CRDDS – Center for Research Data & Digital Scholarship

Introduction to Interactive Data Visualization with Tableau

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CU Earth Lab

CU Research Computing

CRDDS

Cats Vs Dogs
Week 1Exercise

Exercise
Dogs versus Cats who does America love most?

The goal of this exercise is to explore US census data taken in 2012 to get a feeling of the love of dogs or cats across America. This subset of the data looks at number of households per state which have pets and especially in relation to cat owners and dog owners. There is no data, included in this dataset which considers households which have both cats and dog.

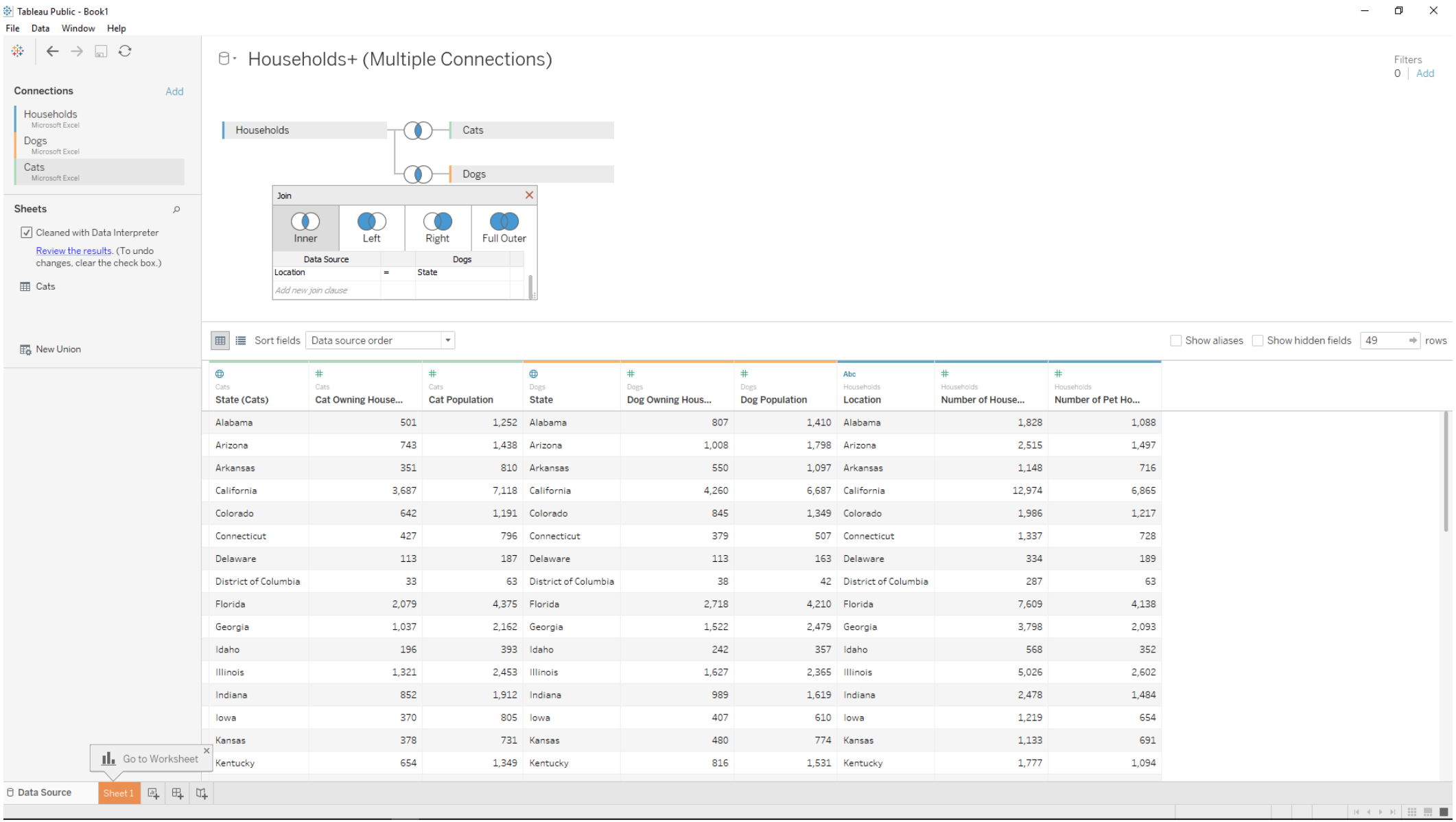
Note, all data is x1000 (e.g. a value of 1000 is really 1000*1000 = 1,000,000.)

Exercise: Loading the data

- Open Households.xlsx and clean it
- Click ‘Add’ and add the Dogs.xlsx data, clean and join it
  - The ‘Add’ link is just to the right of ‘Connections’ and allows you to add new files to your composite data source
  - We want to compare based on state so make sure you resolve the joining correctly.
- Click ‘Add’ and add the Cats.xlsx data, clean and join it
  - Are you sure you have both joined correctly? We want to compare cats and dogs based on a national basis.

  - While I’m not 100% sure, I’m 99% confident that if you are linking to any data sheet that needs a ‘Clean with the Data Interpreter’ that when you join a new sheet to it you have to select that check box for each new join to that sheet as well.

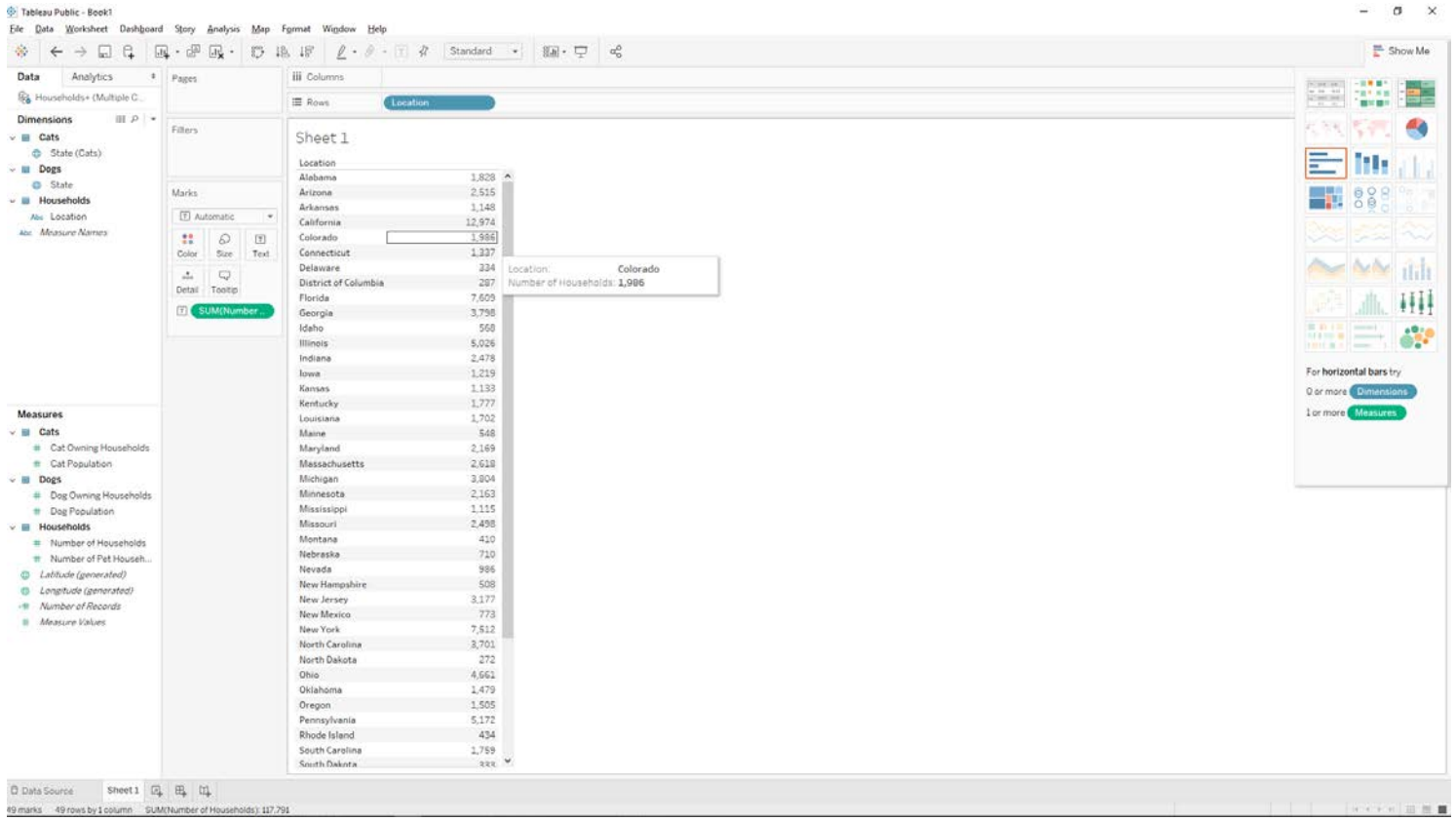
Exercise: Result of Loading the data



State (Cats)	Cat Owning House...	Cat Population	State	Dog Owning Hous...	Dog Population	Location	Number of House...	Number of Pet Ho...
Alabama	501	1,252	Alabama	807	1,410	Alabama	1,828	1,088
Arizona	743	1,438	Arizona	1,008	1,798	Arizona	2,515	1,497
Arkansas	351	810	Arkansas	550	1,097	Arkansas	1,148	716
California	3,687	7,118	California	4,260	6,687	California	12,974	6,865
Colorado	642	1,191	Colorado	845	1,349	Colorado	1,986	1,217
Connecticut	427	796	Connecticut	379	507	Connecticut	1,337	728
Delaware	113	187	Delaware	113	163	Delaware	334	189
District of Columbia	33	63	District of Columbia	38	42	District of Columbia	287	63
Florida	2,079	4,375	Florida	2,718	4,210	Florida	7,609	4,138
Georgia	1,037	2,162	Georgia	1,522	2,479	Georgia	3,798	2,093
Idaho	196	393	Idaho	242	357	Idaho	568	352
Illinois	1,321	2,453	Illinois	1,627	2,365	Illinois	5,026	2,602
Indiana	852	1,912	Indiana	989	1,619	Indiana	2,478	1,484
Iowa	370	805	Iowa	407	610	Iowa	1,219	654
Kansas	378	731	Kansas	480	774	Kansas	1,133	691
Kentucky	654	1,349	Kentucky	816	1,531	Kentucky	1,777	1,094

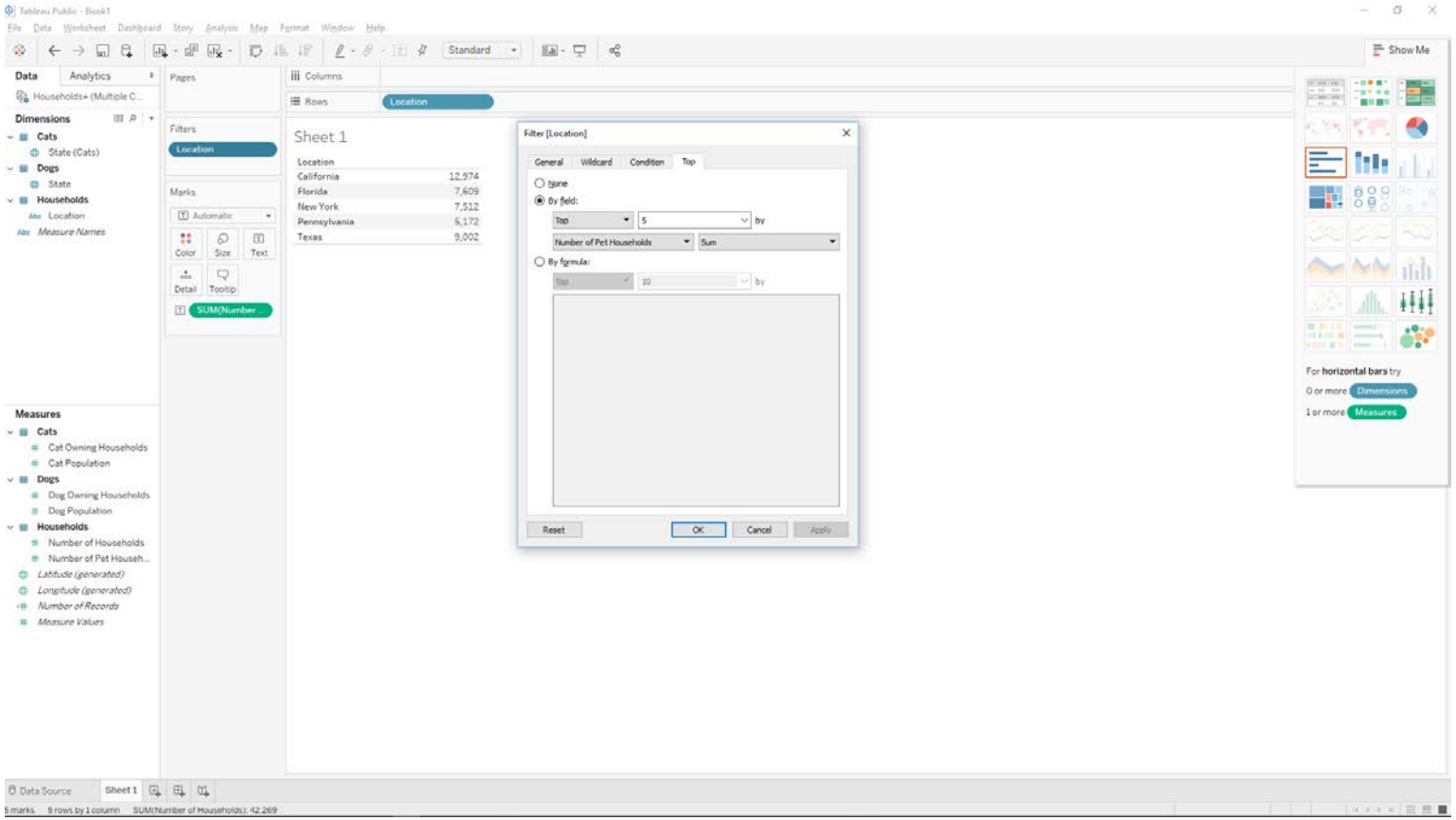
Exercise: First simple visualization – A text table

- Create a new Worksheet and create a ‘Text Table’ visualization of ‘Number of Pet Households’ per ‘Location’
- Rename the Worksheet (right click on the ‘Sheet 1’ tab and select ‘Rename’) to ‘Top/Bottom Pet Households’



Exercise: The ‘Top’ 5 pet owning states

- Create a ‘Top’ filter to find the 5 states with the highest ‘Number of Pet Households’
  - Click and drag the ‘Location’ for Households (under Dimensions) to the ‘Filters’ shelf
    - If the Filter dialog box is not open just double click on your new ‘Location’ filter.
  - Select the ‘Top’ tab
  - Select ‘By Field’
  - Select ‘Top’, change 10 to 5, select ‘Number of Pet Households’
  - Click ‘Apply’

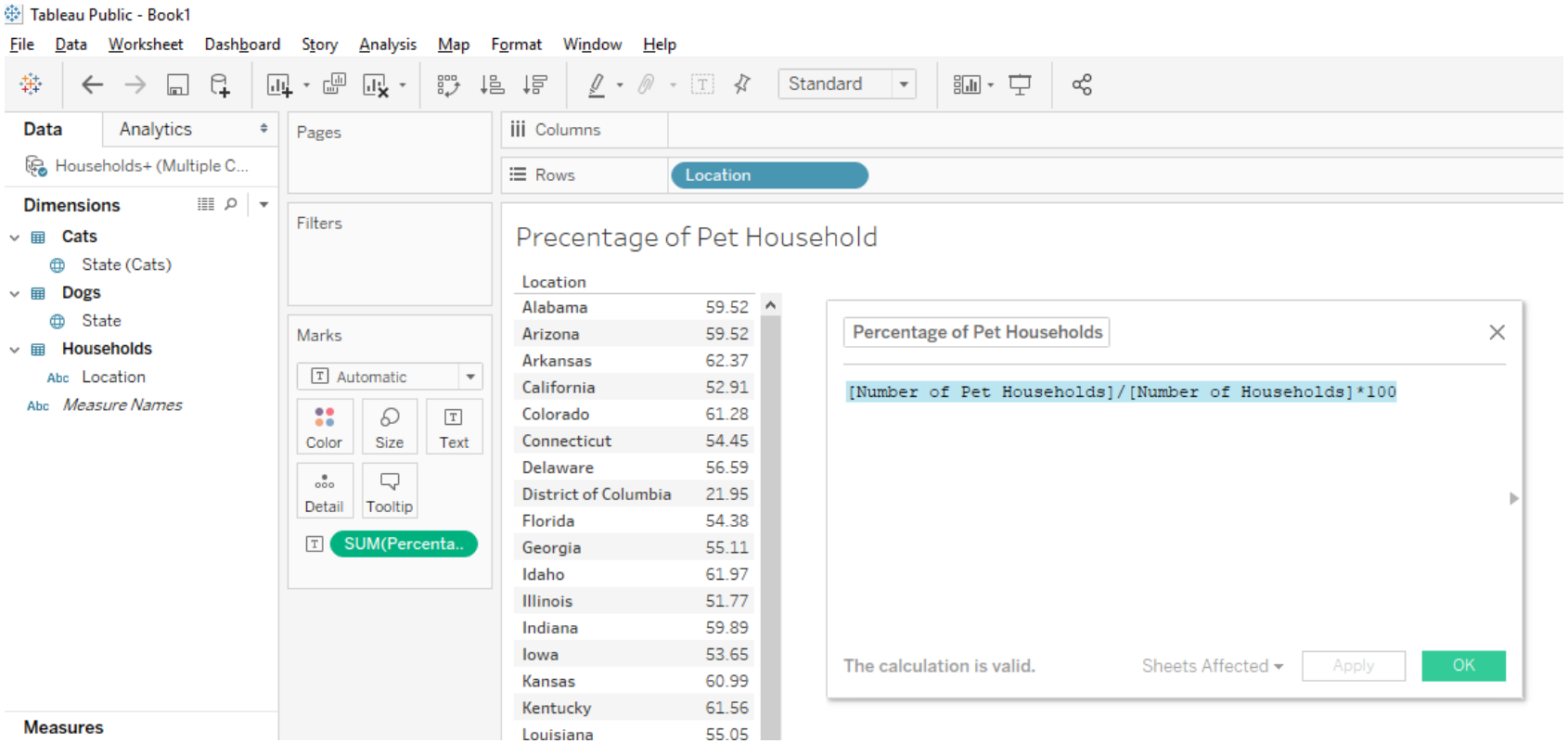


Exercise: The ‘Bottom’ 5 pet owning states

- **Create a ‘Bottom’ filter to find the 5 states with the lowest ‘Number of Pet Households’**
  - **Change ‘Top’ to ‘Bottom’ and click ‘Apply’**
    - **If the Filter dialog box is not open just double click on your new ‘Location’ filter.**

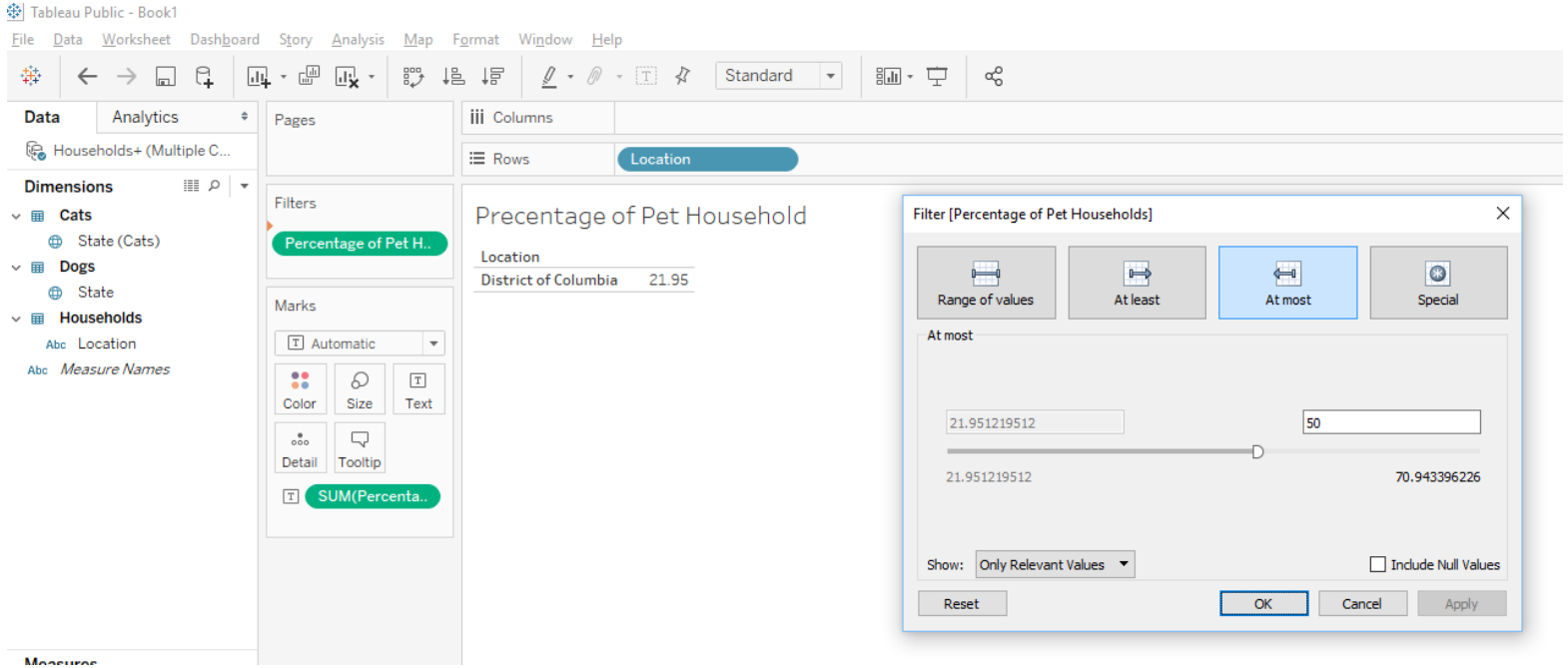
Exercise: New data ‘Percentage of Pet Households’

- Create a new Worksheet and Rename it to ‘Percentage of Pet Household’
- Create a new ‘Calculated Field’ (click ‘Analysis’-> ‘Create Calculated Field’)
- Name it ‘Percentage of Pet Households’
- Add a new expression as: [Number of Pet Households]/[Number of Households]*100
- Click ‘Apply’



Exercise: New data – ‘Percentage of Pet Households’

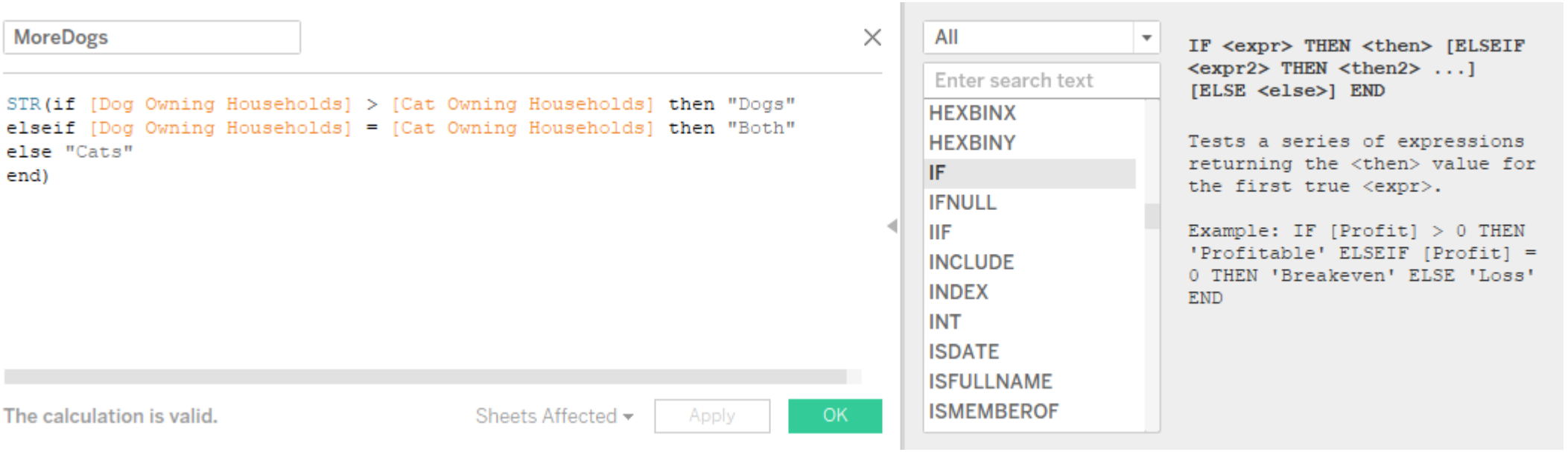
- Create a filter for ‘Percentage of Pet Households’
- Just click next when the ‘Filter Field’ dialog box opens
- Select ‘At Most’ and change the value to ‘50’
- Click ‘Apply’
- Create a filter for ‘Percentage of Pet Households’ < 50%
- If you want to see ‘Percent of Pet Households’ > 50% click ‘At Least’



Exercise: Dogs versus Cats who does America love most?

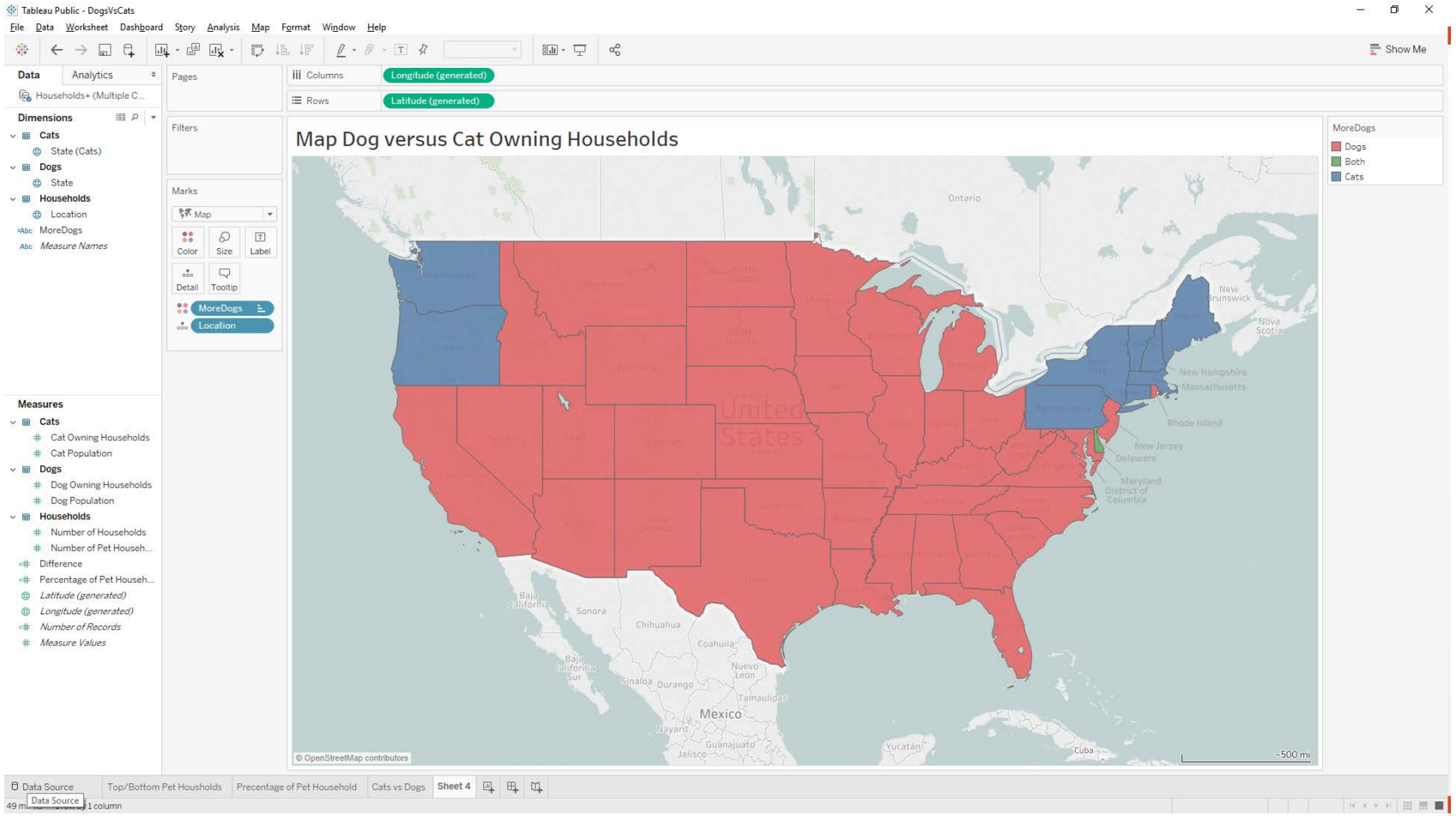
- Create a new Sheet and rename it to ‘Cats vs Dogs’
- Create a new Calculated Field and name it ‘MoreDogs’
- Create the expression as;

  STR(if [Dog Owning Households] > [Cat Owning Households] then "Dogs"
  elseif [Dog Owning Households] = [Cat Owning Households] then "Both"
  else "Cats"
  end)



Exercise: Dogs versus Cats who does America love most?

- Double click ‘Location’ under Households
- Color by ‘MoreDogs’ and change the Marks dropdown from ‘Automatic’ to ‘Map’



Time Series, Area Plots
Plot Formatting
and
More Mapping

Fires Human vs Lightning - Timeseries

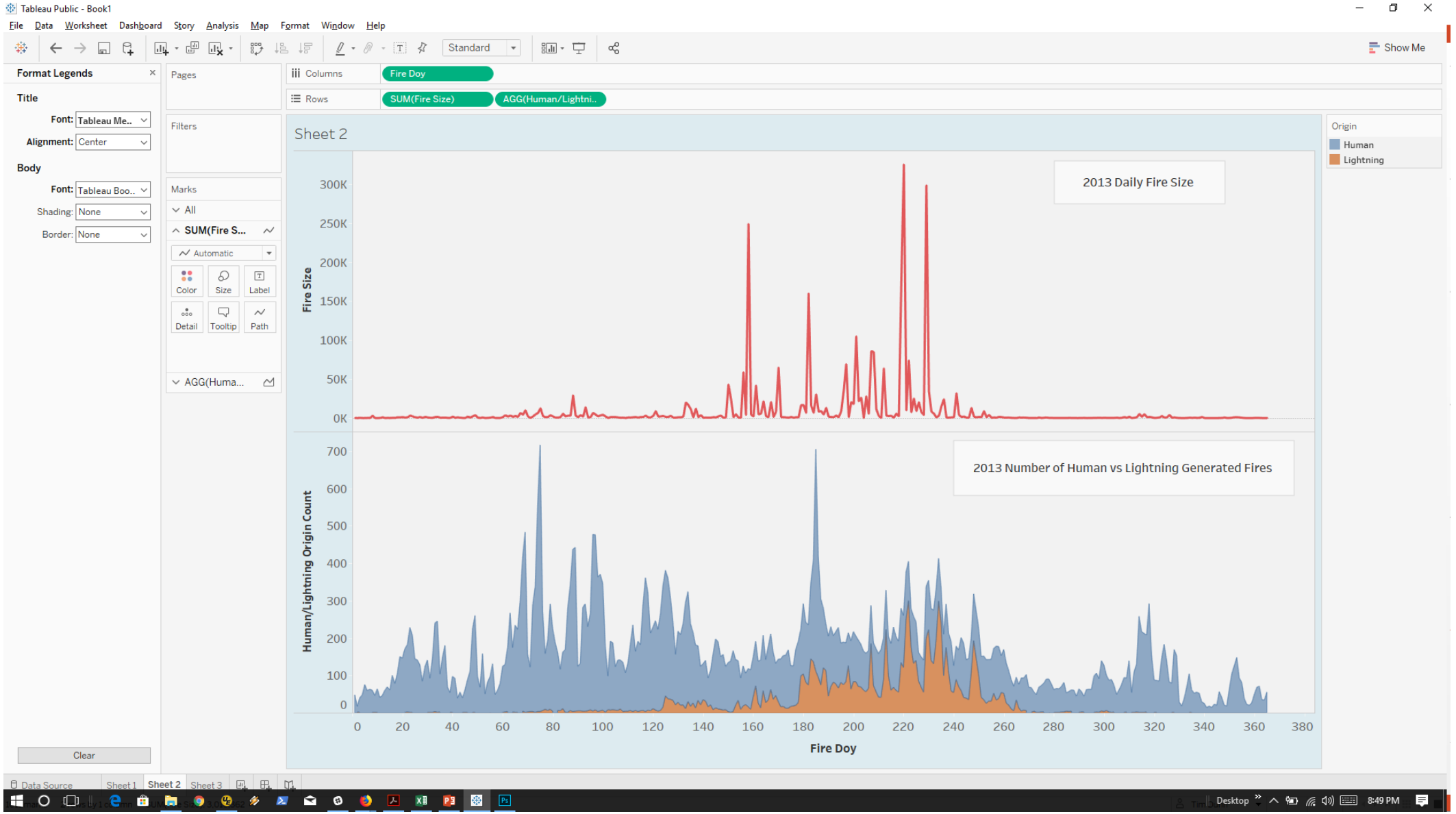
- Clear your Tableau workspace
- On the ‘Data Source’ tab click on Excel
- Load the ‘Fires.xlsx’ file
- Create a new worksheet
- Drag ‘Fire Day’ to Columns and ‘Fire Size’ to Rows
- Right click the ‘Fire Day’ in your Columns and change it to Dimension.

Fires Human vs Lightning – Adding a second Area Plot

- Duplicate your Timeseries plot
- Create a new Calculated Field named ‘Human/Lightning Origin Count’ with the expression; *COUNT([Origin])*
- Drag the new field to Rows and drop it to the right of SUM(Fire Size)
- Make sure you have the new Field selected and in the Marks tab change the drop down box to select ‘Area’
- Color by ‘Origin’

- TIPS ON FORMATTING PLOTS
- Adding Annotations

Fires Human vs Lightning – Cluster Mapping

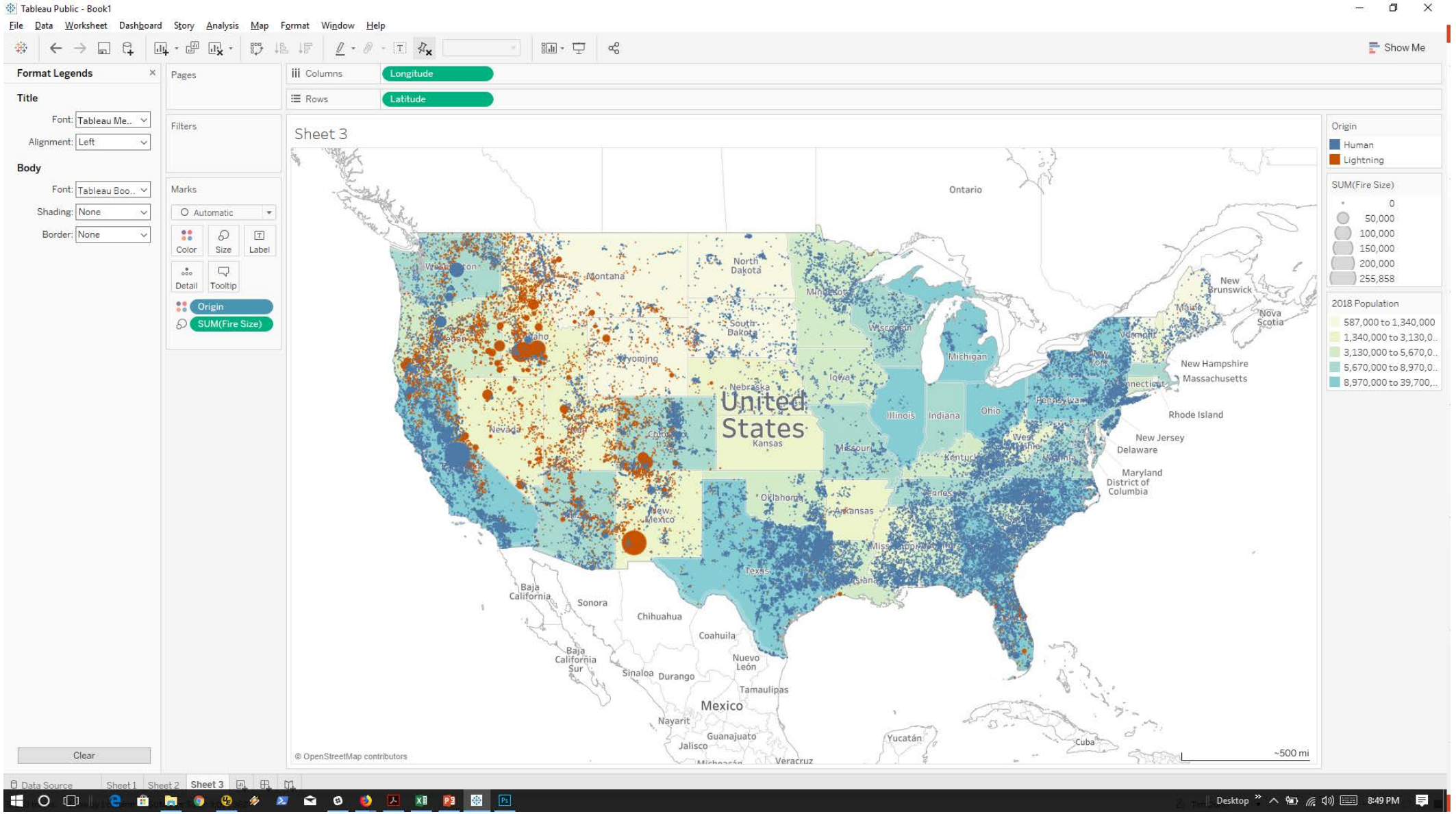


Fires Human vs Lightning – Cluster Mapping

- Create a new worksheet
- Double click on ‘Latitude’ then double click on ‘Longitude’
- Right click on ‘Longitude’ in the Columns shelf and change it to Dimension
- Right click on ‘Latitude’ in the Rows shelf and change it to Dimension
- Reset the Map if needed to see the whole US
- Color by ‘Origin’
- Size by ‘Fire Size’

- TIPS ON FORMATTING MAPS

Fires Human vs Lightning – Cluster Mapping



Spatial Files

Using Spatial files

- Clear your Tableau workspace
- On the ‘Data Source’ tab click on ‘Spatial file’
- Navigate to the na-cec_eco_l1 directory and select ‘NA_CEC_Eco_Level1.shp’
- Create a new worksheet
- Double click on ‘Geometry’ under Measures
- Color with ‘NA L1Name’

- **TIPS ON FORMATING MAPS**

Accessing WMS files for new backgrounds

Web Services

- https://www.gebco.net/data_and_products/gebco_web_services/web_map_service/

- **Scroll down to Accessing the WMS and copy the link for ‘For the global map’**
- **Select Map->Background Maps->Map Services**
- **Click ‘Add’ and select WMS Services**
- **Paste the URL into the ‘URL’ path edit box and then click ‘OK’**
- **It will take a couple of seconds for the map to display**

Creating Dashboards

Sheet 1 – Bar Plot

- Load and connect to US_Obesity.xlsx Excel
- Create a new Sheet and rename it as ‘Obesity Rate 2012-2013 by State’
- Add ‘Measure Values’ to Rows
- Add “State’ and ‘Measure Names’ to Columns
- Change the plot type to ‘side-by-side bars’ if not already set to it
- Create a filter for ‘Measure Names’ double click on the filter
- Exclude everything but ‘Obesity Rate 2012’ and ‘Obesity Rate 2013’
- Color by ‘Measure Names’
- Change the Title to ‘Obesity Rate 2012-2013 by State’
- Change the ‘Fits’ dropdown in the toolbar to ‘Fit Width’

Sheet 2 – Packed Bubbles Plot

- **Duplicate your sheet by right clicking on the Sheet tab**
- **Rename your new sheet to ‘Obesity Rate 2012-2013 by State Bubble’**

Sheet 3 – Map

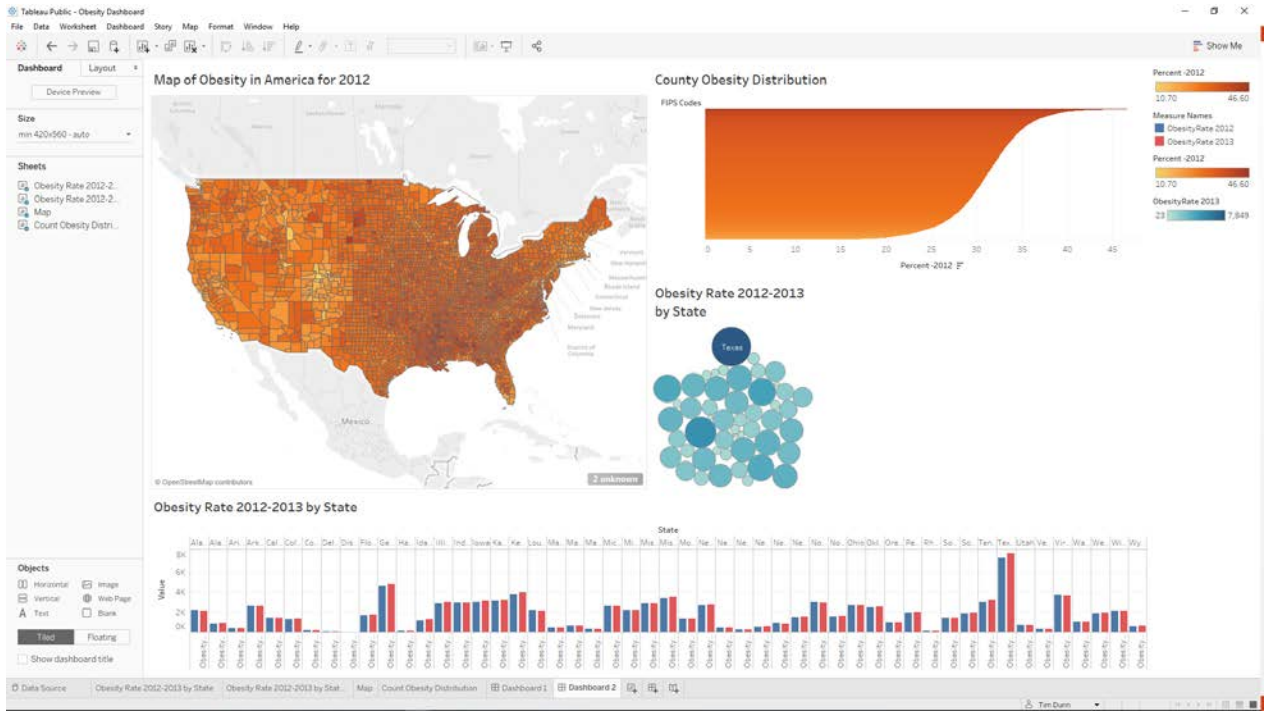
- Create a new Sheet and rename it to ‘Map’
- Double click on ‘State’
- In the Marks shelf click the drop down btn and select ‘Map’
- Right click on Alaska and select ‘Exclude’
- Right click on Hawaii and select ‘Exclude’
- Drag and drop ‘County’ onto the map
- Change coloring to ‘Precent-2012’
- Double click on Colors, select Edit Colors and change the drop down to ‘Orange-Gold’
- Change opacity to 100%
- Change the title to ‘Map of Obesity in America for 2012’

Sheet 4 – County Obesity Plot

- Create a new Sheet and rename it to ‘County Obesity Distribution’
- Add ‘FIPS Codes’ to Rows and when asked select ‘Add all members’
- Add ‘Percent – 2010’ to Columns
- Click the arrow or right click on ‘FIPS Codes’ and select ‘Sort’
  - Change order to Descending
  - Change Sort by to Field
  - Click Apply and OK
- Set Color to ‘Percent – 2012’ and change coloring to ‘Orange-Gold’
- Change the ‘Fit’ toolbar drop down from ‘Standard’ to ‘Fit Height’

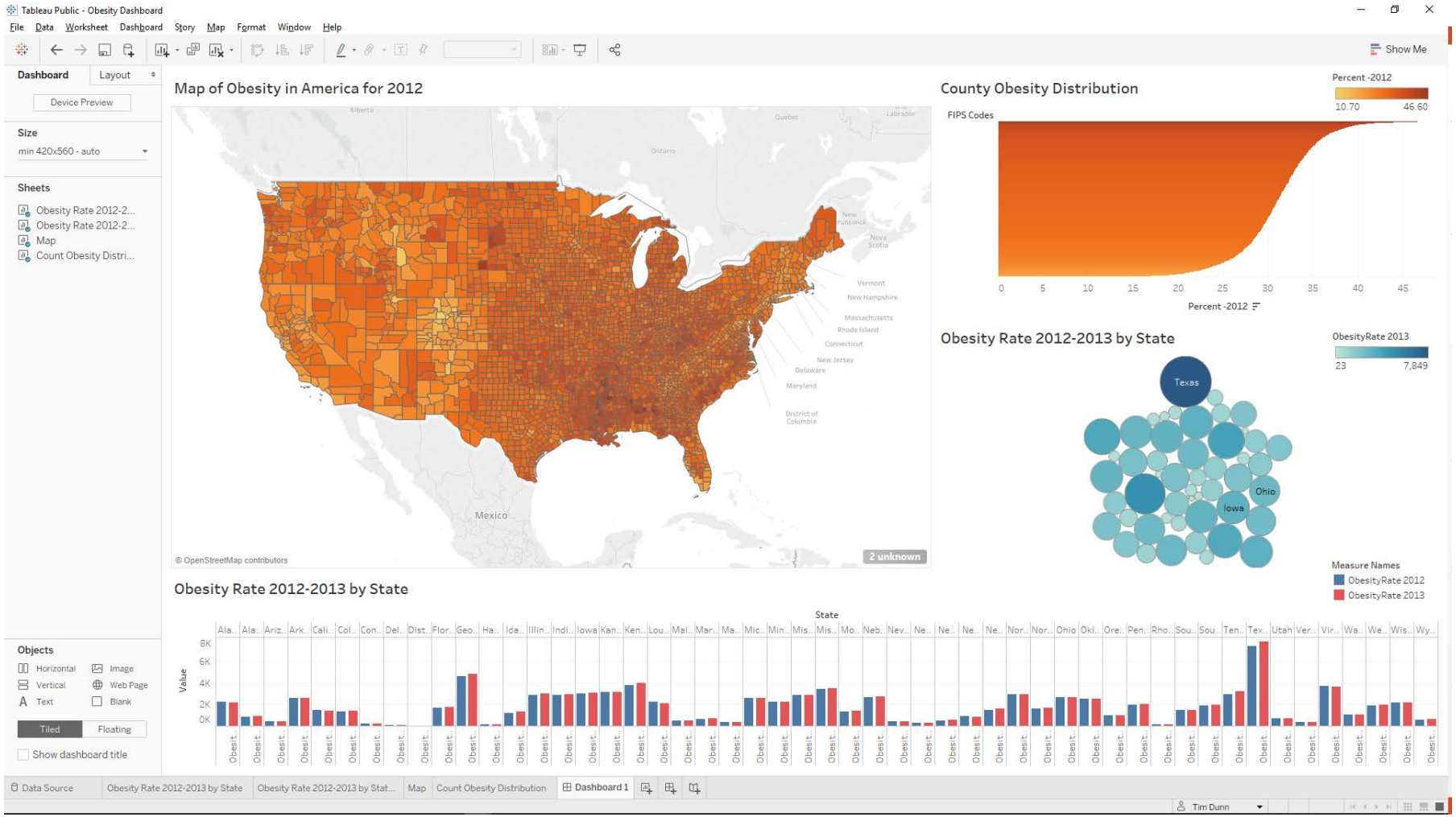
Dash Board – Creating the Dashboard

- Create a new Dashboard
- Click on the Size dropdown and uncheck ‘Maximum Size’
- Under ‘Sheets’ Grab the ‘Map’ sheet and drag it to the Dashboard
- Likewise grab the other sheets and lay them out to match this layout



Dash Board – Cleaning the Legend layout

- **Convert each of the Legends to ‘Float’ and re-adjust the layout**



Dash Board – Adding Interactivity

- Click on the Dashboard menu and select ‘Actions’ then click on ‘Add Action’
- Select ‘Highlight’
- Change the Name to ‘County’
- Under both Source Sheets and Target Sheets and make sure only ‘County Obesity Distribution’ and ‘Map’ are checked.
- Set ‘Run Action on’ ‘Select’
- For Highlighting Fields click on ‘Selected Fields’ and check ‘County’ and ‘FIPS Codes’