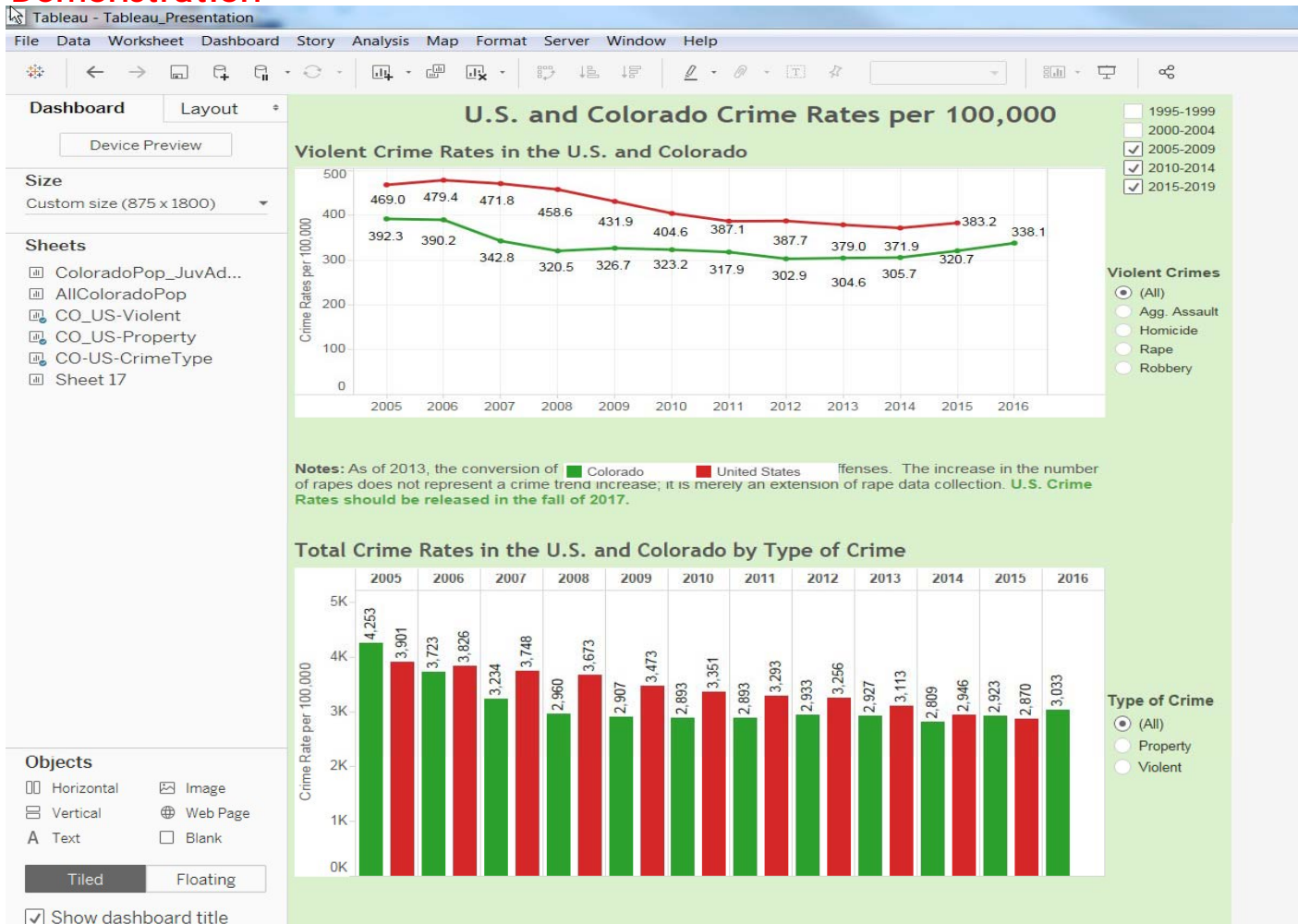
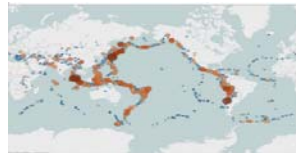
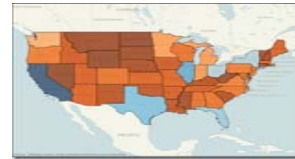


Tableau Maps

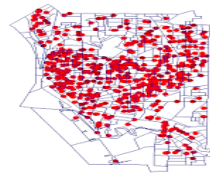
- ▶ Proportional symbol map



- ▶ Filled maps



- ▶ Point Distribution Map



- ▶ Flow Maps



- ▶ Spider Map



Some Highlighted Features

- ▶ **Dashboards and Stories**
- ▶ **Join multiple data sources**
- ▶ **Data:** Discrete = list of values. Continuous = range of data.
- ▶ **Dimensions/Measures:** Dimensions are “Textual” in nature and cannot be aggregated; Measures are numeric values.
- ▶ **Drag and drop:** Measures and dimensions to create graphs/tables/maps and filters
- ▶ **Marks:** Details of the visualization (color, size of graph, label, tooltip).
- ▶ **Filters and Context** - Can create a dependent filter from another numeric filter.
- ▶ **Parameters:** Dynamic values that can replace constant values in calculations, filters and reference lines. For example, create a calculated field that returns true if Variable > than 50,000 and otherwise return false

Some Highlighted Features

- ▶ **Geocoding:** Tableau recognizes country names, state/province names, city names and area codes for many countries. If location not recognized, ability to custom geocode the data and attribute geographic role.
- ▶ **Mapping:** Create views using maps to show data distributions by geographic locations.
- ▶ **Calculations:** Powerful tool in Tableau. Ability to manipulate, calculate and maneuver data quickly and easily.
- ▶ **Calculation Types:**
 - ▶ - Calculated Fields: Custom calculations created using a Calculated Field editor - Math operations across numbers, Logic Statements, Aggregating Data, Manipulating Strings and Data formulas
 - ▶ - Row and Column Totals
 - ▶ - Table Calculations including Quick Table Calculations: Predefined calculations created locally in Tableau

Working within your webpage

- Publish the dashboard in “Tableau Public”
- Retrieve the url
- Embed the url into a webpage or direct link.

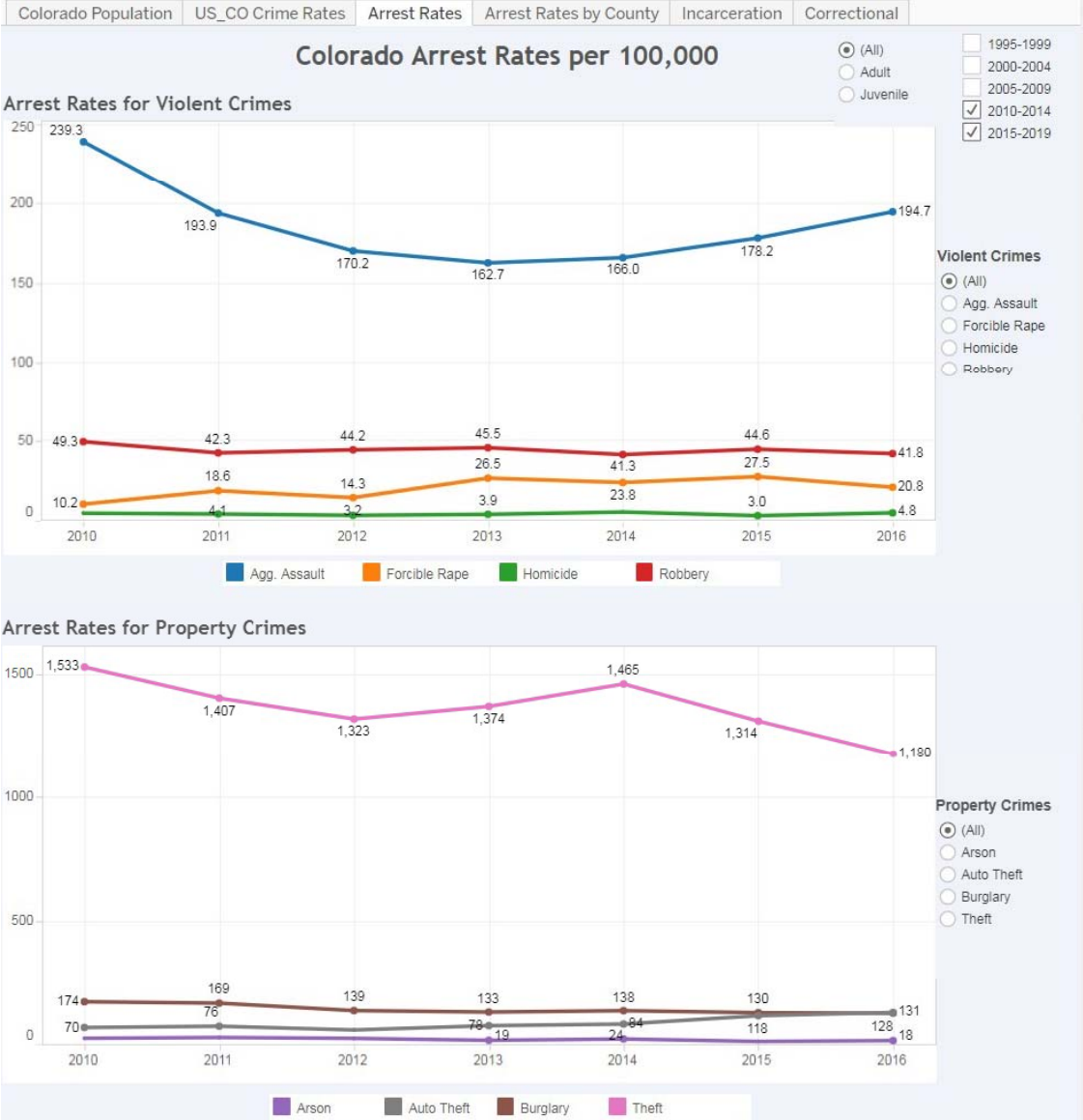
Things to Know about Tableau

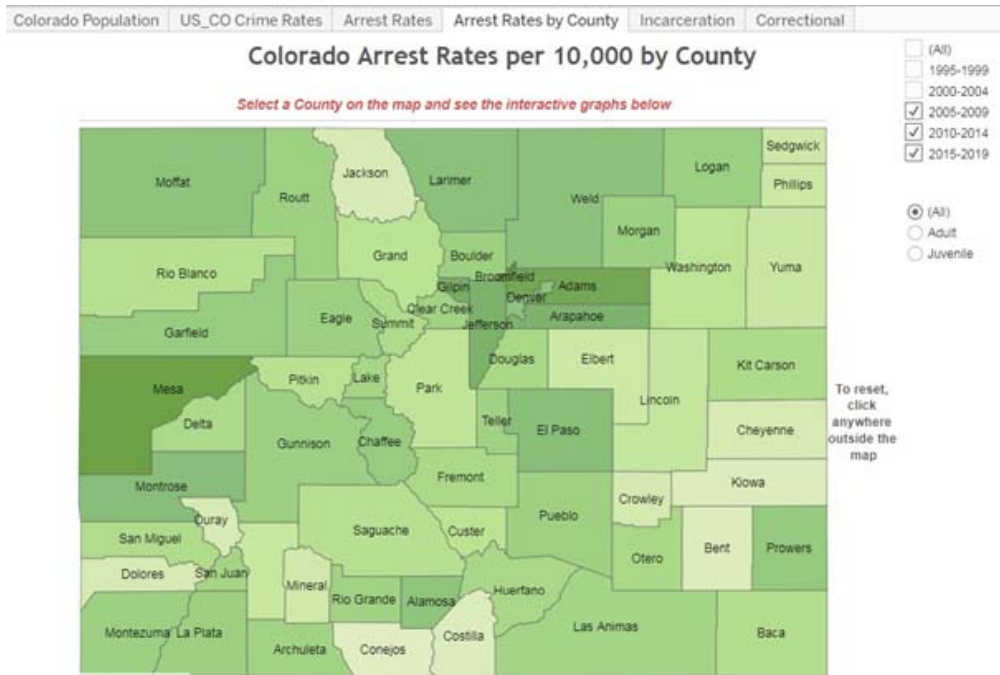
- ▶ Not always “intuitive” and training for users recommended – 1st basic training (40-hour) is offered online
- ▶ Annual maintenance fee allows regular software updates of products and technical assistance.
- ▶ Technical assistance is requested through a ticket system.
- ▶ Very active Community Forums – Good source for technical help

Examples of Tableau dashboards used at the Colorado SAC

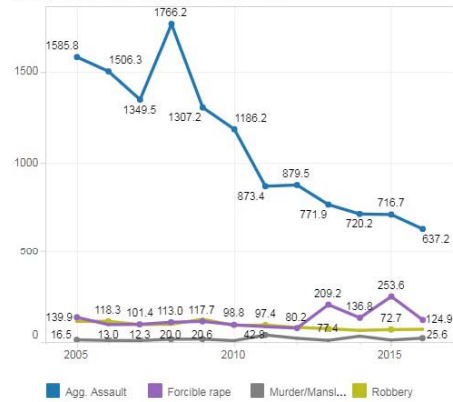
- ▶ Crime Statistics
- ▶ Minority over-representation
- ▶ Correctional Population
- ▶ Community Corrections Profiles
- ▶ Length of Stay in Prison
- ▶ Recidivism
- ▶ Law Enforcement Contacts with Students
- ▶ Race and Ethnicity at Decision Points
- ▶ Marijuana (upcoming)

Some examples

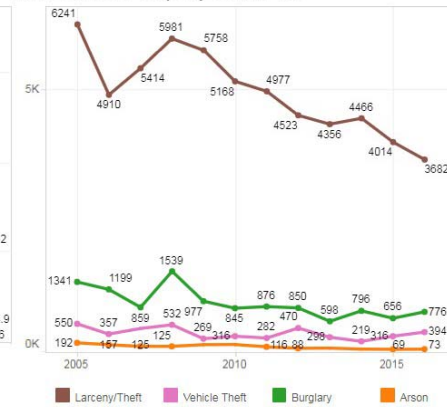




Arrest Rates for Violent Crimes - All



Arrest Rates for Property Crimes - All



Number of marijuana arrests, by county, by agency

1. Select a county

2. Select an agency

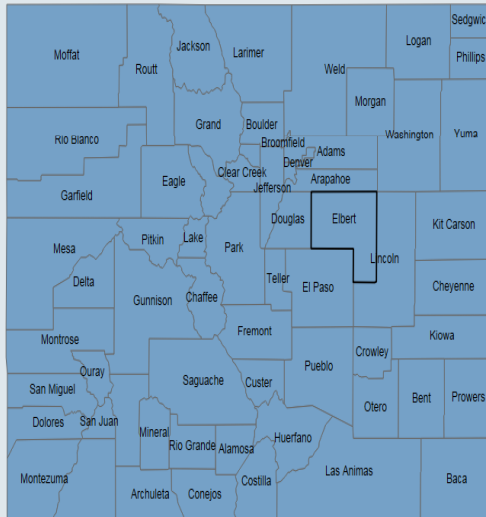
Westminster Police Department

Return to "All" to reset

Some examples

County: All

Click "Esc" to reset



| Type of Crime | 2012 | 2013 | 2014 | 2015 |
|---------------|------|------|------|------|
| Possession | 393 | 124 | 134 | 106 |
| Production | 8 | 5 | 2 | 1 |
| Sales | | 2 | | 1 |
| Unspecified | 100 | 42 | 23 | 5 |

Total Arrests



| Race / Ethnicity | 2012 | 2013 | 2014 | 2015 |
|------------------|------|------|------|------|
| White | 345 | 113 | 114 | 75 |
| African American | 20 | 5 | 6 | 5 |
| Hispanic | 124 | 51 | 39 | 28 |
| Asian | 8 | 4 | | 5 |
| Native American | 1 | | | |
| Unknown | 3 | | | |

| Gender | 2012 | 2013 | 2014 | 2015 |
|--------|------|------|------|------|
| Female | 106 | 42 | 41 | 23 |
| Male | 395 | 131 | 118 | 90 |

| Age Group | 2012 | 2013 | 2014 | 2015 |
|--------------------|------|------|------|------|
| 18 to 20 years old | 104 | 47 | 45 | 30 |
| 21 years or older | 213 | 16 | 21 | 6 |
| Under 18 years old | 184 | 110 | 93 | 77 |

Note: Denver's officially reported marijuana arrest data for 2012 and 2013 was incomplete due to separate jail arrest and citation systems. Cite and release data were not reported to the Colorado Bureau of Investigation until July 2013. Additionally, the 2014 arrest data reported by Denver include non-criminal civil citations, which lead to an over-reporting of marijuana arrests for that year. The Denver Police Department does not believe that the official data they reported to the Colorado Bureau of Investigation is an accurate reflection of their internal data. The data in this table come from an internal analysis conducted by the Denver Police Department's Data Analysis Unit.

Questions?

<https://www.colorado.gov/dcj-ors>