

# KYTC Real-Time Data

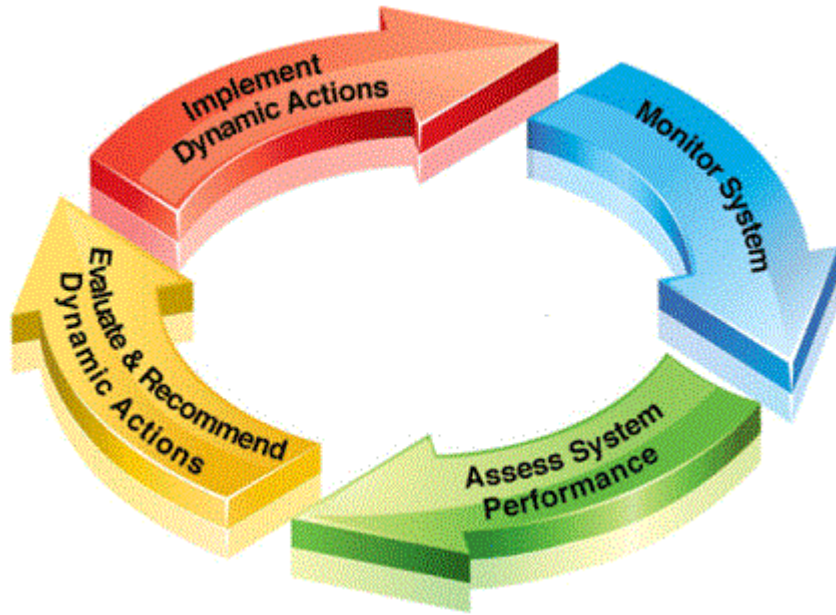
Kentucky Transportation Cabinet



# Data Sources

- HERE Traffic Speeds
- Waze Incidents
- Waze Traffic Speeds
- iCone Traffic Speeds
- Twitter
- KYMesonet
- CoCoRahs
- Doppler Radar
- NWS Forecasts: Rain, Snow, Ice
- Statewide TMC Reports
- Metro TMC Reports
- Snow Plows (AVL)
- Roadway Weather Stations
- County Activity Reports
- Dynamic Message Signs
- Truck Parking

# Monitor and Assess System

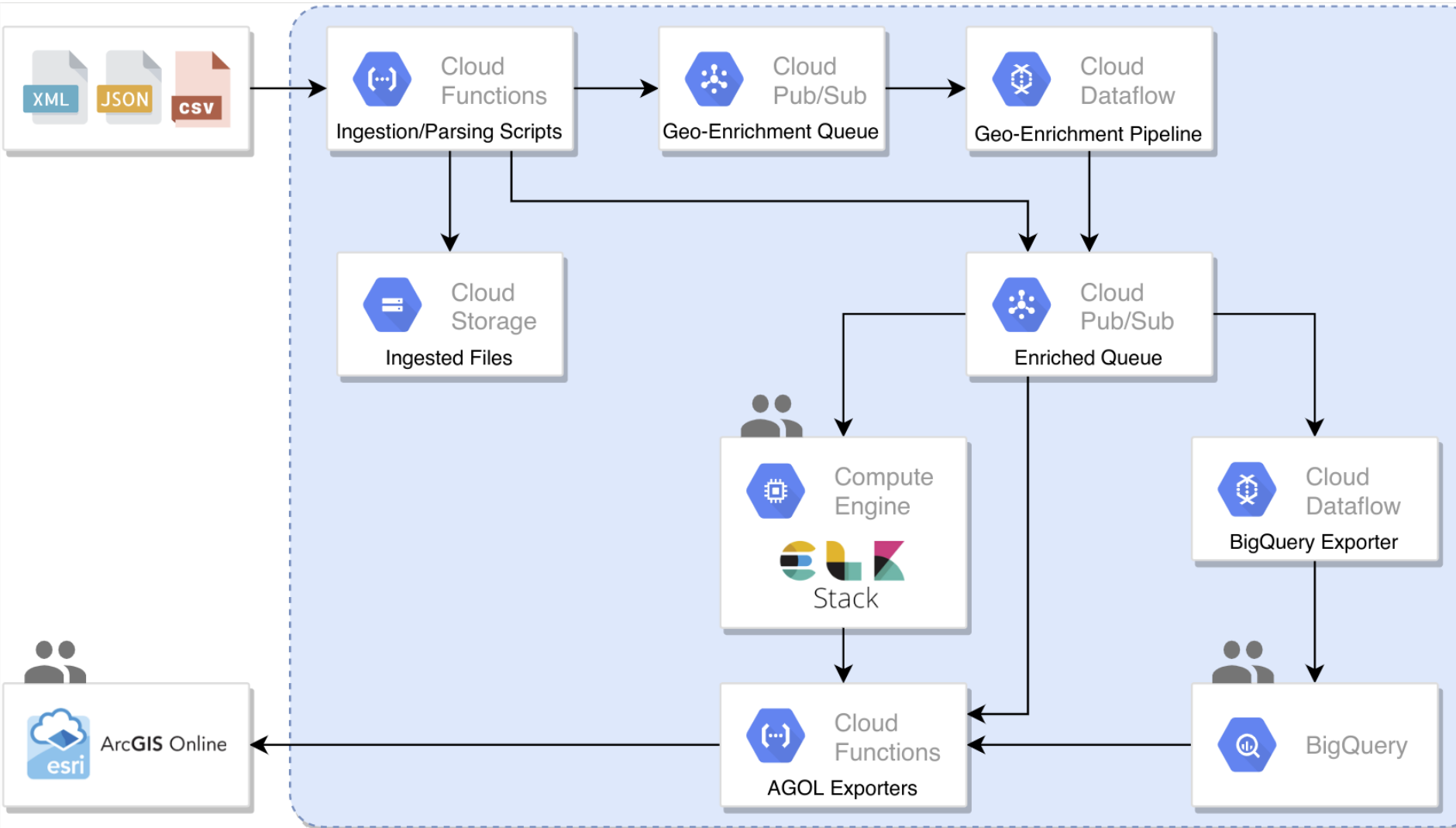


- Polygons
  - Twitter, Weather, etc
  - Snapped to 0.5 and/or 0.2 mile line segment within polygon.
- Lines
  - Work Zones, Speed Data, etc
  - Snapped with greatest percentage of LRS match. Lines are dynamically segmented based on overlap.
- Points
  - Incidents, Vehicles, etc
  - Snapped to highest probability based on distance and direction.

# Linear Referencing System

- District
- County
- City
- Route
- Road Name
- Mile Point
- Functional Class
- Etc...
- Capture Time
- Date Exists
- Date Exists 2min Rounded
- Source Update
- Source Record Update
- Year, Month, Day
- Hour, Minute, Second
- Sub-second (DSRC)

# Google Cloud Workflow



26-36 million records  
per day\*

1+ year of data in  
Elasticsearch for  
dashboards and  
reporting

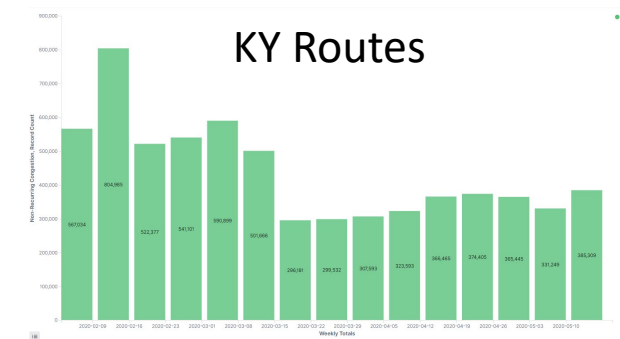
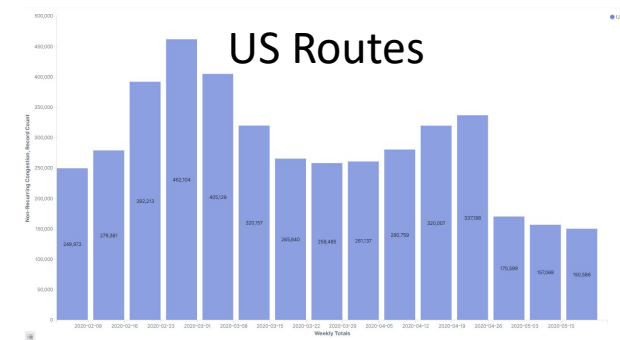
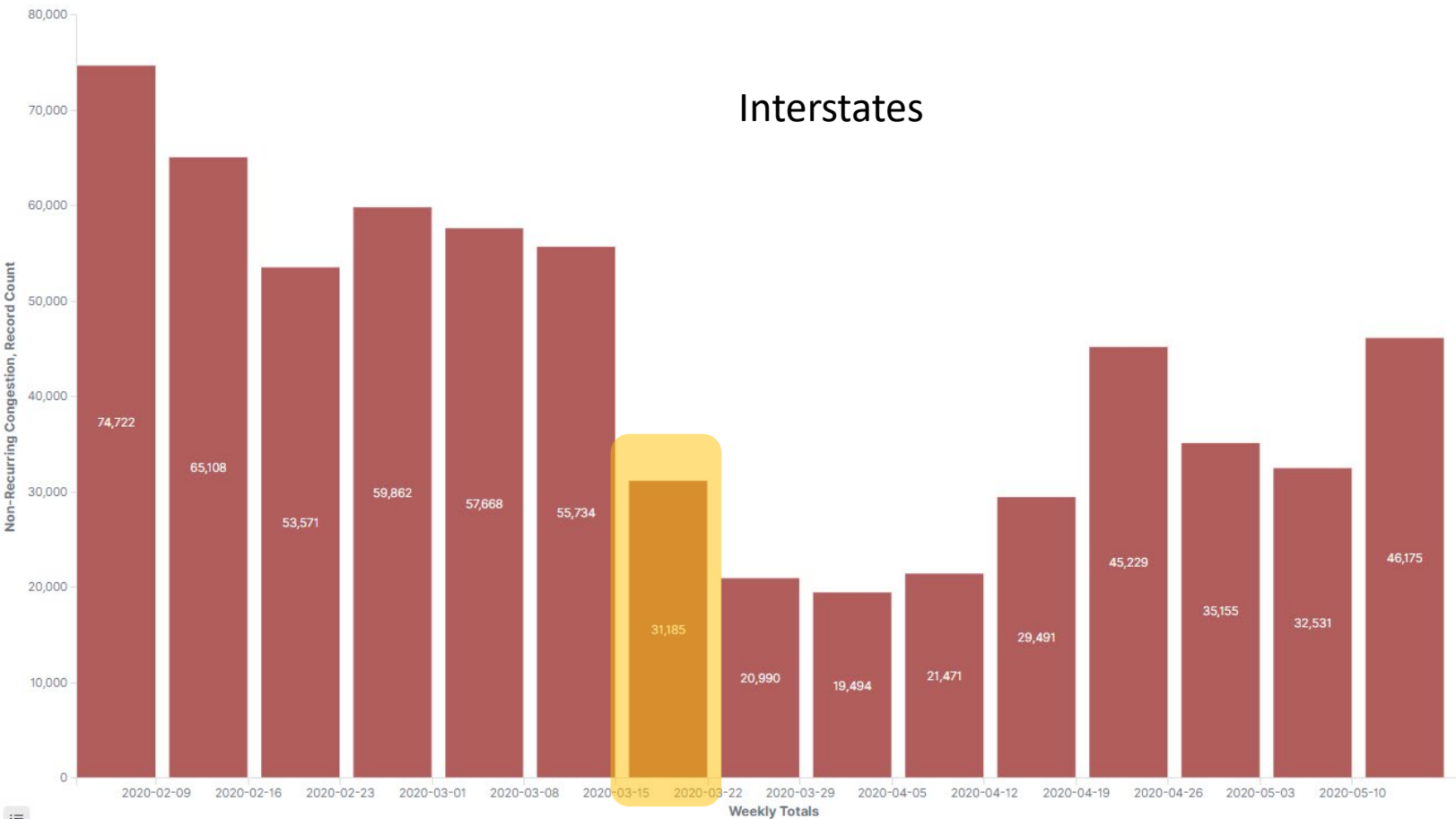
Powered by 50 Google  
Cloud Functions

*\*Snow and Ice generates an additional 10 million records per day of incoming data for a statewide event and output also increases to 125,000 records every 2 minutes for mapping and dashboards used for decision support products.*

# Analysis



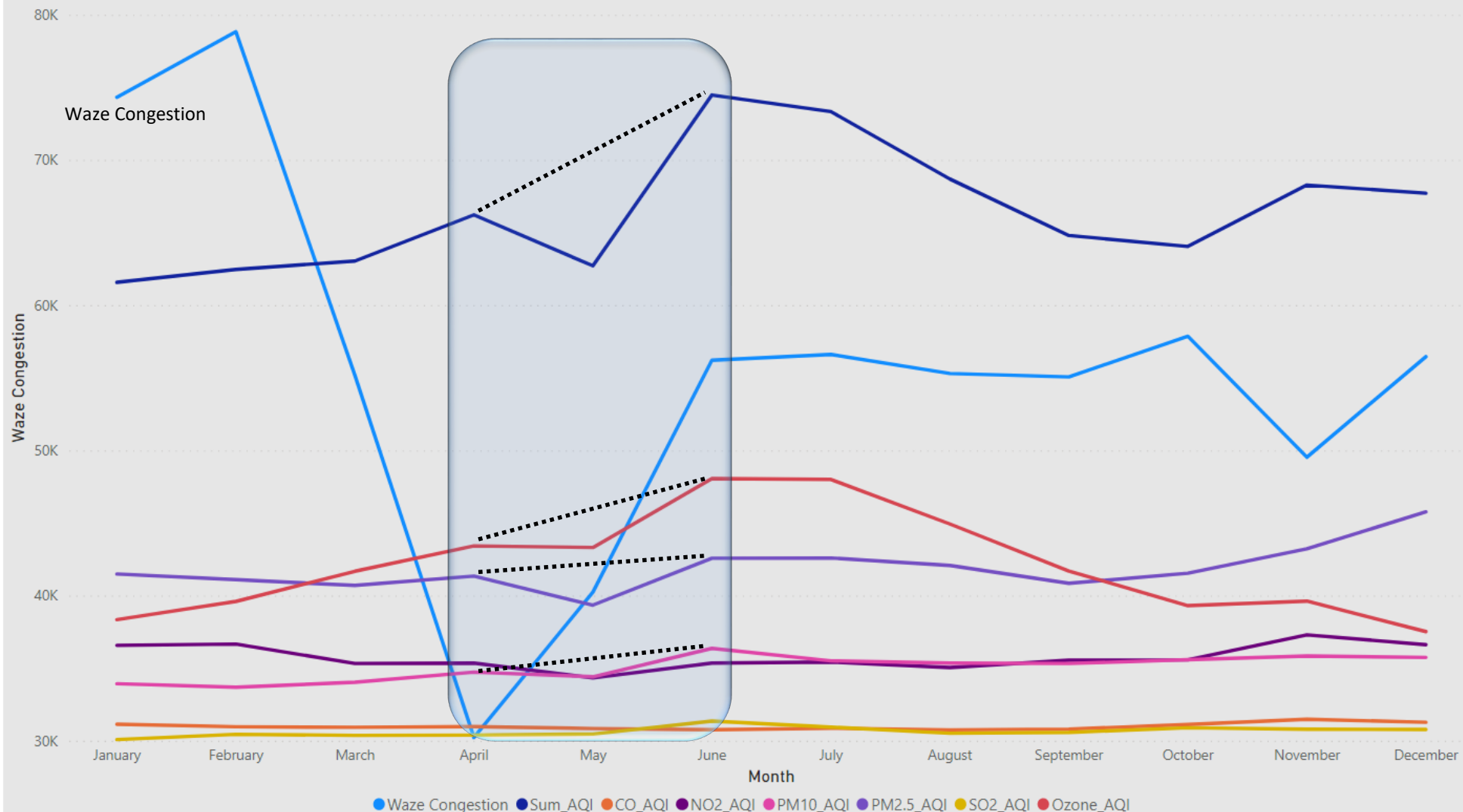
# Analysis: COVID Non-Recurring Congestion



Weekly Totals for 02/03/2020 - 05/18/2020 of Non-Recurring Congestion  
Speeds are typically 50% of free flow before appearing in the data feed.

# Analysis: Air Quality

Waze Congestion, Sum\_AQI, CO\_AQI, NO2\_AQI, PM10\_AQI, PM2.5\_AQI, SO2\_AQI and Ozone\_AQI by Month



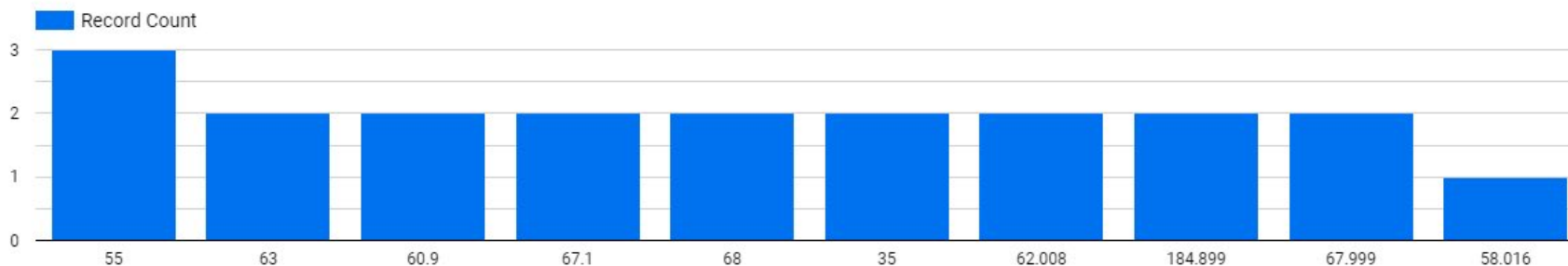
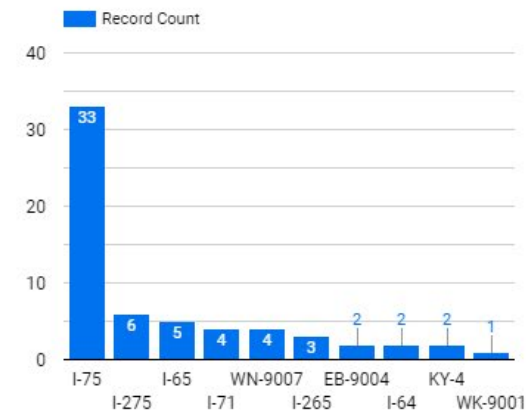
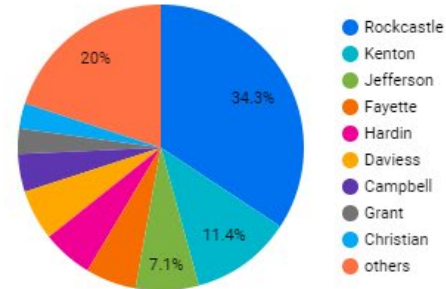
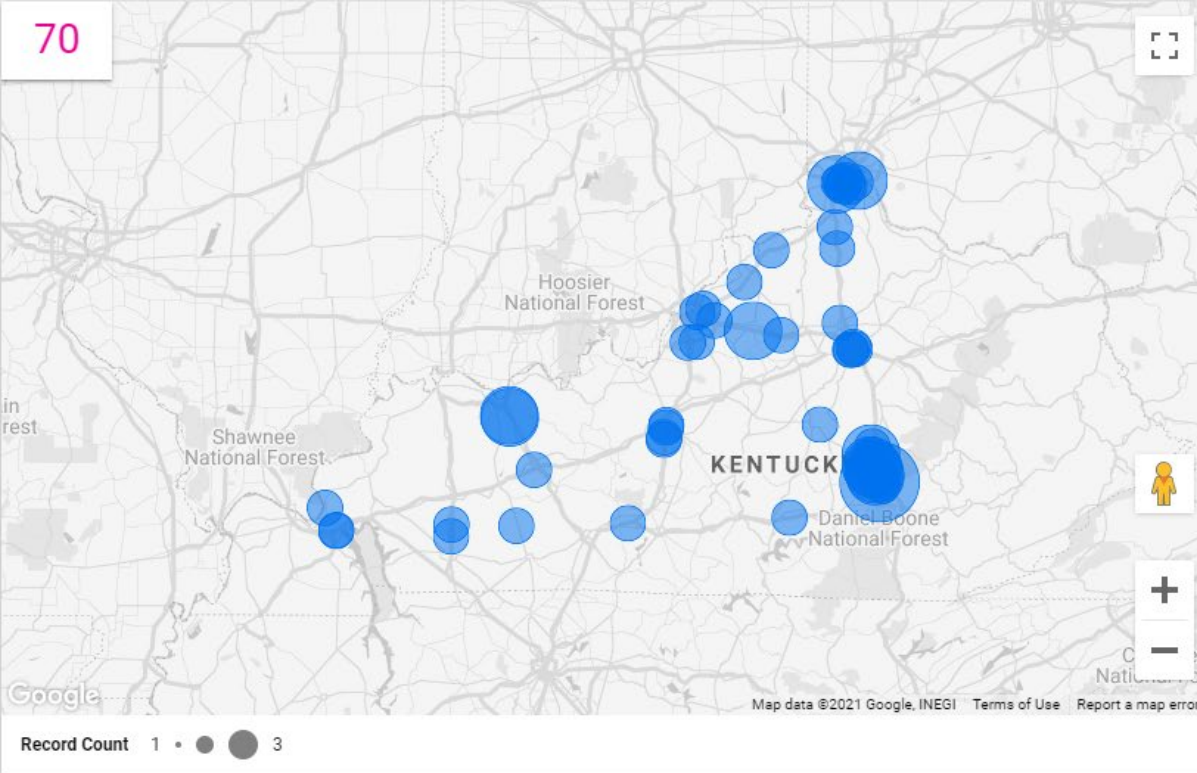
## Disclaimer(s):

- 1) Louisville, KY was used for analysis.
- 2) Only one air quality sensor was used for analysis.
- 3) Entire county of speed data was used.

Questions: Is this a break in a seasonal trend line?



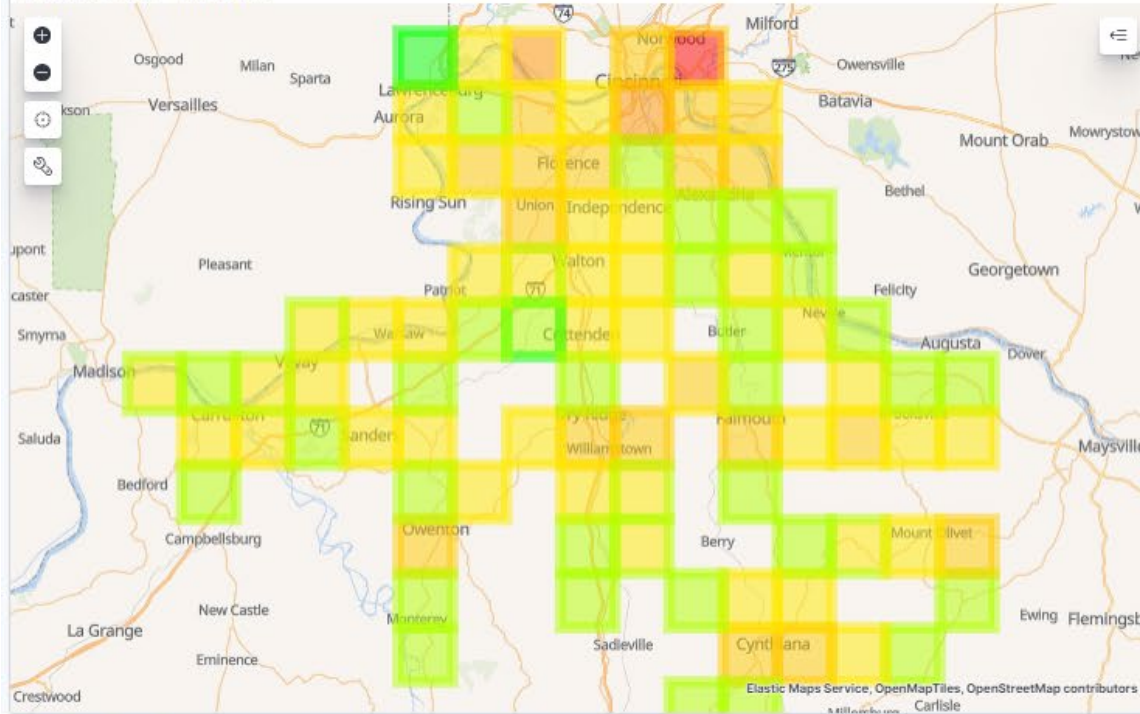
# Analysis: Work Zone & Crashes



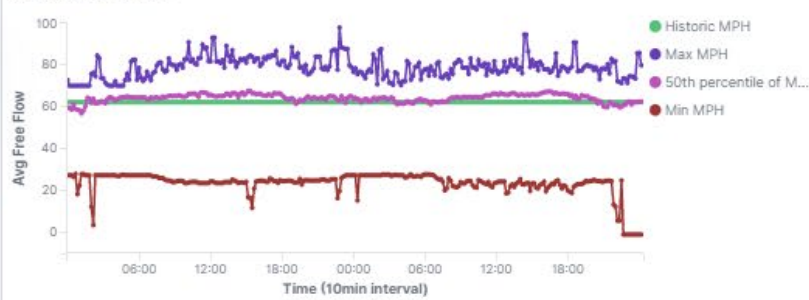
Simple SQL join using TMC Work Zone records and TMC Crash reports using beginning and ending mile points within the join.

# Analysis: Impact of Bridge Closure

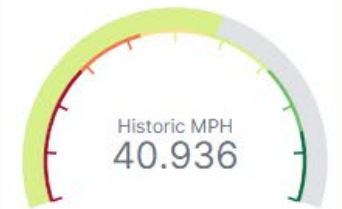
Brent Spence Bridge - Traffic Impact



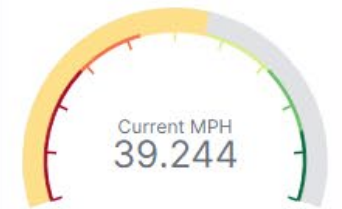
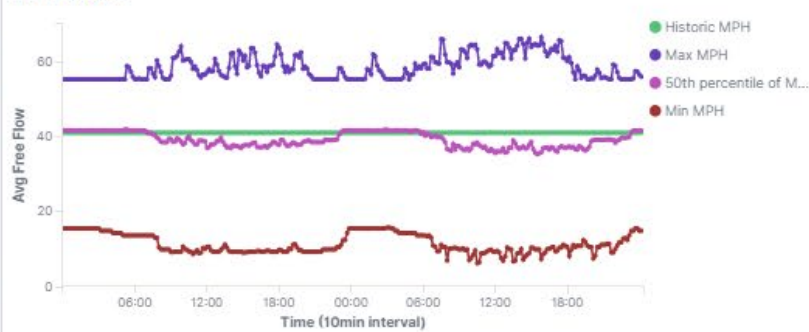
BSB - Interstate Routes



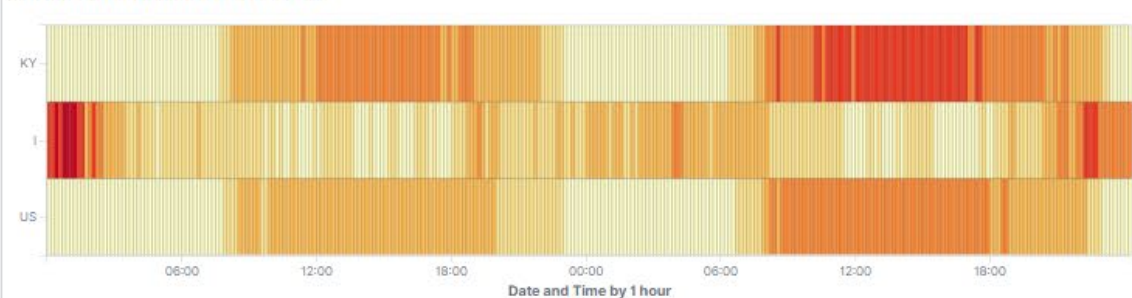
Brent Spence Bridge Speed Gauges ①



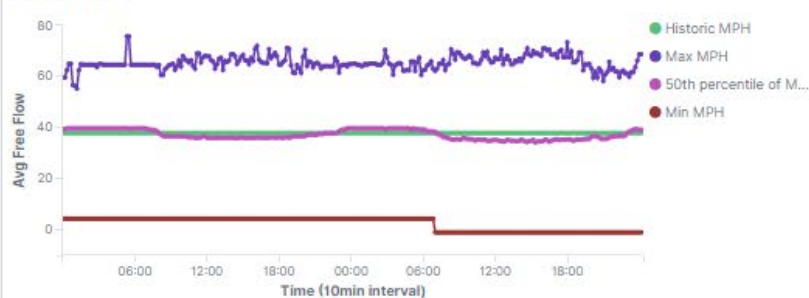
BSB - US Routes



Brent Spence Bridge Traffic Impact per 10min



BSB - KY Routes

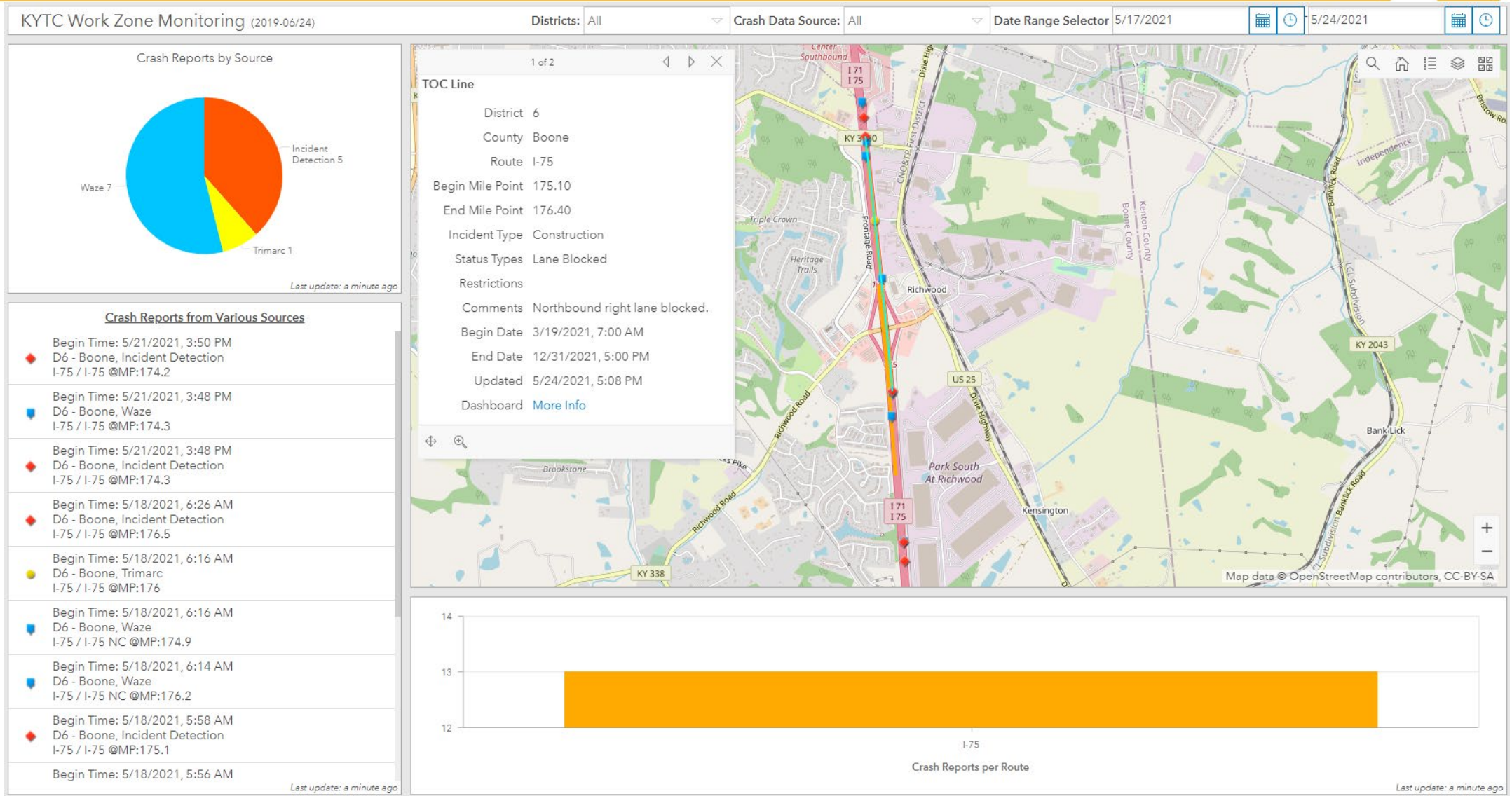


# Monitoring & Detection



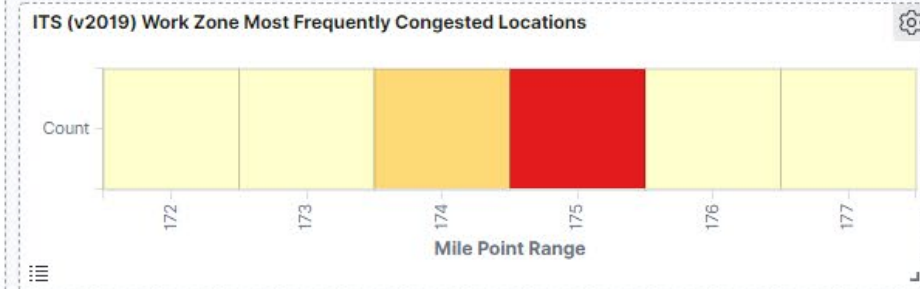
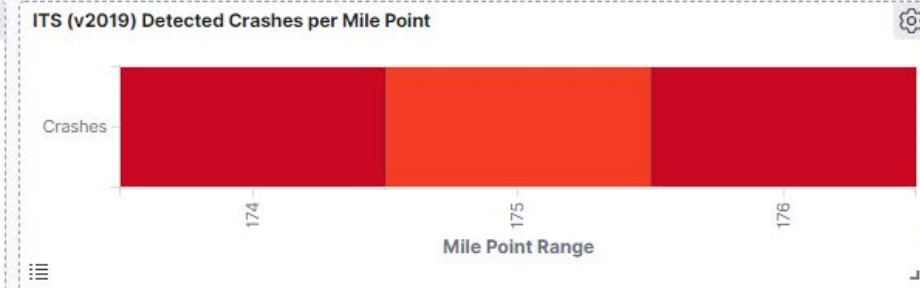
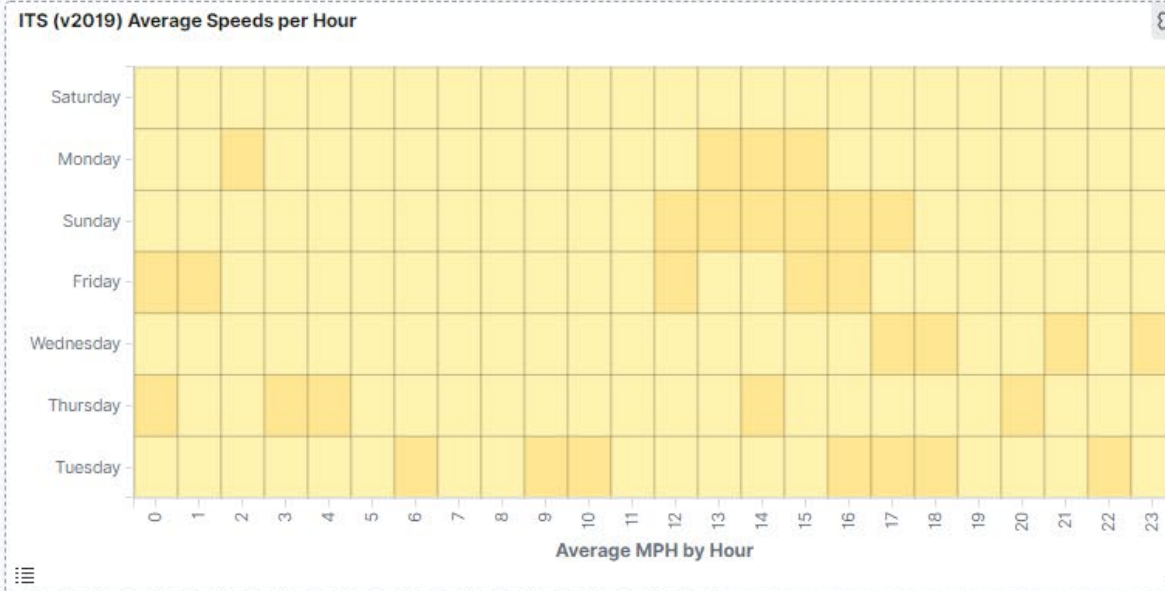
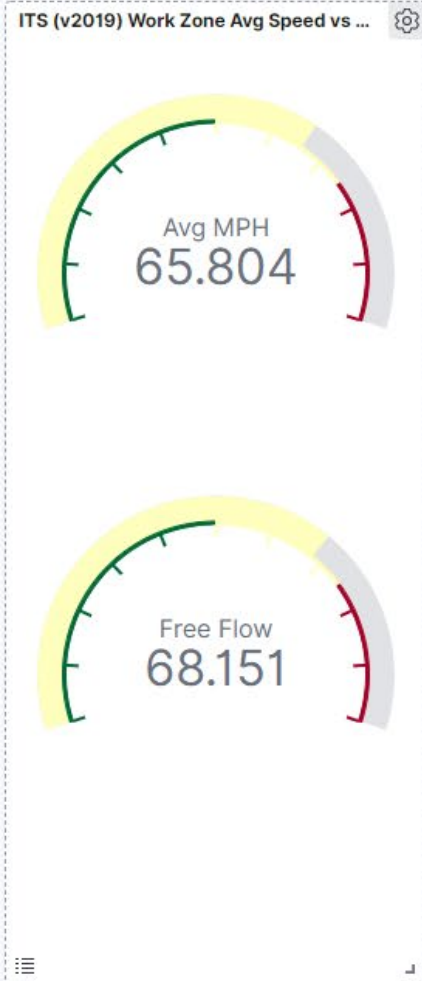


# I-75 Work Zone: Monitoring



# I-75 Work Zone: Performance

kytcCountyName: Boone × kytRoute: I-75 × kytRtSection is one of 0, 10 × kytcMPlInitial: 174 to 177 × + Add filter



# Incident Detection: HERE + Waze



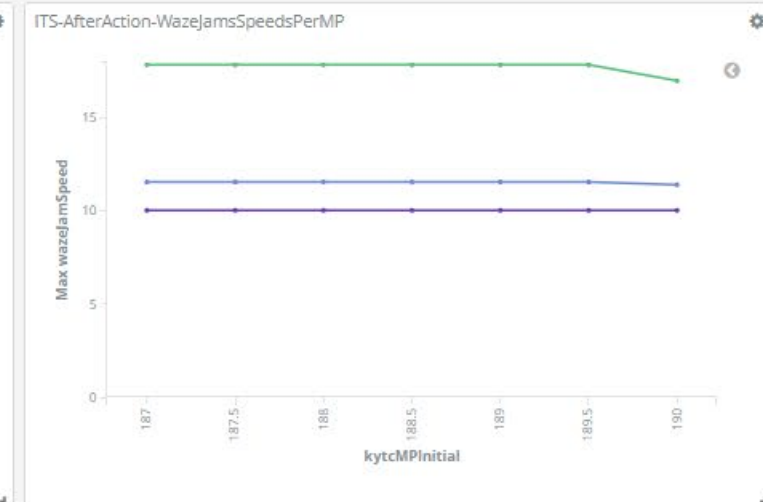
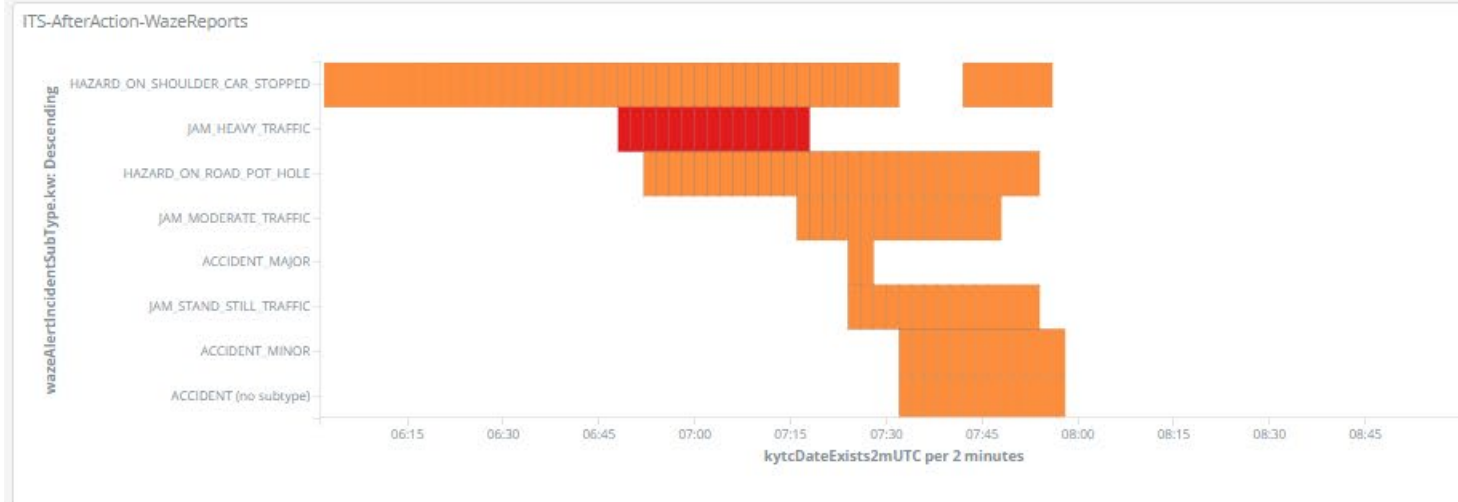
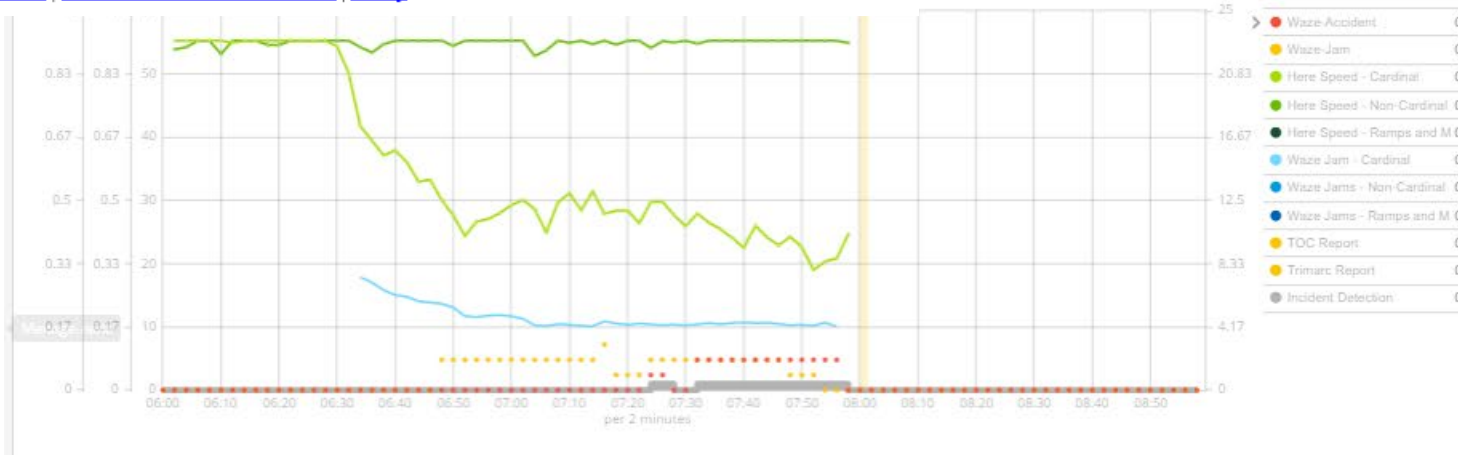
District: 6 -- Kenton -- I-75 -- Northbound -- Milepoint Range: 188.0 to 190.5

A crash has been detected at milepoint 190.2 with an average speed of 28.0 mph and a historic free flow of 54.9 mph.

Maps: [GoKy](#) | [TOC Incident Manager](#) | [Waze](#) | [Google](#) | [Here Traffic](#)

Dashboards: [Real Time View](#) | [After Action View](#)

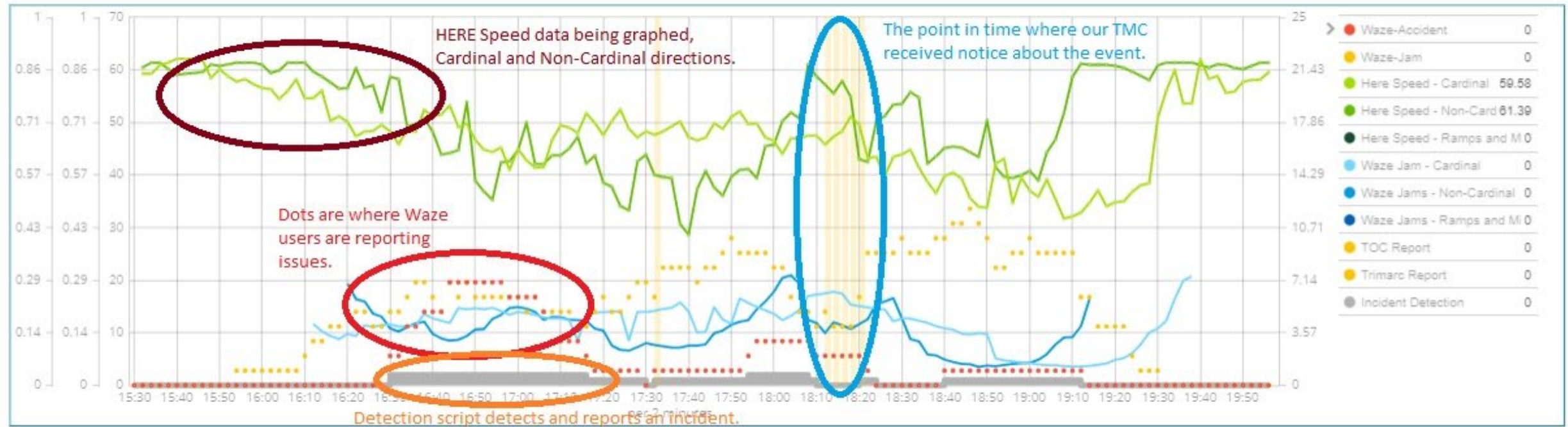
Weather: [National Weather Service](#) | [National Weather Service Details](#) | [Windy](#)



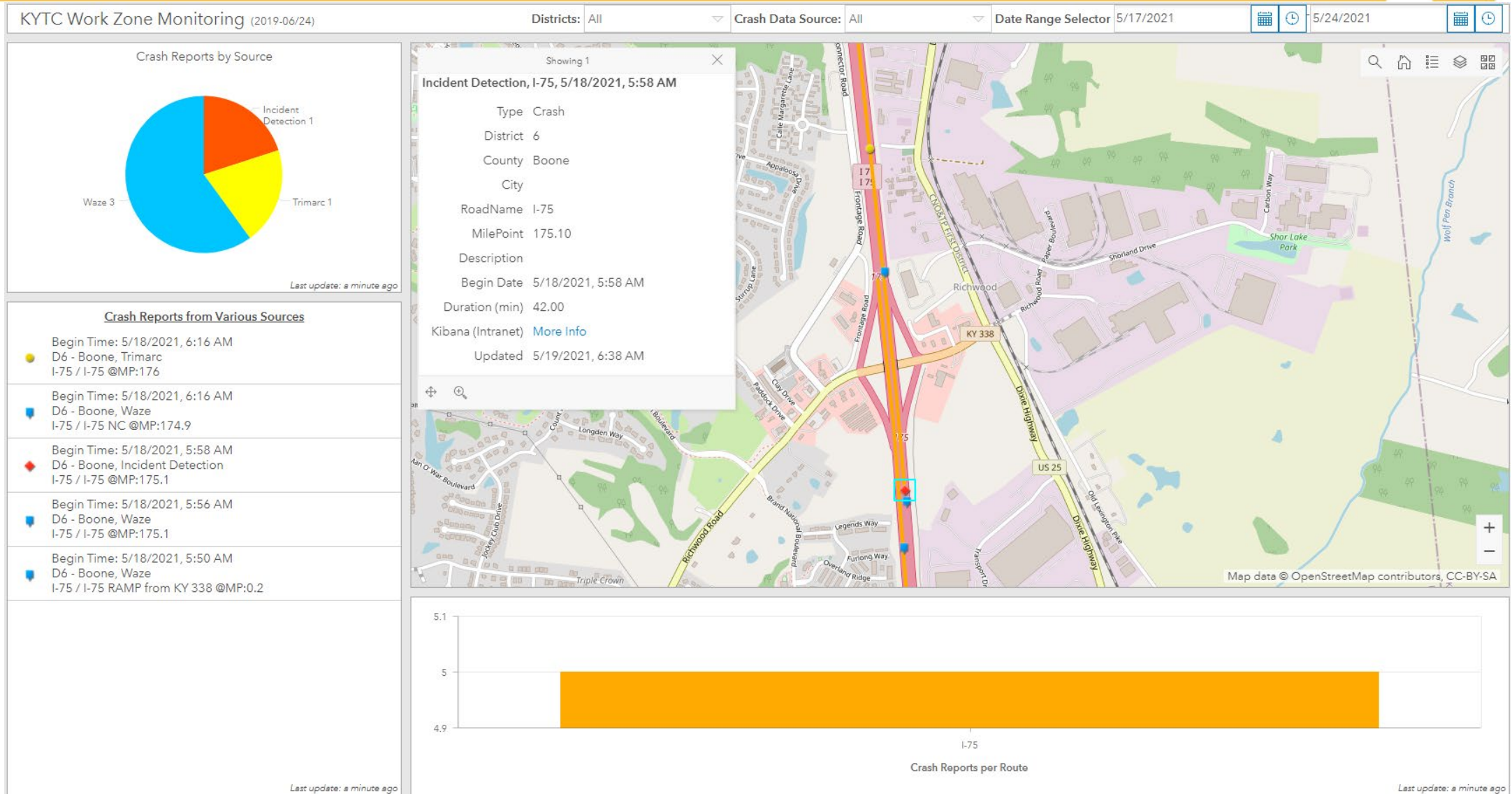


# Incident Detection: After-Action

ITS-ChrisTest



# I-75 Incident Review

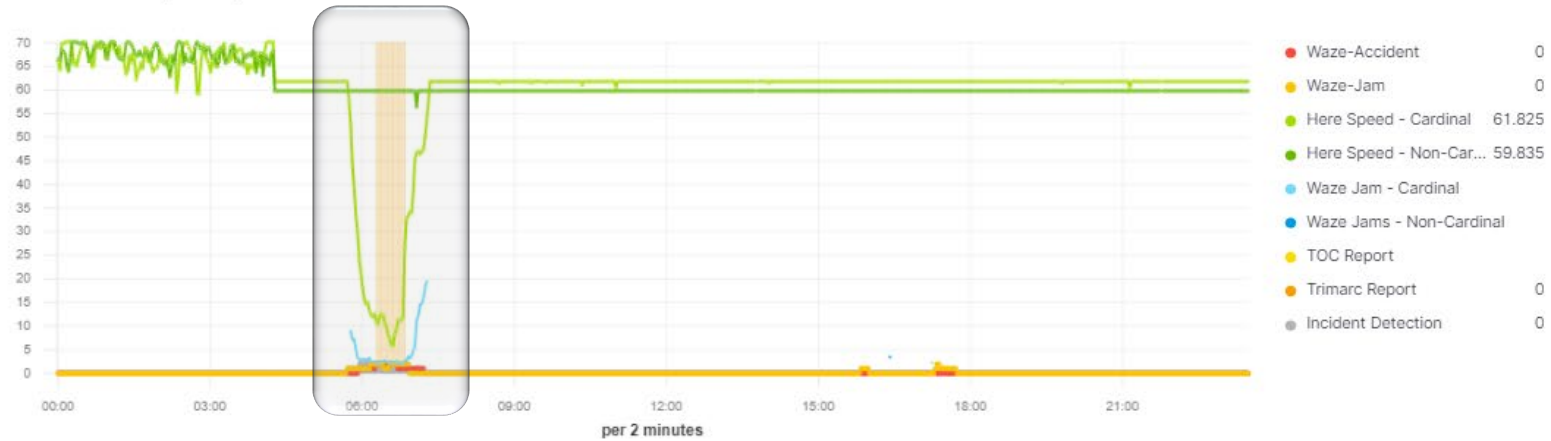




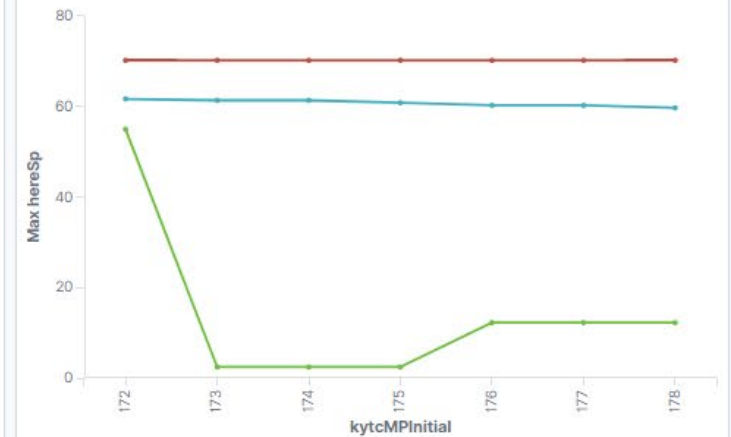
# I-75 Incident Impact

kytcCountyName: Boone × kytcroute: I-75 × + Add filter

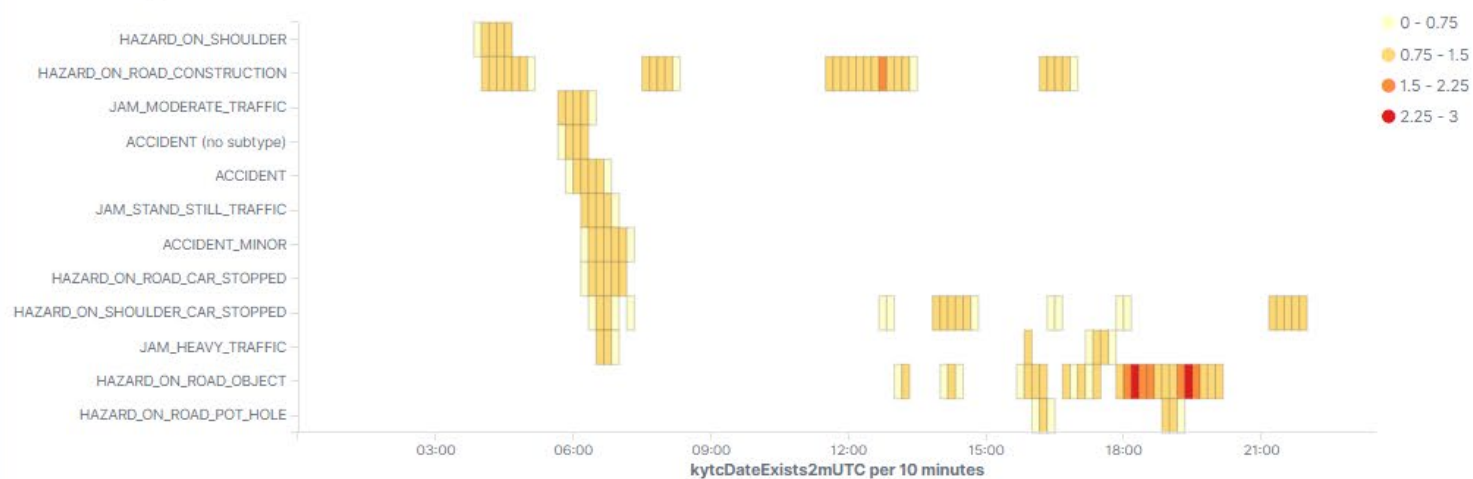
ITS-v2019-AfterAction(VBuilder)



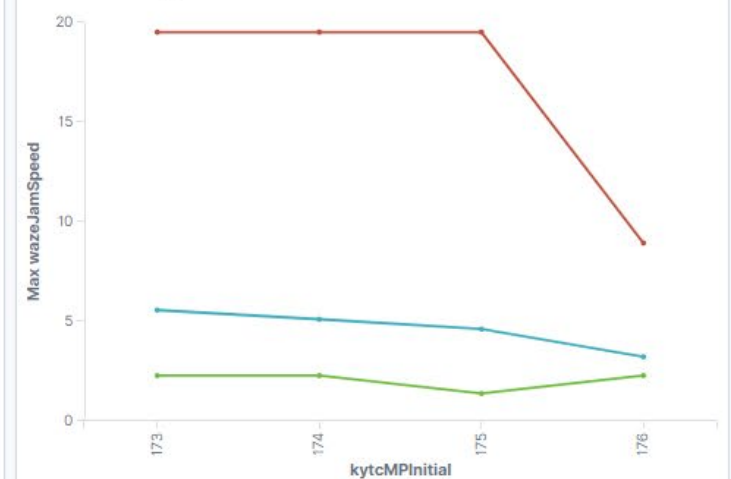
ITS-v2019-HERESpeedsPerMP



ITS-v2019-WazeReports



ITS-v2019-WazeSpeedsPerMP

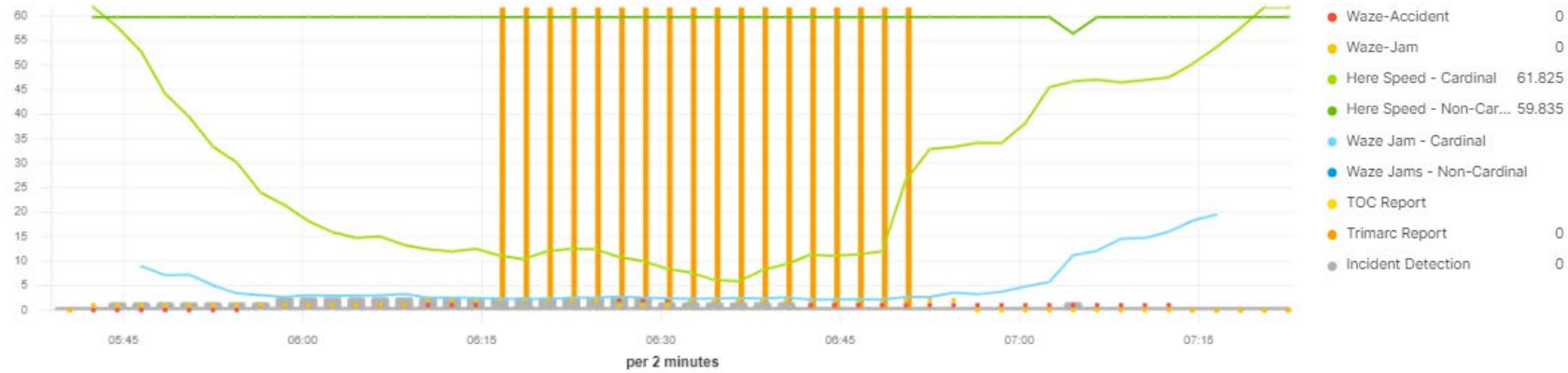


# I-75 Incident Impact

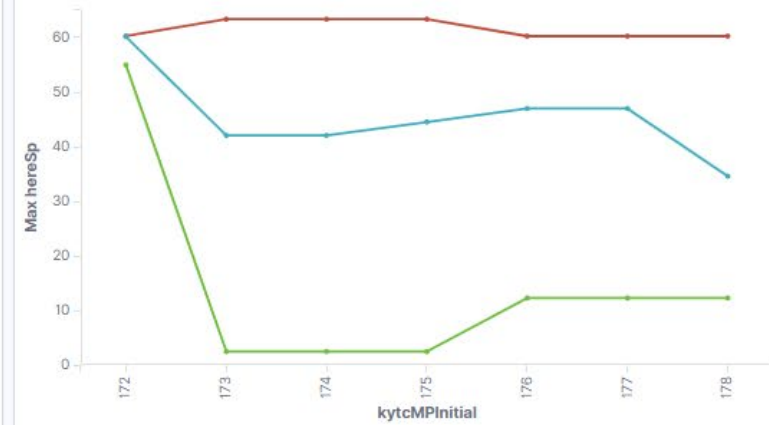


kytcCountyName: Boone × kytcroute: I-75 × + Add filter

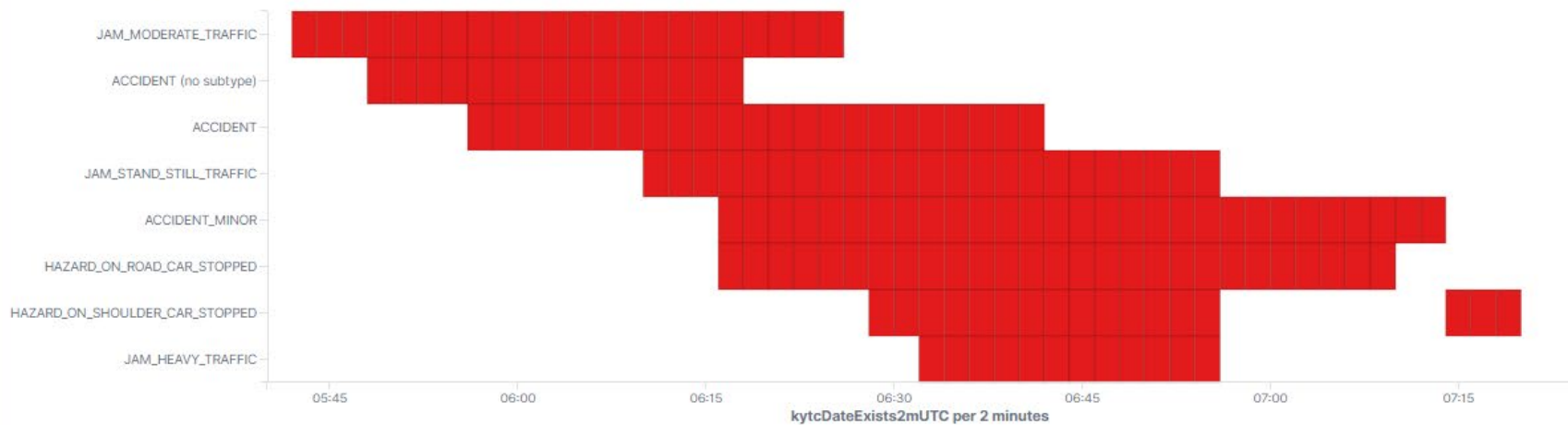
ITS-v2019-AfterAction(VBuilder)



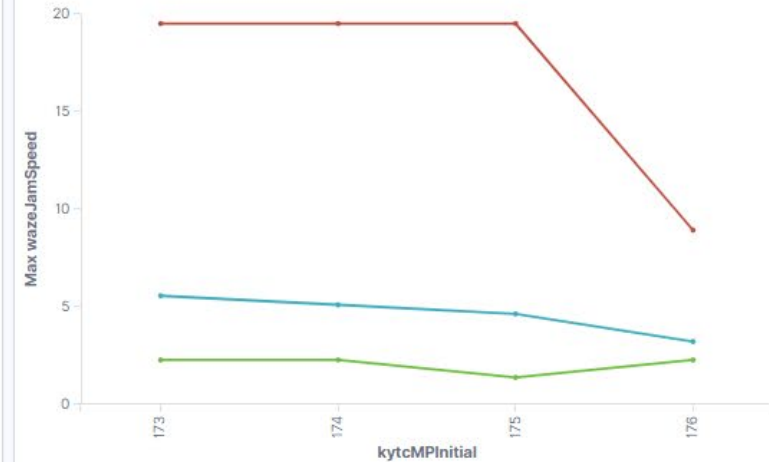
ITS-v2019-HERESpeedsPerMP



ITS-v2019-WazeReports

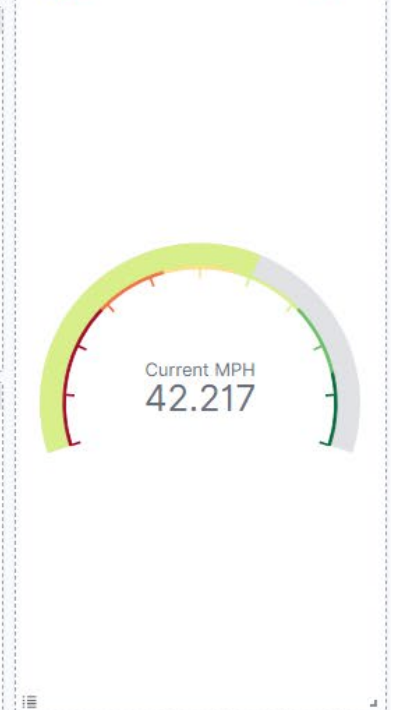
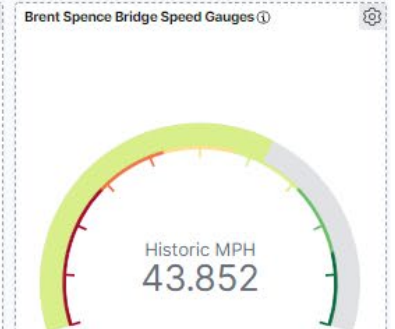
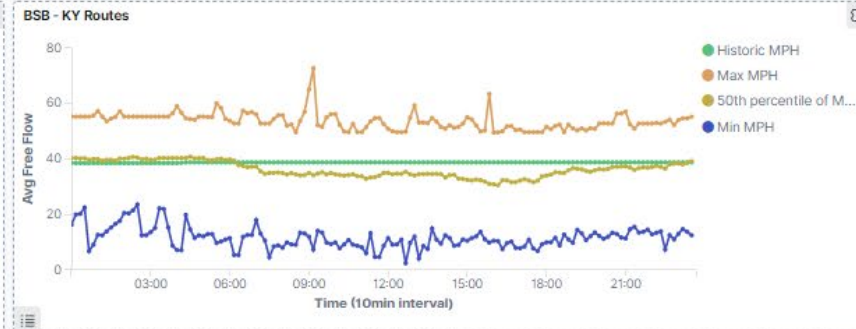
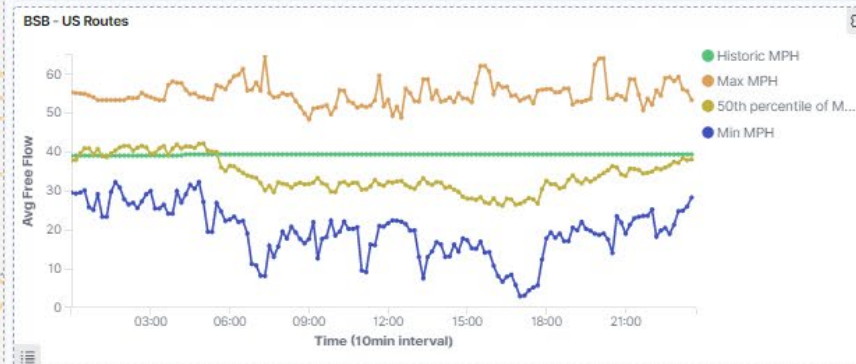
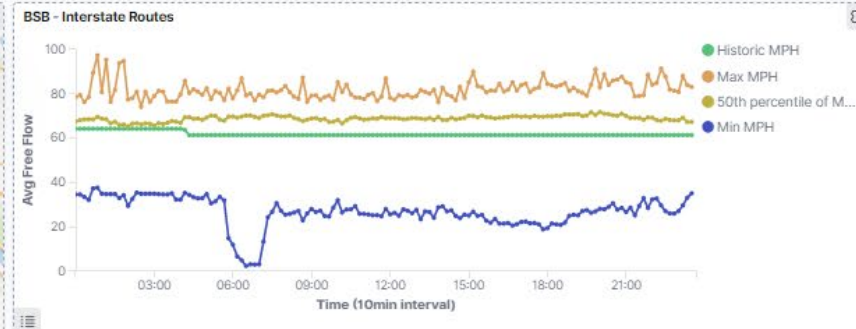
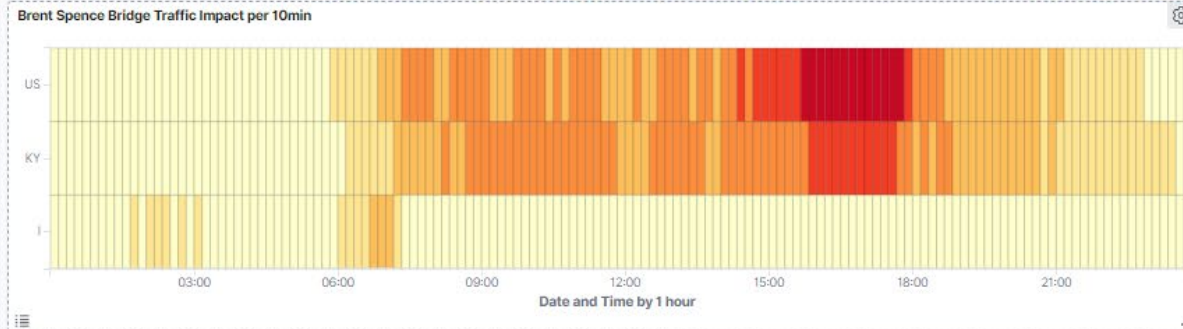
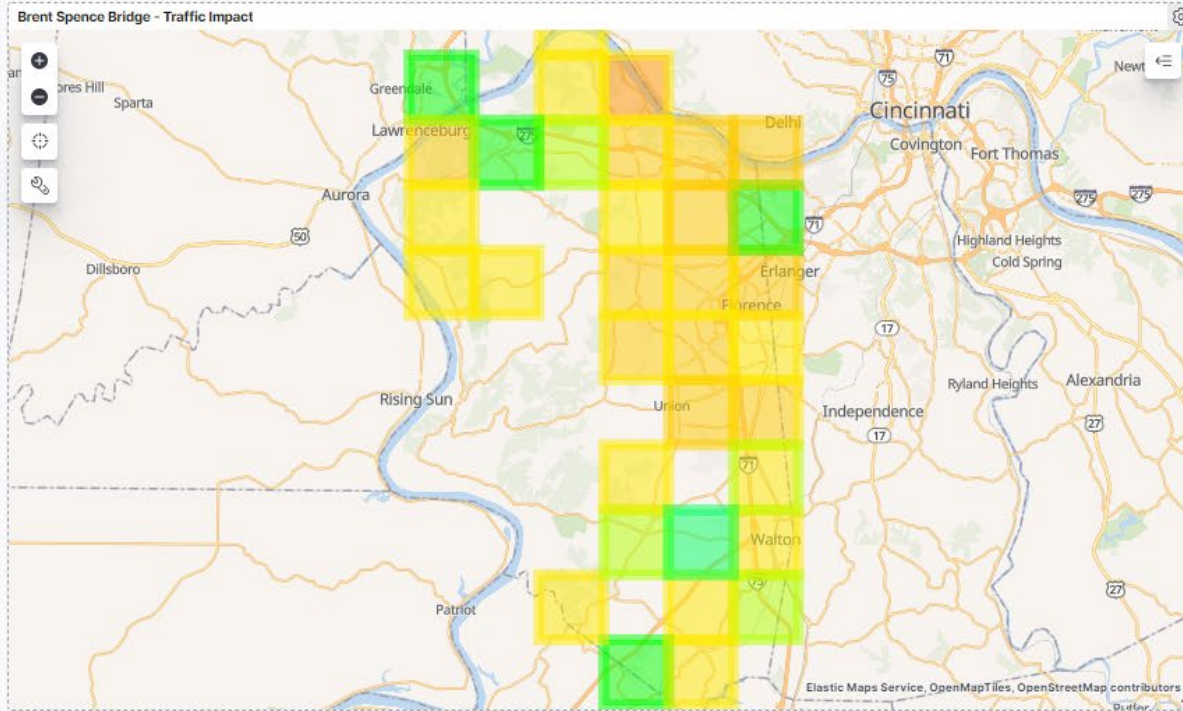


ITS-v2019-WazeSpeedsPerMP



# I-75 Incident Regional Impact

kytcCountyName: Boone x + Add filter

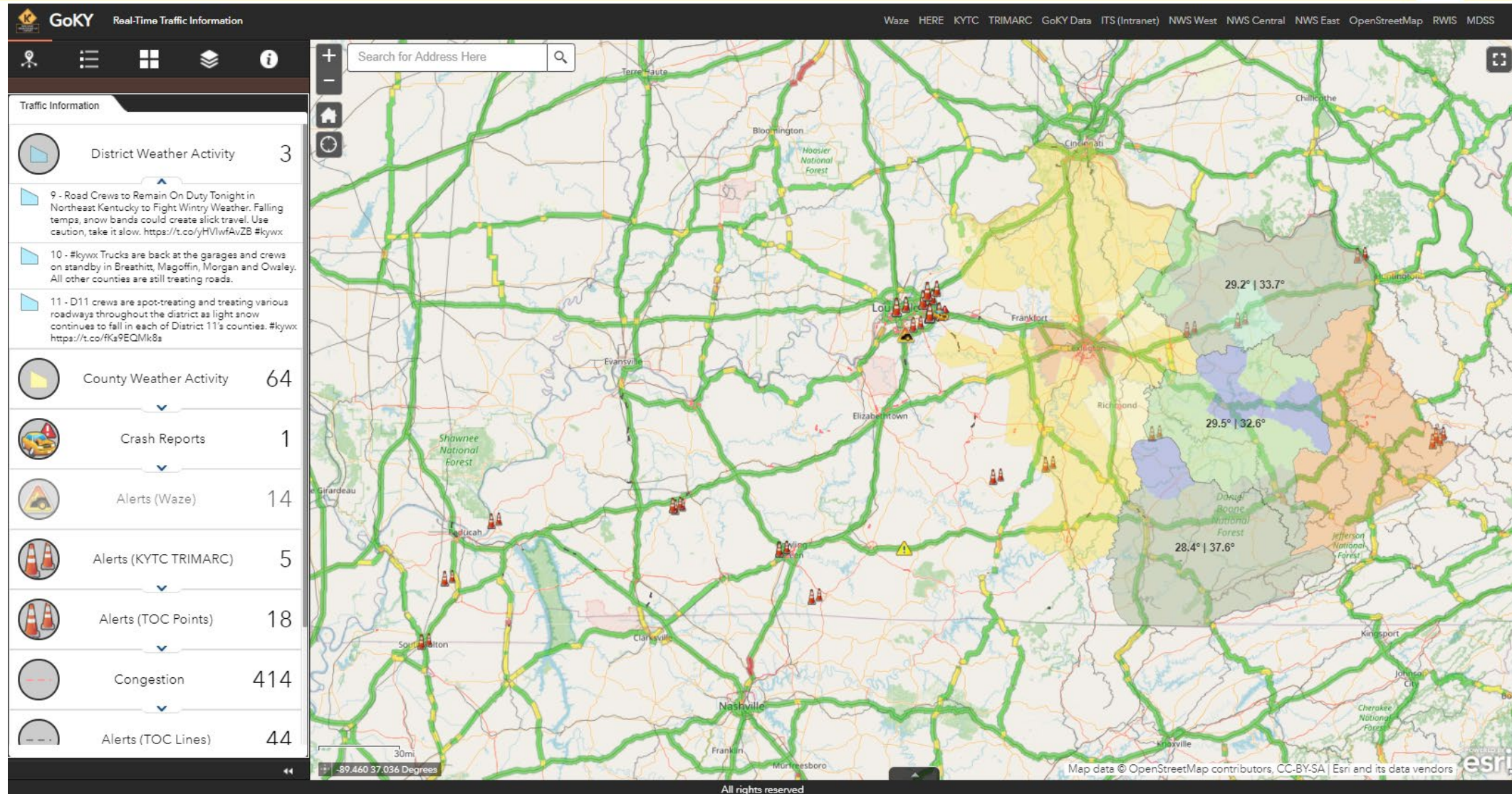


# Real-Time Decision Support



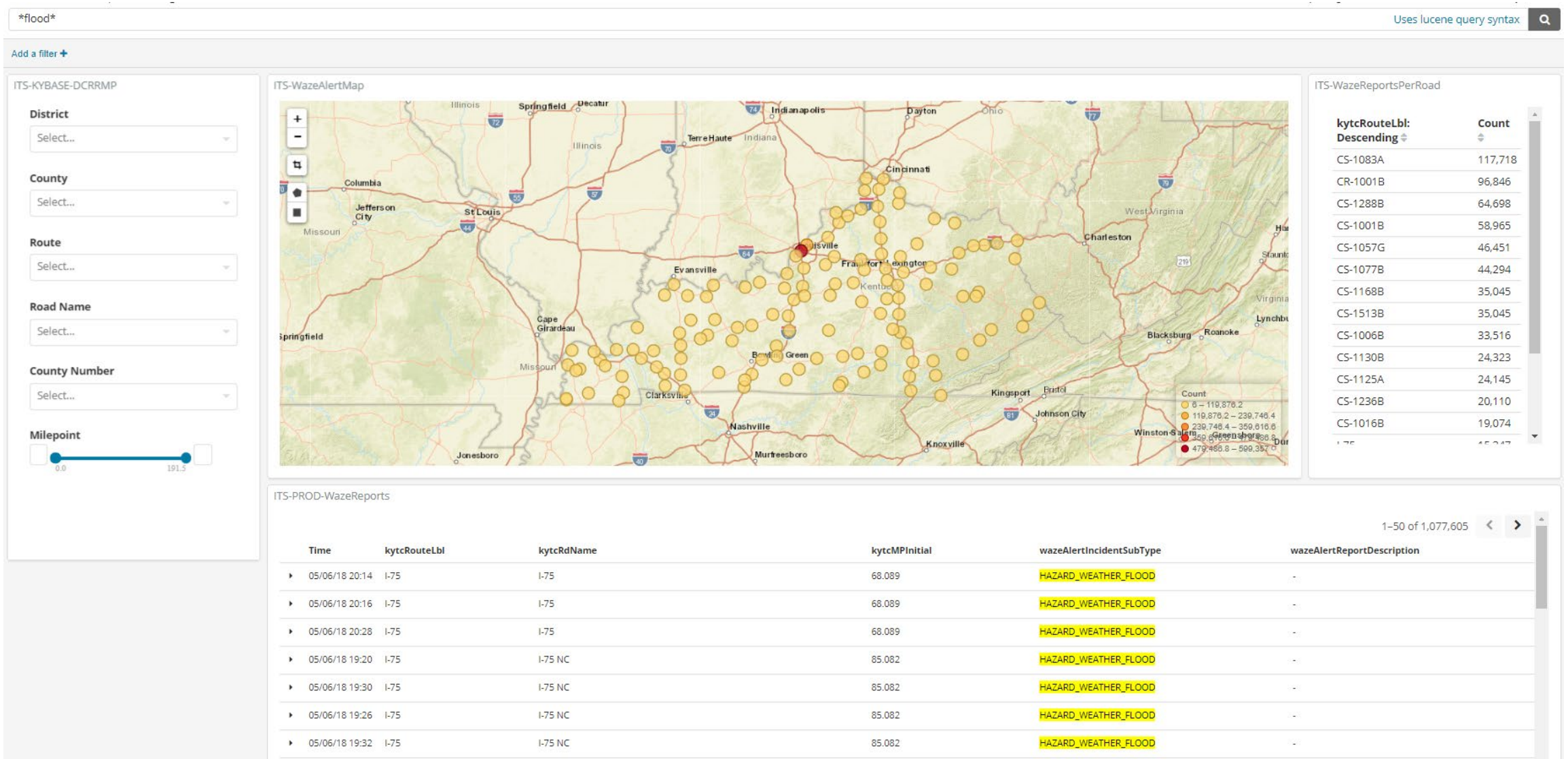


# Operations: Traveler Information





# Operations: Flooding



# Snow and Ice: Decision Support

KYTC Snow and Ice Decision Support

GoKY | Status | Teams

Air Temps

29

Last update: a few seconds ago

Pavement Temps

32

Last update: a few seconds ago

Consolidated Traffic Speeds

Scott US-460 and/or W MAIN ST  
MP: 9.25-9.3 Speed: 4

--- Fayette US-25 and/or W VINE ST  
MP: 13.98-14.15 Speed: 5

--- Fayette KY-4 and/or W NEW CIRCLE RD  
MP: 10.66-10.9 Speed: 6

--- Fayette KY-4 and/or W NEW CIRCLE RD  
NC  
MP: 10.67-10.67 Speed: 6

--- Fayette US-25 and/or W VINE ST  
MP: 13.91-13.98 Speed: 6

--- Fayette US-25 and/or W VINE ST  
MP: 13.91-13.98 Speed: 7

--- Fayette US-68 and/or HARRODSBURG RD  
MP: 3.02-3.06 Speed: 7

--- Woodford US-62 and/or S MAIN ST  
MP: 6.95-7.05 Speed: 7

--- Scott I-75 and/or I-75 RAMP from US 460  
MP: 0-0.02 Speed: 8

--- Scott US-460 and/or PARIS PIKE  
MP: 10.82-10.93 Speed: 8

Select a Tab

Wc MF District

Cle MF County Status

Fay MF Crashes

Fay MF Traffic

Fay MF Waze Alerts

Sc MF Cameras

Sc MF CoCoRahs

Sc MF Treated Roads

KYTC SNIC

District Plan

NWS Map

NWS West

NWS Central

NWS East

Read Me

Showing 1

I-71

1 of 2

Start MP 22.93

Ending MP 23.40

Road Name I-71

Route I-71

Route Label I-71

County Oldham

Priority A

District 5

City

Treatment Time 1/28/2021, 10:46 AM

[ITS] Treatment Value

Avg Event Rate 500.00

Treatment 6

Segment Count

Treatment Last

Time Indicator

SNIC Activity

SNIC Precip Type None

SNIC Precip Amt

SNIC Report

Air Temp 29.50

Pave Temp 30.05

Dew Point 24.70

Wind Speed 9.10

Radar Value 0

Severity Index 3

Avg Elevation 869

Avg Slope 1.69

NICHOLASVILLE RD

Showing 1

OBJECTID 7388263

Date 2/1/2021, 4:48 PM

District 7

County Fayette

City Lexington

Route US-27

RoadName NICHOLASVILLE RD

BeginMilePoint 4.20

EndMilePoint 4.31

Delay 434.00

Source Waze

Historic Speed

Current Speed 4.00

Updated 2/1/2021, 4:48 PM

I-64 NC

Showing 1

Type Crash

Source Trimarc

District 5

County Jefferson

City Louisville

Route I-64

RoadName I-64 NC

MilePoint 21.20

Description May be viewed on  
CCTV\_05\_64\_0214, I-64 West at  
MM 21.3 Just Past Echo Trail

Lat 38.22

Long -85.46

Begin Date 2/1/2021, 3:50 PM

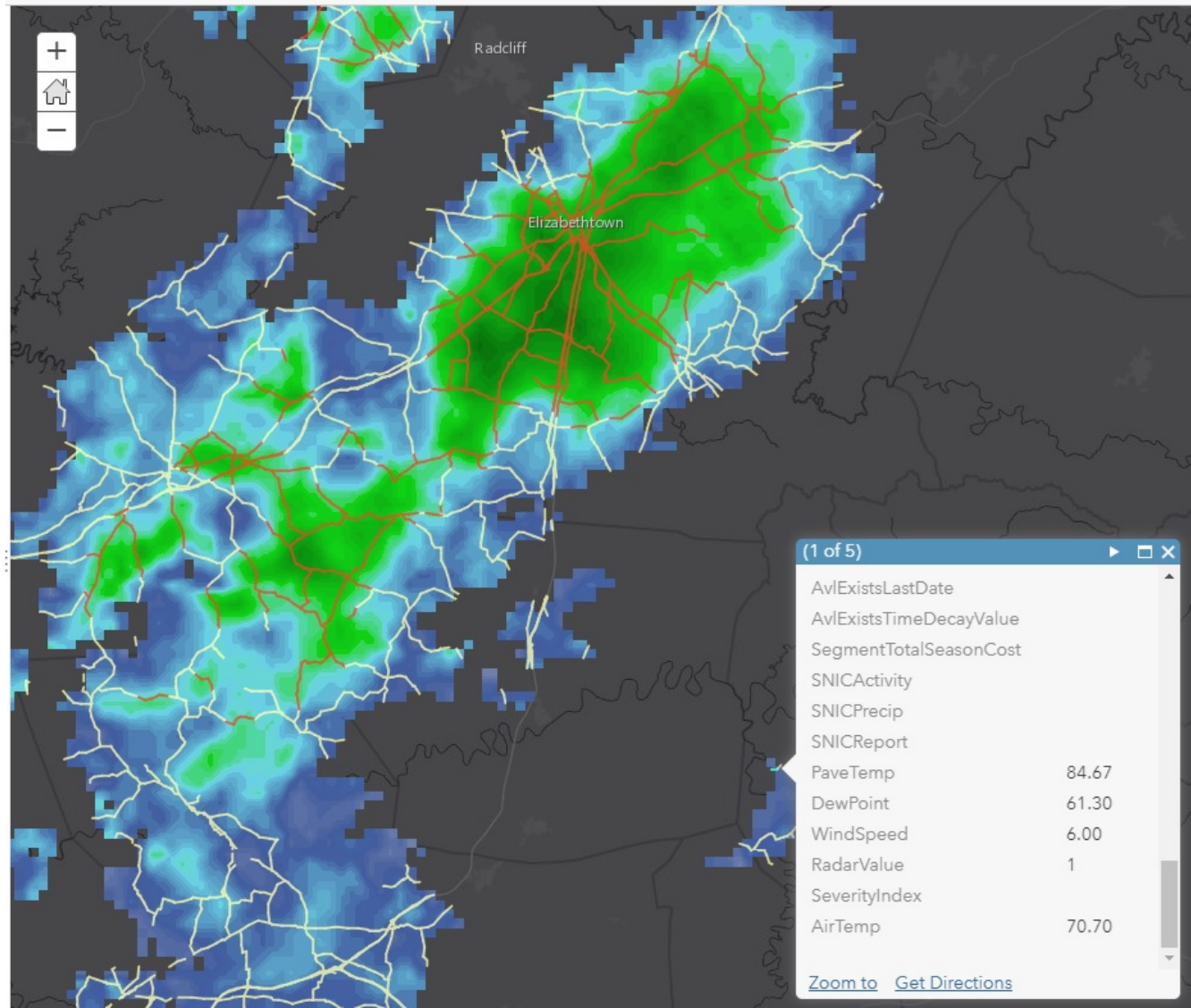
End Date 2/1/2021, 4:36 PM

Duration (min) 46.00

Updated 2/1/2021, 4:22 PM

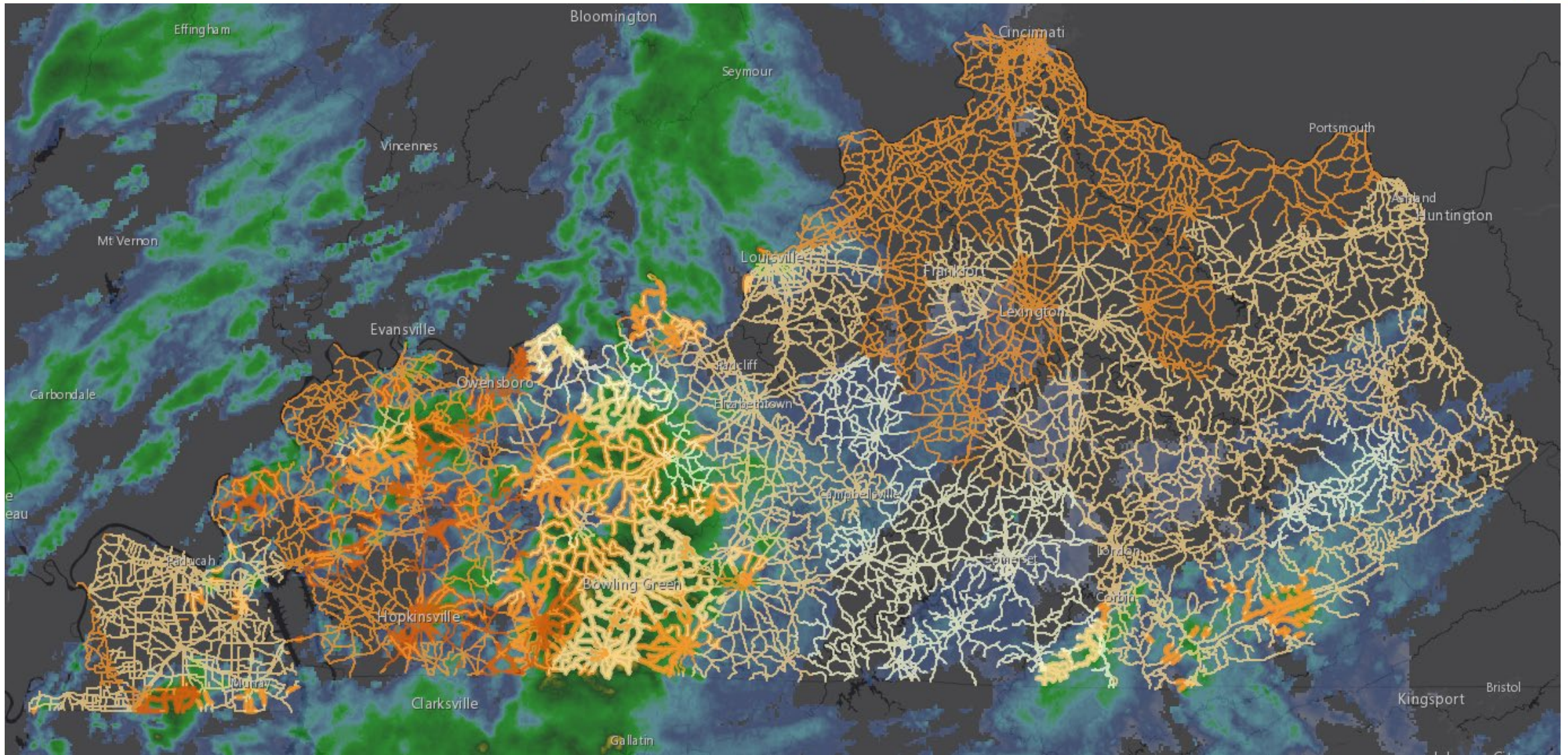


# Roadway Weather: Doppler Symbolology



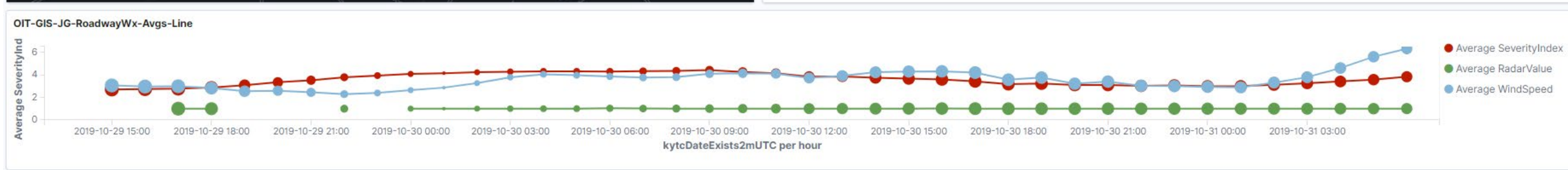
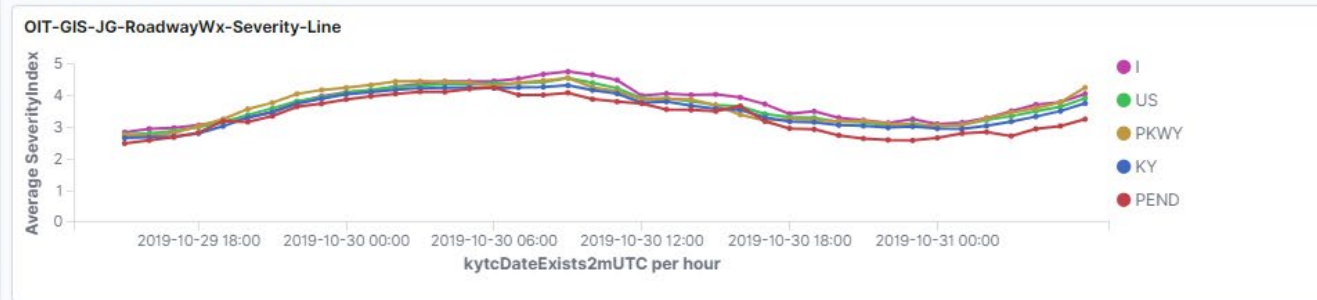
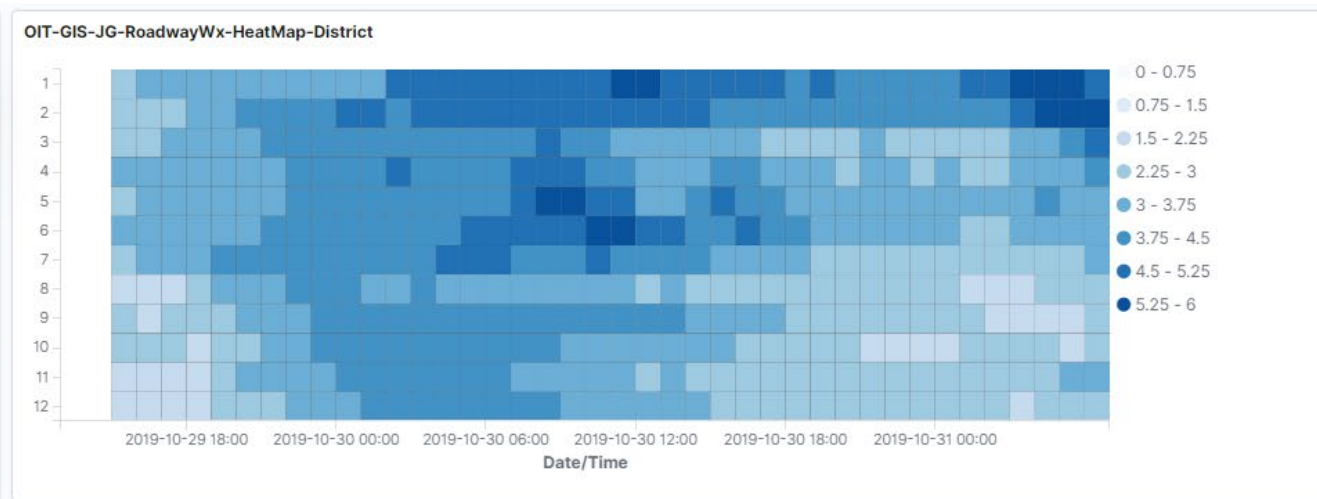
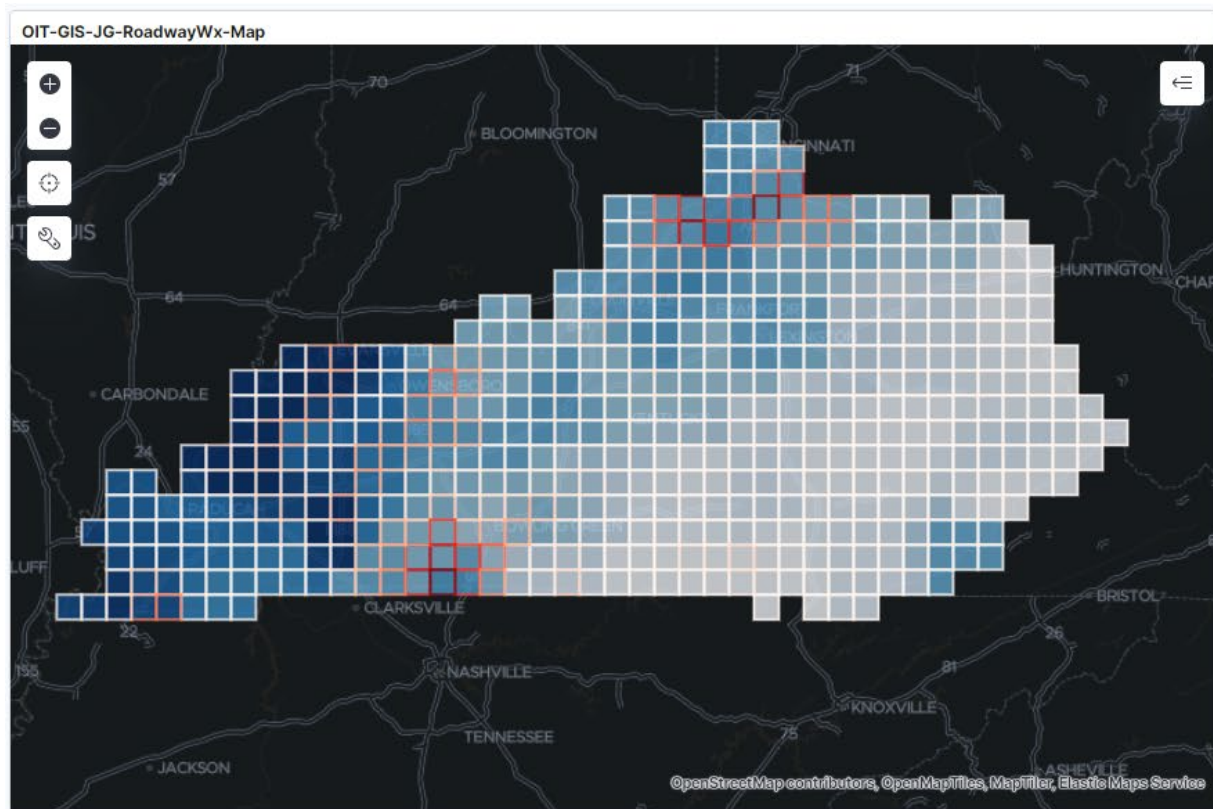


# Roadway Weather: Doppler Symbology





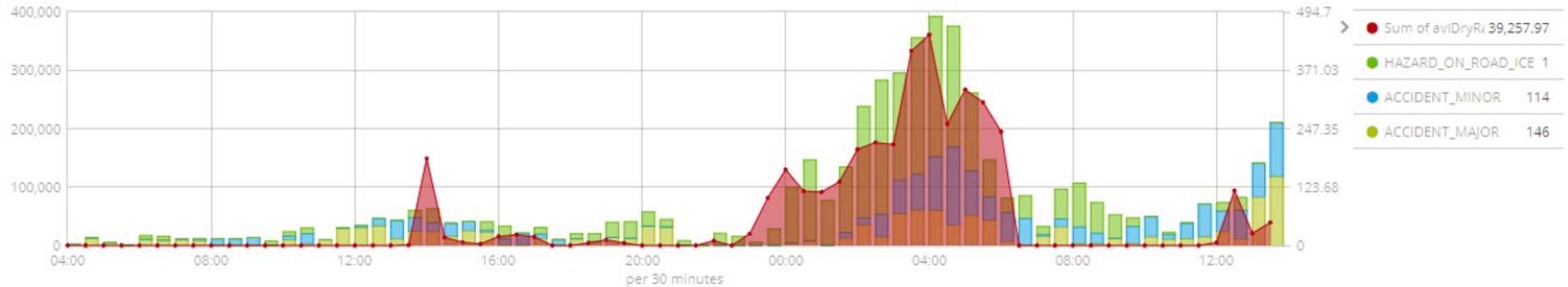
# Roadway Weather Performance



# Snow and Ice Performance



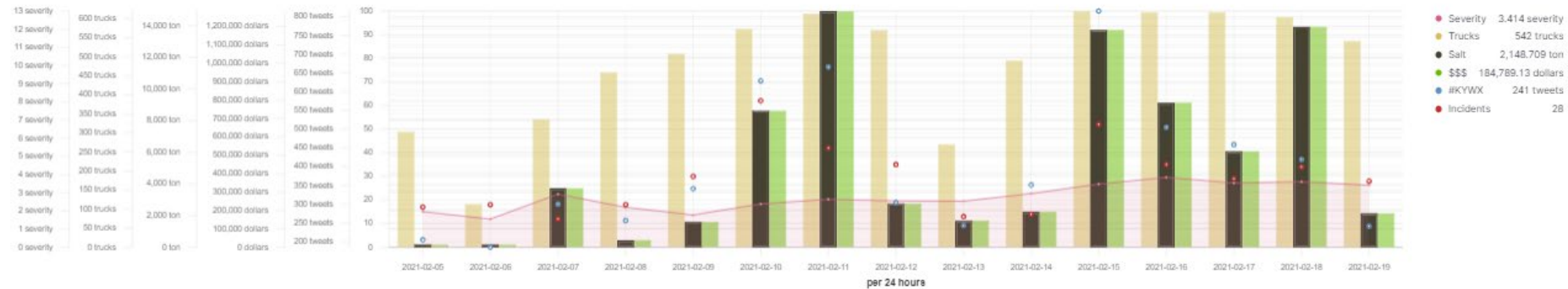
Time Series   Metric   Top N   Gauge   Markdown   Table



# Snow and Ice: Executive View



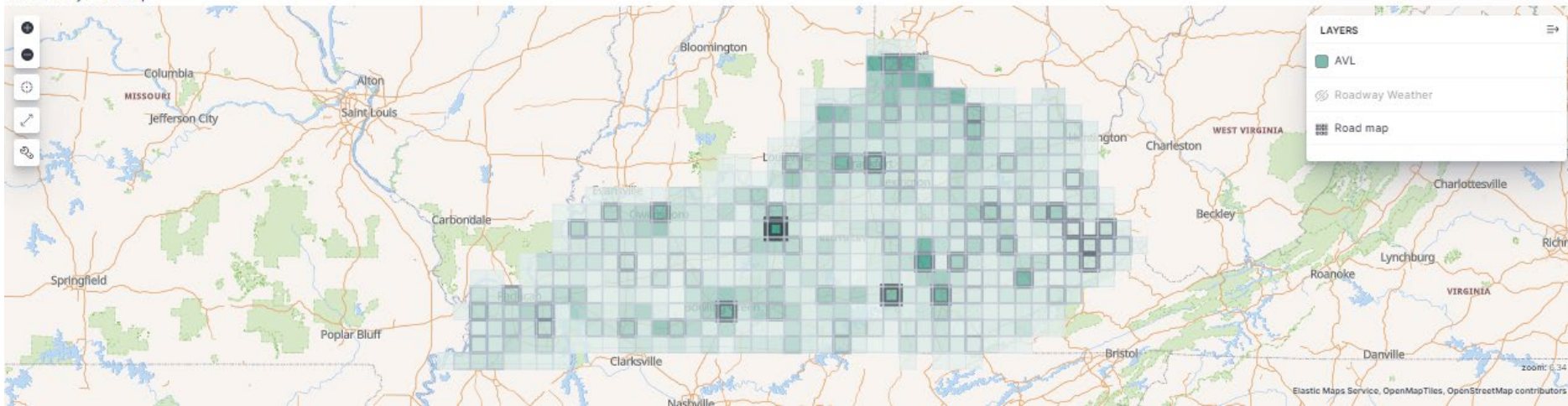
SHE View - Time Series Severity Index



SHE View Memo

This dashboard is created for the purpose of summarizing information for members of the Executive staff, specifically the State Highway Engineer's Office. Please contact [Randi.Feltner@ky.gov](mailto:Randi.Feltner@ky.gov) for more information.

2020 Roadway Weather Map



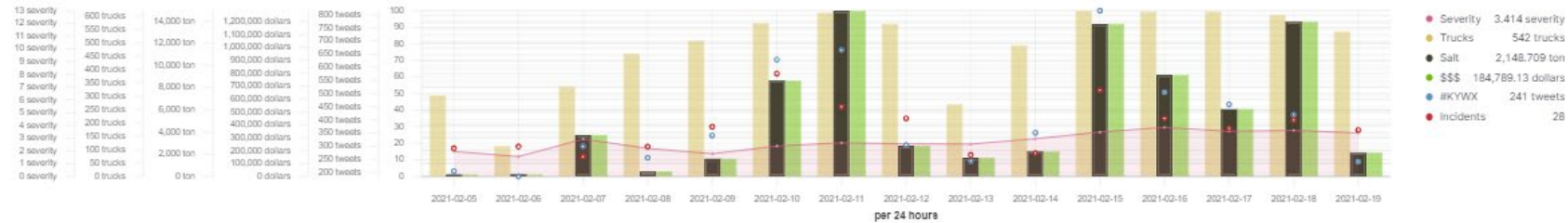


# Snow and Ice: Executive All-in-One

SHE View AVL Metric

669 AVL Trucks 393.752 AVL Dry Rate 81,281.214 AVL Tonnage 8,188,937.972 AVL Salt Cost

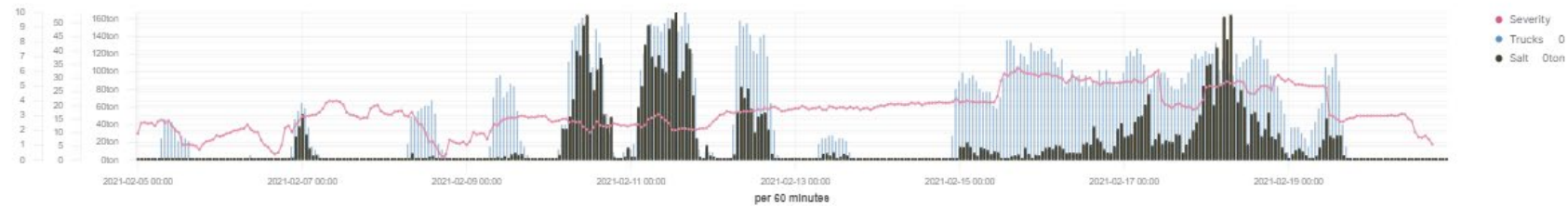
SHE View - Time Series Severity Index



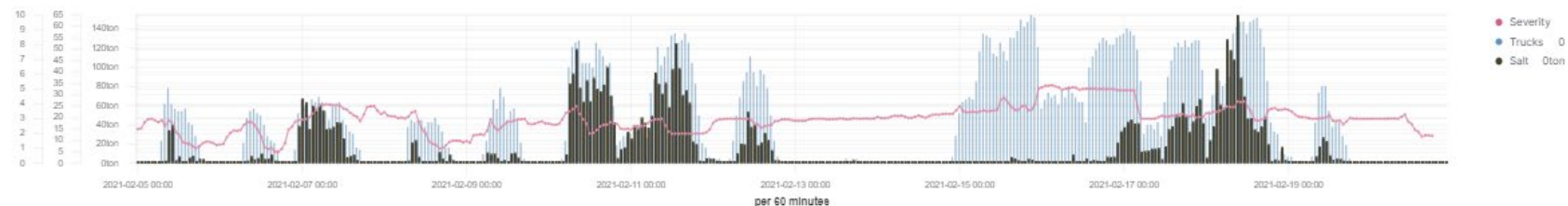
SHE View Memo

This dashboard is created for the purpose of summarizing information for members of the Executive staff, specifically the State Highway Engineer's Office. Please contact [Randi.Feltner@ky.gov](mailto:Randi.Feltner@ky.gov) for more information.

SHE View - Time Series Severity Index (D1)



SHE View - Time Series Severity Index (D2)



# Snow and Ice: District View

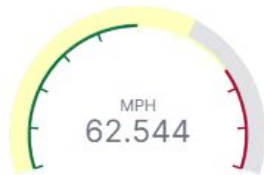


# Snow and Ice: Corridor View

Corridor Selector

Route  
I-75

Corridor View HERE MPH



2020 Roadway Weather Map



2020 Snow and Ice Time Series Mobility per Hour

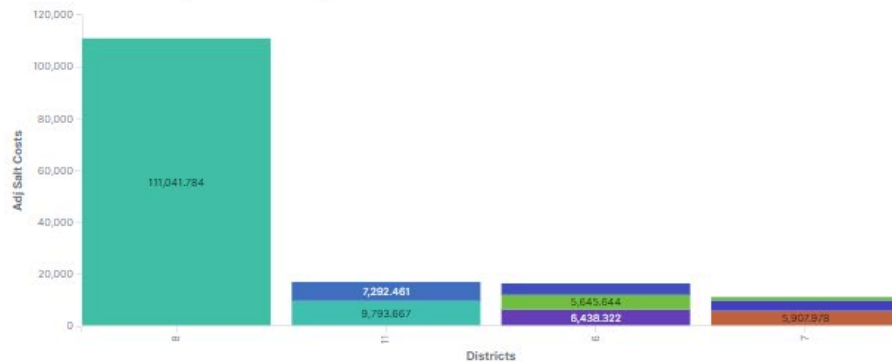


Corridor View Snow and Ice Weather Gauges

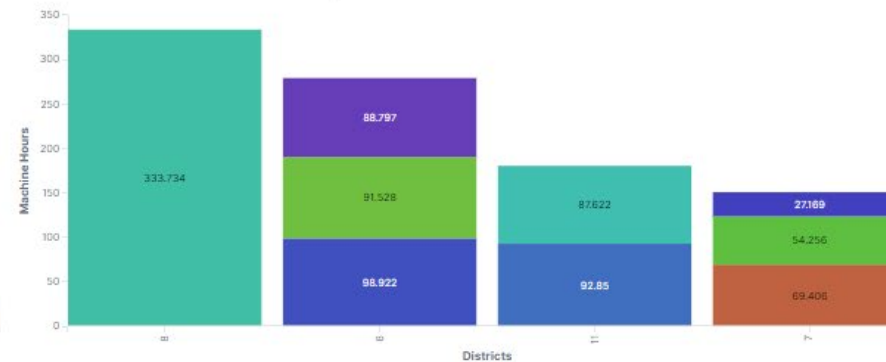


iii

2020 Snow and Ice District Adj Salt Costs Per District



2020 Snow and Ice District Machine Hours Per District



# Reality Check: Data Points = Lives



## I-71 NORTHBOUND

**8:39am – Waze users report a Minor Accident.**

**8:52am – HERE speed data starts to show a relevant decline in speeds (59mph vs. 70.21mph historic average) with a “Jam Factor” greater than 2.**

**9:12am – Waze Jams data shows a delay of 1.8 minutes and traffic moving at 45mph.**

## I-71 SOUTHBOUND

**9:03am – Waze users report a Minor Accident**

**9:19am – HERE speed data starts to show a relevant decline in speeds (57mph vs. 70.21mph historic average) with a “Jam Factor” greater than 2.**

**9:24am – Waze Jams data shows a delay of 17.11 minutes and traffic moving at 7.35mph.**

**10:30am - GALLATIN COUNTY, KY (FOX19) - One person died in a crash on Southbound Interstate 71 near the Kentucky Speedway Thursday morning. The crash happened off the side of the road near the 57-mile marker around 10:30 a.m., according to Gallatin County dispatchers.**



# Questions?

---

Chris Lambert  
chris.lambert@ky.gov

Twitter: @KYTC | @ChrisLambertKY  
Facebook: /kytc120