Transportation Pooled Fund Program

To create Web-based Traffic Data Visualization and Analysis Tools

Software Testing Document Version 1.1

Prepared for the Federal Highway Administration

By

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2 STATEWIDE AVERAGE TRAFFIC AND HPMS GRAPHS AND HPMS VIEW:

1. Sign in to the development site: http://dev.wim.availabs.org.
2. You should see this image of the US. When you scroll over a state it should animate blue.

Figure 1

3. The data dropdown at the top right of the page contains the different datasets. TMAS is the default dataset. For the purposes of this test we will use the TMAS dataset. All of the graphs on the statewide page use class datasets and we are still processing class data from various states. Ohio, North Carolina and Michigan should all have excellent statewide data. If you'd like to explore the graphs and map features discussed in this document using those statewide datasets, you can access them using the dropdown menu pictured in figure 2 below.

Figure 2

NOTE: *When switching between datasets, when deselecting a set of stations on a selected HPMS route, or in general,* ***whenever the page seems to be stuck****, you should refresh your browser and start over again.*

After refreshing your browser, you'll need repeat step 4.

4. To select a state use Ctrl + Click. After 'control-clicking' a state, give the server a couple of seconds to load the graphs at right, as well as the HPMS data and the stations on the map. Your state dashboard should now look like this:

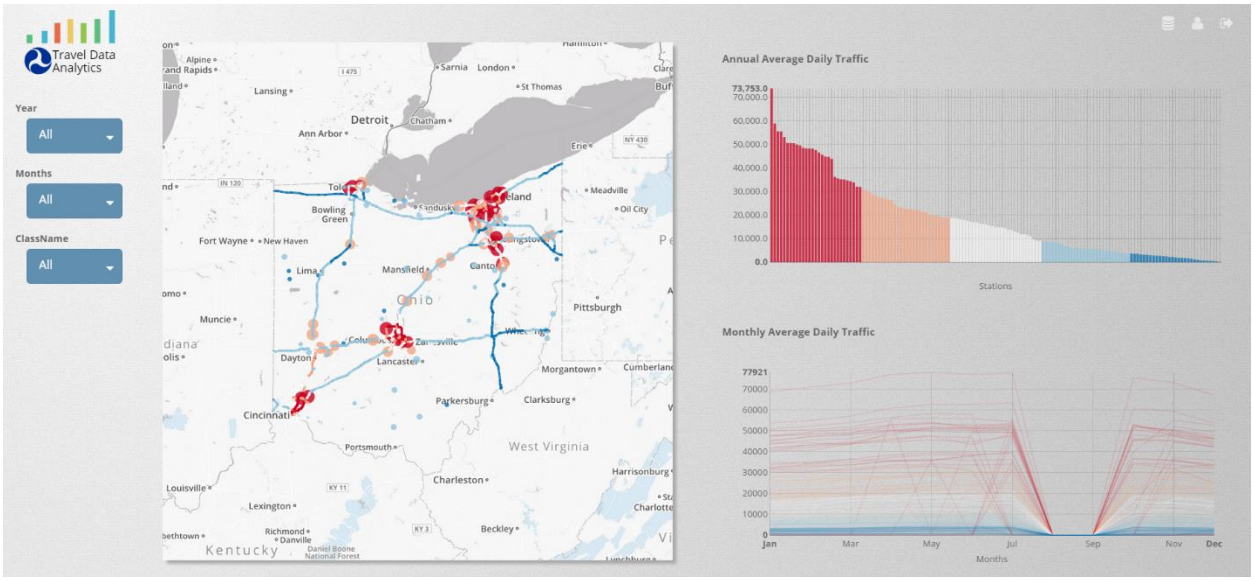


Figure 3

   a. *When you Ctrl+click does the map zoom into the state? Do you see circles representing stations? Do you see HPMS data on the roads? Do you see the graphs at right?*

5. First we'll take a look at the graphs at right.

6. The first graph is the **Annual Average Daily Traffic**. To find data for this graph AVAIL used the class data and takes the simple average of all days (when data for a day is missing, the denominator is reduced by one) as per the Traffic Monitoring Guide:
    a. AADT – Annual Average Daily Traffic – The total volume of vehicle traffic of a highway or road for a year divided by 365 days. It is meant to represent traffic on a typical day of the year. The Traffic Monitoring Guide lists two basic procedures for calculating AADT. In the first of these techniques, AADT is computed as the simple average of all 365 days in a given year (unless a leap year). When days of data are missing, the denominator is simply reduced by the number of missing days:
        i. A simple average of all days; and
        ii. An average of averages (the American Association of State Highway Transportation Officials (AASHTO) method).
    b. AVAIL is capable of employing the AASHTO method of calculating AADT if the TA Panel deems it necessary.

Figure 4

The AASHTO formulation for AADT is as follows:

$$AADT = \frac{1}{7}\sum_{i=1}^{7}\left[\frac{1}{12}\sum_{j=1}^{12}\left(\frac{1}{n}\sum_{k=1}^{n} VOL_{ijk}\right)\right]$$

Where:

VOL	=	daily traffic for day *k*, of DOW *i*, and month *j*
i	=	day of the week
j	=	month of the year
k	=	1 when the day is the first occurrence of that day of the week in a month, 4 when it is the fourth day of the week
n	=	the number of days of that day of the week during that month (usually between one and five, depending on the number of missing data)

Figure 5

7. The second graph is **Monthly Average Daily Traffic.**

a. Monthly Avg. Daily Traffic sums all traffic in a month and divides by the number of days in that month.

8. For Both Graphs:
   a. *What labels would you like to see?*
   b. *What information, if any, is missing?*

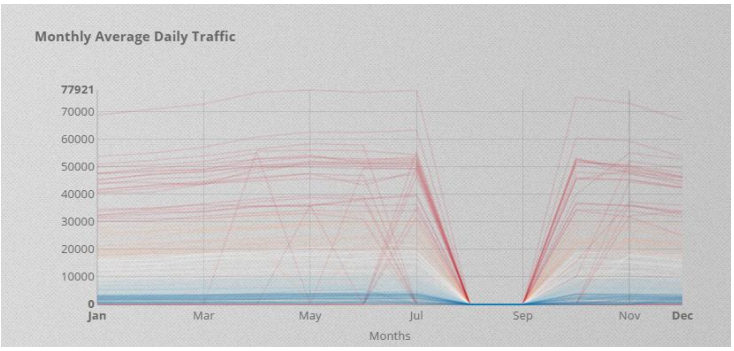


Figure 6

9. **Interactivity between the graphs and the map**. Notice when you scroll over a given graph, how the station is highlighted on the map and the corresponding station is highlighted in the other graph.

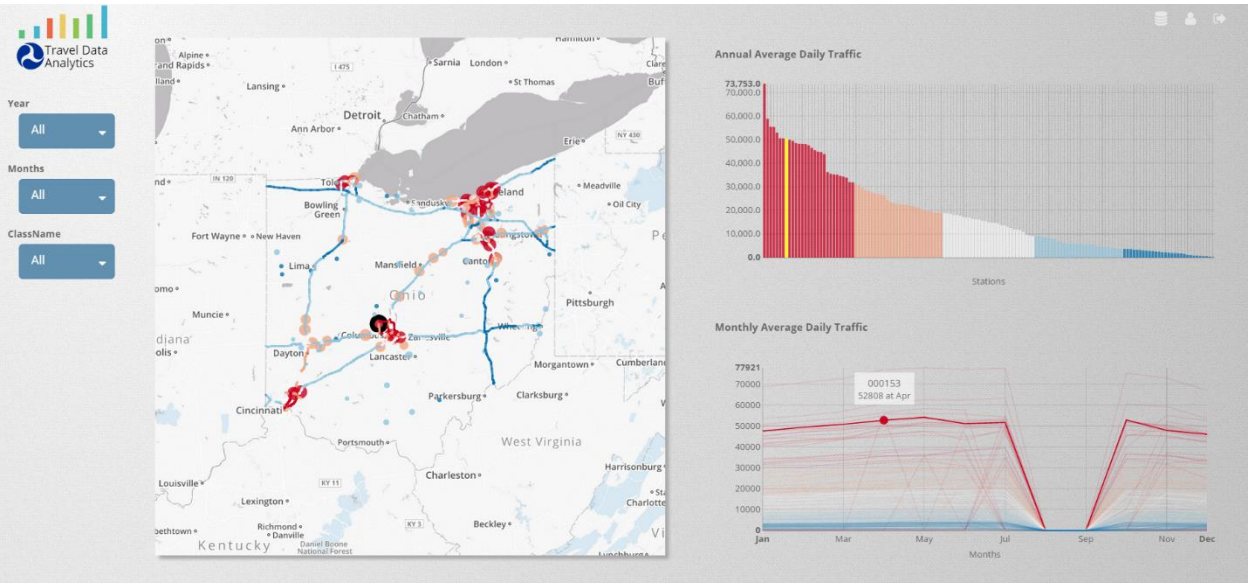
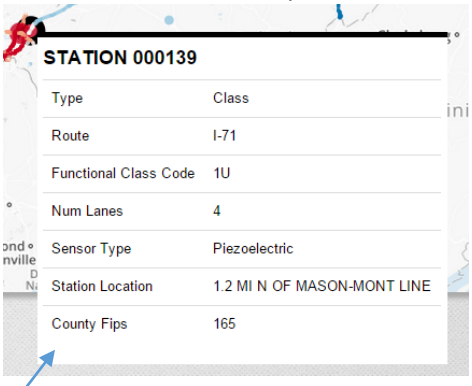


Figure 7

10. Now look at the map. You'll see that the WIM and Class Stations on the map are sized and colored according to the calculated AADT. The size and color of the stations are a visual representation of the AADT graph at right.
11. Scroll over a station to see selected information from that station's S-Card. And see that station represented in the graphs at right.
    a. *Is there any additional information you'd like to see in the S-Card scroll-over box?*
    b. In the future you will be able to select this station to enter the single station page that you tested previously.



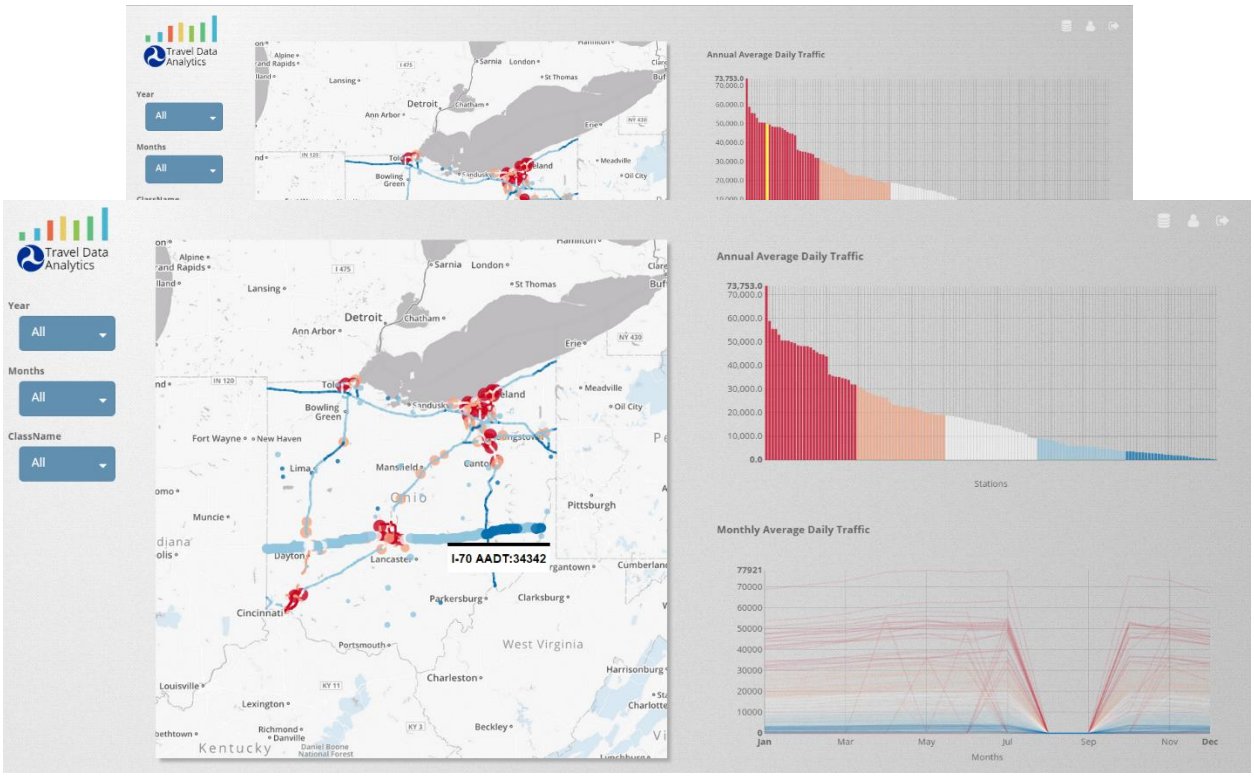


Figure 9

12. When you scroll over an HPMS road segment, a box displays HPMS road segment and AADT information.
    a. *Is there anything further you'd like to see about HPMS data for that segment? It's length?*
13. You can zoom in to the map by putting your cursor on the map and scrolling in or out. We will soon include map tools (magnification and switch to satellite) as well. As you zoom in, you see lower level road types with their AADT displayed as well.

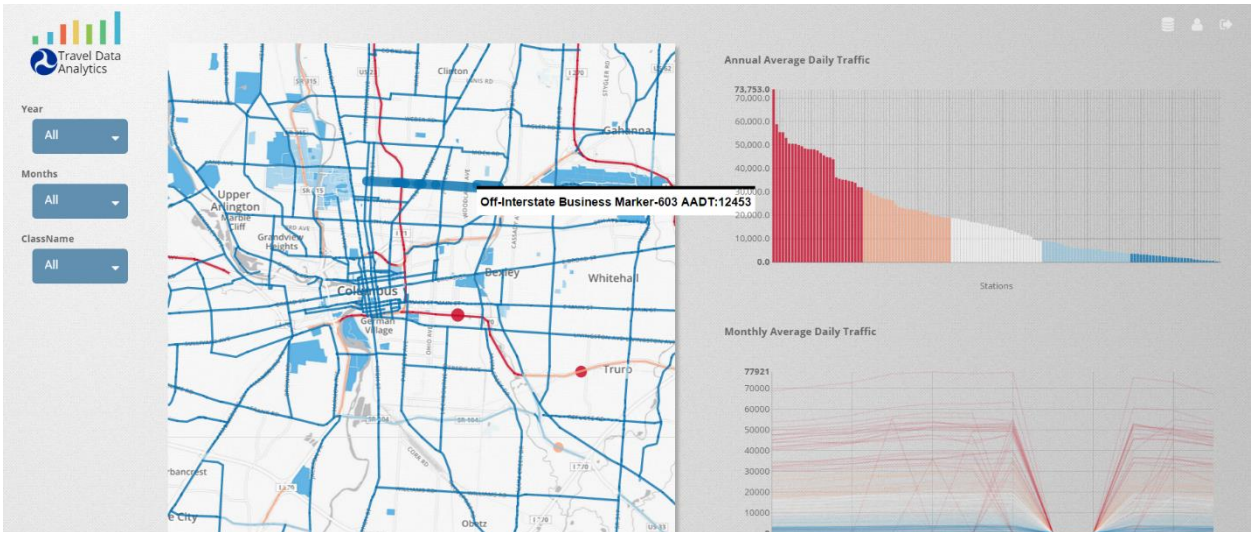


Figure 10

14. Zoom back out to see the entire state again.
15. Now, position your cursor on the right side of the screen and scroll down.
    a. You see graphs located below the top two graphs.

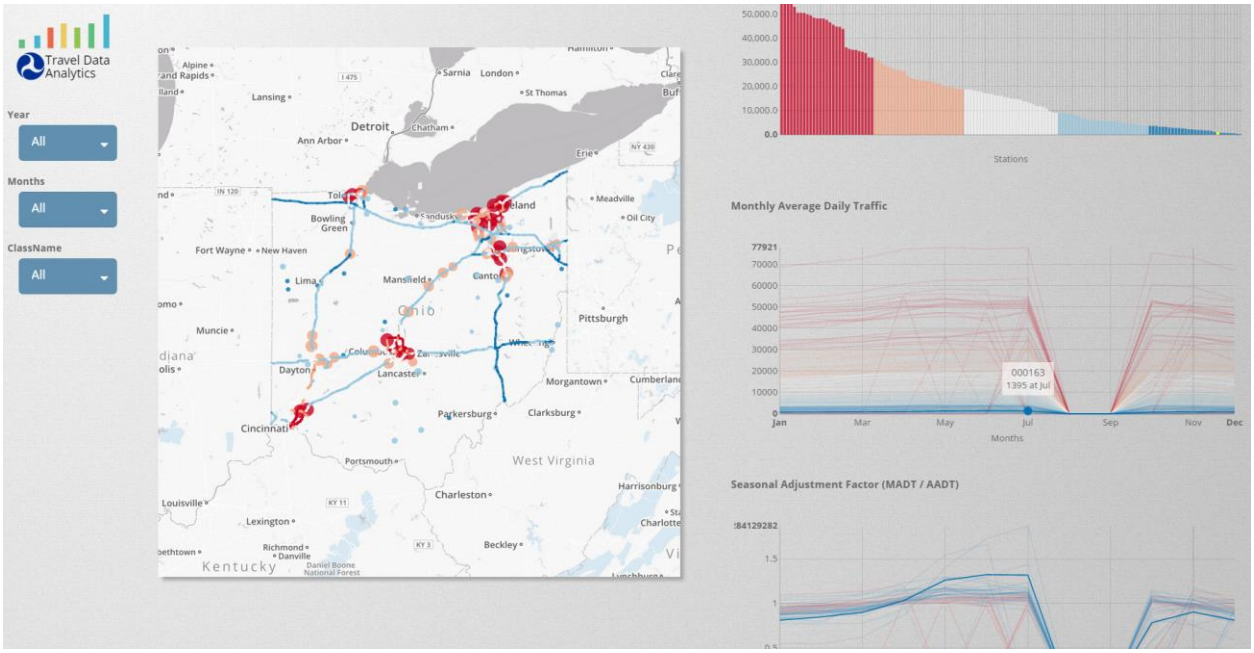


Figure 11

16. The first new graph that appears is the **Seasonal Adjustment Factor** graph.
    a. To calculate the Seasonal Adjustment Factor, AVAIL takes the Monthly Average Daily Traffic and Divides it by the Annual Average Daily Traffic.
    b. The Seasonal Adjustment factor shows how much more or less traffic than average, a station sees in any given month.

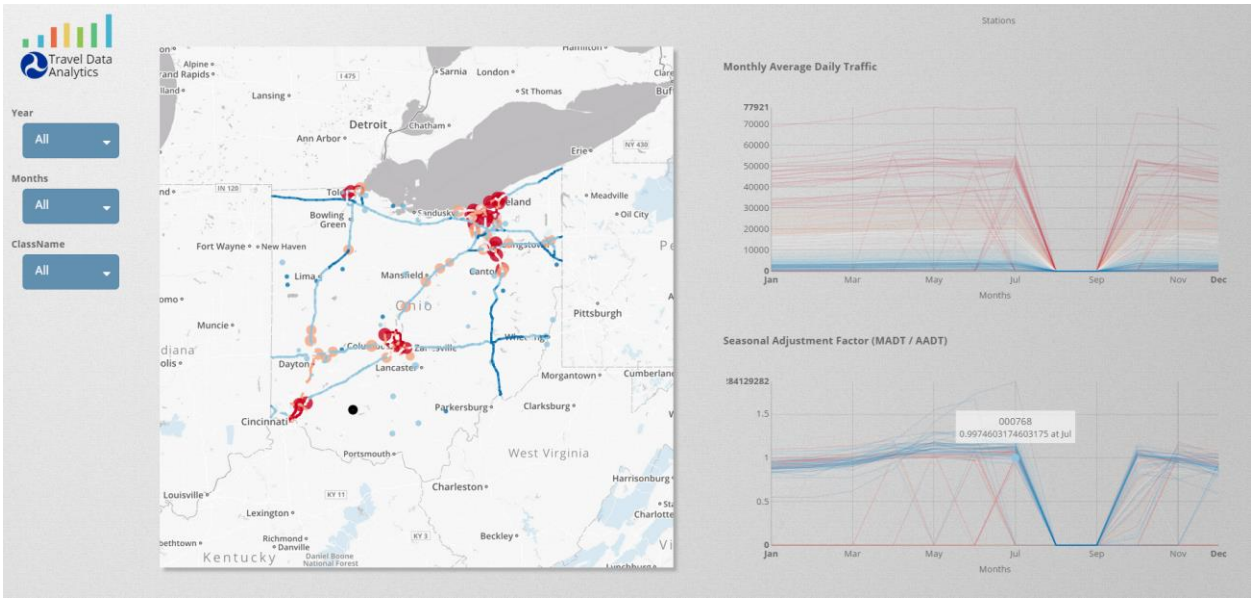


Figure 12

17. On the left side of the page, there are three filters: Year, Months, ClassName. You can filter the information on the graphs using these filters. Filter the ClassName to Class 1 to look at motorcycles. (There is a bug in the filter. It may take a couple of clicks before the filter actually works. Clicking on the right side of the menu seems to help.)

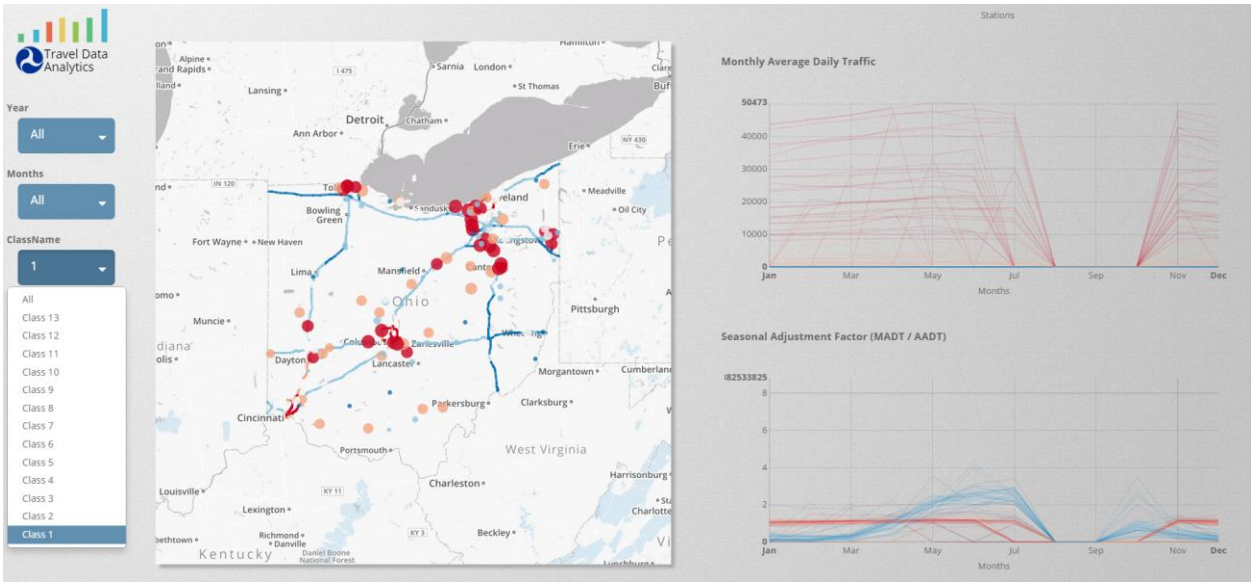


Figure 13

18. Look again at the Seasonal Adjustment Factor to see the clear difference in motorcycle use during the warm weather months. You can also see a clear trend of increased motorcycle traffic volume on roads with lower AADT.

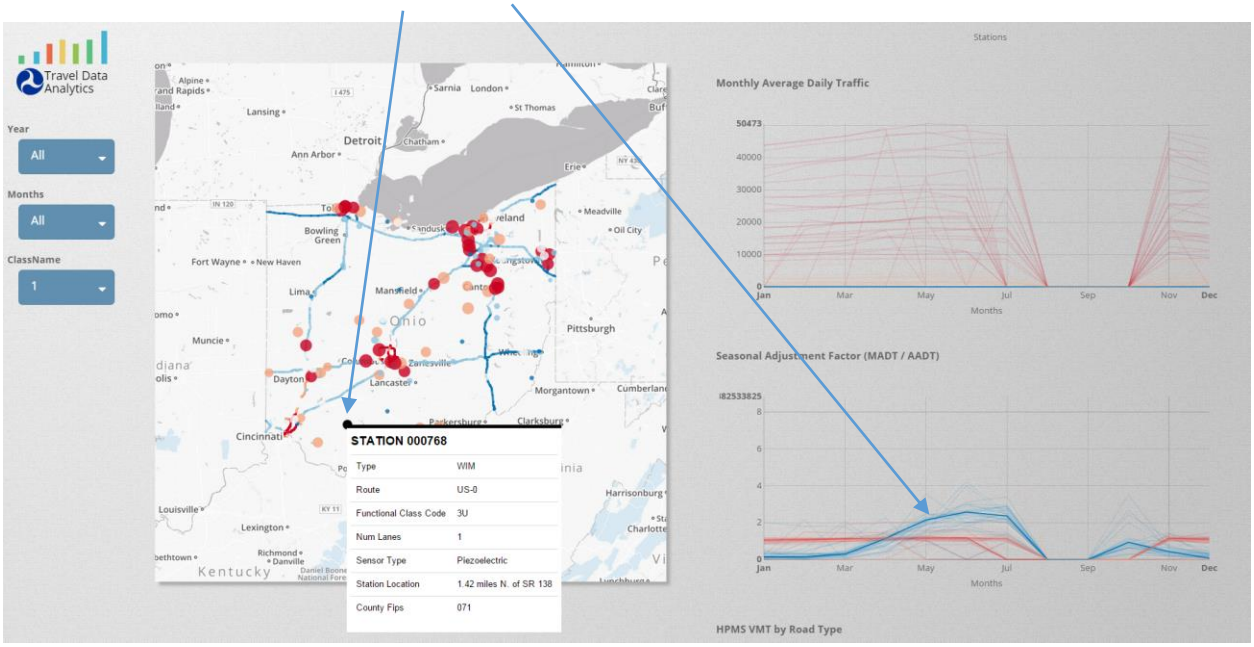


Figure 14

a. *Is the seasonal adjustment graph useful to you?*

b. *Avail plans to use the seasonal adjustment factor in other features throughout the site. Some of these will be discussed later. One, listed in the Gantt chart is Seasonal Adjustment Factor by Route.*

19. Continue to scroll down the right side of the screen. Here you see the first of AVAIL's new HPMS graphs. The graphs show Vehicle Miles Traveled by Route and Total Length of Route.
    a. As per the Traffic Monitoring Guide: VMT by Route is calculated by multiplying the AADT value for each section of road by the section length (in miles) and summing all sections to obtain VMT for a complete route.
    b. Total Length of Route is calculated by summing the lengths of all segments in a given route.

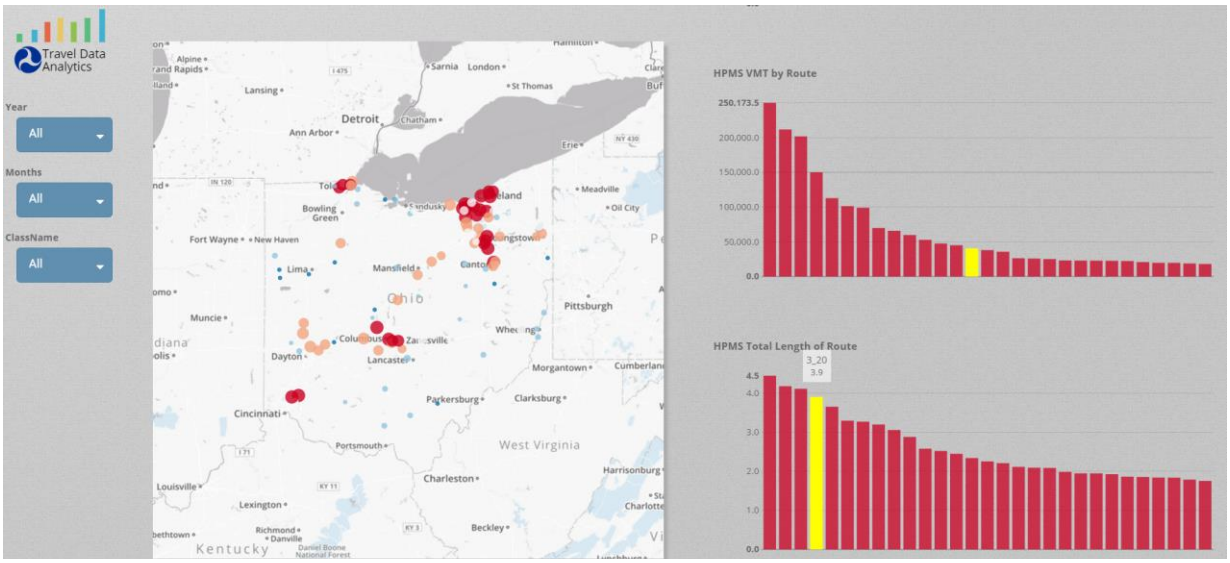


Figure 15

20. Next, scroll over the map to highlight one of the routes. Select a route that has at least two stations on it. Click on that route.
    a. The graphs at right should now filter to show only the data for the chosen stations.

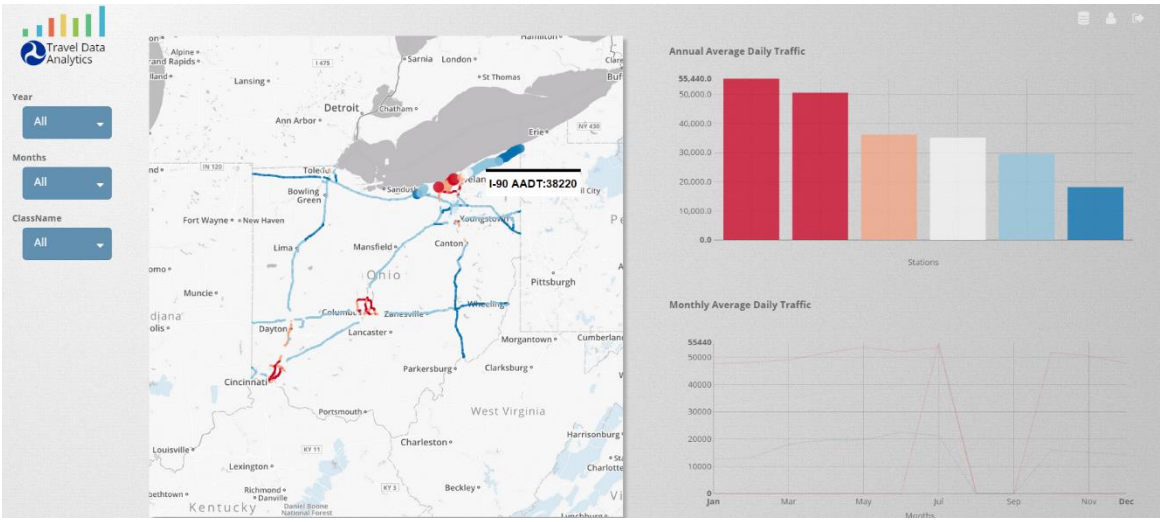


Figure 16

21. Questions for you:
    a. *How useful are these Graphs? How can you imagine using them?*
        i. *AADT Graph?*
        ii. *MADT Graph?*
        iii. *Seasonal Adjustment Factor?*
        iv. *HPMS VMT Graph?*
        v. *HPMS Total Length of Route*
    b. *What other functions would you like to see added to these graphs?*
    c. *Are the labels adequate, do you need additional labelling beyond those indicated in red?*
    d. *What additional suggestions do you have about these graphs*