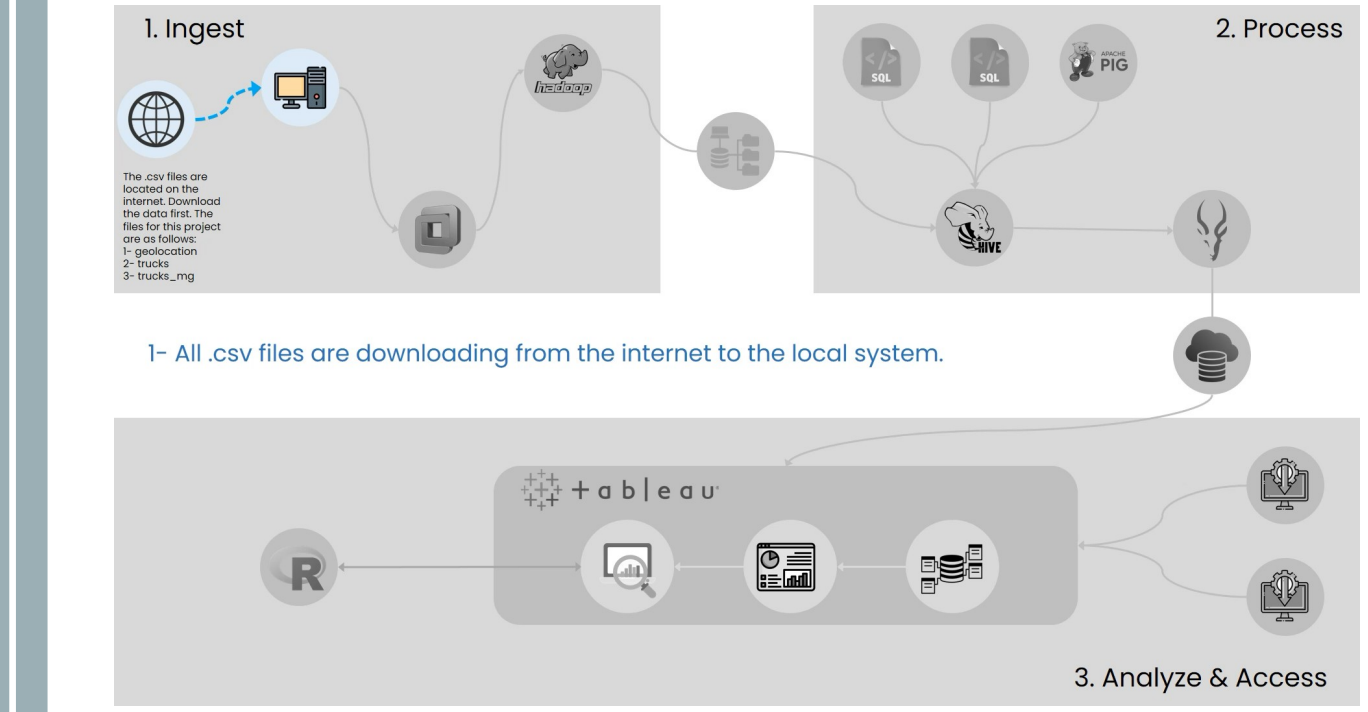
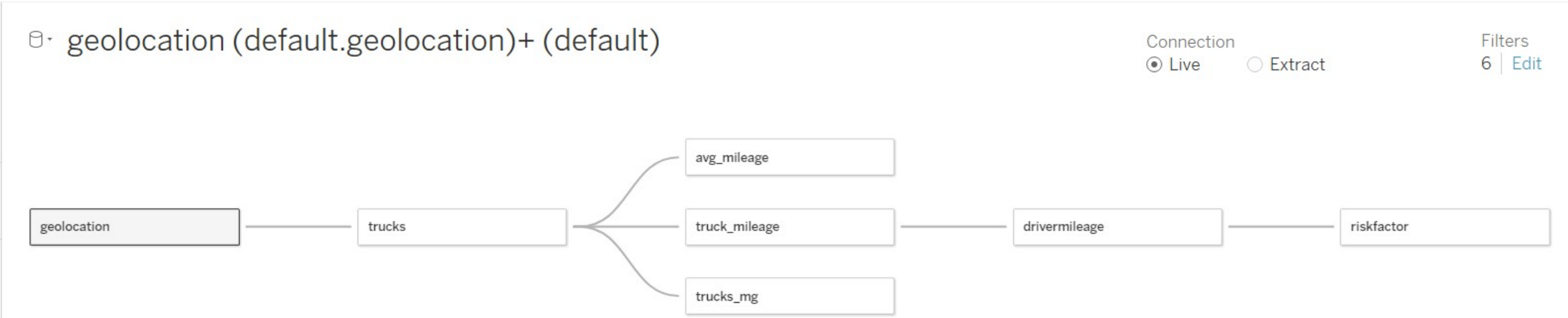
LOGISTICS RISK ANALYSIS

GROUP 1

- Azadjoutabari, Farhad
- Byna, Shreya
- Patel, Jahanvi Kamleshkumar
- Patel, Sakshi Jayesh
- Shankar, Nandhakumar Raj
- Vemula, Akshita

PROCESS FLOW





RELATIONAL DATABASE

This shows the connection made between the tables and the database, to define the schema and use it further for analysis.

BUISNESS QUESTIONS

What are the top 5 cities that the events were happened by riskiest drivers on average?

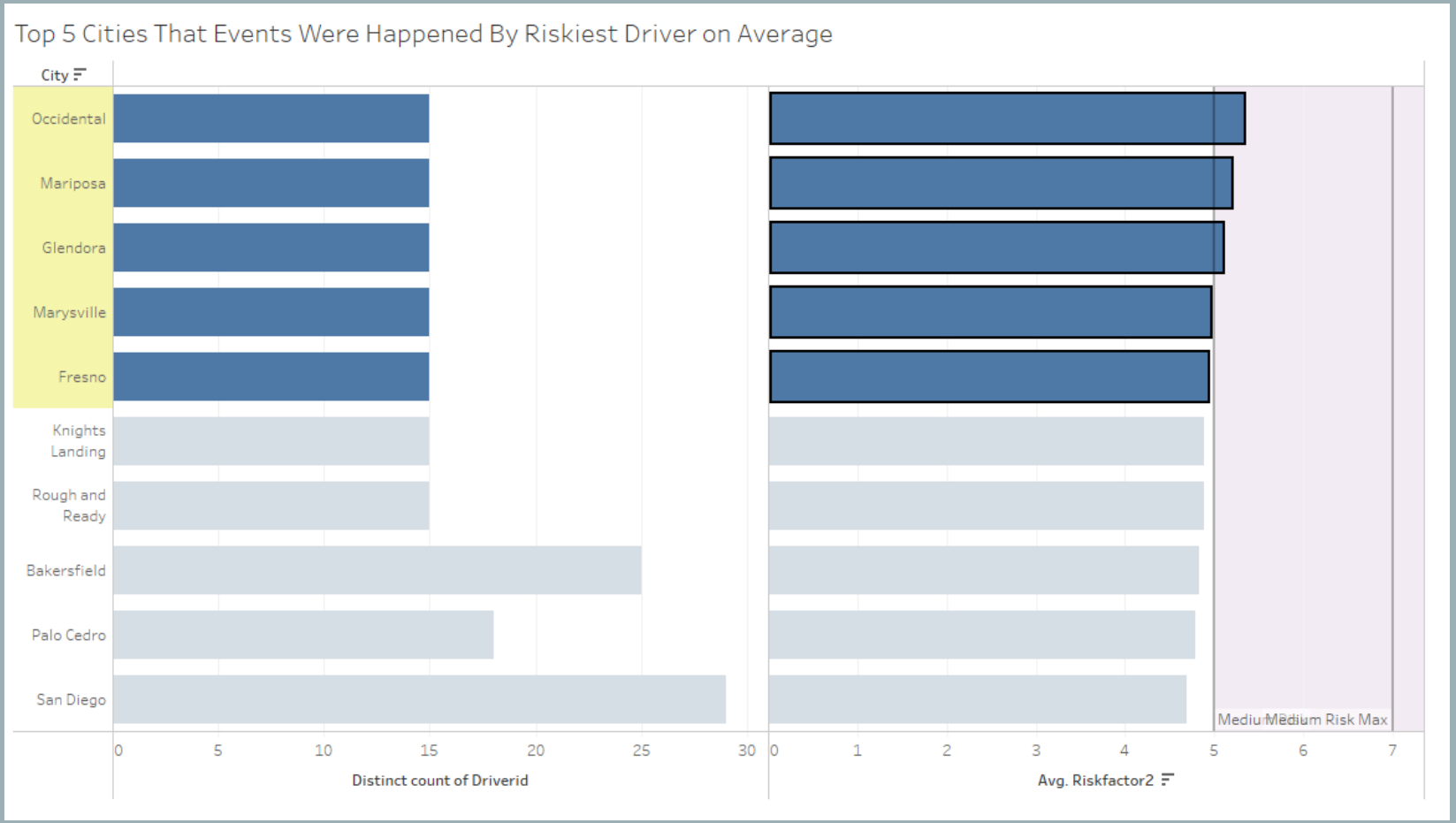
Which Cities Have the Highest Rate of Events?

What are the top cities That drivers had highest Average Velocity?

What Is the Average Velocity for Each Event Type?

Which Drivers Have the Event Because of Over Speed?

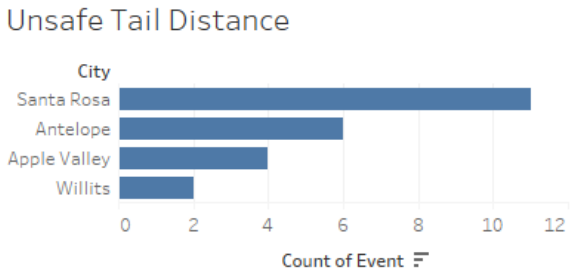
What are the top 5 cities that the events were happened by riskiest drivers on average?

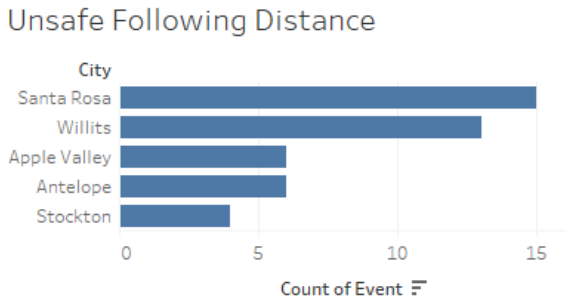


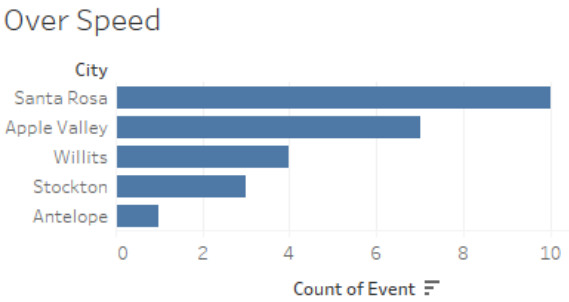
The average of risk factor of drivers who did an event in these highlighted cities are the highest.

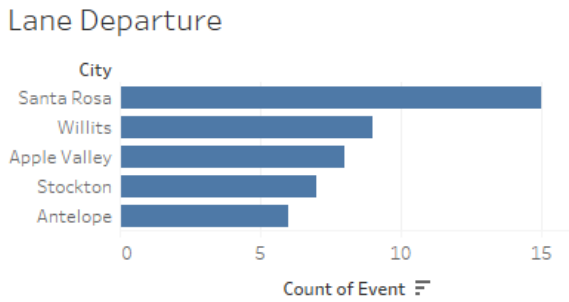
The average risk factor of drivers in Occidental is **5.33** which is classified as Medium Risk level. It means the riskier drivers have driven in this city more and had more accident.

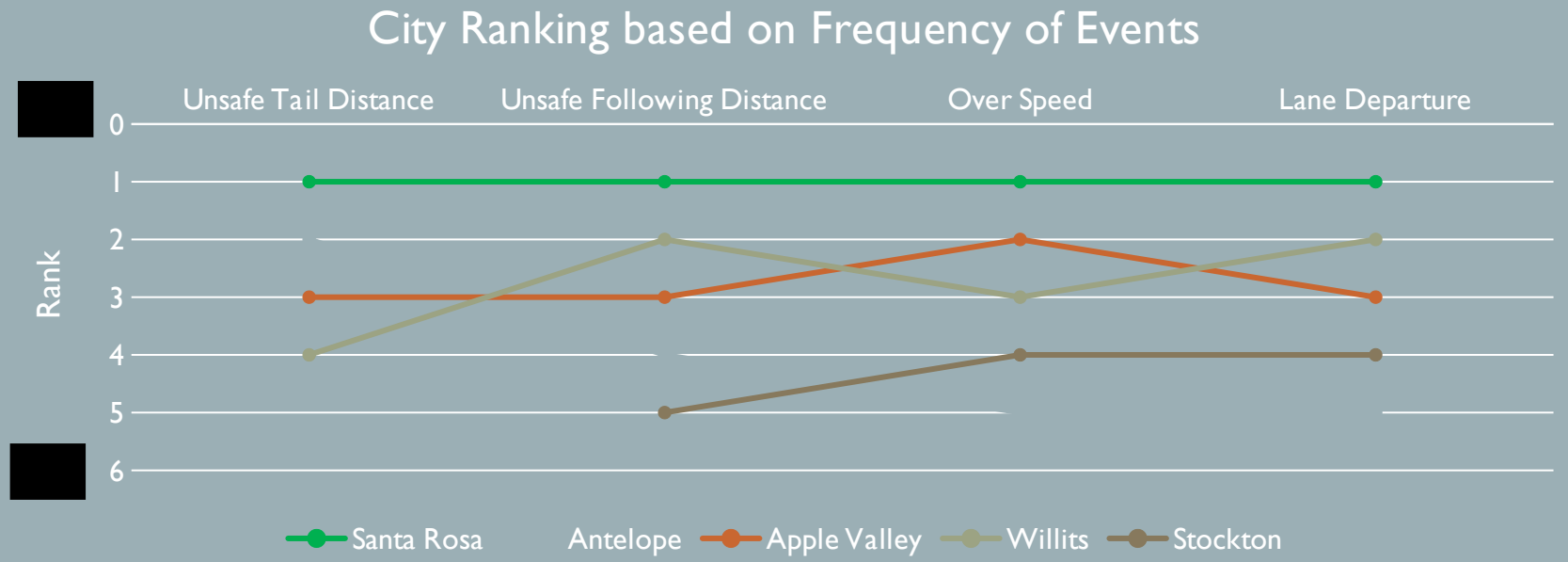
Which Cities Have the Highest Rate of Events?







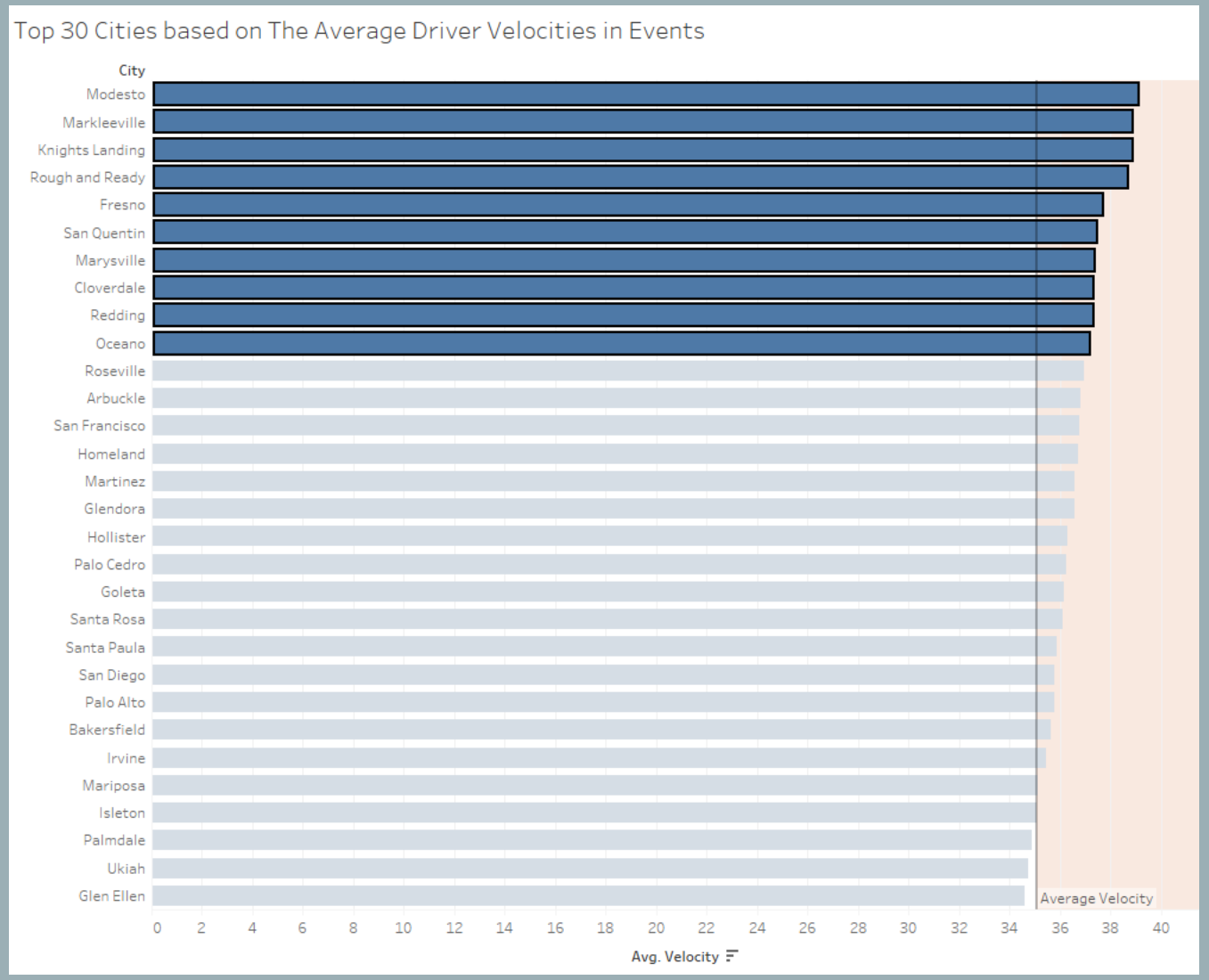




For all type of events the top 5 cities are the same, but the ranking changes by type.

Santa Rosa is the city with higher number of events for all types.

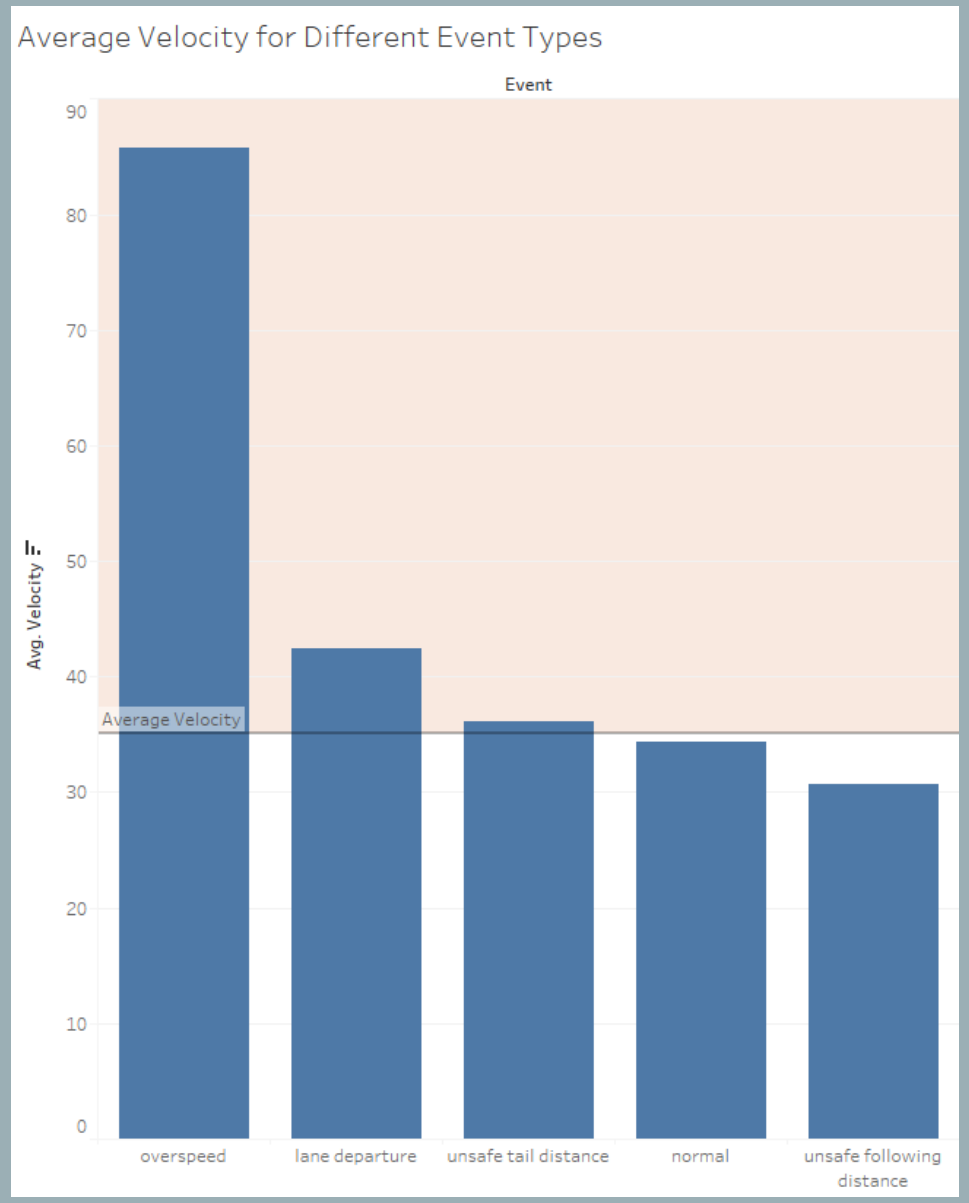
What are the top cities That drivers had highest Average Velocity?



In many cities the average drivers velocity was higher than the average velocity. It means in these cities drivers prefer to drive faster or the speed limitation might be a reason for the events.

The average drivers velocity in ***Modesto*** when the events happened was **39.1** MPH.

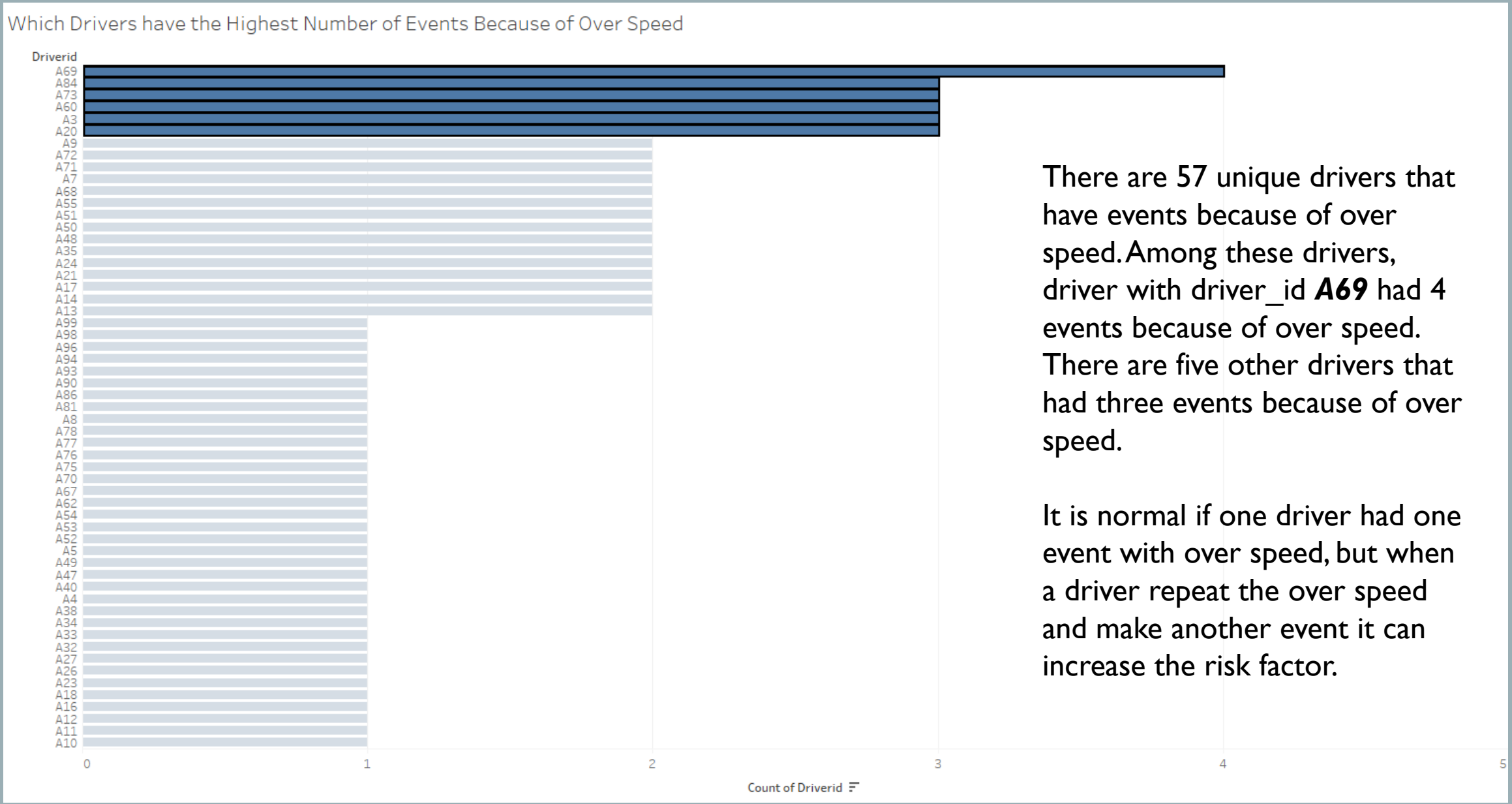
What Is the Average Velocity for Each Event Type?



The average drivers velocity for the event "Over Speed" is much higher than the average. This number is **85.76** MPH. This number is the main reason for this type of event.

For the event "Lane Departure", we can see that the average drivers velocity is **42.38** MPH, which is higher than the average and could be a cause for it.

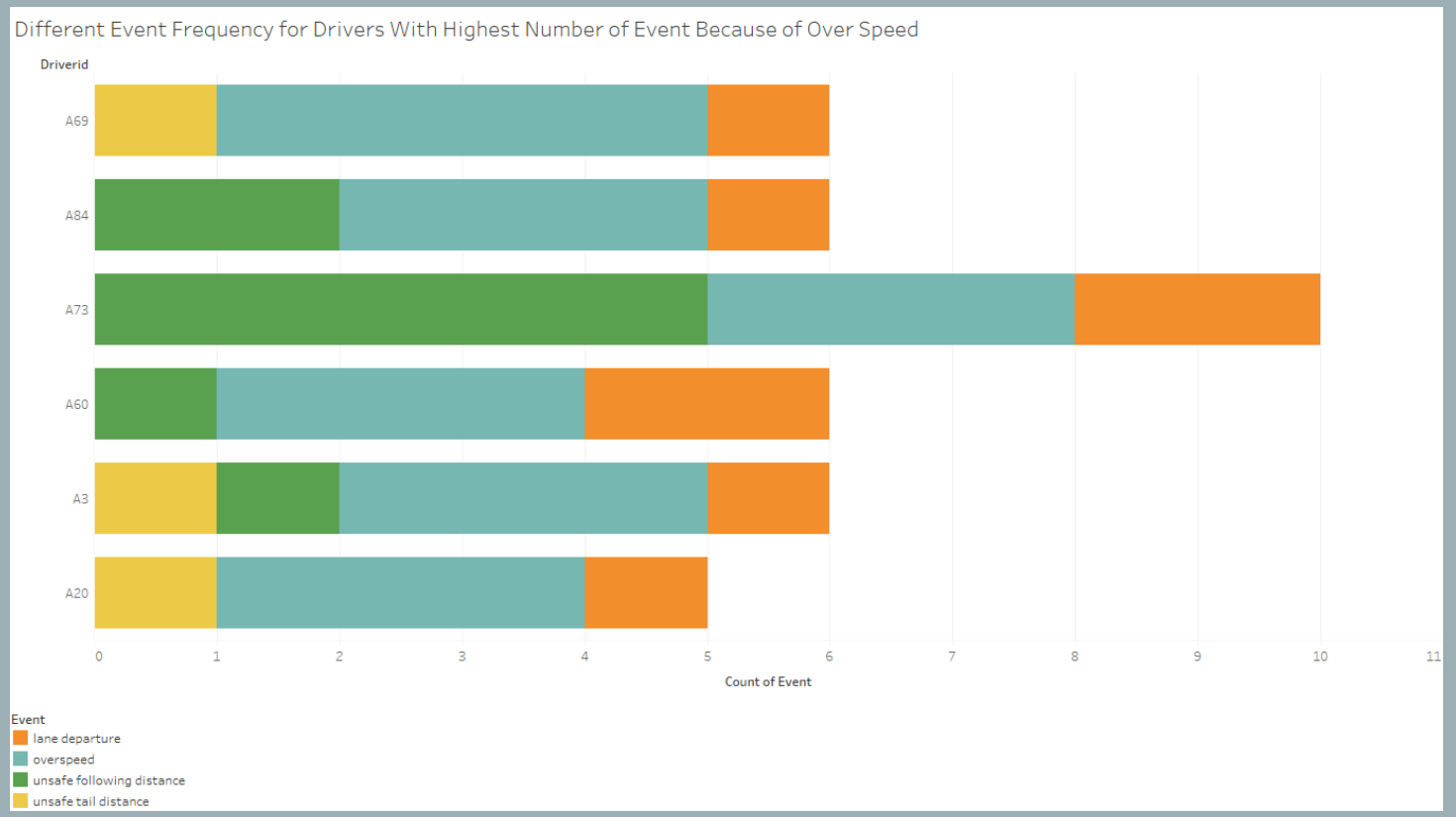
Which Drivers Have the Event Because of Over Speed?



There are 57 unique drivers that have events because of over speed. Among these drivers, driver with driver_id ***A69*** had 4 events because of over speed. There are five other drivers that had three events because of over speed.

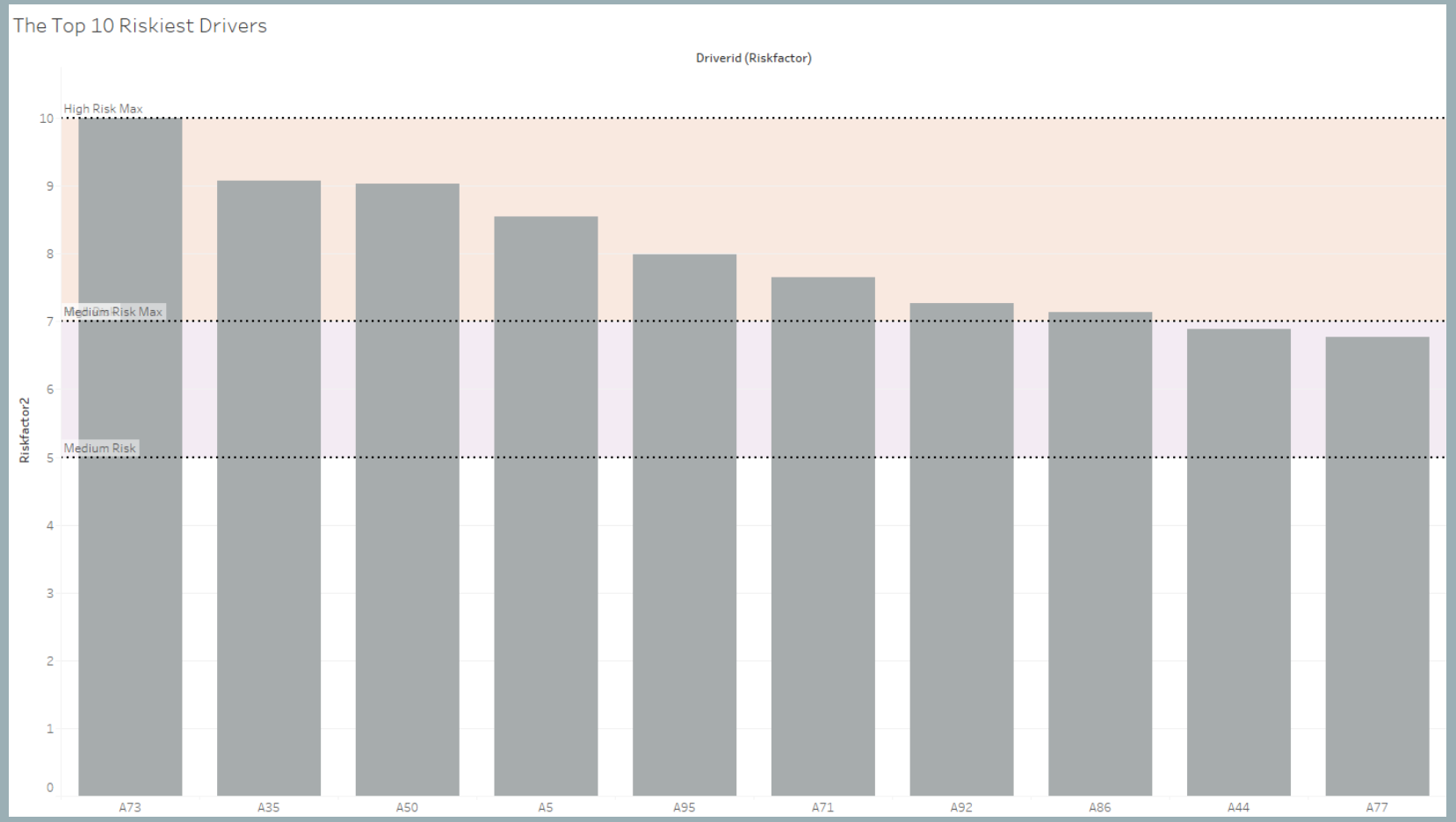
It is normal if one driver had one event with over speed, but when a driver repeat the over speed and make another event it can increase the risk factor.

Did Drivers with High Number of Over Speed Event Have Risky Behavior In Other Events?



Driver with driver_id A69, who had the maximum number of events because of over speed, had not many frequent event. However, the driver with driver_id A73 had six events with "Unsafe Following Distance" type. So, we can say that the A73 would have higher risk factor than the A69.

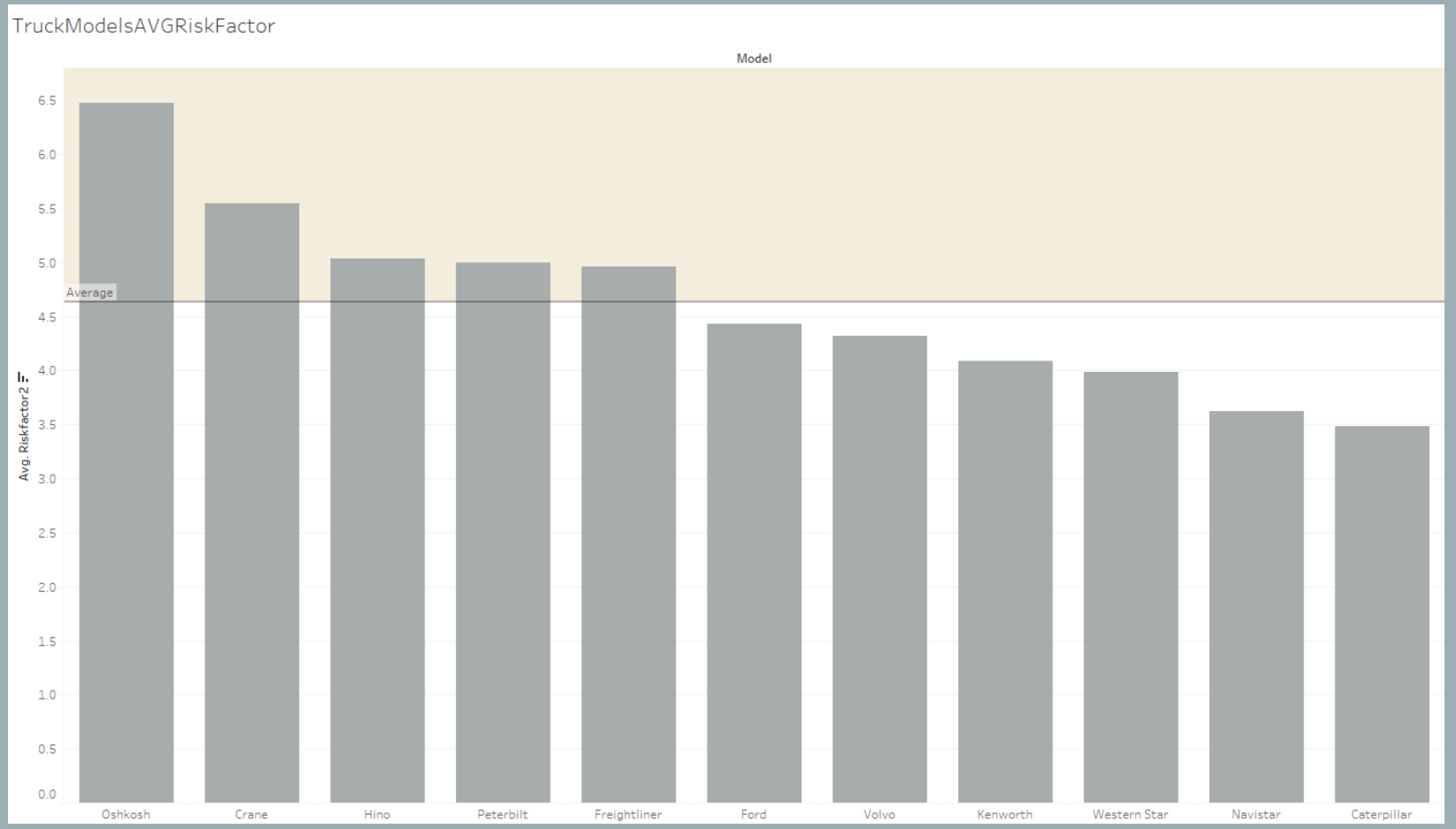
Who are the Top 10 Riskiest Drivers?



We classify the drivers as High Risk Driver if their risk factor is greater than 7. Based on this classification, among 100 unique drivers, only 8 drivers are classified as High Risk Drivers.

As we can see, driver with driver_id A73 is the riskiest driver with risk factor equal to 10.

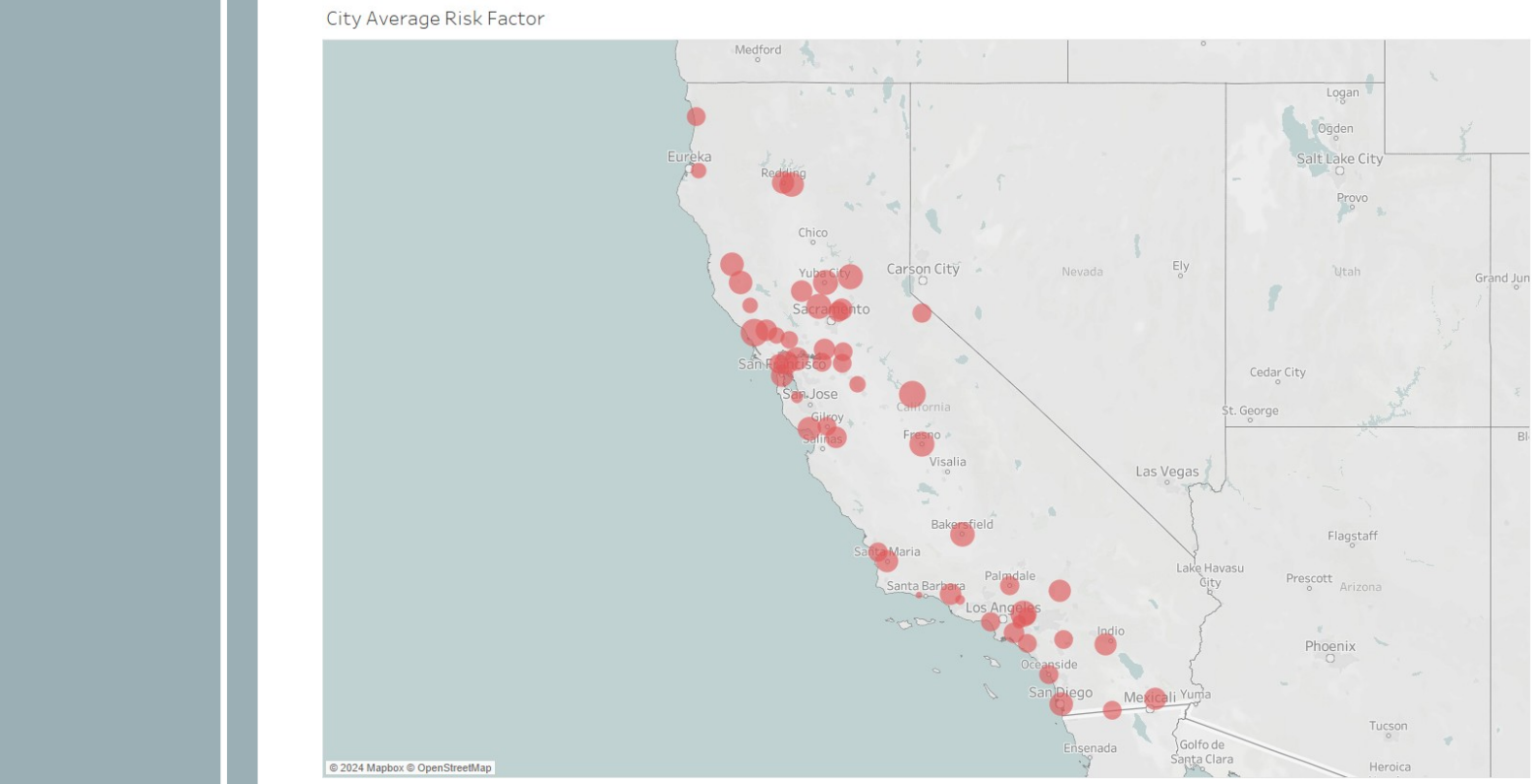
What are the Average Risk Factor For Each Truck Model?



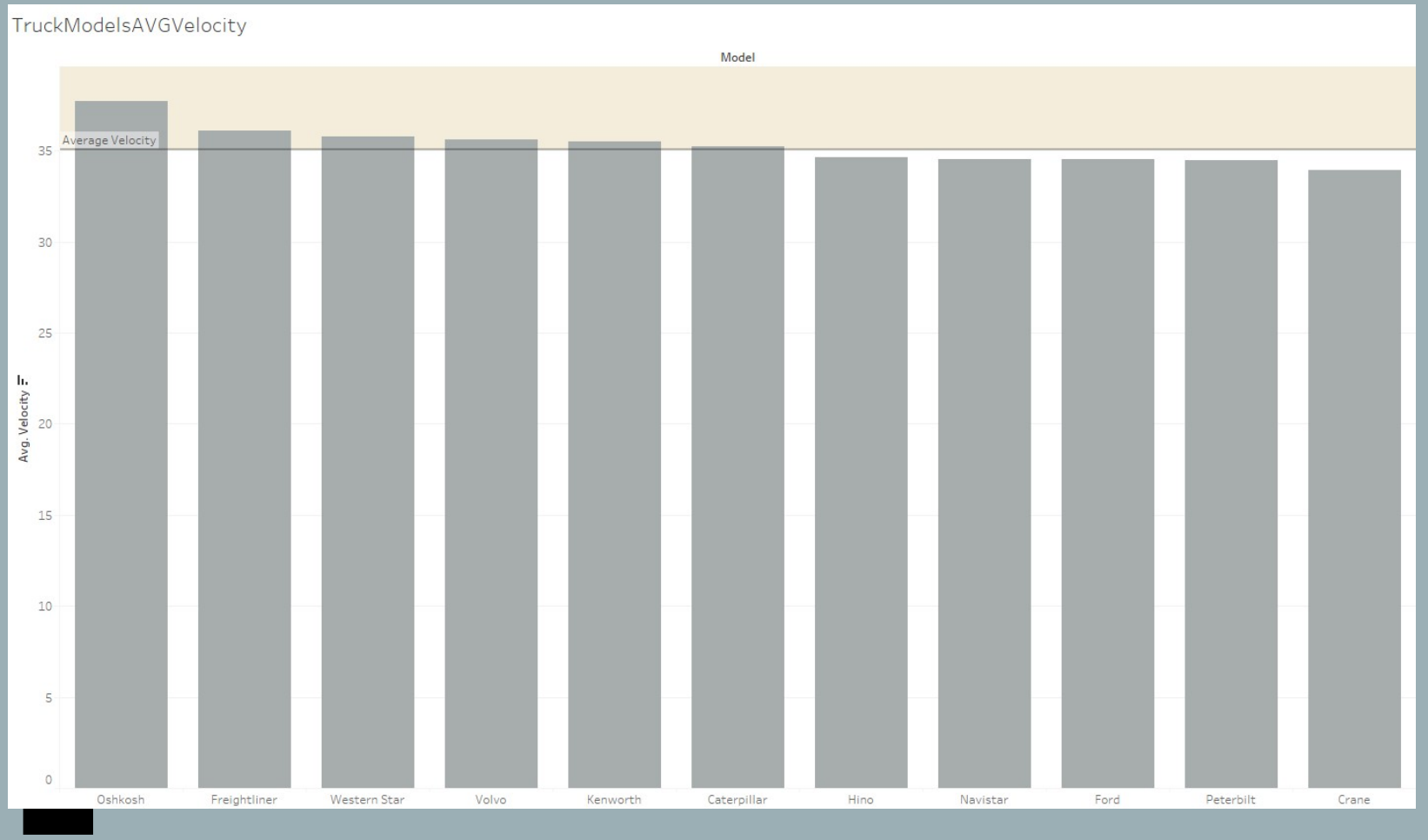
The Average Risk Factor is 4.63. According to this number, for the average of drivers risk factor for each truck model, we can see five truck models have average risk factor greater than the average.

The trucks with model name ***Oshkosh***, had the highest average risk factor **6.48**.

CITY WISE AVERAGE RISK FACTOR



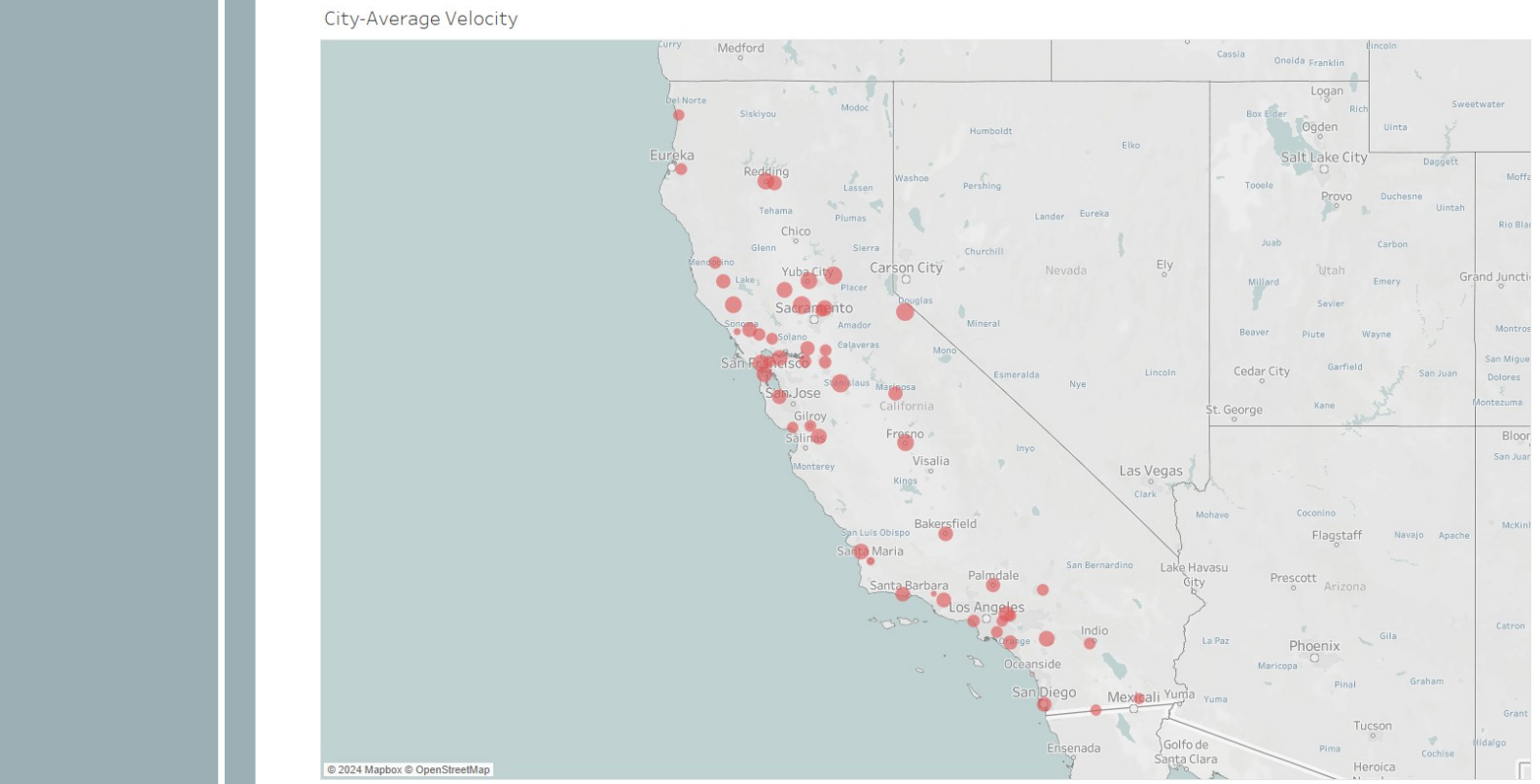
What are the Average Drivers' Velocity For Each Truck Model?



The Average Drivers' Velocity is 35.07 MPH. According to this number, for the average of drivers velocity for each truck model, we can see six truck models have average velocity greater than the average.

The trucks with model name ***Oshkosh***, had the highest average drivers' velocity of **37.72 MPH**.

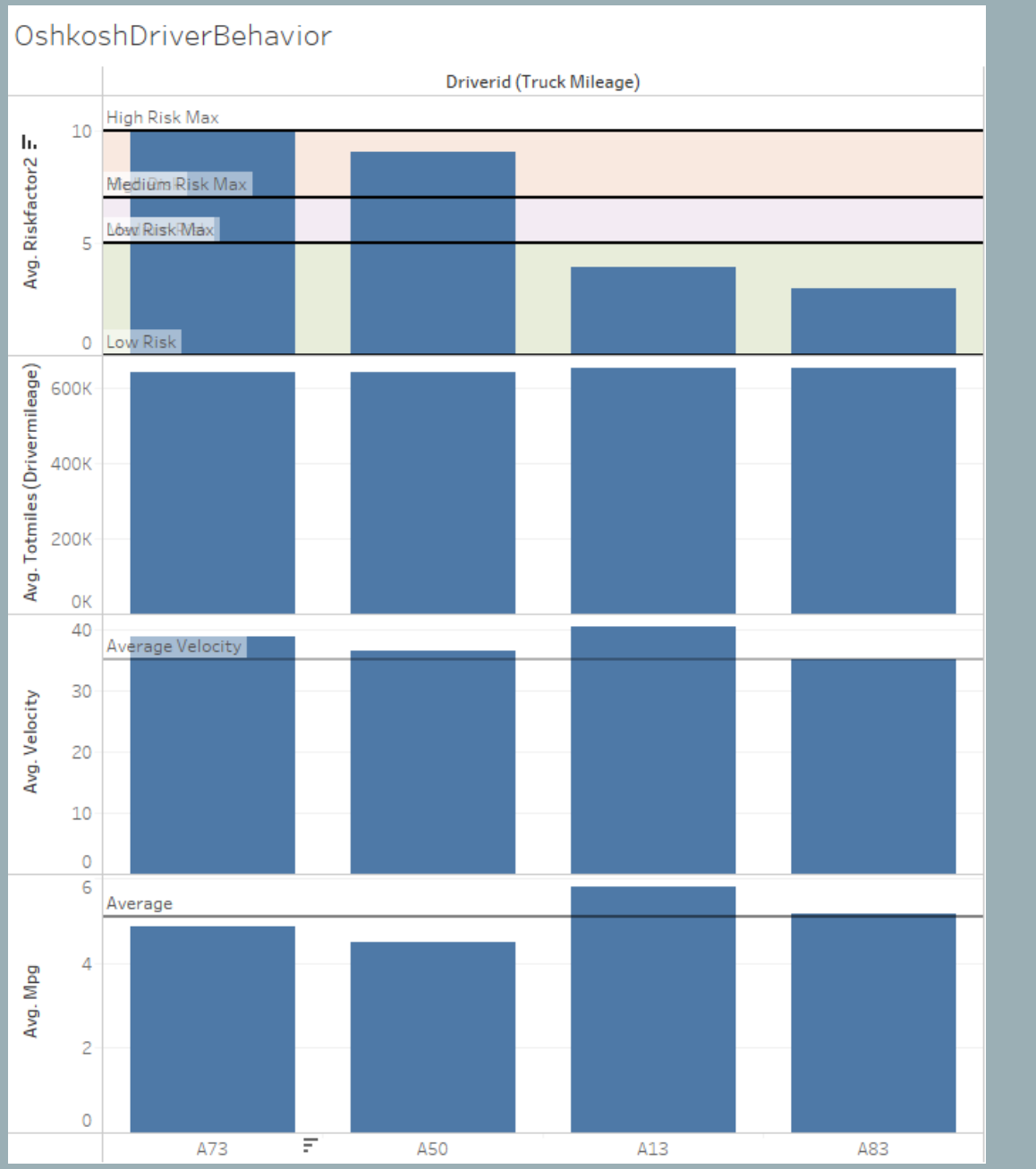
CITY WISE AVERAGE DRIVERS' VELOCITY



How is the Oshkosh Drivers Behavior as Riskiest Model?

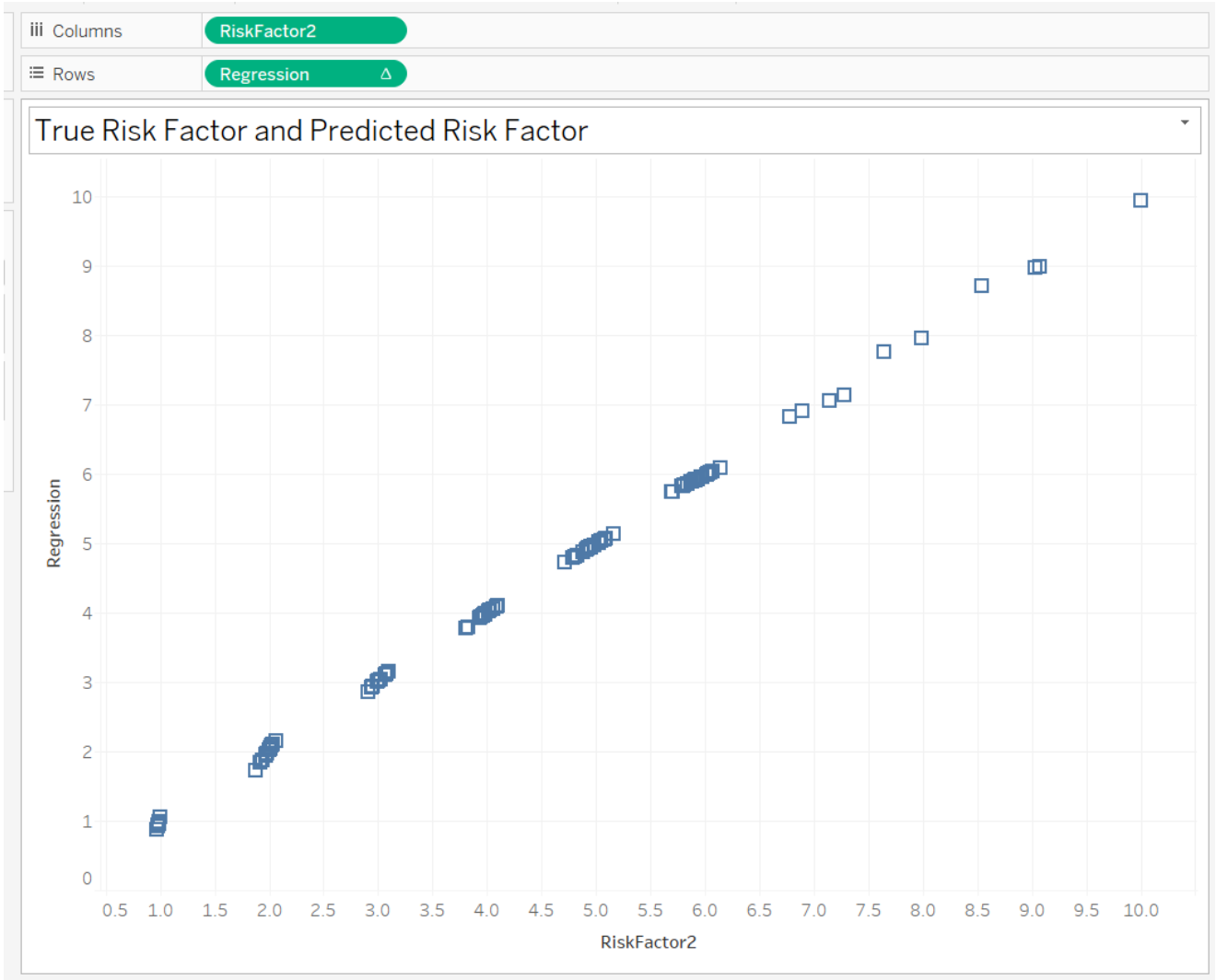
We can see there were 4 drivers who used the Oshkosh truck model. Two of them are classified as High Risk Driver, and the two others are classified as Low Risk Driver.

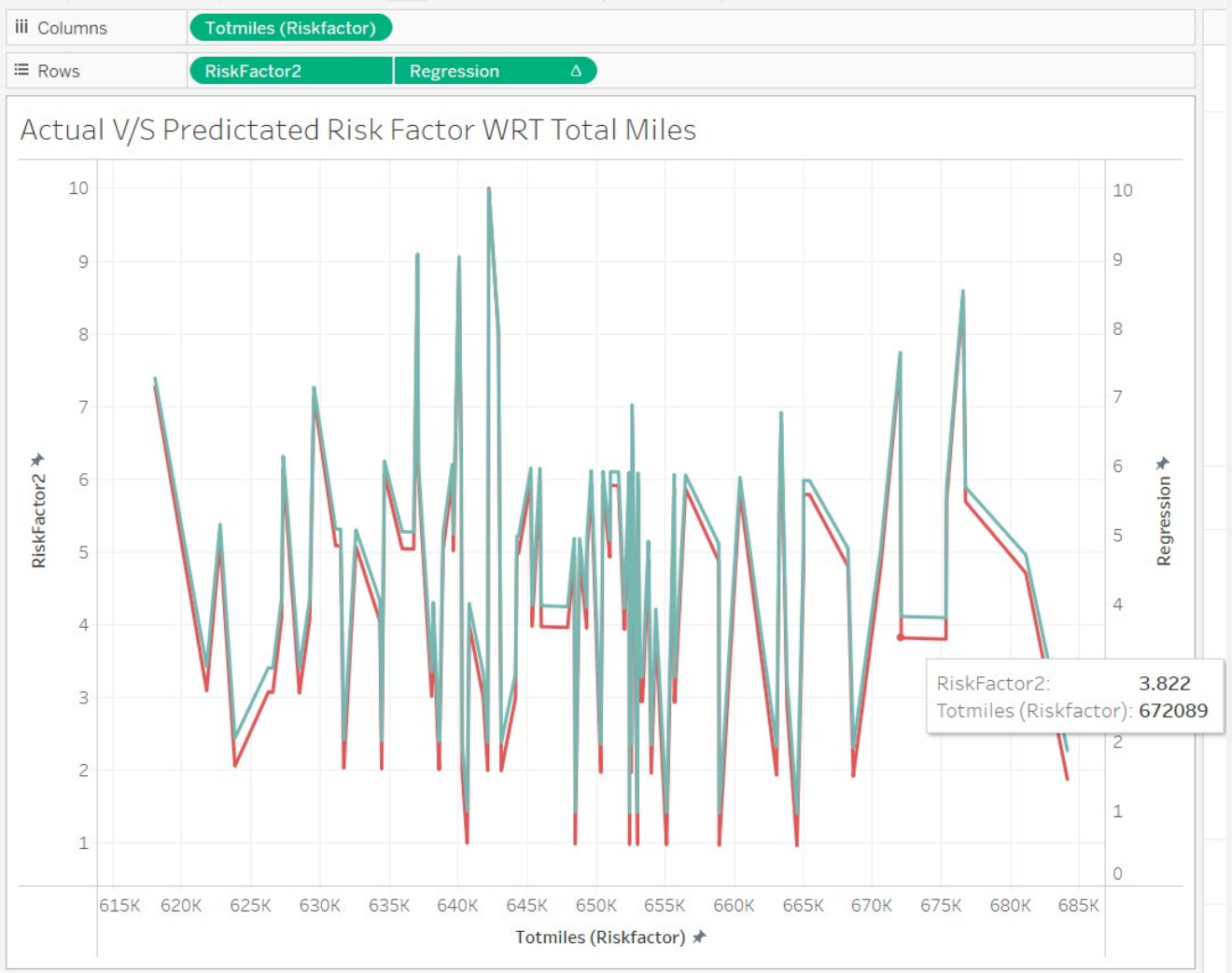
All these four drivers had around 600K total mileage driving. So, there is not any significant difference in total mileage. We cannot consider this factor as a predictor of risk factor.
As we can see the driver with driver_id A13 had the highest average velocity but is classified as a Low Risk Driver. Oppositely, we have driver A50 with average velocity and considered as High Risk driver.



R- REGRESSION

This plot shows the true and predicted risk factor





R- REGRESSION

With this plot we can infer how risk factor changes with regards to total miles and the key takeaway is upon occurrences of the peaks in the risk factor as the total miles progress could be an indicator for vehicle service/maintenance.

CHALLENGES

1. Team members working on MAC OS couldn't replicate few required steps such as "scp" which were critical to the project.

   Solution: MAC users focused on other aspects of the projects such as R integration and presentation preparation.

2. Matching agendas proved to be difficult.

   Solution: Planned meets way ahead to accommodate everyone's schedules.

CONCLUSION

- High-risk drivers are identified by the type of events and their frequency instead of only the number of events. This shows that qualitative factors should also be considered along with quantitative ones during driver's risk profile assessment.

- There could be a relationship between the average velocity of driver and event type. For example, if we look at the events categorized under "Overspeed" event type, they mostly occurred due to high velocities of the drivers.

- Driver risk profiles are also affected by the behavior and experience along with the external factors like city environment. Because drivers with more driving experience have lower probability of risky driving events as compared to those with more experience.