




RITIS Best Practices Handbook

Version 1.0

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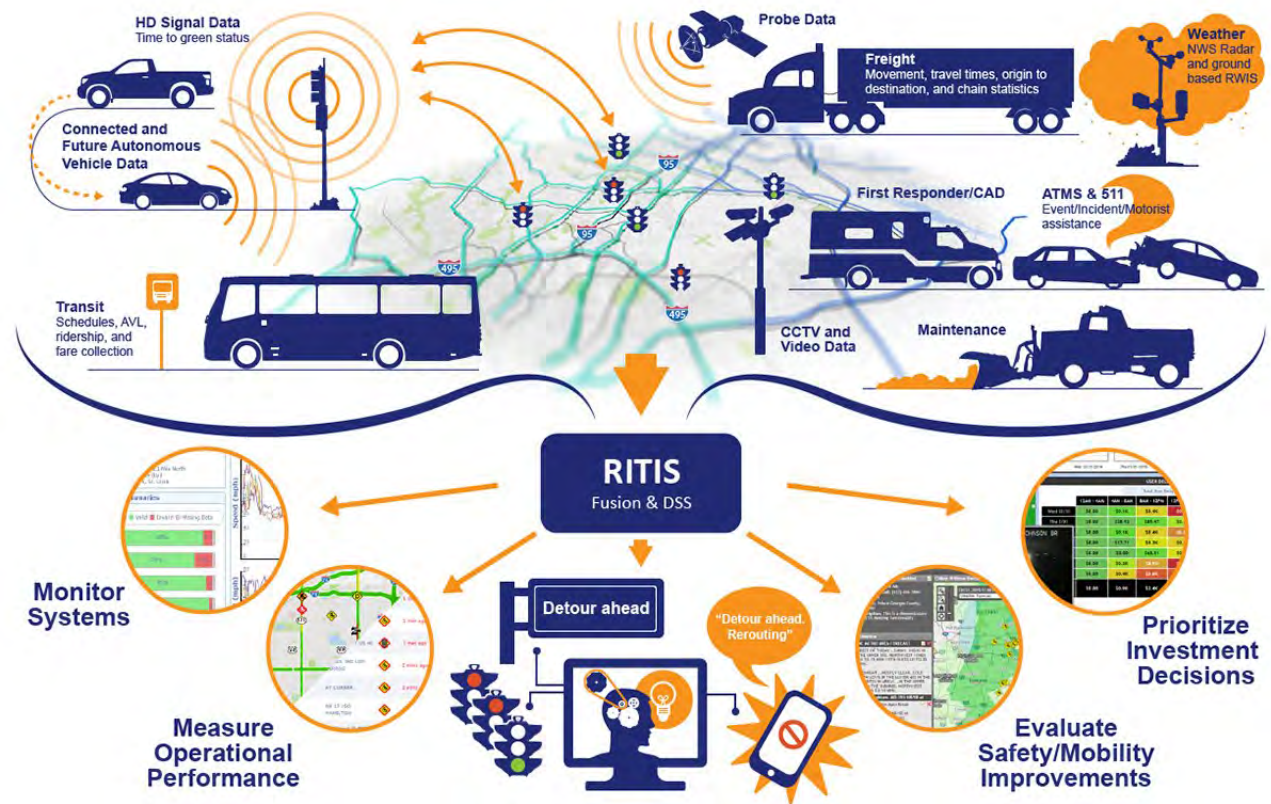
Click on a heading in the table of contents to go to that section. Click on back arrows next to page numbers  to jump back to this table of contents.

Introduction

The Regional Integrated Transportation Information System, or RITIS, is an automated data sharing, dissemination, and archiving system that includes many performance measures, dashboards, and visual analytics tools that can be used to gain situational awareness, measure system performance, and communicate information between agencies and the general public. ODOT signed an agreement with the University of Maryland to access RITIS, beginning on May 1, 2020.

The goals of the Oregon RITIS Best Practices Handbook are to:

- Serve as a user guide to help new users get started and as a reference guide for experienced users
 - Provide guidance to users on how to navigate the tools within RITIS and understand their uses and capabilities
 - Provide users with information on the underlying data, algorithms, and assumptions within the tool (eliminate the “black box” feeling)
- Provide guidance on performance measures analysis within the tool and calculations outside of the tool.



The above diagram is intended to provide a visual representation of the RITIS platform. It is for demonstration purpose only. ODOT has the majority but not all the data available in RITIS. The Data Sources section of this report provides ODOT’s data sources in RITIS as of June 2023. ODOT has a team that coordinates with and directs RITIS on which data sources to integrate into the RITIS platform and make available to Oregon users.

Resources

How to Read this Handbook

Information is provided in general black text. *Whenever guidance is provided, the text will be in colored, italicized font **and sometimes bolded to emphasize a higher level of importance.***

Links to additional topical guidance are provided throughout this handbook. In some instances, access to linked resources requires you to be logged into your RITIS account.

Access and Training

Under ODOT's current agreement, RITIS access is available to all ODOT employees, State of Oregon public agencies, and consultant or university staff performing work for a public agency in the State of Oregon. Non-ODOT RITIS accounts require an organization to sign an INRIX data use agreement in order to access INRIX's private sector data within the RITIS platform. More information can be found [here](#).

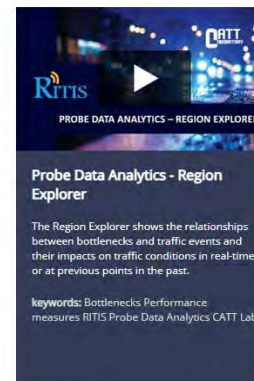
There are numerous ways in which users can access training for RITIS:

- ODOT-specific training videos can be found [here](#).
- RITIS tutorials and use cases are available [here](#).

RITIS Tutorials

Learn how to navigate RITIS, discover new information regarding speed and congestion data, and use certain tools like Trip Analytics.

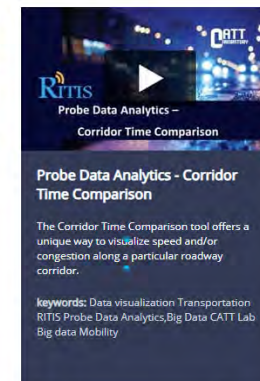
Search for keywords, titles, ...



Probe Data Analytics - Region Explorer

The Region Explorer shows the relationships between bottlenecks and traffic events and their impacts on traffic conditions in real-time or at previous points in the past.

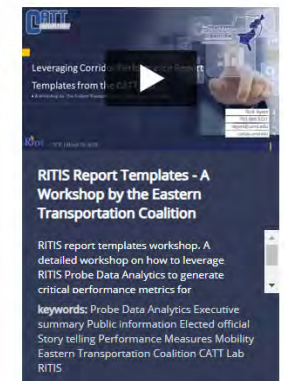
keywords: Bottlenecks Performance measures RITIS Probe Data Analytics CATT Lab



Probe Data Analytics - Corridor Time Comparison

The Corridor Time Comparison tool offers a unique way to visualize speed and/or congestion along a particular roadway corridor.

keywords: Data visualization Transportation RITIS Probe Data Analytics Big Data CATT Lab Big data Mobility

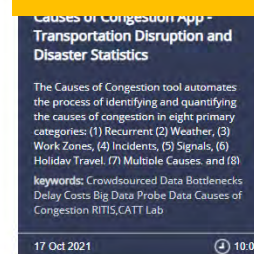


RITIS Report Templates - A Workshop by the Eastern Transportation Coalition

RITIS report templates workshop. A detailed workshop on how to leverage RITIS Probe Data Analytics to generate critical performance metrics for

keywords: Probe Data Analytics Executive summary Public information Elected official Story telling Performance Measures Mobility Eastern Transportation Coalition CATT Lab RITIS

These are samples of the many RITIS Tutorial videos available. Each video walks the user through the entire process of using the tool, from creating a query to navigating the results. Other topics – like how to create an After-Action Review – are also covered.

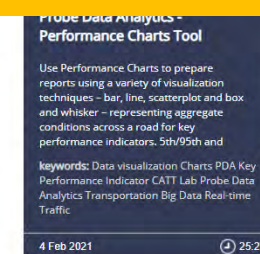


Causes of Congestion App - Transportation Disruption and Disaster Statistics

The Causes of Congestion tool automates the process of identifying and quantifying the causes of congestion in eight primary categories: (1) Recurrent (2) Weather, (3) Work Zones, (4) Incidents, (5) Signals, (6) Holiday Travel, (7) Multiple Causes, and (8)

keywords: Crowdsourced Data Bottlenecks Delay Costs Big Data Probe Data Causes of Congestion RITIS,CATT Lab

17 Oct 2021 10:08

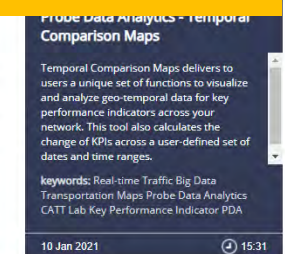


Probe Data Analytics - Performance Charts Tool

Use Performance Charts to prepare reports using a variety of visualization techniques – bar, line, scatterplot and box and whisker – representing aggregate conditions across a road for key performance indicators. 5th/95th and

keywords: Data visualization Charts PDA Key Performance Indicator CATT Lab Probe Data Analytics Transportation Big Data Real-time Traffic

4 Feb 2021 25:27



Probe Data Analytics - Temporal Comparison Maps

Temporal Comparison Maps delivers to users a unique set of functions to visualize and analyze geo-temporal data for key performance indicators across your network. This tool also calculates the change of KPIs across a user-defined set of dates and time ranges.

keywords: Real-time Traffic Big Data Transportation Maps Probe Data Analytics CATT Lab Key Performance Indicator PDA

10 Jan 2021 15:31

Resources, Continued

- Probe Data Analytics Suite tutorials are available [here](#).

ODOT provides annual training each Fall. ODOT leads an Oregon RITIS quarterly user group meeting that is scheduled on the third Tuesday of every March, June, September, and December.

RITIS provides training at the national level through collaboration with the Eastern Transportation Coalition and MATOC. These high-level training webinars only require an active RITIS account. The schedule of these upcoming webinars is located [here](#).



Data Sources

Data Sources

Per our contract, ODOT (and third parties) provide various data for RITIS integration, such as probe-based speed data, road and atmospheric weather data, volume profiles, events and incidents, dynamic message sign messages, first responder radio dispatch, and roadway detector data.

Probe (Speed) Data

Commercial probe data vendors purchase information from mobile phones, connected vehicles, trucks, delivery vans, and other fleet vehicles equipped with GPS telematics devices. The acquired raw data is then aggregated and anonymized. The data provider monitors the movement of the probes as they travel across a stretch of roadway called a segment, or TMC (Traffic Message Channel). The amount of time it takes for the probes to travel across a segment can be used to derive near real-time traffic speeds and travel times that can be archived for look-back analysis and performance reporting. Probe data can cover a much broader roadway network area than traditional ITS point-sensors data collection.

The third-party probe data source that RITIS archives for ODOT is supplied by INRIX. The INRIX data is available starting on 1/1/2016 through present.

ODOT also has access to the National Performance Management Research Data Set (NPMRDS) data, a free data set for the National Highway System from the Federal Highway Administration (FHWA) for federally mandated annual MAP21 Systems Performance Measures (often called PM3) submittal. Within the RITIS platform, users will also see TomTom as a choice for road selection or data selection. Oregon does not subscribe to TomTom data. **For the majority of use case applications conducted by Oregon RITIS users, INRIX data should be selected.**

Table 1: Probe Data Sources

	INRIX	NPMRDS (INRIX)	NPMRDS (HERE)
TMC (5-min bins)	X	X	X
TMC (1-min bins)	X		
XD (1-min bins)	X		
Data Date Range	1/1/2016 to present	1/1/2017 to present	10/1/2011 to 1/31/2017
Vehicle Mix	Combined	PCs, Trucks, Combined	PCs, Trucks, Combined

Data Sources (INRIX)

INRIX TMC and XD Segments

INRIX reports speed data on roadway segments in two systems of roadway network segmentation: TMC segments and eXtreme Definition (XD) segments. TMC is a unique 9-digit value identifying the TMC segment while XD is a unique 10-digit value identifying the XD segment. INRIX XD segments cover more miles of road than TMC segments, most often with finer spatial granularity, and with the ability to adapt more quickly to changes in the road network and the addition of new roads and new markets. Generally, XD segments are less than a mile long. In urban central business districts they can be as short as a few tenths of a mile. ***Whenever given the data choice between INRIX TMC and INRIX XD, users should select XD for greater network coverage and granularity. Also, some graphical outputs in which incident/event data is shown alongside congestion data, we've noticed that the incident/event data shows up more precisely when INRIX XD is selected.***

INRIX updates its proprietary XD segment map in the spring of each year, typically in March or April. Immediately following each INRIX map update release, RITIS updates the base map and segment metadata in the Probe Data Analytics (PDA) Suite to the most recent map version. While most of the XD segments remain unchanged between map updates, there are XD

segments added, removed, and replaced in each map update that may impact the study network.

For ongoing multi-year data monitoring efforts, when downloading INRIX speed data from RITIS using the Massive Data Downloader Tool, it is important to check that the map version and the data are compatible at the time of download. If a map update impacts the study segments, all previously downloaded historical data should be re-downloaded from RITIS to ensure they match the same network map version.

INRIX Speed Data Cap

INRIX caps its speed data, with different caps based on functional road class and geography. They work to create caps that ensure inaccurate data is not included in speed generation and to ensure the most accurate speed provision. The speed cap for Functional Road Classes 1 (national highway) and 2 (state highway) is 85mph. Lower road classes are capped at lower speeds.

Data Sources (INRIX, Continued)

INRIX Major Data Changes

In May 2019, INRIX had a significant increase in its passenger vehicle data sources. Roads most affected were those previously had less coverage (e.g., lower volume roads). This resulted in more data points and improved quality.

On September 1, 2020, INRIX implemented an algorithmic change to how it creates its data. Again, roads most affected were those previously had less coverage. This was done in order to improve the quality and also increase stability on roads that have stop-and-go traffic.

When conducting year-over-year data monitoring or before-after analysis on lower class facilities or lower volume rural facilities, it is important to keep in mind these two major data changes. When applicable, it is best to select INRIX data from September 2020 going forward.

INRIX Data License Terms

All users should be aware of and adhere to the INRIX data license terms located in [Appendix A](#). ODOT makes an annual payment to RITIS for the use of their data integration platform. We also make an annual payment to license the INRIX data for the geographic area that covers all of Oregon and Clark County, WA.

Data Sources (NPMRDS)

NPMRDS

The National Performance Management Research Data Set (NPMRDS) is a free vehicle probe-based travel time data set funded by the Federal Highway Administration (FHWA) for use in various performance measurement programs, such as the federally mandated PM3 reporting, Freight Performance Measures, Urban Congestion Report, and other programs. The NPMRDS is provided to state departments of transportation (DOTs) and metropolitan planning organizations (MPOs) for their performance management activities.

The NPMRDS is an archived speed and travel time data set (including associated location referencing data) that covers the National Highway System (NHS) and additional roadways near 26 key border crossings with Canada (20 crossings) and Mexico (6 crossings).

FHWA-specified Data Set	Commercial Data Set
NPMRDS Data	Speed Data Purchased by ODOT from INRIX
Free	ODOT purchases
Speed data provided at 5-minute intervals	Speed data provided at 1-minute intervals
Not real-time. Updated weekly with a 10-day lag	Real-time. Updated every minute of every day.
Spatial coverage is limited to TMC segments on the National Highway System (NHS)	Spatial coverage covers NHS and non-NHS roadways in both TMC segments and XD segments which are usually shorter in length than TMC segments
Does not use imputed data. Probes must be present for a measurement to be provided. This leads to 'null' values being provided when probes are not present on a segment during a 5-minute epoch.	Can include imputed data based on upstream or downstream data, historic values, or predictions based on complex methodologies.
Provides speed data by: <ul style="list-style-type: none"> Passenger vehicles only Trucks only Combined trucks and passenger vehicles 	Provides only one data set that blends trucks and passenger vehicle speeds

There are several key differences between the FHWA specified NPMRDS data set and the commercial data set from the same vendor.

Data Sources (NPMRDS, Continued)

Three datasets are available as part of the NPMRDS that include speeds and travel times at 5-minute intervals on over 400,000 TMC segments:

- Passenger vehicles
- Trucks
- Trucks and Passenger vehicles combined

The NPMRDS is updated and released weekly where a week is defined as Monday to Sunday. Data for any given data week is released within 10 days of the close of that particular week. For example, NPMRDS probe data collected from March 13, 2023 to March 19, 2023 would be available for download on or around March 29, 2023.

NPMRDS data from 2011 through January 31, 2017 were provided by HERE. Data from January 1, 2017 to present are provided by a team consisting of the CATT Lab at the University of Maryland (UMD), INRIX, the Texas A&M Transportation Institute (TTI), KMJ Consulting, and 1spatial - collectively referred to as the UMD team.

The older NPMRDS data provided by HERE did not fully conform to NHS network specifications. When FHWA rebid the NPMRDS contract, they included more specific requirements that led to a more uniform and workable dataset.

The following list highlights some of the new features available in the UMD team's version of the NPMRDS that is available from Jan 1, 2017 through present:

- Uses path-processing which results in higher data quality and coverage
- Includes a sample size indicator for each vehicle type which specifies the number of reporting devices contributing to the speed and travel time record
- Includes epochs filled with nulls for better data management
- Is available weekly within 10 business days after the end of each week

Data Sources (NPMRDS, Continued)

- Adheres to the following monthly data completeness commitments:
 - Interstate Truck Coverage - Total: 65%
 - Interstate Truck Coverage - Peak (M-F, 6a-8p): 75%
 - Interstate All-Vehicles - Total: 80%
 - Interstate All-Vehicles - Peak: 85%

 - Non-Interstate All Vehicles - Total: 30%
 - Non-Interstate All Vehicles - Peak: 40%
- Contains TMC Path and Highway Performance Monitoring System (HPMS) Segment Conflation which supports federally mandated performance reporting
- Includes separate travel times on internal and external TMC paths
- Includes new fields including UTC timestamps and data density for all vehicle types

Data Sources (ODOT)

ODOT Incident and Detector Data

ODOT provides RITIS with a direct feed of data collected on our system and these sources are listed in Table 2.

RITIS incorporates these data to display real-time information in several tools found under the Transportation Systems Status tab. These data are archived by RITIS and are available in the tools found under the Data Archive tab including the Probe Data Analytics Suite.

Unlike ODOT's official crash data, incident data in RITIS are operations data from ODOT dispatch centers across Oregon and are of the type used for traveler information; events are recorded in real time and are not researched or validated.

Table 2 shows some of the feeds available via the ODOT API.

(Click on the hyperlinks under Resource in the table to see more info)

Table 2: TripCheck API Data Resources

Resource	Description
CCTV Inventory	The CCTV Inventory data feed provides an inventory of all available cameras currently displayed on TripCheck, along with an Internet URL that can be used to access the specific still camera image. Cameras may be ODOT owned and maintained or owned and maintained by a partner agency.
DMS Status	Statewide Dynamic Message Sign (DMS) returns current message data for active signs in the State of Oregon.
Incidents	Current traffic incidents that are being reported on State Highways by ODOT – e.g. crashes, planned closures, and construction zones.
RWIS Status	Weather data from automated Weather stations along state highways (e.g. Air Temperature, Surface Temperature, wind speed, etc.) Note: not all stations can measure all types of weather factors.
Traffic Detector: Inventory	Name and location of traffic detector stations and highway ramps associated with them.
Traffic Detector: Roadway Data	Roadway traffic detectors collecting volume, occupancy, and speed data from select roadways located in Oregon.
Traffic Detector: Ramp Data	Highway ramp data such as ramp occupancy, volume, and metering rate collected by ODOT Central Ramp Metering System for select ramps located in Oregon.
WZDx Activities	Work zone related activities occurring throughout the State of Oregon formatted according to the WZDx standard created by the FHWA and USDOT.

Data Sources (Waze, Weather)

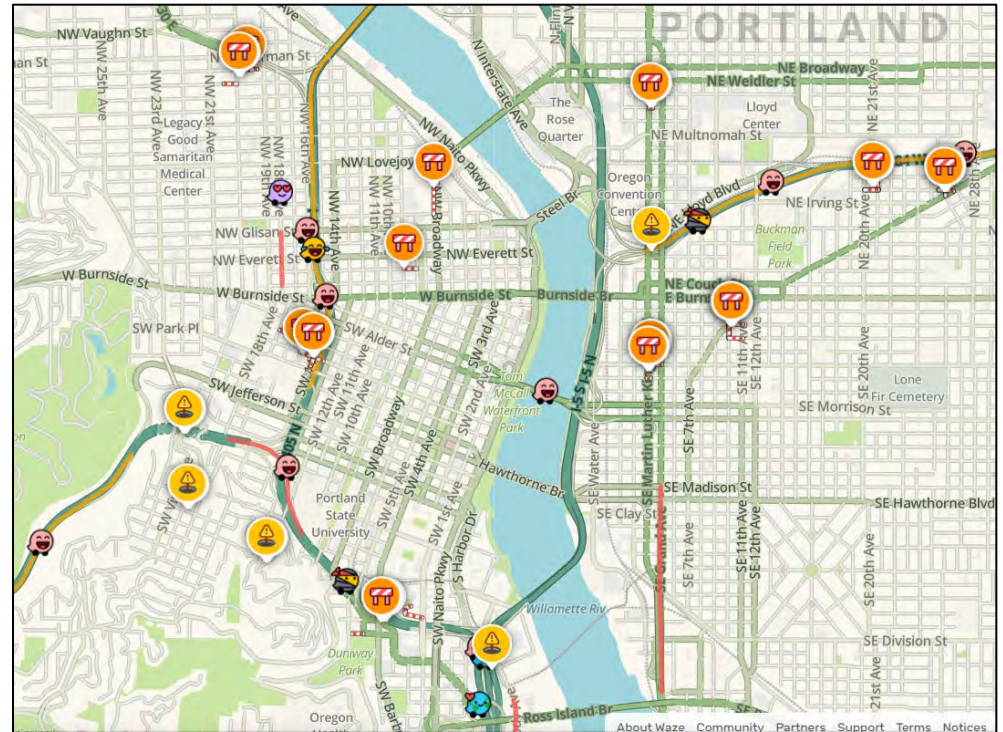
Waze

Waze is a GPS-based smart phone app that allows users to report current traffic conditions.

Waze is one of the largest "crowd sourced" traffic applications on the market. Adding Waze data to our authoritative data helps provide real time conditions and supplements information in areas where we don't have devices on the road.

Waze provides RITIS with a copy of their data for the entire state of Oregon. Currently Waze data is concentrated primarily in the Portland Metro area (because that is where the "Wazer's" are).

As Waze continues to gain new users throughout the state, there is a potential to increase coverage in cities and towns throughout the state.



Weather

The road weather data fed into RITIS is from [FHWA's Weather Data Environment portal](#).

RITIS loads weather alerts from the National Weather Service's and also displays real-time weather radar data from NOAA.

These data are fused and mapped to all TMC segments to create a nation-wide road weather data layer that is archived.

Volumes, Value of Time

Volumes

A common misunderstanding is that there are counts directly associated with the probe speed data. This is not true. Data points that make up probe speed data represent a fraction of the vehicles on the roadway and provide acceptable speed data but not count data. There are many third-party vendors currently providing count estimates developed from machine learning models using probe data. ODOT continues to track this advancement but at this time has not found this data to be an acceptable substitute for counts.

Traffic volume data are needed for certain performance measure calculations that account for system users, such as vehicle hour delay (VHD) and user delay cost (UDC). Since there are no direct counts associated with the probe speed data, volume profiles are ingested into RITIS to be used in these calculations where volumes are needed. Volume profiles are available representative volume set of each roadway segment and are static, meaning they do not change with changing traffic conditions (i.e., 5:30pm for last Tuesday, this Tuesday and next Tuesday will have the same volume). There are currently two sources of volume profiles, one provided by ODOT and one provided by INRIX.

Volume Profile Data

ODOT Volumes ODOT submits to RITIS on an annual basis the volume profile for the NHS network in the data format specified by RITIS [here](#).

INRIX Volumes INRIX provides an annual INRIX volume profile set to RITIS. For each segment, there is a volume associated with each 15-minute increment of each day of the week. This data set is traffic volume estimates derived from scaled probe data and not actual counts.

Value of Time

To help quantify the user cost of delays, ODOT produced a Value of Travel Time document which focuses on highway users and provides an estimate of the value of travel-time in Oregon for three vehicle categories: automobiles/light trucks, delivery/medium trucks, and heavy trucks.

Table 3: Estimated Value of One Hour of Travel-Time by Vehicle Class, Oregon 2017

Vehicle Class	Average Value
Auto/Light Truck	\$26.44
Delivery/Med. Trucks	\$31.89
Heavy Trucks	\$33.24

The User Delay Cost Analysis module (discussed later in this handbook), requires cost input for passenger vehicles and commercial vehicles. Oregon users should input \$27 and \$33, respectively.



Regional Integrated Transportation Information System (RITIS)

RITIS Portal

After [logging into your RITIS account](#), you will land on the Incident List page under the Transportation System Status tab. Other dashboards under this tab that are important to Oregon include Traffic Map, Incident Overview & Work Zones (WZPMA).

These dashboards contain interactive tabular and graphical displays of various data on Oregon's roadway network and are most useful for operations personnel who are monitoring the roadway system:

Incident List – scroll through an up-to-date list of incident locations to help monitor and manage incidents on the roadway network.

Traffic Map – select up to 17 interactive layers of data on a map that provides comprehensive situational awareness in the state.

Incident Overview – combines Incident List and Traffic Map for greater flexibility in locating and evaluating incidents.

The other main tabs - Data Archive and Personal Traffic Alerts – are discussed later.

(**NOTE:** due to the goal to release this Handbook in a timely manner, lower priority analytics tools are not covered in this first edition - they will be included in future updates. A RITIS 101 tutorial video is located [here](#).)

RITIS Portal (Transportation System Status – Incident List)

A-Z List Sort
(Click a heading to sort on that column's content).

Interface Controls
(Show map location, join event chat, upload media).

Full Screen, Chat, Day/Night Mode

Set Incident Filters

Set Region of Interest

See More
(Click a down arrow to see more event detail).

State	Source	Location	Type	Updated	Start Time	Lane Status	Event Details
OR	WAZE	I-5 I-5	Disabled Vehicle	4 mins ago	06/08/23 04:27 PM	—	Hazard on shoulder car stopped at I-5 S
OR	WAZE	I-5 I-5	Disabled Vehicle	4 mins ago	06/08/23 04:18 PM	—	Hazard on shoulder car stopped at I-5 S
OR	WAZE	I-5 I-5	Disabled Vehicle	5 mins ago	06/08/23 04:06 PM	—	Hazard on shoulder car stopped at I-5 S
OR	WAZE	I-5 I-5	Disabled Vehicle	5 mins ago	06/08/23 04:24 PM	—	Hazard on shoulder car stopped at I-5 N
OR	WAZE	I-84 I-84	Disabled Vehicle	6 mins ago	06/08/23 03:44 PM	—	Hazard on shoulder car stopped at I-84 E
OR	WAZE	SE MCLOUGHLIN BLVD	Disabled Vehicle	6 mins ago	06/08/23 03:36 PM	—	Hazard on shoulder car stopped at SE McLoughlin Blvd
OR	WAZE	I-5 I-5	Disabled Vehicle	6 mins ago	06/08/23 04:05 PM	—	Hazard on shoulder car stopped at I-5 S
OR	WAZE	I-205 I-205	Disabled Vehicle	7 mins ago	06/08/23 04:18 PM	—	Hazard on shoulder car stopped at I-205 S
OR	WAZE	OR-22 OR-22	Disabled Vehicle	7 mins ago	06/08/23 03:57 PM	—	Hazard on shoulder car stopped at OR-22 E
OR	HERE	Nw Countryview Way in Washington County	Weather Condition	7 mins ago	06/08/23 03:57 PM	—	Slippery Road in Washington County
OR	HERE	Nw Countryview Way in Washington County	Weather Condition	7 mins ago	06/08/23 03:57 PM	—	Slippery Road in Washington County
OR	WAZE	I-5 I-5	Disabled Vehicle	8 mins ago	06/08/23 03:57 PM	—	Hazard on road car stopped at I-5 S
OR	WAZE	I-84 I-84	Obstructions	8 mins ago	06/08/23 03:57 PM	—	Hazard on shoulder at I-84 W
OR	WAZE	JENKINS RD	Incident	9 mins ago	06/08/23 03:57 PM	—	Accident at SW Jenkins Rd
ID	INRIX	Five Mile Rd both ways	Construction Work	9 mins ago	06/08/23 06:20 AM	—	Road closed due to construction work on Five Mile Rd
ID	INRIX	Shannon Dr Westbound	Construction Work	9 mins ago	06/08/23 06:00 AM	—	Road closed due to construction work on Shannon Dr
ID	INRIX	Reed St both ways	Construction Work	9 mins ago	05/26/23 11:59 AM	—	Road closed due to construction work on Reed St
ID	INRIX	Osage St both ways	Construction Work	9 mins ago	05/26/23 11:57 AM	—	Road closed due to construction work on Osage St

1 - 100 incidents (of 587 incidents)

© 2008 - 2023 University of Maryland CATT Lab - [Contact Us](#) - [Release Notes](#)

Last Updated: 06/08/2023 - 4:34 PM

RITIS Portal (Transportation System Status – Traffic Map)

The screenshot shows the RITIS Portal Traffic Map interface. The main map displays a network of roads with various colored overlays representing traffic conditions, incidents, and weather. Several callout boxes provide detailed information about these elements:

- Situational Awareness:** A blue box at the top center states, "Click on any icon or roadway segment for additional data, most at or near real-time".
- Weather/Time Zone:** A yellow box on the left explains, "Current and forecasted weather conditions – rain, snow, temp; select time zone".
- Zoom Controls:** A yellow box on the left describes, "In, Out, Specific Area, My Location, Default View".
- Imagery:** A yellow box on the left notes, "Toggle between Map and Hi-Res Satellite backgrounds".
- Legend:** A yellow box at the bottom center lists, "Agency-related Incidents, Waze Incidents, NWS Alerts, and more".
- Detectors:** A blue box shows a graph for "Unknown on US20 @ Fischer Rd WB" with a red bar indicating a "Rain, Wind-Driven, Intermittent Event".
- Work Zones:** A blue box displays "Construction Work reported by GDOT (Oregon)" on "15 southbound" in Multnomah County, Oregon, with event details and a media link.
- Speeds:** A blue box shows "SR14X PROBE DATA" for "I-205 S(I-205) Southbound @ US-30 BUS...", including a graph of speed and a confidence score.
- Incidents:** A blue box shows an incident "Disabled On Shoulder" on "I-5" in Washington County, Oregon, with event details and a chat room link.
- General Controls:** A yellow box at the top right lists "Options, Video Tutorials, Log Out".
- Interface Controls:** A yellow box below it lists "Filters, Full Screen, Chat, Night/Day Screen Colors".
- RWIS:** A blue box shows "Weather station for SR14 @ Cape Horn" with temperature, road surface status (Dry), and visibility data.
- Layer List:** A yellow box on the right lists 17 interactive data layers and sub-layers, including "Future Events", "Incidents and Events", "Traffic Message Signs", "Traffic Detectors", "Traffic Cameras", "RWIS", "Radio Scanners", "FITM Plans", "Montgomery County", "Evacuation Support", "Public Transportation", "Fleets", "Points of Interest", "Weather Alerts", "Metro Routes", "Road Weather Data", "Probe Speed Data", and "Weather Radar".
- Support/Release Notes:** A yellow box at the bottom center encourages users to "Contact the Support Team, see the latest improvements".

To see a video tutorial on how to use Traffic Map, click [here](#).

RITIS Portal (Transportation System Status – Incident Overview)

Click on an event in the list; the map will automatically center on the event and display more detail.

Traffic Congestion reported by INRIX
US-26 Eastbound
Multnomah County, Oregon

-Delays
-Traffic Congestion

Started: 6/8/2023 4:12 PM
Updated: 6/8/2023 5:00 PM
[Join Incident Chat Room](#)

Event Details
Delays of six minutes and delays increasing on US-26 Eastbound between Exits 69A,69B OR-217 and Exit 74 I-405 Exits 1B,1C,1D. Average speed 20 mph.

Media
[Add File/Link](#)

NOTE: Traffic Cameras, RSS Feed, Operations Dashboard (COP), Covid-19 Impact and VWS tools under Transportation System Status do not have much content of interest to Oregon users at this time. However, more information about Covid-19 can be found [here](#). Information on the Work Zone dashboard tool (WZPMA) will be presented later in this handbook.

RITIS Portal (Imagery, Weather, Screen Modes)

Satellite high-resolution imagery gives users significant detail of roadway features and surrounding land use.

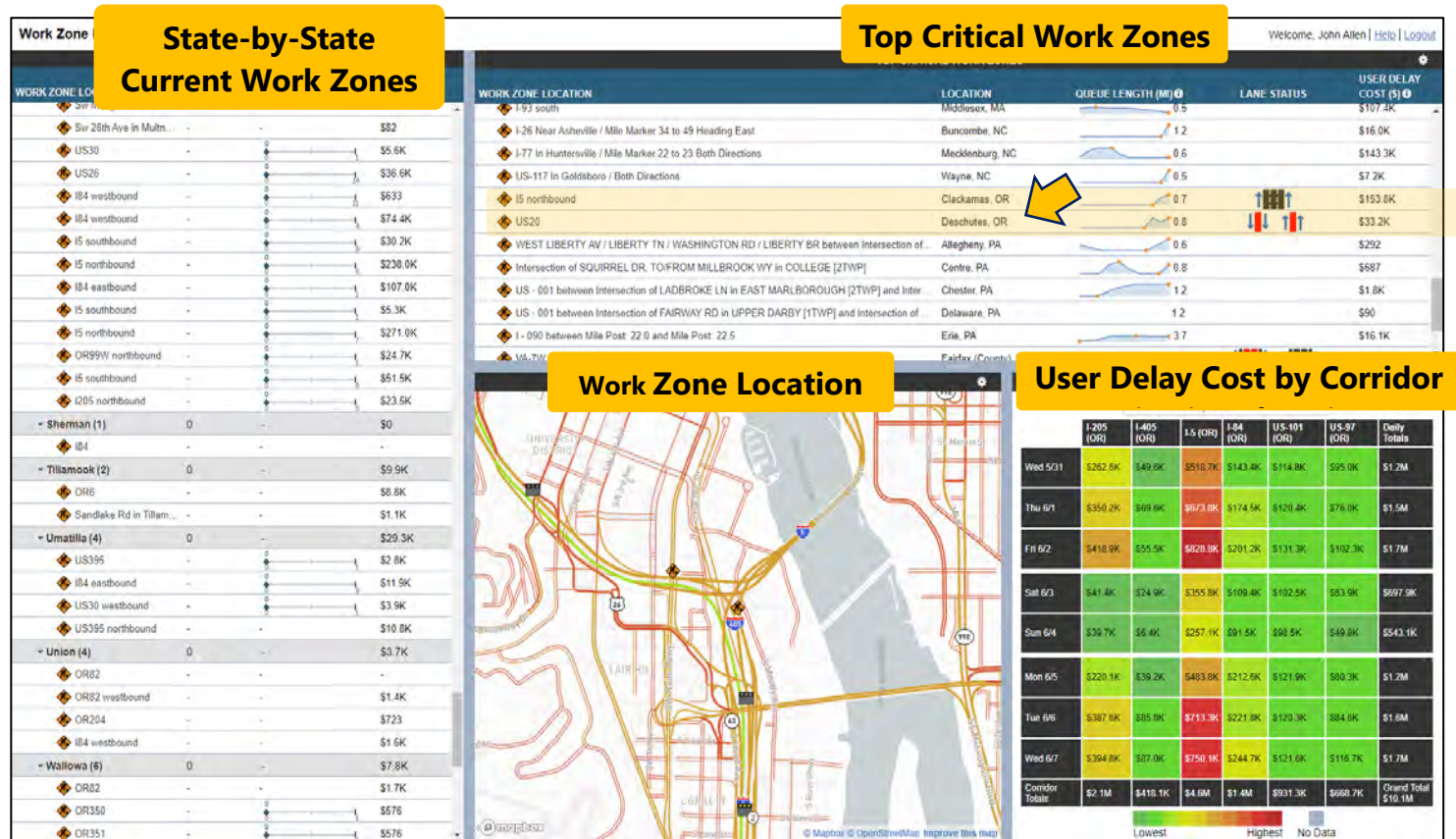
Several weather layer options allow for better planning, monitoring and management of traffic during major weather events.

Two screen modes (day/night colors) provide flexibility for viewing in bright or low-light ambient conditions.



RITIS Portal (Work Zone Performance Monitoring Application)

The Work Zone Dashboard or WZPMA is a real-time performance monitoring tool for work zones, using vehicle probe data and active work zone information. There are two distinct dashboards – a State-by State dashboard (*shown here*) and an Individual Work Zone Profile Dashboard.



(NOTE: this dashboard is a Beta Version and, while still useful for monitoring work zones, is subject to substantial changes in the future. The user delay costs on this dashboard should be used for comparison purposes only, since the calculation is not customizable with ODOT value of time for vehicular delay)

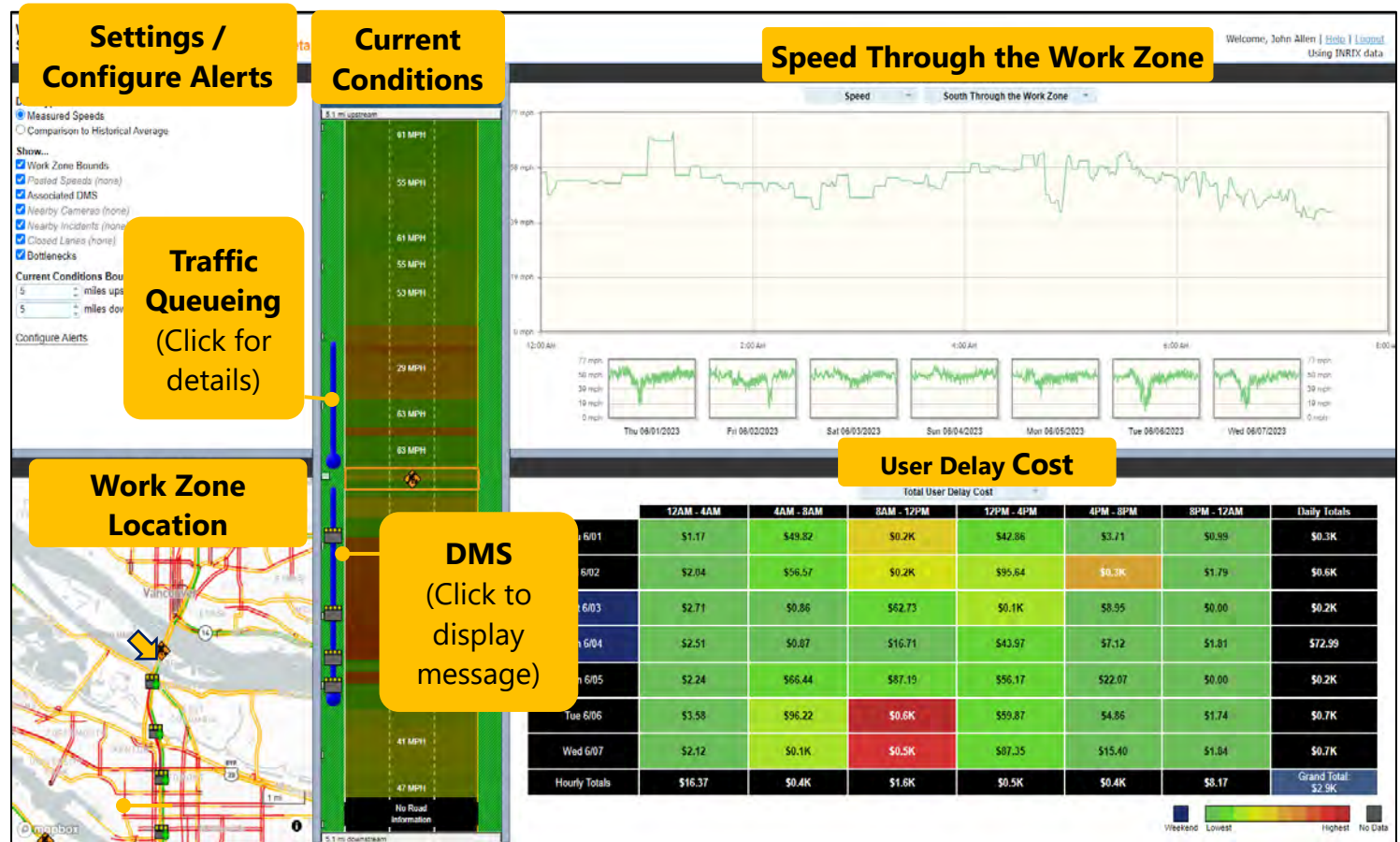
A reference guide for WZPMA is available [here](#). A video tutorial is available [here](#).

RITIS Portal (Individual Work Zone Profile)

The Individual Work Zone Profile Dashboard consists of five separate widgets that help monitor and manage a work zone:

- Settings/Configure Alerts
- Work Zone Location
- Current Conditions
- Speed Through the Work Zone, plus:
 - Queue Length
 - Travel Time
- User Delay Cost

As traffic conditions change, the Current Conditions graphic will update, showing speed variations upstream and downstream from the work zone, and any queuing that is occurring. If Dynamic Message Sign (DMS) data is provided, clicking on the DMS icon will show the current message.



(NOTE: this dashboard is a Beta Version and, while still useful for monitoring work zones, is subject to substantial changes in the future. The user delay costs on this dashboard should be used for comparison purposes only, since the calculation is not customizable with ODOT value of time for vehicular delay)

Hovering over the Speed graph will highlight the location with a green dot and line, to show speeds and time along the graph. The green dot will also display along the bottom charts for each of those days for comparative purposes.

Data Archive (Event Query Tool)

The **Data Archive** tab contains links to tools that work with historic or archived data. For ODOT, this tab has five main tools:

- Event Query Tool
- Detector Tools
- Congestion Causes Analytics
- Probe Data Analytics
- NPMRDS Analytics

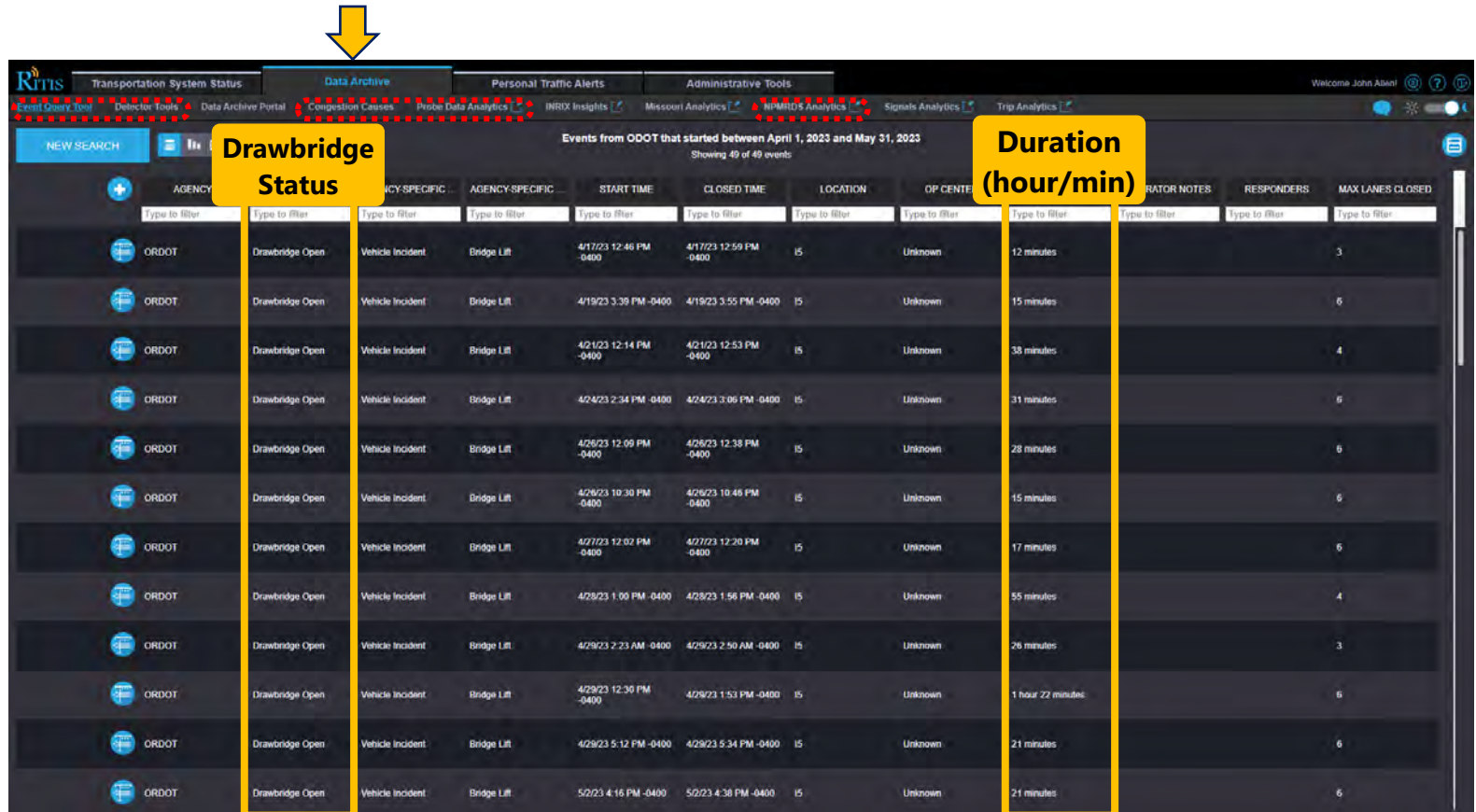
Event Query Tool

(EQT) allows users to query events and incidents and organize and display them in a number of ways.

As an example, if a

user wants to know how many bridge lifts took place on the I-5 Interstate Bridge within a certain date range, they could use this tool to attain a list which includes the date and duration of each bridge lift.

A tutorial video on the Event Query Tool is located [here](#).



The screenshot shows the Data Archive portal interface. A yellow arrow points to the 'Data Archive' tab. The table displays events from ODOT starting between April 1, 2023, and May 31, 2023. Two yellow boxes highlight the 'Drawbridge Status' and 'Duration (hour/min)' columns.

AGENCY	AGENCY-SPECIFIC	AGENCY-SPECIFIC	START TIME	CLOSED TIME	LOCATION	OP CENTE	Duration (hour/min)	RATOR NOTES	RESPONDERS	MAX LANES CLOSED
ORDOT	Drawbridge Open	Vehicle Incident	4/17/23 12:46 PM -0400	4/17/23 12:59 PM -0400	I5	Unknown	12 minutes			3
ORDOT	Drawbridge Open	Vehicle Incident	4/19/23 3:39 PM -0400	4/19/23 3:55 PM -0400	I5	Unknown	15 minutes			6
ORDOT	Drawbridge Open	Vehicle Incident	4/21/23 12:14 PM -0400	4/21/23 12:53 PM -0400	I5	Unknown	38 minutes			4
ORDOT	Drawbridge Open	Vehicle Incident	4/24/23 2:34 PM -0400	4/24/23 3:06 PM -0400	I5	Unknown	31 minutes			6
ORDOT	Drawbridge Open	Vehicle Incident	4/26/23 12:09 PM -0400	4/26/23 12:38 PM -0400	I5	Unknown	28 minutes			6
ORDOT	Drawbridge Open	Vehicle Incident	4/26/23 10:30 PM -0400	4/26/23 10:46 PM -0400	I5	Unknown	15 minutes			6
ORDOT	Drawbridge Open	Vehicle Incident	4/27/23 12:02 PM -0400	4/27/23 12:20 PM -0400	I5	Unknown	17 minutes			6
ORDOT	Drawbridge Open	Vehicle Incident	4/28/23 1:00 PM -0400	4/28/23 1:56 PM -0400	I5	Unknown	55 minutes			4
ORDOT	Drawbridge Open	Vehicle Incident	4/29/23 2:23 AM -0400	4/29/23 2:50 AM -0400	I5	Unknown	26 minutes			3
ORDOT	Drawbridge Open	Vehicle Incident	4/29/23 12:30 PM -0400	4/29/23 1:53 PM -0400	I5	Unknown	1 hour 22 minutes			6
ORDOT	Drawbridge Open	Vehicle Incident	4/29/23 5:12 PM -0400	4/29/23 5:34 PM -0400	I5	Unknown	21 minutes			6
ORDOT	Drawbridge Open	Vehicle Incident	5/2/23 4:16 PM -0400	5/2/23 4:38 PM -0400	I5	Unknown	21 minutes			6

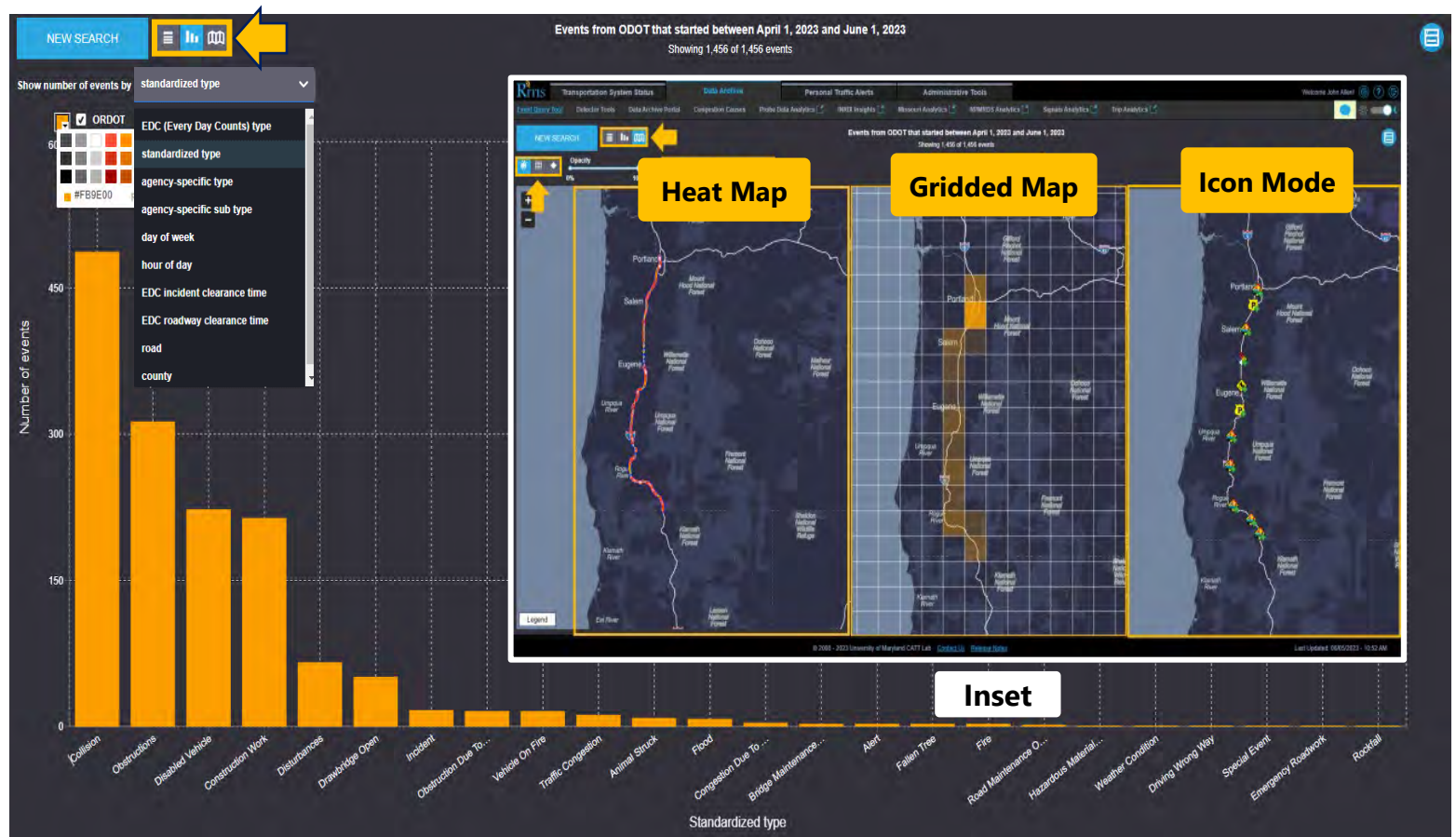
Data Archive (Event Query Tool)

In addition to **EQT's** table results, this tool allows for two other results summary modes:

- Bar Chart
- View Event on Map

Displayed on the right is a bar chart depicting events that occurred in Oregon from April 1, 2023, to June 1, 2023, broken down by standardized event types.

There are nine display types for showing the results, as well as full color control.



Selecting View Event on a Map (*inset*) defaults to a **Heat Map** view with colors based on density of events. There are two other viewing choices:

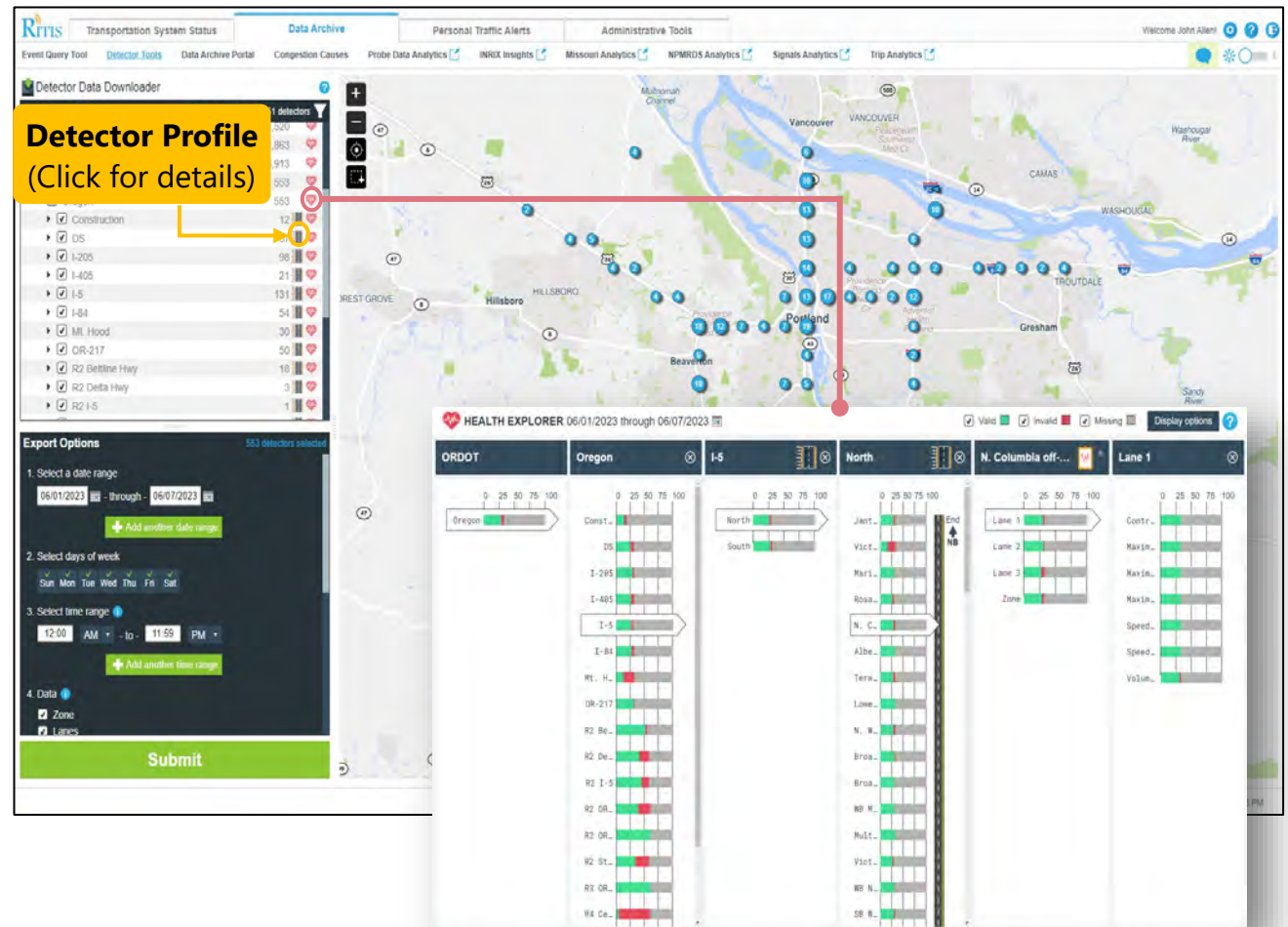
- **Gridded Map** – a grid is drawn over the map, colored to the number of events within it. Hovering over the colored boxes will display the total number of events.
- **Icon Mode** – displays events as icons; clicking on an event icon will show additional detail.

Data Archive (Detector Tools)

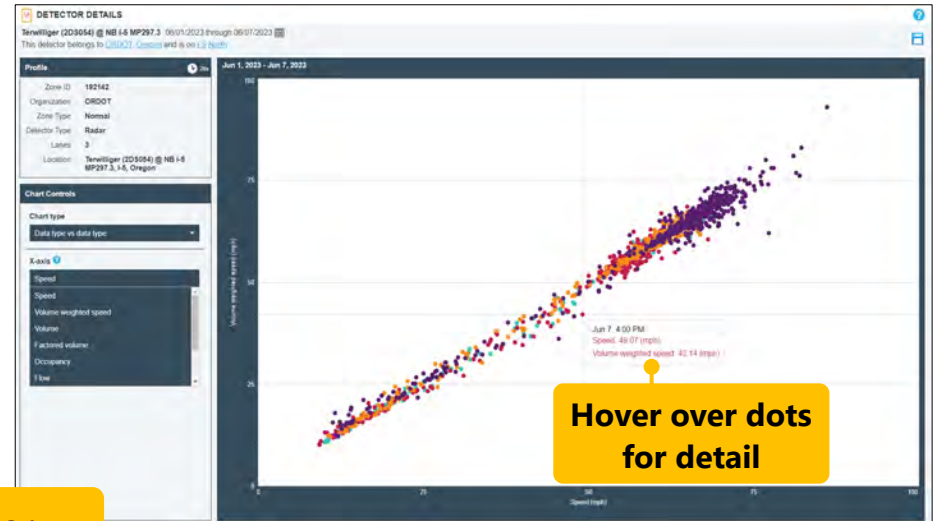
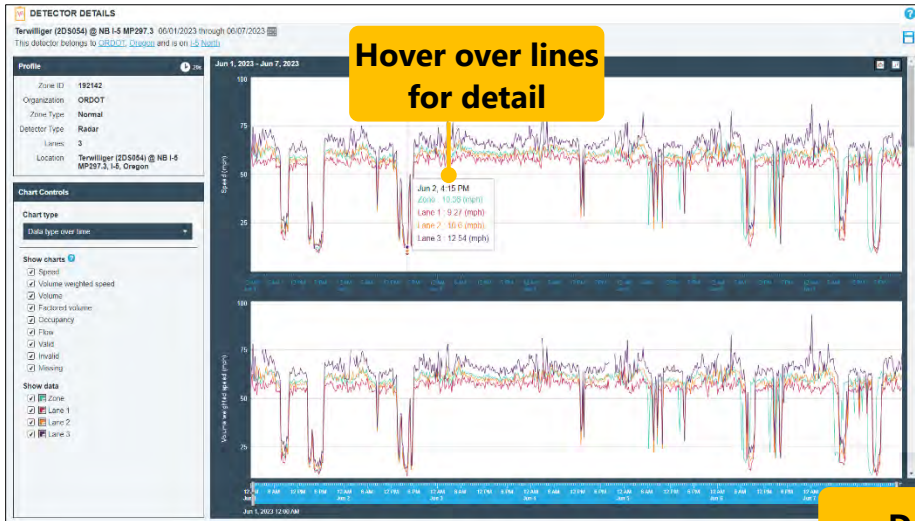
ODOT has roadway detector data, described earlier in the Data Sources section. This tool allows users to select down to the individual detector location (example: Barnes (2R3355) to WB US 26 Frontage). A detector or multiple detectors can be selected, and the date range specified. The query results are multiple excel files, one for each lane with speed and volume data. For users who are familiar with the [PORTAL](#), this is the same detector data feed that goes into that data archive website.

In addition to raw data exports, Detector Tools also lets you examine data via the Road Profile, Detector Profile and Detector Health Explorer. These tools allow users to analyze the data of individual detectors or detector locations with a visual interface.

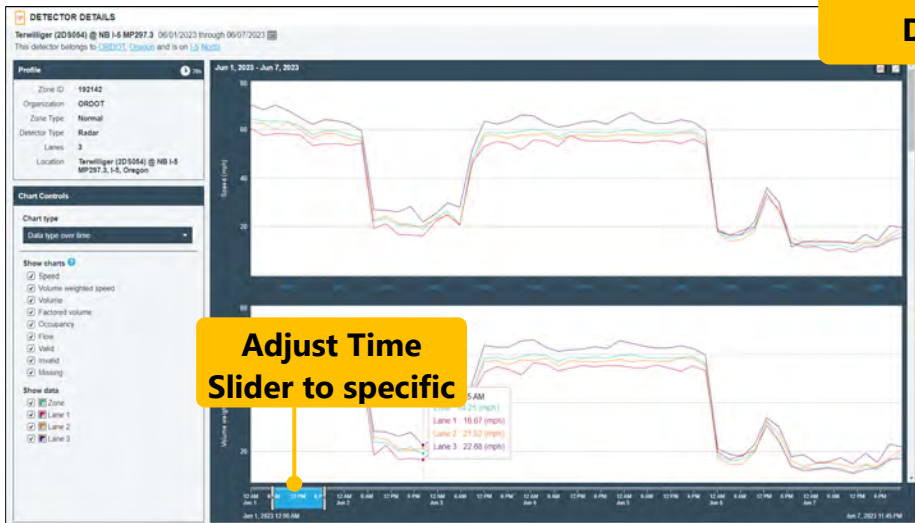
The Detector Profile for an individual detector can be accessed by clicking the yellow chart icon next to the detector in question (*see next page*). The Detector Health Explorer for a detector can be opened by clicking the heart icon.



Data Archive (Detector Tools)



**Detector
Details**



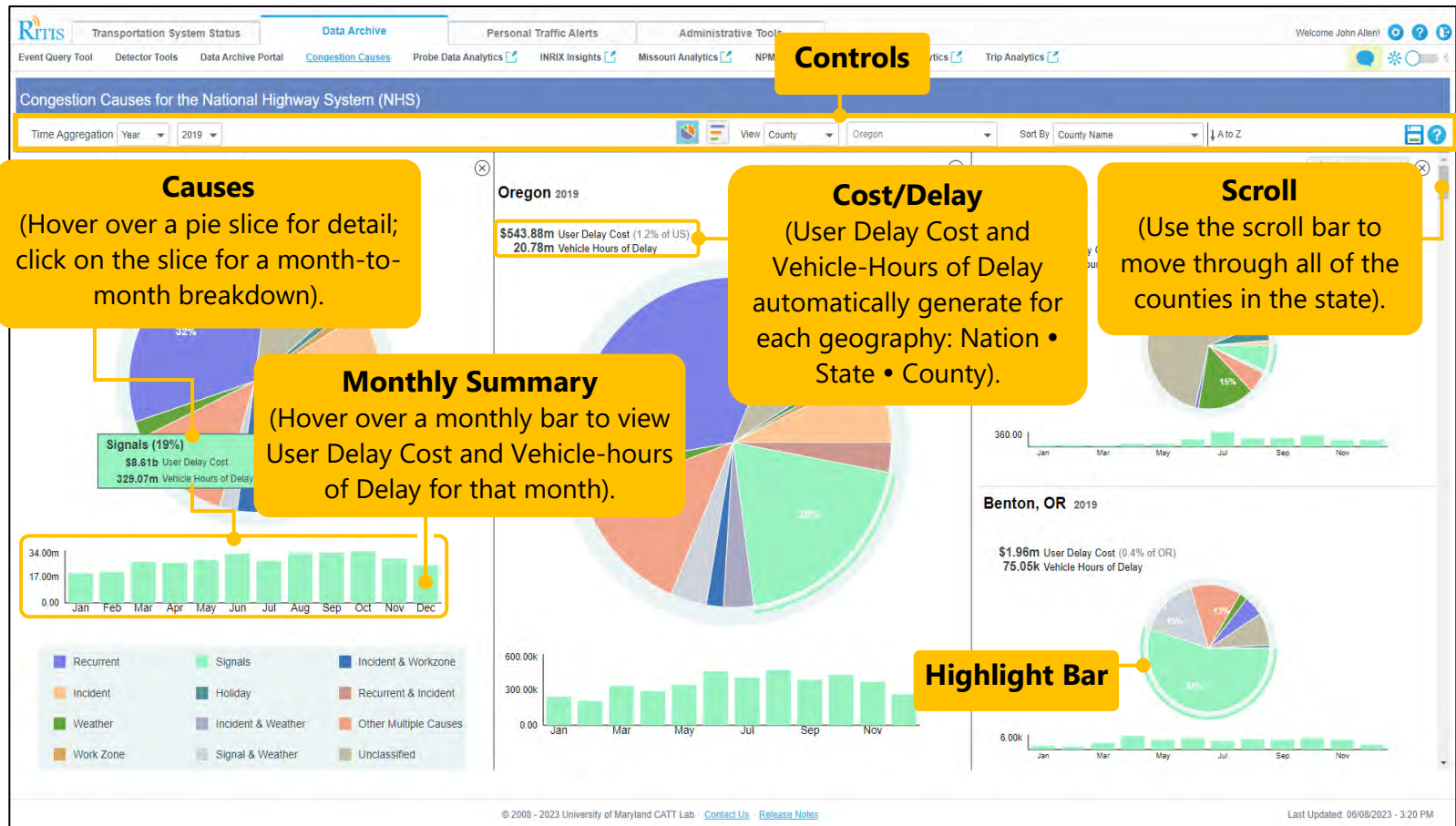
Data Archive (Congestion Causes)

This page displays the Congestion Causes Dashboard based on year 2019 data (and only Waze data as the Incident/Event tool) for the NHS in every state.

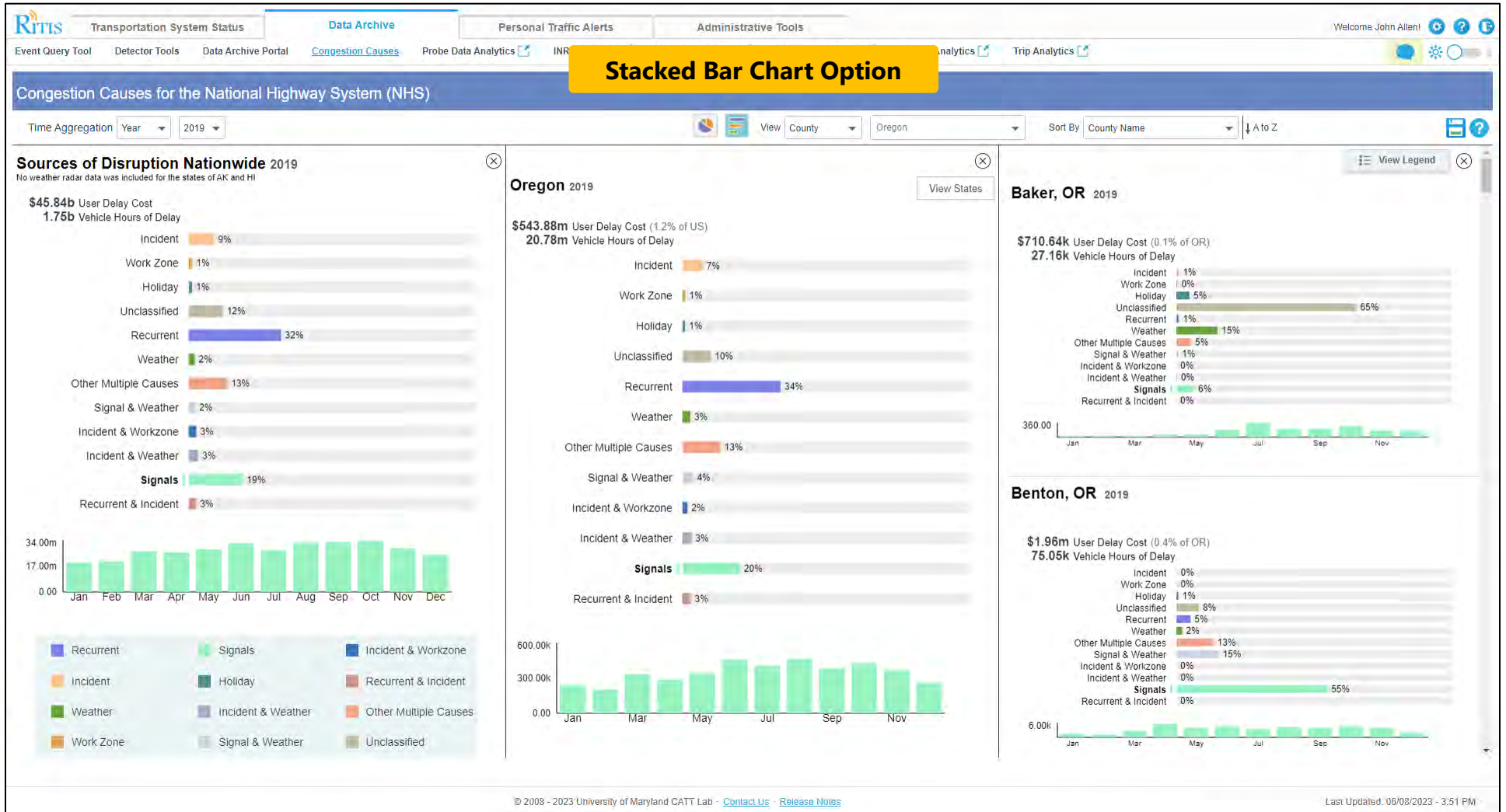
In addition to the Nationwide average, the Statewide average, and the average for every county in Oregon are also shown.

Users can compare high-level causes of congestion between the county of interest to the state average and to the national average. Users can toggle between two display options: pie chart or bar chart.

For detailed help in using this tool, click [here](#).



Data Archive (Congestion Causes)



Personal Traffic Alerts

The Personal Traffic Alert tab allows users to define their route of interest and subscribe to personal incident alerts. Guidance will be provided in a future Handbook update.

The screenshot displays the RITIS (Regional Information Technology Infrastructure System) interface for Personal Traffic Alerts. The top navigation bar includes 'Transportation System Status', 'Data Archive', 'Personal Traffic Alerts' (highlighted), and 'Administrative Tools'. Below this, there are links for 'View Current Subscriptions', 'Subscribe to a New Incident Alert', and 'Subscribe to a New Speed Alert'. A progress bar shows steps from '1. Define Route' to '8. Done!'. The main area is a map of Washington and Oregon with a route highlighted in orange, starting near Seattle and ending near Portland. A yellow arrow points to the 'Personal Traffic Alerts' tab, and another yellow arrow points to a pop-up box titled '1. Build Your Route'. The pop-up box contains the following text: 'Click on the map to start building your route. You must select a starting point and at least one waypoint before you can move to the next step. You can zoom in or out of the map using your mouse scroll wheel or the map controls in the upper right-hand corner of the map. Click "Next Step" when you are comfortable with your route.' Below the text is a 'Jump to State' dropdown menu and a 'Next Step' button. The bottom of the interface shows a 'Satellite' view button and two 'Export (.zip)' buttons.



Probe Data Analytics Suite

Probe Data Analytics Suite

The Probe Data Analytics (PDA) Suite is a set of tools frequently used by agencies to:

- Answer questions
- Inform executives
- Aid management's decision-making process
- Meet a requirement (Federal, State, etc.)

PDA currently has 22 analytics tools. We cover the most frequently used tools in this handbook edition.

To access the PDA Suite tool, users can log in to RITIS and select the "Data Archive" tab, then click on the "Probe Data Analytics" heading. Alternatively, users can go directly [here](#).

Select a tool using any icon on the top left corner or by selecting any tool listed in the main screen. To get back to the home screen, simply select "Probe Data Analytics Suite" on the upper left corner.

The upper right corner has selection options to allow users to access the following:

My History – view a list of the user's PDA-use history. This is a handy feature to help manage all previously run queries in any tool, quickly retrieving any downloads and reports, or open the results in other tools (where applicable). Users can also "star" all of their favorite reports or remove those no longer needed.

Help – view glossaries; tool descriptions, tutorials, and methodology descriptions provided by RITIS.

Tutorials – view brief pre-recorded videos from RITIS which provide guidance on how to use each tool.

Templates – view a compilation of templates created from RITIS to help users prepare a project data analysis story.

Probe Data Analytics Suite

Links

(My History, Help, Tutorials, Templates, Logout).

The screenshot shows the Probe Data Analytics Suite dashboard. At the top, there is a navigation bar with the title 'Probe Data Analytics Suite' and a user greeting 'Welcome, John'. A 'Links' menu is visible in the top right corner, containing 'My History', 'Help', 'Tutorials', 'Templates', and 'Logout'. The main dashboard area is a grid of 18 tool cards, each with an icon, title, description, and links for 'Tutorial', 'Help', and 'History'. A 'What's New' badge is positioned above the 'CORRIDOR SPEED BINS' card. A yellow callout box on the right points to the 'What's New' badge with the text: 'What's New (Click to see the latest updates, features or improvements)'. Another yellow callout box on the left points to the 'Feedback' and 'Support' links in the bottom left corner with the text: 'Need Help? (Click to send Feedback or contact the Support Team)'. A third yellow callout box at the bottom left points to the 'Feedback' and 'Support' links with the text: 'Need to reach out to us? Feedback | Support'.

Need Help?
(Click to send Feedback or contact the Support Team).

What's New
(Click to see the latest updates, features or improvements).

Need to reach out to us? [Feedback](#) | [Support](#)

(NOTE: For understanding of which PDA tool has which underlying data sources and produces which performance measures, see the PDA Tools – Data and PM Matrix [here](#).)

Probe Data Analytics Suite

When you select a tool, PDA will open a query screen, where you'll define your search parameters.

All query screens are structured to have the same look and feel and to be intuitive (though depending on the tool, there could be some variation in the number of steps and input requirements).

In the following example for creating a Performance Chart (next page), the basic steps are:

1. Select a country
2. Select roads
3. Select one or more time periods to analyze
4. Select data sources
5. Select granularity (time range option)
6. Submit (the query parameters)

Generally, each step has three basic ways to select parameters: drop-down menus, check boxes and radio buttons.

There also could be occasions to enter text (such as searching for a specific road), use sliders to define time ranges or click a button, such as to save your roads as a segment set for later use.

Tool tips are also included at various steps along the way, to help you get more information or better understand why a parameter isn't selectable.

Simply hover over or click on the tooltip icon  on the RITIS screen to see more information.

See the following pages for details on selecting roads and time periods.

Probe Data Analytics Suite (Query Screen)

1. Select a country
United States

2. Select roads
TMC segments from INRIX
Road Region Segment codes Map Saved Advanced
Search in Oregon...
Your selected roads
I-205
Directions: Northbound Southbound
Intersections: 21
 Entire Partial
51 miles of roadway selected (82 TMC segments)
Segments from INRIX [Report a problem with this road](#)

3. Select one or more time periods to analyze
Days Months Years
07/11/2022 - through - 07/15/2022
! Add time periods
Remove All
July 14, 2022
July 15, 2022

4. Select data sources
 INRIX
 HERE
 TomTom
 NPMRDS from INRIX (Passenger vehicles)
 NPMRDS from INRIX (Trucks and passenger vehicles)
 NPMRDS from INRIX (Trucks)
 NPMRDS from HERE (Passenger vehicles)
 NPMRDS from HERE (Trucks and passenger vehicles)
 NPMRDS from HERE (Trucks)

5. Select granularity
 1 minute
 5 minutes
 10 minutes
 15 minutes
 1 hour
 Day of week

Submit **SUBMIT** **Satellite**

Map Controls
(Zoom in/out, Center).

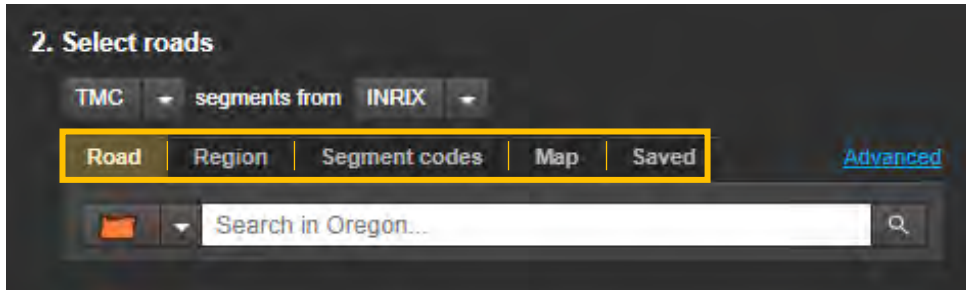
Location Map
(Displays your selected roadways).

Selected Roadway
(Hover over segments for detail, click to remove).

Imagery
(Toggle between Map and Hi-Res Satellite backgrounds).

Map Detail:
Road: I-5
Intersection: OR-34/EXIT 228
Direction: NORTHBOUND
Segment Code: 114-04782
Click the segment for options...

Probe Data Analytics Suite (Selecting Roads)



Select roads

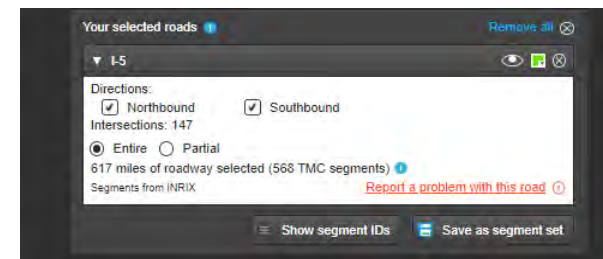
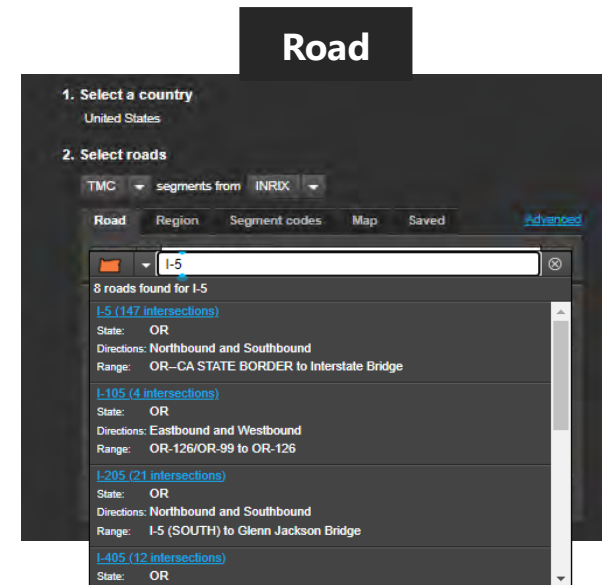
Depending on the tool, there are up to five different ways to select roads in PDA. The most common is to search and select a road under the Road tab, then use the entire length or choose a partial length. Below are summaries for each of the five selection processes. To watch a video tutorial on road selection, click [here](#).

THE FIRST STEP IS TO SELECT THE SEGMENT TYPE AND DATA VENDOR. YOU SHOULD ONLY SELECT TMCs OR XD SEGMENTS (WHEN AVAILABLE) FROM INRIX.

The **Road** tab lets you search for roads by name. If you have access to more than one data source, a dropdown menu is available to let you select which data source you want to search. To narrow down the search, another dropdown menu lets you restrict the search to a specific state.

Once you select a road, a new panel will appear below with further options, and the road will be drawn on the map. You can refine the road by selecting road direction or choose certain portions of the road by selecting "Partial", then use the "From/To" drop downs to refine your section between intersections.

When you are done adding roads to your query and wish to hide the controls, you can close the window by clicking the minimize button (the solid triangle in the upper-left corner); if



Probe Data Analytics Suite (Selecting Roads, Continued)

you need to edit it further, just click again to re-open the editor. You do not need to close the editing window in order for your changes to be applied. All changes you make in this editor will be shown on the preview map.

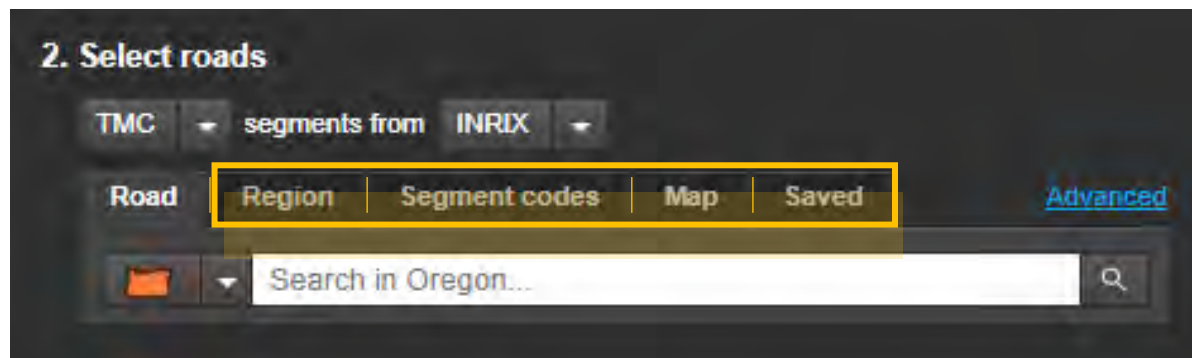
Multiple roads can be added to your selection, and you can remove them by clicking the X (Close) button.

Selections can also be hidden from the map by clicking the eye button. This affects only the drawing on the map; it does not remove your road selection.

The **Advanced** option under the **Road** selection tab allows you to supply more than just the state filter for your initial road search. You can filter down on individual counties, road directions, zip codes, or particular road classes.

Select roads

Other ways to add segments is by using the Region, Segment codes, Map or Saved functions, arranged by tabs, as summarized below. To view the video tutorial on road selection, click [here](#).



Probe Data Analytics Suite (Selecting Roads, Continued)

Region

2. Select roads

TMC segments from INRIX

Road Region Segment codes Map Saved

Regions All

Directions All

Zip Codes Example: 20742, 20904

Road Classes All

+ Add region

The **Region** tab will select all segments with a state, county, or zip code. You can also filter by direction and road class.

Segment Codes

2. Select roads

TMC segments from INRIX

Road Region Segment codes Map Saved

Auto refresh map

Enter your TMC codes as a comma-separated list (e.g. 110+04645,110P04645,110+04646)

+ Add segments

The **Segment Codes** tab lets you enter a list of segment codes (TMCs or XDs).

NOTE: For all selection options, you MUST click on the +Add button after you have made a selections (when the button turns green).

Saved

2. Select roads

TMC segments from INRIX

Road Region Segment codes Map Saved

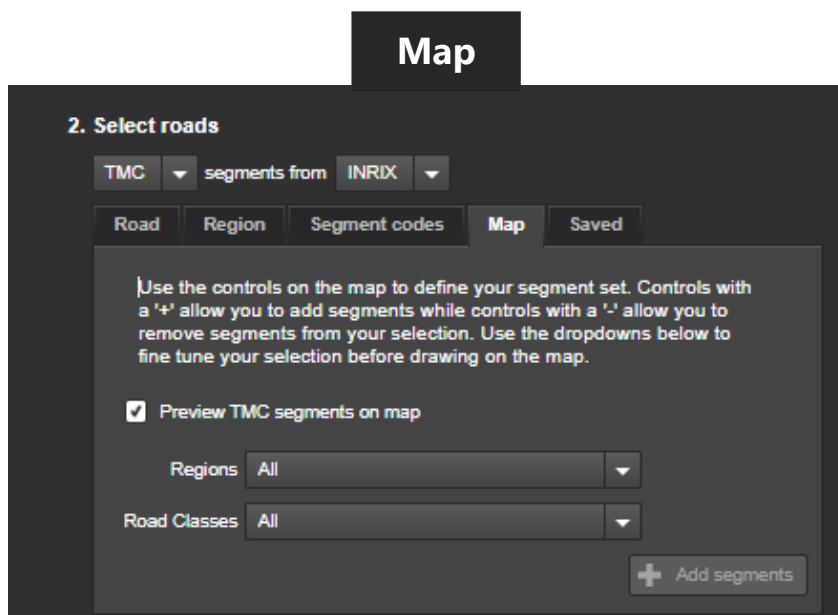
Showing 50 of 462 available segment sets Display Options

Segment set	Segments	Owner
Papal Visit Layer	260	jallen35@umd.edu
Phila to AC (322)	149	jallen35@umd.edu
Kelly's Fire Department Test	4	jallen35@umd.edu
PA Turnpike Closure Travel Times in...	53	jallen35@umd.edu
I-95 at Scudder Falls Bridge (PA/NJ)	26	jallen35@umd.edu
BMC Labor Day	480	jallen35@umd.edu
Papal Visit Layer-Final	468	jallen35@umd.edu

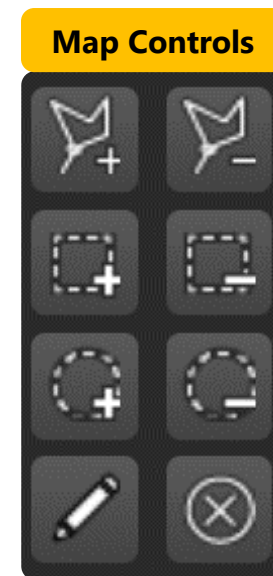
+ Add selected segment sets

The **Saved** tab lets you use a previously saved segment set – scroll through the list, (or use Display Options search filters), click on the desired set and click “Add selected segment set.”

Probe Data Analytics Suite (Selecting Roads, Continued)



The **Map** tab lets you select and exclude segment codes by drawing shapes directly on the map. You can draw, edit, and delete any combination of rectangles, circles, and complex polygons. You can filter the segment codes in your selection by state and road class using the dropdowns. When you have made your selection, click the green "Add segments" button and the segment codes within your shapes will be added as a list of raw segment codes.



Use the controls on the map to define your segment set – polygon, rectangle, or circle – and edit or remove them. Controls with a '+' allow you to add segments while controls with a '-' allow you to remove segments from your selection.

Probe Data Analytics Suite (Selecting Roads, Continued)

Click here to see a list of the IDs for your segment set. You can copy them to a clipboard to save or share.

Click here to save your segment set. This is particularly useful for very large sets, regular use of a set (quarterly reporting) or to share them with others in your agency.

Saving Segments

Once you have defined your segment set, you have two options to save them before proceeding with the rest of the query: **Show segment IDs** and **Save as a segment set**.

Functional Road Classes

Under the Region or Map tabs of roadway selection described above, users have a choice to filter out roadways by functional classes (FRCs). Table 4 below lists the FRCs for XD segments.

Table 4: Functional Road Classes for XD Segments

Value	Road Type
1	National Highway Network
2	State Highway Network
3	Interconnecting Network
4	Major Connectors Minor Roads

IMPORTANT

Some tools allow for the data choice between TMC and XD network segment type; users should select XD for the greater network coverage and granularity. If XD segments are selected for road segment search, users will only have the option to choose INRIX as the probe data source.

Probe Data Analytics Suite (Selecting Roads, Continued)

Under the Congestion Scan tool and the Corridor Time Comparison tool, the number of saved sets available for use will be smaller because these two tools are designed to analyze continuous stretches of road. Therefore, only saved sets that have an underlying order are available in these two tools, specifically unmerged sets created using the "Road" tab. For this reason, "region search", "raw segment code entry", and "map search" are unavailable under these two tools (as is the loading of segment sets created using these features).

If you intend to revisit or update the data in your analysis at a later date, in addition to saving your roadway segment set in RITIS, we recommend using the "Show segment IDs" button to copy the segment IDs to Notepad or Word and save for reference later. The INRIX base map changes slightly from year to year, therefore when replicating prior work users should re-check the segment IDs to verify that they still represent the same highway study section. Saving the segment IDs also allows you to share your study roadway section with RITIS users outside of your organization.

Probe Data Analytics Suite (Selecting Time Periods)

3. Select one or more time periods to analyze

Days Months Years

06/12/2023 - through - 06/12/2023

Create a single time period for this range

Limit to specific days of the week

Create a time period for each day within this range

+ Add time period

Select one or more time periods to analyze

After selecting roads, the next step is selecting time periods. There are three choices: Days, Months or Years. To watch a video tutorial on time period selection, click [here](#).

June 2023

June 2023

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

Click on the entry bar or calendar icon to bring up an interactive calendar – select a start date and end date to create a date range.

3. Select one or more time periods to analyze

Days Months Years

06/01/2023 - through - 06/07/2023

Create a single time period for this range

Limit to specific days of the week

Sun Mon Tue Wed Thu Fri Sat

Create a time period for each day within this range

+ Add time period

Choose aspects of the time period: whether to create a single time period for your range (with the option to limit it to certain days of the week) or create a time period for each day with the range.

Probe Data Analytics Suite (Selecting Time Periods, Continued)

3. Select one or more time periods to analyze

Days Months **Years**

Select a range of one or more months

2023 May - to - 2023 May

1 month

Create a single time period for this range
 Create a time period for each month within this range

Limit to specific days of week

Sun Mon Tue Wed Thu Fri Sat

+ Add time period

3. Select one or more time periods to analyze

Days Months **Years**

Select a year

2022

Limit to specific days of week

Sun Mon Tue Wed Thu Fri Sat

+ Add time period

Choose the months you want to include, and either a single time period for the range or a time period for each month within the range.

Choose the year to analyze, and whether to limit to specific days of the week.

Once you are satisfied with your time period, click the Add time period button.



Probe Data Analytics Suite (Results Screen)

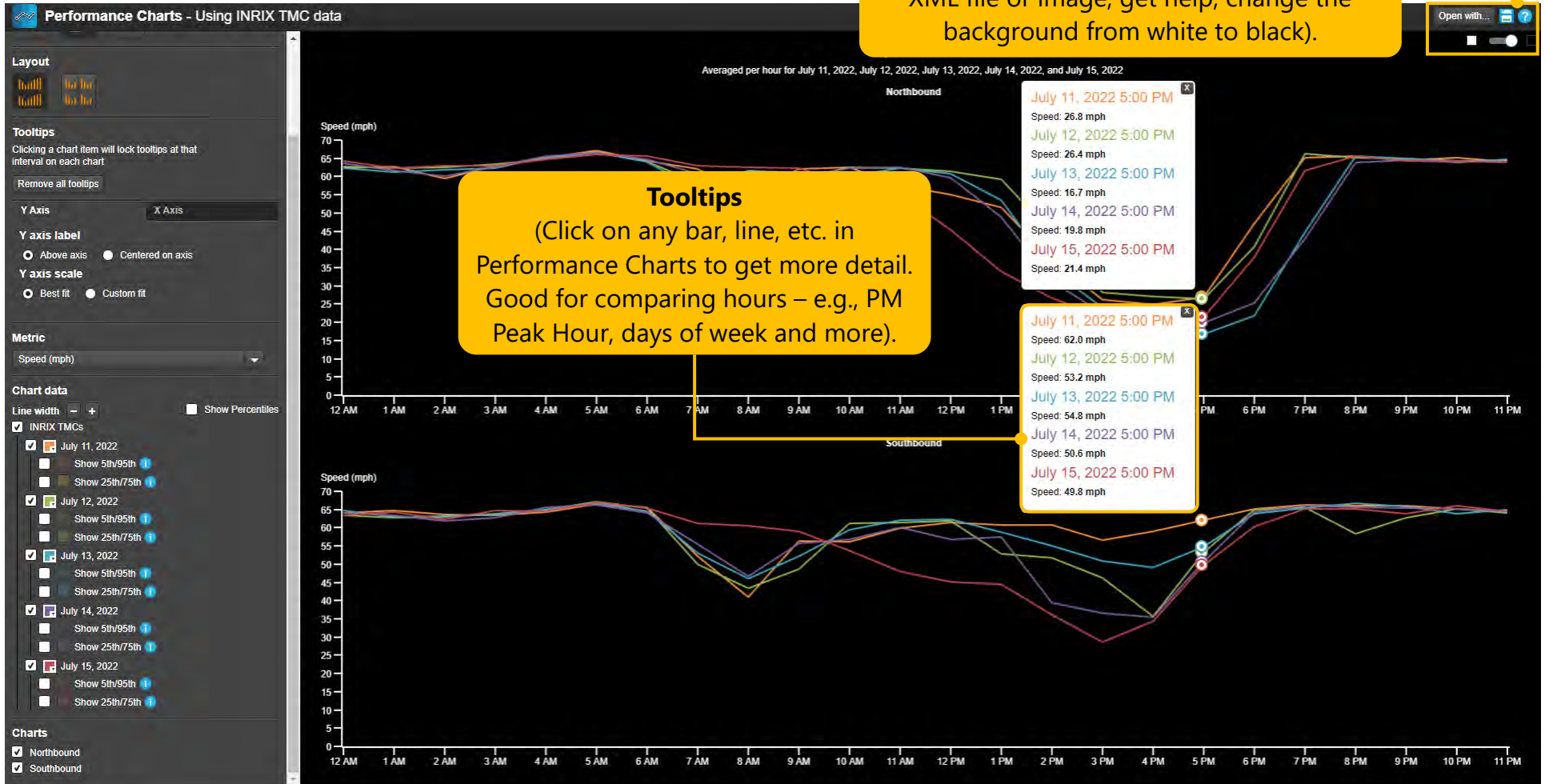
Once you have completed and submitted your query, RITIS will process your request and return results to your screen.

Depending on the tool and how extensive your TMC set and time periods were, you may see results in under a minute to a few hours. Some tools (e.g., User Delay Cost Analysis) will notify you – by email and My History – when your results are ready.

Shown below are results from the example Performance Charts query. Note that this results screen has additional functions to further refine the chart:

- **Mode** - chart per direction or period
- **Type** - bar, line, plot, candlestick (that displays the 25th/75th percentiles as a vertical bar while the 5th/95th percentiles are represented by the lines above and below the bar)
- **Layout** - vertical, tile (side-by-side)
- **Tooltips** - click on a chart item to lock tooltips at that interval, or click on Remove all tooltips to clear the chart
- **X/Y Axis** - adjust label location (above/centered on axis), scale (best fit or custom)
- **Metric** - 15 choices of metrics – speed (mph) is the default
- **Chart data** - change results colors and other features (depending on chart type)
- **Charts** - display one or both directions

Probe Data Analytics Suite (Results Screen, Continued)





Probe Data Analytics Suite

Select Tool Quick Reference Guides (QRGs)

(Click on a tool icon to jump to its QRG • Click on the same icon in the QRG to return here)



Region Explorer



Massive Data Downloader



Congestion Scan



Corridor Time Comparison



Corridor Speed Bins



Trend Map



Performance Charts



Performance Summaries



Bottleneck Ranking



User Delay Cost Analysis



Dashboard



NPMRDS Coverage Map



Travel Time Delta Ranking



Travel Time Comparison



Temporal Comparison




Causes of Congestion Graphs



MAP-21



RITIS Report Templates

(Click on the Help icon  on each QRG page – upper right corner - to access the PDA Suite's Help page for that tool)



Massive Data Downloader

The Massive Data Downloader allows users to export probe speed data as a CSV file for offline analysis. (Video demonstration [here](#).)



The Massive Data Downloader allows the users to export probe speed data as a CSV file for off-line analysis. Files can get very large very quickly and it is prudent for users to carefully evaluate their data extraction plan and limit segments or duration. The data extract comes down to a different line for each time period of each segment of each day. Excel can struggle with some of the output files and the post processing effort can be substantial.

QUERY SCREEN

1. **Select a country** (default – US)

2. **Select roads** - *for most analysis needs, users should select INRIX XD segments for greater network coverage and finer segmentation.*

• **Selection Options** - choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets.

• **Show segment IDs/Save as segment set** - Use the Show segment IDs to see all the TMC codes for your selection and to copy them for saving. Use Save as a segment set to save your TMCs for later analyses.

The screenshot shows the 'Massive Data Downloader' interface. At the top, it says 'Use the Massive Data Downloader to download raw probe data from our archive for offline analysis.' Below this are five numbered callouts:

- 1. Select a country**: A dropdown menu showing 'United States'.
- 2. Select roads**: A section with 'TMC' and 'segments from INRIX' dropdowns. Below are tabs for 'Road', 'Region', 'Segment codes', 'Map', and 'Saved'. A search bar contains 'Search in Oregon...'. Under 'Your selected roads', a road is selected: 'I-5 between I-205/Exit 288 and Butteville Rd/Miley Rd/Exit 282'. It shows directions (Northbound and Southbound checked), 147 intersections, and '13 miles of roadway selected (16 TMC segments)'. There are buttons for 'Show segment IDs' and 'Save as segment set'.
- 3. Select one or more date ranges**: A date range selector showing '05/01/2022' through '05/31/2022' with a '+ Add another date range' button.
- 4. Select days of week**: A row of checkboxes for days of the week: Sun, Mon, Tue, Wed, Thu, Fri, Sat. Mon, Tue, Wed, Thu, and Fri are checked.
- 5. Select one or more times of day**: A time range selector showing '12:00 AM' to '11:59 PM' with a '+ Add another time of day' button.

3. **Select date ranges** - use the dialog boxes or calendar icons to define the dates of your query.

4. **Select days of week** - check or uncheck the days of week you want to include in your query.

5. **Select time of day** - *You can filter out to include only certain times of day. (Most users who choose to download data for analysis will select 12:00AM to 11:59PM and filter out the analysis time in their script outside of the tool.) Timestamps provided are local to the user.*



Massive Data Downloader, Continued



QUERY SCREEN, CONT'D.

6. Select data sources - The "data sources and measures" section has nested checkboxes; the top level is a list of data sources that your account has access to. When you select a data source, you will see a list of checkboxes for each of the available data fields. See also the [Data Types](#) page for a description of those fields.

7. Select units for travel time - For most analysis needs, users should select "seconds."

8. Null record handling - The "Null record handling" checkbox lets you exclude records with no data. This can help decrease the size of the export. Users should leave this box unchecked.

9. Select averaging - In exported data sets that use averaging, the times reported with each reading will represent the beginning of the time window that was averaged. For most of the time, users should select "Don't Average."

10. Provide title - Provide a title for this export. If left blank, a description of the export parameters will be shown in My History and the default file name will be "Export."

11. Notification - If you opt out of the notification email, you can check the status of your export using the "My History" link in the top right corner of screen.

6. Select data sources and measures

- INRIX
 - Speed
 - Historical average speed
 - Reference speed
 - Travel time
 - C-Value
 - Confidence score
 - Select quality threshold for INRIX confidence score
 - 30
 - Real Time Data: Any segment that has adequate data, at any time of day, will report real time data.
 - 20
 - Historical Average: Between 4 am and 10 pm, any segment without sufficient real time data will show the historical average for that segment during that daytime period (15 minute granularity).
 - 10
 - Reference Speed: From 10 pm to 4 am, any segment without sufficient real time data will show the reference speed for that segment. Any segment that does not have calculated historical averages will show the reference speed 24 hours a day if there is not sufficient real time data.
- HERE
- TomTom

NPMRDS INRIX is available from January 1, 2016 to May 28, 2023 in one year intervals.

- NPMRDS from INRIX (Passenger vehicles)
- NPMRDS from INRIX (Trucks and passenger vehicles)
- NPMRDS from INRIX (Trucks)

NPMRDS HERE is available from October 1, 2011 to January 31, 2017.

- NPMRDS from HERE (Passenger vehicles)
- NPMRDS from HERE (Trucks and passenger vehicles)
- NPMRDS from HERE (Trucks)

7. Select units for travel time

- Seconds
- Minutes

8. Null record handling

- Include records with null values

9. Select averaging

- Don't Average
- 5 minutes
- 10 minutes
- 15 minutes
- 1 hour

10. Provide title

Enter a title...

11. Notification

- Send me an email when this export is ready to download

SUBMIT

SUBMIT



Massive Data Downloader, Continued



RESULTS SCREEN

tmc_code	measurement_tstamp	speed	average_speed	reference_speed	travel_time_seconds	confidence_score	cvalue
114P04435	5/1/2023 0:00	63	65	65	41.68	30	100
114P04435	5/1/2023 0:01	63	65	65	41.68	30	100
114P04435	5/1/2023 0:02	63	65	65	41.68	30	100
114P04435	5/1/2023 0:03	63	65	65	41.68	30	100
114P04435	5/1/2023 0:04	63	65	65	41.68	30	100
114P04435	5/1/2023 0:05	65	65	65	41.68	30	100
114P04435	5/1/2023 0:06	66	65	65	41.68	30	100
114P04435	5/1/2023 0:07	66	65	65	41.68	30	100
114P04435	5/1/2023 0:08	66	65	65	41.68	30	100
114P04435	5/1/2023 0:09	65	65	65	40.4	30	100
114P04435	5/1/2023 0:10	65	65	65	40.4	30	100
114P04435	5/1/2023 0:11	65	65	65	40.4	30	100
114P04435	5/1/2023 0:12	65	65	65	40.4	30	100
114P04435	5/1/2023 0:13	65	65	65	40.4	30	100
114P04435	5/1/2023 0:14	65	65	65	40.4	30	100
114P04435	5/1/2023 0:15	65	65	65	40.4	30	100
114P04435	5/1/2023 0:16	68	65	65	38.61	30	100
114P04435	5/1/2023 0:17	68	65	65	38.61	30	100
114P04435	5/1/2023 0:18	68	65	65	38.61	30	100
114P04435	5/1/2023 0:19	68	65	65	38.61	30	100
114P04435	5/1/2023 0:20	69	65	65	38.05	30	100

Confidence Score
 Quality threshold for INRIX confidence score:
 30 = real time data
 20 = historical average
 10 = reference speed

C-Value
 (Indicates the probability that the current probe reading represents actual roadway conditions recent and historical trends.)

Each report comes as a compressed zip file. The zip file contains three files:

- A CSV (comma-separated values) file with the requested data (shown above). The file name will be the entered title of the report or "Readings.csv" if the Title field was left blank.
- Contents.txt: The parameters of the data export: data source selected roads, date range, averaging.
- TMC_Identification.csv: A list of all the TMCs in your report with its [associated metadata](#).

The size of your export file depends on the complexity of the [export you submitted](#). Each row will show a TMC and a timestamp. Export download links expire after one week. However, the exports will remain listed in your [My History](#) page. Once they're shown as expired, they will include a "Run this again" link so you can easily re-run the export using the same parameters.



Why is my TMC_Identification.csv from the Massive Data Downloader missing segments I included in my export request?

You might see this happen if your export request was for a time period prior to the current version of the vendor's metadata. When you search for segments, the search is done against the current version of the vendor's metadata. When the TMC Identification file is built, it uses the version of the metadata that was active during the time period of your export request. The consequence of this is that newer segments will not be included in your export for the simple reason that they did not exist during the time period of your request. For example, if you queried for 50 segments but 10 of them were introduced in the newest version of the metadata and your time period only included dates from the previous version, your TMC Identification file will only include 40 segments.

What version of the INRIX metadata is used to populate the inventory file included in Massive Data Downloader export requests?

Due to the more fluid nature of XD metadata, Massive Data Downloader uses the most up-to-date version of the XD metadata from INRIX to populate the identification file for XD exports.

Where can I find the latest INRIX shapefiles?

The latest shapefiles are posted at [this weblink](#) for users to download.



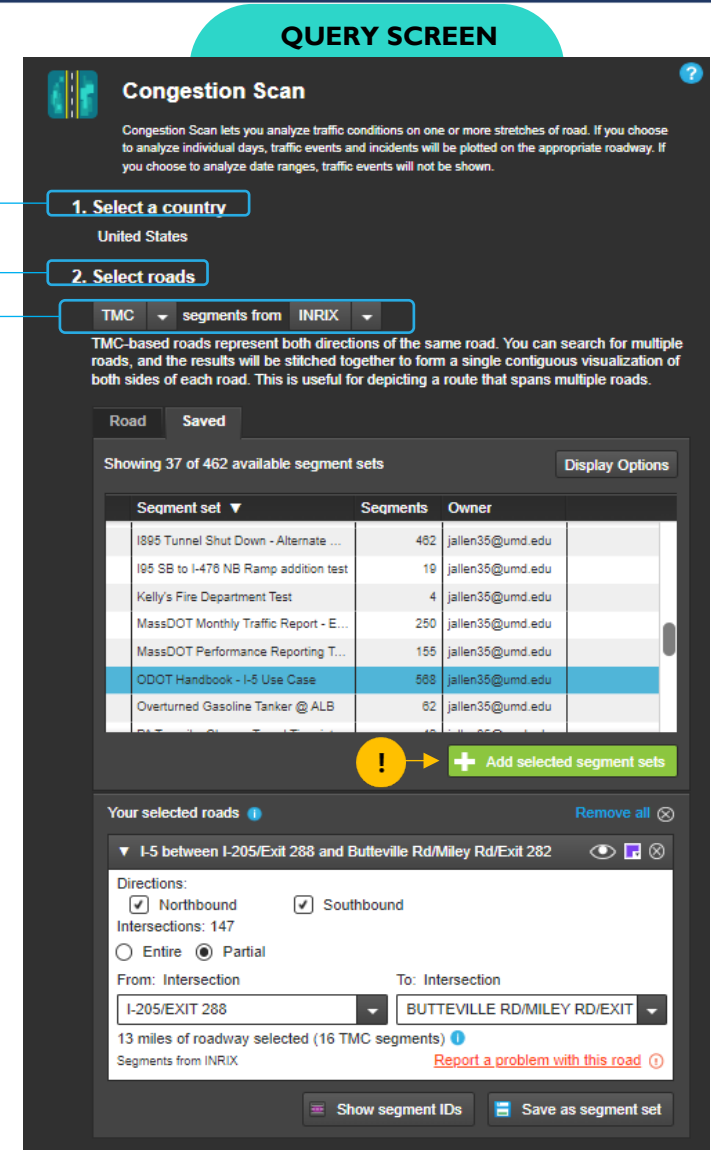
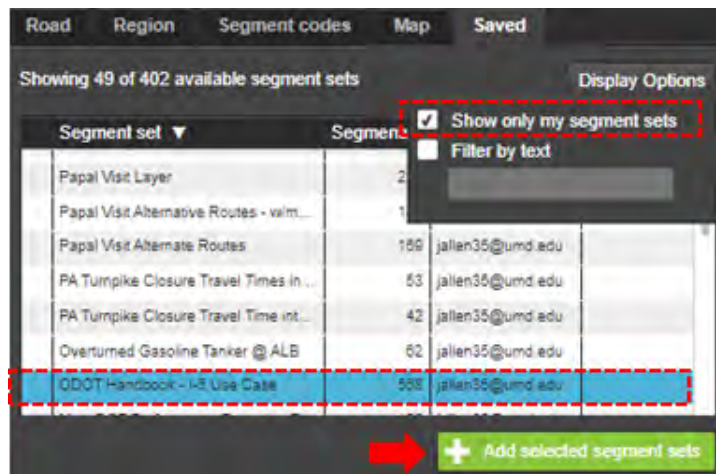
Congestion Scan

Congestion Scan lets you analyze traffic conditions by creating a congestion heat map of one or more contiguous stretches of road (video demonstration [here](#))



1. **Select a country** (default - US)
2. **Select roads** - *for most analyses, users should select INRIX XD segments for greater network coverage and finer segmentation.*
 - Selection Options - choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets. In this example we used our Saved TMC set from a previous analysis. Simply click on the Saved tab, locate your set, then click on the "Add selected segment sets" button.

(NOTE: In the Congestion Scan tool, the number of saved sets available for use will be limited because this tool is useful only if road selections are well-ordered, or in a contiguous line. Therefore, only saved sets that have an underlying order are available in these two tools, specifically unmerged sets created using the "Road" tab.)





Congestion Scan, Continued



3. Select time periods - use the dialog boxes or calendar icons to define the dates of your query. Then select whether you want to create a single time period for this range, or for each day within the range (**NOTE: If you choose to analyze date ranges, traffic events will not be shown.**) If you select a single time period, you can limit the analysis to specific days of the week by checking or unchecking the days of week you want to include in your query. Finally, click on the “Add time period” button.

You also have the option to select Months or Years for your analysis – simply click on the associated tab.

4. Select data sources - *for most analyses, users should select INRIX.*

5. Select granularity - The finer the granularity, the better the results resolution; but the longer it takes for the tool to create the congestion scan plot. Typical selections are 1 hour or 15 minutes.

QUERY SCREEN, CONT'D.

3. Select one or more time periods to analyze

Days Months Years

05/01/2022 - through - 05/31/2022

Create a single time period for this range

Limit to specific days of the week

Sun Mon Tue Wed Thu Fri Sat

Create a time period for each day within this range ?

! + Add time period

Your selected time periods Remove All (X)

May 02, 2022 through May 31, 2022 (22 days)
Every weekday (X)

4. Select data sources

INRIX

HERE ?

TomTom ?

NPMRDS from INRIX (Passenger vehicles) ?

NPMRDS from INRIX (Trucks and passenger vehicles) ?

NPMRDS from INRIX (Trucks) ?

NPMRDS from HERE (Passenger vehicles) ?

NPMRDS from HERE (Trucks and passenger vehicles) ?

NPMRDS from HERE (Trucks) ?

5. Select granularity

1 minute

5 minutes

10 minutes

15 minutes

1 hour

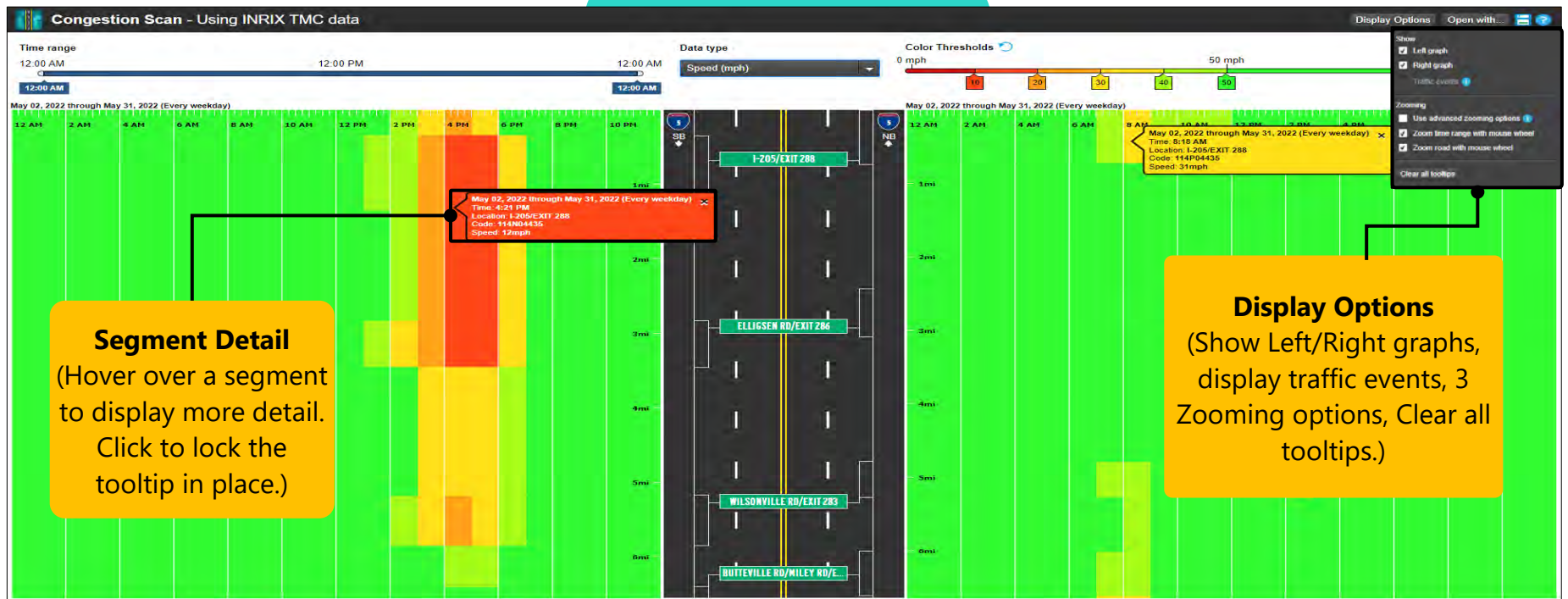
SUBMIT SUBMIT



Congestion Scan, Continued



RESULTS SCREEN



You can interact with your report using the following:

Time range - the Time range bar allows you to isolate smaller periods of time throughout the day within the selected date range of your query. Move the sliders to adjust your time range.

Data type - the Data type dropdown menu allows you to switch between eight different metrics.

Color Threshold - the Color Threshold bar allows you to customize the metric ranges for each color shown in the heat map by sliding the tabs.



Congestion Scan, Continued



Display Options - the Display Options menu provides additional Congestion Scan features: display one or both sides of the graph, show traffic events on the map, and zoom options to show a more detailed view of your road selection.

Open with - open with allows you to open your same exact query in the Trend Map or Performance Charts tools.

Save as – click the save as icon to save an Excel file or image.

Heat Map - hovering over the map shows tooltips with segment detail and will color the roadway for the time period selected (click to lock a tooltip). Hovering on street names will zoom in on them.



Corridor Time Comparison

Corridor Time Comparison shows changes in metrics across a contiguous stretch of road to help identify traffic condition break-downs (video demonstration [here](#))



1. **Select a country** (default - US)

2. **Select roads**

Select XD INRIX - XD-based roads represent a single direction of travel. When using XD segments in this tool, you can search for one or two roads.

Select TMC INRIX TMC-based roads represent both directions of the same road. You can search for multiple roads, and the results will be stitched together to form a single contiguous visualization of both sides of each road. This is useful for depicting a route that spans multiple roads

- **Selection Options** - choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets. In this example we selected a saved segment set (I-5 between Exits 288 and 282). *(NOTE: In the Corridor Time Comparison tool, the number of saved sets available for use will be limited because this tool is useful only if the road selections that make it up are well-ordered. Therefore, only saved sets that have an underlying order are available in these two tools, specifically unmerged sets created using the "Road" tab.)*

QUERY SCREEN

Corridor Time Comparison

Corridor Time Comparison allows plotting of the change in various metrics across a contiguous stretch of road to help pinpoint exactly where traffic conditions tend to break down.

1. Select a country
United States

2. Select roads

TMC segments from INRIX

TMC-based roads represent both directions of the same road. You can search for multiple roads, and the results will be stitched together to form a single contiguous visualization of both sides of each road. This is useful for depicting a route that spans multiple roads.

Road Saved

Showing 36 of 461 available segment sets Display Options

Segment set	Segments	Owner
PA Turnpike Closure Travel Times in...	53	jallen35@umd.edu
PA Turnpike Closure Travel Time int...	42	jallen35@umd.edu
Overturned Gasoline Tanker @ ALB	62	jallen35@umd.edu
ODOT Handbook - I-5 Use Case	588	jallen35@umd.edu
MassDOT Performance Reporting T...	155	jallen35@umd.edu
MassDOT Monthly Traffic Report - E...	250	jallen35@umd.edu
Kelly's Fire Department Test	4	jallen35@umd.edu
I95 SB to I-476 NB Ramp addition test	19	jallen35@umd.edu

+ Add selected segment sets

Your selected roads Remove all

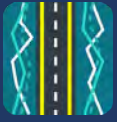
I-5 between I-205/Exit 288 and Butteville Rd/Miley Rd/Exit 282 👁️ 🗨️

Directions:
 Northbound Southbound
 Intersections: 147
 Entire Partial

From: Intersection To: Intersection
 I-205/EXIT 288 BUTTEVILLE RD/MILEY RD/EXIT

13 miles of roadway selected (16 TMC segments) 📌
 Segments from INRIX Report a problem with this road

Show segment IDs Save as segment set



Corridor Time Comparison, Continued



- 3. Select time periods** - use the dialog boxes or calendar icons to define the dates of your query. Then select whether you want to create a single time period for this range, or for each day within the range. If you select a single time period, you can limit the analysis to specific days of the week by checking or unchecking the days of week you want to include in your query. Finally, click on the "Add time period" button. You also have the option to select Months or Years for your analysis – simply click on the associated tab (**NOTE: If you choose to analyze individual days, traffic events and incidents will be plotted on the appropriate roadway. If you choose to analyze date ranges, traffic events will not be shown.**)
- 4. Select a time range** - use the sliders to define your time ranges (all day, AM peak, PM peak, etc.) Click the "Add another time range" to add additional ranges.
- 5. Select data sources** - *for a majority of your analysis needs, users should select INRIX.*

QUERY SCREEN, CONT'D.

The screenshot shows a query configuration interface with three main sections:

- 3. Select one or more time periods to analyze:** Includes tabs for Days, Months, and Years. A date range is set from 02/10/2023 to 02/10/2023. A "Limit to specific days of week" section has checkboxes for Sun, Mon, Tue, Wed, Thu, Fri, and Sat, all of which are checked. A green "+ Add time period" button is present. Below, a list of "Your selected time periods" shows "February 10, 2023" with a remove icon.
- 4. Select a time range to analyze within each time period:** Features two horizontal sliders. The first slider shows a range from 12:00 AM to 12:00 PM with a blue bar indicating a selected range from 7:00 AM to 8:30 AM. The second slider shows a range from 12:00 AM to 12:00 PM with a blue bar indicating a selected range from 4:00 PM to 5:00 PM. A green "+ Add another time range" button is at the bottom.
- 5. Select data sources:** A list of checkboxes for data sources:
 - INRIX
 - HERE ?
 - TomTom ?
 - NPMRDS from INRIX (Passenger vehicles) ?
 - NPMRDS from INRIX (Trucks and passenger vehicles) ?
 - NPMRDS from INRIX (Trucks) ?
 - NPMRDS from HERE (Passenger vehicles) ?
 - NPMRDS from HERE (Trucks and passenger vehicles) ?
 - NPMRDS from HERE (Trucks) ?

At the bottom of the screen, there are two blue "SUBMIT" buttons.

SUBMIT

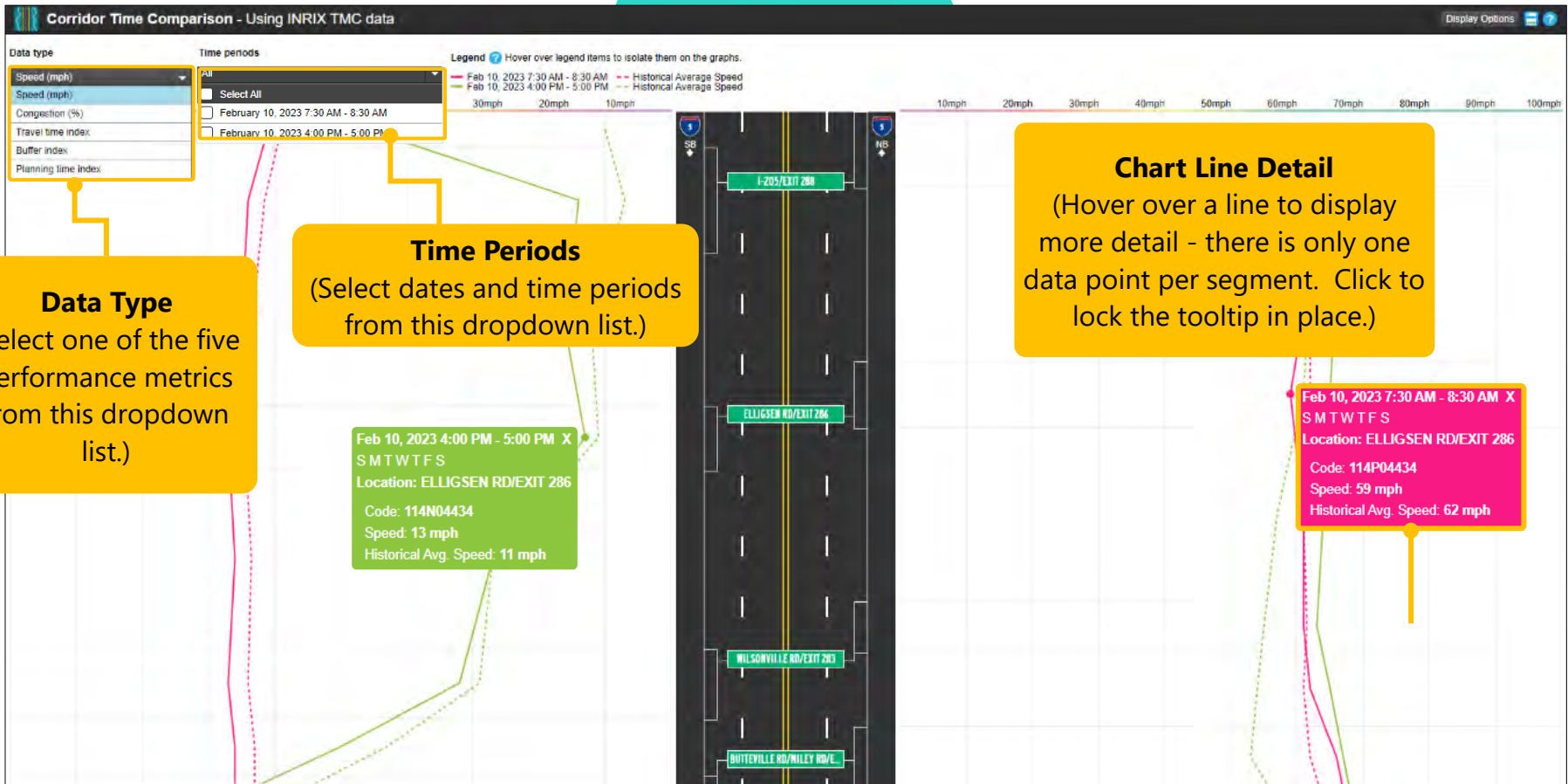
SUBMIT



Corridor Time Comparison, Continued

?

RESULTS SCREEN



You can interact with your report using the following:

Data type - the Data type dropdown menu allows you to switch between the different metrics available in the Corridor Time Comparison tool.



Corridor Time Comparison, Continued



Time Periods - the Time periods dropdown menu allows you to toggle time selections on and off if multiple periods of time were added to your query.

Display Options - the Display Options menu provides additional Corridor Time Comparison features: graph display mode; selecting which sides of the map to show, displaying the grid in the chart area, and zooming options to allow for more refined selection of the road. When speed is selected as the data type for the graph, you will also be able to show or hide historic average speed from this menu.

Compare - hover over a graph line to show results at key locations in tooltips (green boxes mean speeds are higher than Historical Average Speed; red means lower).

Save as - the save option allows you to export your report as an image or as an .xml file, which can be opened in Excel or other spreadsheet software program.



Corridor Speed Bins

Corridor Speed Bins counts the number of probe readings recorded for various congestion measures and displays time-aggregated bins to explore patterns on a stretch of road (video tutorial not available at this time)



1. **Select a country** (default - US)
2. **Select roads** – *for most analyses, select INRIX XD segments for greater network coverage and finer segmentation.*
 - **Selection Options** – choose how to define your roads: by selecting a road or a Saved TMC set. In this example, we selected I-5, between I-205 / Exit 288 and Interstate Bridge
 - **Show segment IDs/Save as segment set** - Use the “Show segment IDs” to see all the TMC codes for your selection and to copy them for saving. Use “Save as segment set” to save your TMCs for later analyses.

QUERY SCREEN

Corridor Speed Bins

Corridor Speed Bins counts the number of probe readings recorded for various congestions measures and establishes time aggregated bins to explore patterns on a stretch of road.

1. Select a country
United States

2. Select roads

XD segments from INRIX

XD-based roads represent a single direction of travel. When using XD segments in this tool, you can search for one or two roads. The first south or west bearing road will appear on the left side of the resulting visualization, and the first north or east bearing road will appear on the right. This is useful for building visualizations that show opposing directions of travel of the same road.

Road Saved [Advanced](#)

Search in Oregon...

Your selected roads [Remove all](#)

I-5 between I-205/Exit 288 and Interstate Bridge

Directions:
 Northbound Southbound
Intersections: 147
 Entire Partial

From: Intersection To: Intersection
I-205/EXIT 288 INTERSTATE BRIDGE

43 miles of roadway selected (126 TMC segments)
Segments from INRIX [Report a problem with this road](#)

Show segment IDs Save as segment set



Corridor Speed Bins, Continued



3. Select time periods - use the dialog boxes or calendar icons to define the dates of your query. Then select whether you want to create a single time period for this range, or for each day within the range. If you select a single time period, you can limit the analysis to specific days of the week by checking or unchecking the days of week you want to include in your query. Finally, click on the "Add time period" button.

You also have the option to select Months or Years for your analysis – simply click on the associated tab.

4. Select a time range - use the sliders to define your time range (all day, AM peak, PM peak, etc.)

5. Select data sources - *for most analyses, users should select INRIX.*

6. Provide title (optional) - Provide a title for this export. If left blank, a description of the export parameters will be shown in My History and the default file name will be "Export."

7. Notes (optional) - you can add notes that will be accessible on your results page. Then click on the green "Add notes" button.

QUERY SCREEN, CONT'D.

The screenshot shows a query configuration interface with the following elements:

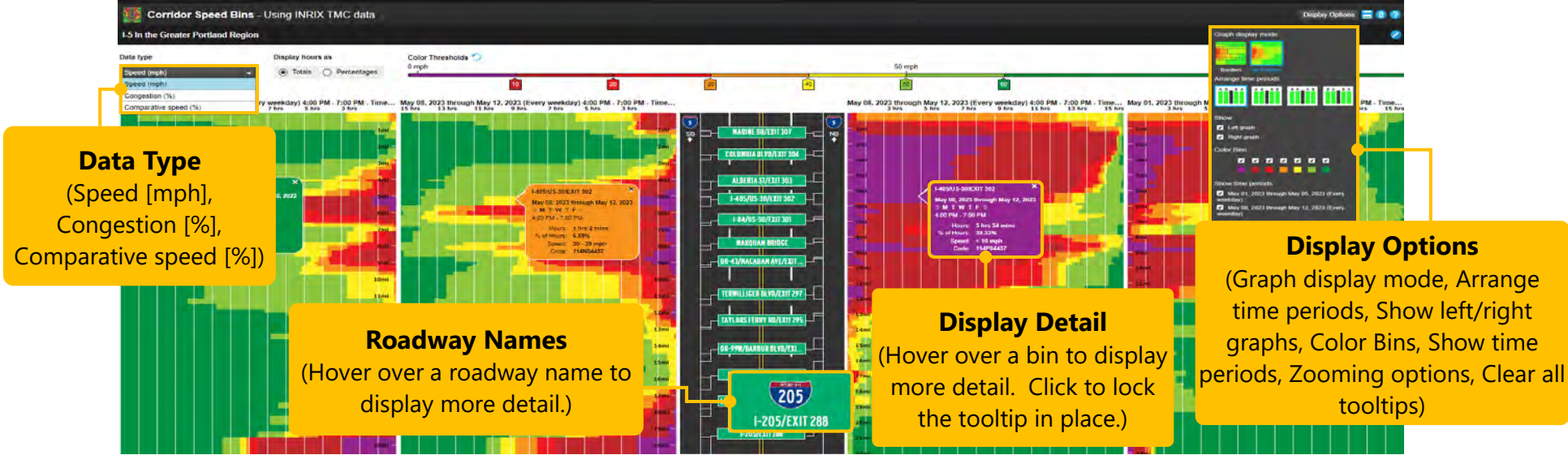
- 3. Select one or more time periods to analyze:** Includes tabs for Days, Months, and Years. A date range is set from 05/01/2023 to 05/05/2023. There are radio buttons for "Create a single time period for this range" and "Create a time period for each day within this range". Under the first option, there are checkboxes for "Limit to specific days of the week" and a row of checkboxes for Sun, Mon, Tue, Wed, Thu, Fri, and Sat. A yellow exclamation mark icon points to a green "+ Add time period" button.
- Your selected time periods:** A list showing "May 01, 2023 through May 05, 2023 (5 days) Every weekday" with a "Remove All" button.
- 4. Select a time range to analyze within each time period:** A horizontal timeline slider from 12:00 AM to 12:00 AM, with a blue bar indicating a selected range from 4:00 PM to 7:00 PM.
- 5. Select data sources:** A list of checkboxes for data sources: INRIX (checked), HERE, TomTom, and various NPMRDS sources from INRIX and HERE for passenger vehicles, trucks, and passenger vehicles.
- 6. Provide a title for this report (optional):** A text input field containing "I-5 In the Greater Portland Region".
- 7. Notes (optional):** A green "+ Add notes" button with a yellow exclamation mark icon pointing to it.
- SUBMIT:** A large blue button at the bottom right of the screen.



Corridor Speed Bins, Continued



RESULTS SCREEN



Data Type
(Speed [mph],
Congestion [%],
Comparative speed [%])

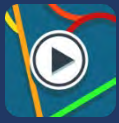
Roadway Names
(Hover over a roadway name to
display more detail.)

Display Detail
(Hover over a bin to display
more detail. Click to lock
the tooltip in place.)

Display Options
(Graph display mode, Arrange
time periods, Show left/right
graphs, Color Bins, Show time
periods, Zooming options, Clear all
tooltips)

You can interact with your report using the following:

- Data type** - the Data type dropdown menu allows you to switch between different metrics available in the tool.
- Display hours as** - the "Display Hours as" dropdown menu lets you choose to have the x-axis represent either the total amount of time or the percentage of time for your time periods.
- Display Options** - with the "Display Options" menu you can customize the display to fit your needs with the following controls: selecting to show borders (no borders option shown above), arrange the time period charts, which sides of the map to display, choose what color bins to display, show time periods (both shown) and zooming options to allow for more refined selection of the road.
- Compare** - hover over a speed bin to show tooltips with detailed results at that location. Click to lock the tooltip in place.
- Save as/Notes/Help/Title** - "Save as" allows you to export your report as an .xml file (use in Excel); "Notes" allows you to add notes or edit previous ones; Help takes you to the CSB Help page; and "Title" allows you to add or edit a report title.



Trend Map

Trend Map allows the user to create animated maps of metrics to compare changes and impacts to a single roadway or regional roadway network over time (video demonstration [here](#))

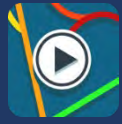


1. **Select a country** (default - US)
2. **Select roads** - *for most analyses select INRIX XD segments for greater network coverage and finer segmentation.*
 - **Selection Options** - choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets. In this example we selected I-5 between Exits 288 and 282.
3. **Select time periods** - use the dialog boxes or calendar icons to define the dates of your query. Then select whether you want to create a single time period for this range, or for each day within the range (*NOTE: If you choose to analyze date ranges, traffic events will not be shown*). If you select a single time period, you can limit the analysis to specific days of the week by checking or unchecking the days of week you want to include in your query. Finally, click on the “Add time period” button.

You also have the option to select Months or Years for your analysis – simply click on the associated tab.

QUERY SCREEN

The screenshot shows the Trend Map query interface. It includes a search bar for "Search in Oregon...", a section for "Your selected roads" showing "I-5 between I-205/Exit 288 and Butteville Rd/Miley Rd/Exit 282", and a "Directions" section with "Northbound" and "Southbound" checked. The "From" and "To" fields are set to "I-205/EXIT 288" and "BUTTEVILLE RD/MILEY RD/EXIT" respectively. Below this, there are options for "Show segment IDs" and "Save as segment set". The "3. Select one or more time periods to analyze" section shows "Days" selected, with a date range from "08/21/2017" to "08/21/2017". There are radio buttons for "Create a single time period for this range", "Limit to specific days of the week", and "Create a time period for each day within this range". A green "Add time period" button is visible. At the bottom, "Your selected time periods" lists "August 14, 2017" and "August 21, 2017".



- 4. Select data sources** - *for a majority of analysis needs, users should select INRIX.*
- 5. Select granularity** - The finer the granularity, the better the results resolution; but the longer it takes for the tool to create the Trend Map plot. A typical selection is either 1 hour or 15 minutes.

QUERY SCREEN, CONT'D.

4. Select data sources

- INRIX
 - HERE ?
 - TomTom ?
- NPMRDS from INRIX (Passenger vehicles) ?
- NPMRDS from INRIX (Trucks and passenger vehicles) ?
- NPMRDS from INRIX (Trucks) ?
- NPMRDS from HERE (Passenger vehicles) ?
- NPMRDS from HERE (Trucks and passenger vehicles) ?
- NPMRDS from HERE (Trucks) ?

5. Select granularity

- 1 minute
- 5 minutes
- 10 minutes
- 15 minutes
- 1 hour

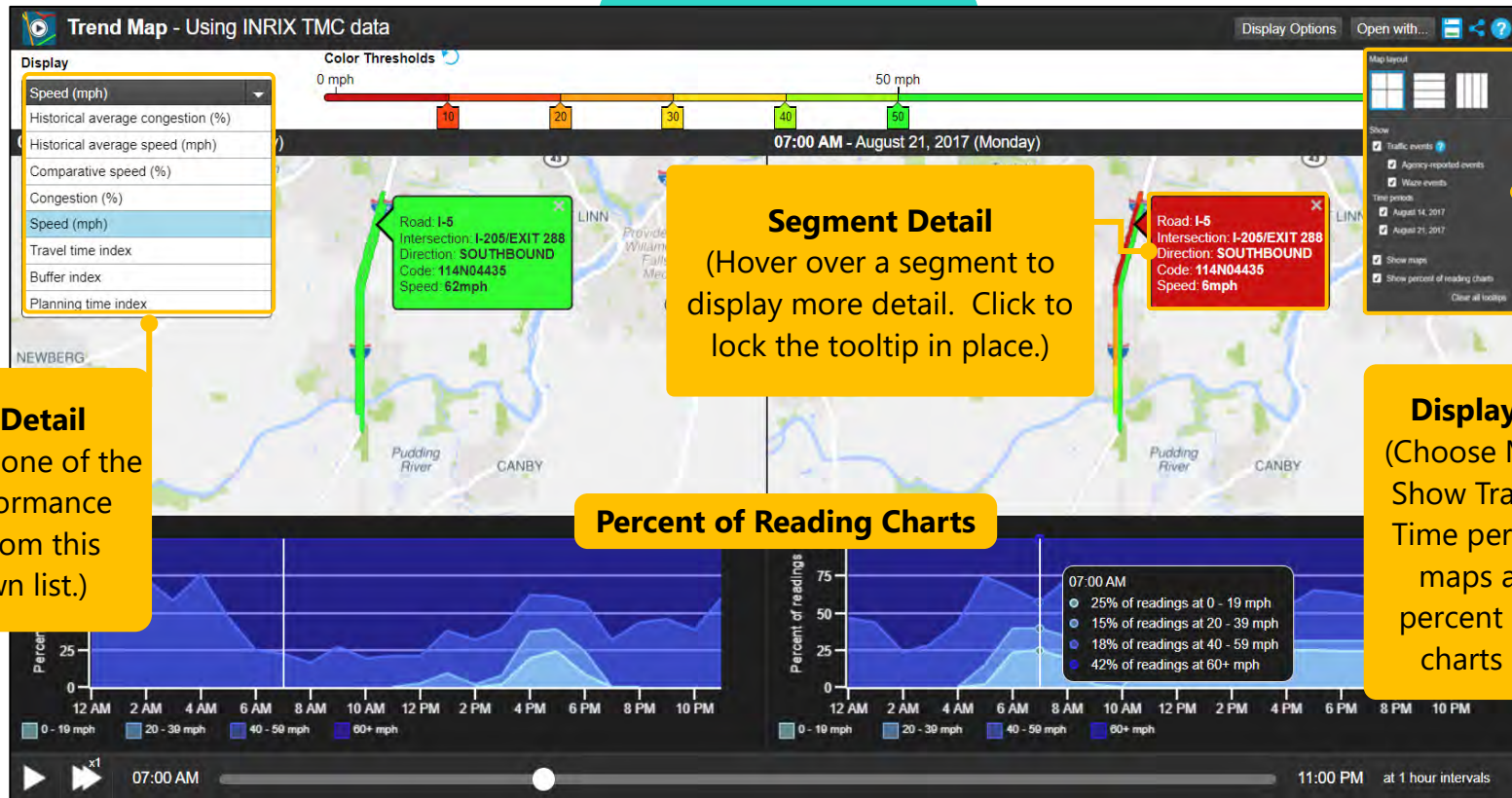
SUBMIT **SUBMIT**



Trend Map, Continued

?

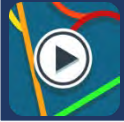
RESULTS SCREEN



You can interact with your report using the following:

Display - click on the Display dropdown to choose one of the 8 available metrics for display.

Color Threshold - slide the tabs to customize the metric ranges for each roadway color shown on the map.



Trend Map, Continued



Animate - use the playback bar at the bottom to start the animation of your Trend Map. You can pause the playback, fast-forward, or manually move the progress dot to move through time.

Map - hovering the cursor over any segment on the map will pull up a tool tip with information about the selected metric for that segment. Double clicking on the segment will display that segment's speed reading in a chart. You can also get speed readings for the maps by clicking on the Display Options button, then check marking "Show percent of reading charts."

Display Options - use this dropdown to select map layouts, and display traffic events, time periods, maps and % of reading charts.

Open with - click on the "Open with" button will let you open the same query in Congestion Scan or Performance Charts.

Save - save Trend Map as an XML file, animated GIF, movie (MP4) or image (useful for presentations). You can also **Share** your map by clicking on the Share icon, the "Create embed code" button (useful for adding to websites).



Performance Charts

Performance Charts are bar, line, plot and candlestick charts representing aggregate conditions across stretches of road (video demonstration [here](#))



1. **Select a country** (default - US)

2. **Select roads** - *for most analyses select INRIX XD segments for greater network coverage and finer segmentation.*

•**Selection Options** - choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets. In this example we used a Road search for the entirety of I-205 for the query.

3. **Select time periods** - use the dialog boxes or calendar icons to define the dates of your query. You can choose up to 7 time periods to analyze. Then select whether you want to create a single time period for this range, or for each day within the range. If you select a single time period, you can limit the analysis to specific days of the week by checking or unchecking the days of week you want to include in your query. Finally, click on the “Add time period” button.

You also have the option to select Months or Years for your analysis – simply click on the associated tab.

The screenshot shows the 'QUERY SCREEN' for 'Performance Charts'. It includes a title bar, a description of performance charts, and three main sections: '1. Select a country' (set to United States), '2. Select roads' (set to I-205, Northbound/Southbound, Entire), and '3. Select one or more time periods to analyze' (set to 07/11/2022 through 07/15/2022). A yellow callout box with an exclamation mark highlights the 'Add time periods' button.



Performance Charts, Continued

?

4. Select data sources - *for most analyses, users should select INRIX.*

5. Select granularity - The finer the granularity, the better the results resolution; but the longer it takes for the tool to create the Trend Map plot. A typical selection is either 1 hour or 15 minutes.

QUERY SCREEN, CONT'D.

4. Select data sources

- INRIX
- HERE ?
- TomTom ?

- NPMRDS from INRIX (Passenger vehicles) ?
- NPMRDS from INRIX (Trucks and passenger vehicles) ?
- NPMRDS from INRIX (Trucks) ?
- NPMRDS from HERE (Passenger vehicles) ?
- NPMRDS from HERE (Trucks and passenger vehicles) ?
- NPMRDS from HERE (Trucks) ?

5. Select granularity

- 1 minute
- 5 minutes
- 10 minutes
- 15 minutes
- 1 hour
- Day of week ?

SUBMIT

SUBMIT



Performance Charts, Continued

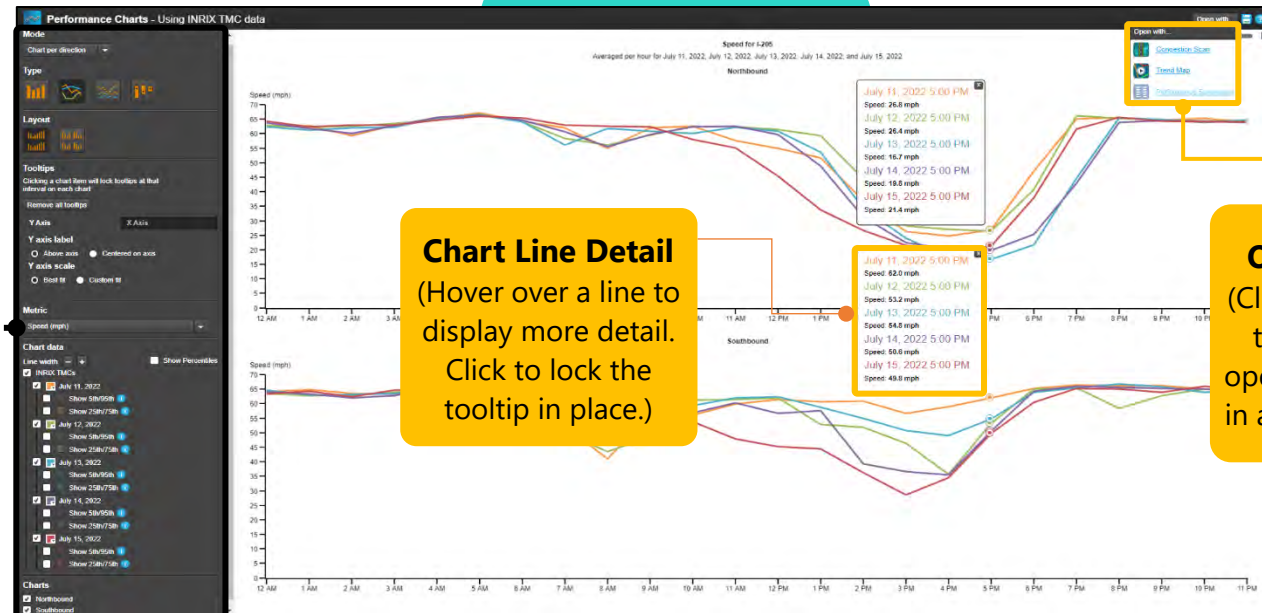


Side Bar Controls

Use these controls to change the look of your charts:

- **Type** – choose from four different chart styles
- **Layout** – select from two layouts
- **Tooltips** – click a chart item to lock tooltips; use the button to remove all tooltips
- **X/Y Axis** – use the controls to change label position, custom fit the data
- **Metric** – choose from 15 different metrics to display
- **Chart Data** – change the “Line Width” by clicking the “-” or “+” signs; check or uncheck the “Show Percentiles” box for percentile display; check or uncheck each dataset shown in the chart, including individual percentile ranges. Change the chart element colors from a color palette or create your own
- **Charts** – check or uncheck the boxes to show charts by direction.

RESULTS SCREEN



You can interact with your report using the following:

- Side Bar** - this results screen has a side bar with additional functions to further refine the chart.
- Charts** - hover over the data in the chart (bar, line, etc.) for a tooltip with more detail. Multiple lines (like above) will show all of the line details at the hover location. Click to lock the tooltip.
- Open with** - click on the “Open with” dropdown to open your same exact query in other tools.
- Save as** - click on “Save as” to save the results as an XML file (for use in Excel) or an image. Choosing the latter will allow for further report customization by clicking the “Customize image export” link.
- Light/Dark background** – use the slider in the upper right-hand corner to change the background from light to dark (experiment with the background color to get the best possible contrast with the chart data, for optimal viewing.)

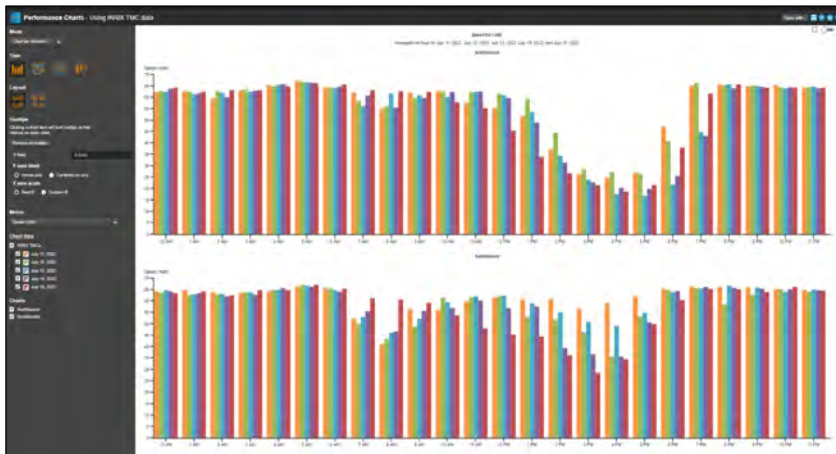


Performance Charts, Continued

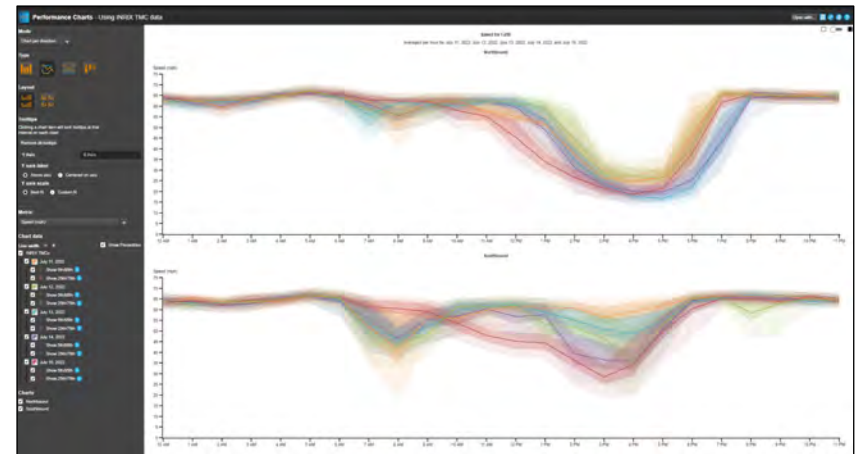
?

CHART TYPES

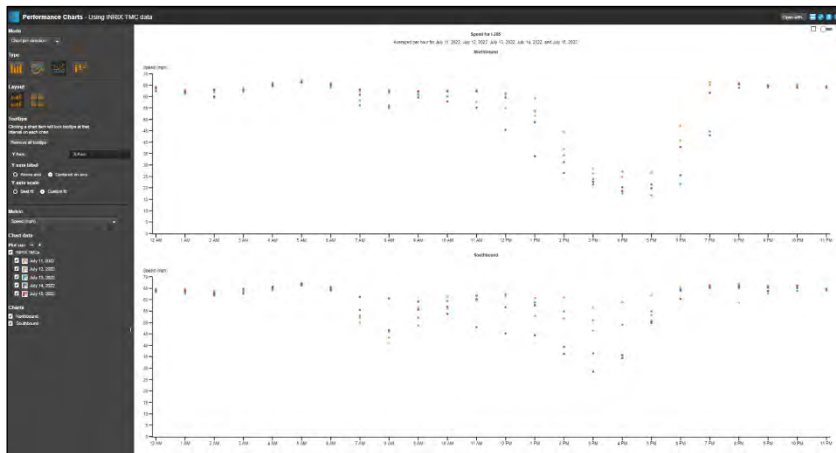
COLUMN



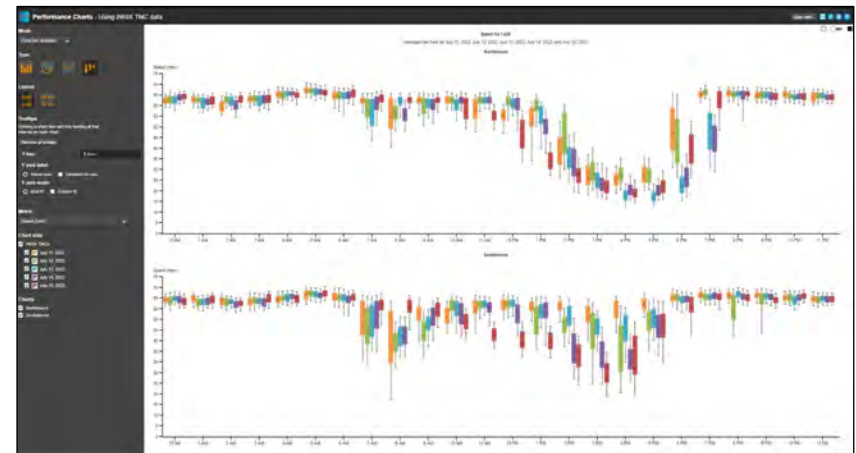
LINE



PLOT



CANDLESTICK





Performance Summaries

Performance Summaries allows the user to create performance metrics summary reports grouped by day of week, weekdays, and weekends across a stretch of road (video demonstration [here](#))



1. **Select a country** (default - US)

2. **Select roads** – *for most analyses, select INRIX XD segments for greater network coverage and finer segmentation.*

•**Selection Options** – choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets. In this example we selected I-5 between Exits 288 and 282 .

3. **Select time periods** - use the dialog boxes or calendar icons to define the dates of your query. You can choose up to 7 time periods to analyze. Then select whether you want to create a single time period for this range, or for each day within the range. If you select a single time period, you can limit the analysis to specific days of the week by checking or unchecking the days of week you want to include in your query. Finally, click on the “Add time period” button.

You also have the option to select Months or Years for your analysis – simply click on the associated tab.

The screenshot shows the 'Performance Summaries' interface with several callouts:

- 1. Select a country**: Points to the 'United States' selection.
- 2. Select roads**: Points to the 'Road' tab and the search bar containing 'I-5 between I-205/Exit 288 and Butteville Rd/Miley Rd/Exit 282'.
- 3. Select one or more time periods to analyze**: Points to the 'Days' tab and the date range '07/14/2022 - through - 07/28/2022'.

The interface includes a 'QUERY SCREEN' header, a 'Performance Summaries' title, a description of the summary report, and various configuration options for country, roads, and time periods. A yellow warning icon is visible near the 'Add time period' button.



Performance Summaries, Continued



4. Select a time range - use the sliders to define your time ranges (all day, AM peak, PM peak, etc.) Click the "Add another time range" to add additional ranges to your query.

5. Select data sources - *for most analyses, users should select INRIX.*

QUERY SCREEN, CONT'D.

The screenshot shows a 'QUERY SCREEN, CONT'D.' interface. At the top, it displays 'Your selected time periods' with a 'Remove All' button and a date range 'July 14, 2022 through July 28, 2022 (15 days)'. Below this is a section for '4. Select a time range to analyze within each time period', which includes a slider for '12:00 AM' to '12:00 AM' and a green '+ Add another time range' button. A yellow warning icon is present next to this section. The next section is '5. Select data sources', which lists several options with checkboxes: 'INRIX' (checked), 'HERE', 'TomTom', and various 'NPMRDS from INRIX' and 'NPMRDS from HERE' options for passenger vehicles, trucks, and passenger vehicles. At the bottom of the screen, there are two blue 'SUBMIT' buttons. Blue lines connect the text on the left to the corresponding sections in the screenshot.

SUBMIT

SUBMIT



Performance Summaries, Continued



RESULTS SCREEN

Performance Summaries - Using INRIX TMC data

July 14, 2022 through July 28, 2022 Northbound | July 14, 2022 through July 28, 2022 Southbound

Northbound segments from I-5 between I-205/Exit 288 and Butteville Rd/Miley Rd/Exit 282 using INRIX data

July 14, 2022 through July 28, 2022

	Speed (mph)	Buffer time (minutes)	Buffer index	Planning time (minutes)	Planning time index	PSL - Planning time index ?	Travel time (minutes)	Travel time index	PSL - Travel time index ?	
	12:00 AM - to - 12:00 AM	12:00 AM - to - 12:00 AM	12:00 AM - to - 12:00 AM	12:00 AM - to - 12:00 AM	12:00 AM - to - 12:00 AM	12:00 AM - to - 12:00 AM	12:00 AM - to - 12:00 AM	12:00 AM - to - 12:00 AM	12:00 AM - to - 12:00 AM	
Mon	62.70	2.49	0.39	8.94	1.41	1.43	6.36	1.00	1.02	Mon
Tue	59.90	3.40	0.53	9.81	1.54	1.57	6.67	1.05	1.06	Tue
Wed	64.60	0.49	0.08	7.04	1.11	1.12	6.18			
Thu	57.80	5.39	0.82	12.00	1.89	1.92	6.91			
Fri	55.70	7.45	1.12	14.11	2.22	2.25	7.16			
Weekdays	59.80			10.87	1.71	1.74	6.68			
Sat	65.50			7.04	1.11	1.13	6.09	0.96	0.97	Sat
Sun	57.90			11.38	1.79	1.82	6.89	1.08	1.10	Sun
Weekends	61.50			10.45	1.65	1.67	6.49	1.02	1.04	Weekends
All Days	60.20			10.42	1.64	1.66	6.63	1.04	1.06	All Days

Day of Week
 (Results for each weekday, all Weekdays, Sat/Sun, Weekends and All Days)

Performance Metrics
 (Results grouped by nine available performance metrics)

You can interact with your report using the following:

Tabs –your report could have multiple tabs (e.g., for northbound and southbound directions). Simply click on a tab to see the results.

Summary Table –each Performance Summaries table shows results for nine performance metrics that are grouped by each day of the week, as well as summaries for Weekdays, Weekends and All Days, for the specified time period.

Open with -click on the “Open with” dropdown to open your same exact query in the other tools.

Save as -click on “Save as” to save the results as an XML file (for use in Excel) or an image.

Help–if you need help, click on the question mark icon to see more information & resources.

#1 Bottleneck Ranking

Bottleneck Ranking allows the user to create a dashboard-style report that includes a bottleneck ranking table with attributes, a location map and graphs (video demonstration [here](#))

- Select roads** - For this tool, TMC is the only segment type available. Select TMC segments from INRIX.
 - Selection Options** - choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets. In this example we selected US-26 between 185th Avenue/Exit 64 and SW 5th Avenue.
- Select time periods** - This step allows the user to choose one time period to analyze. If you choose to analyze individual days, traffic events and incidents will be plotted on the appropriate roadway. If you choose to analyze date ranges, traffic events will not be shown.
- Select data sources** - select INRIX
- Select inclusion criteria** - Check box to include congestion that originates outside your selected geography. (Note, queries of more than 50 segments may fail if this option is checked.) It might be helpful to do a query of this box unchecked and one with the box checked to track the bottlenecks within the analysis area and those that originate upstream outside of the analysis area.
- Select time zone** - Your time zone selection controls how data is displayed on the result page. This allows segments to be viewed in a time zone of your choosing instead of the time zone local to the browser. Selecting "Segment Local" will display the data relative to where the bottlenecks occur.

QUERY SCREEN

#1 Bottleneck Ranking
Rank congestion locations over long periods of time and discover which ones have the greatest impact.

1. Select roads:
TMC segments from INRIX

Road Region Segment codes Map Saved [Advanced](#)

Search in Oregon...

Your selected roads [Remove all](#)

US-26 between 185Th Ave/Exit 64 and Sw 5Th Ave

Directions:
 Eastbound Westbound
Intersections: 99
 Entire Partial
From: Intersection To: Intersection
185TH AVE/EXIT 64 SW 5TH AVE
22 miles of roadway selected (56 TMC segments)
Segments from INRIX [Report a problem with this road](#)

Show segment IDs Save as segment set

2. Select a time period to analyze:
05/01/2022 - through - 05/31/2022

3. Select data sources:
 INRIX
 HERE
 TomTom

4. Select inclusion criteria:
 Include congestion that originates outside your selected geography
Queries of more than 50 segments may fail if this option is checked.

5. Select time zone:
Segment Local

SUBMIT SUBMIT

#1 Bottleneck Ranking, Continued



RESULTS SCREEN

#1 Bottleneck Ranking - Using INRIX TMC data

Bottleneck Ranking for US-26 between 185Th Ave/Exit 64 and Sw 5Th Ave between May 1, 2022 and May 31, 2022 displayed in segment-local timezones (28 total)

Rank	Map	Head Location	Bottleneck Profile			Influence		Base Impact Weighted By				Total Delay
			Average Max Length	Average Daily Dur.	Total Duration	Agency-Reported Ev.	Waze Events	Base Impact	Speed Differential	Congestion		
1	<input checked="" type="checkbox"/>	US-26 E @ I-405/MARKET ST	2.58	8 h 28 m	8 d 9 h 52 m	33	66	26,280	905,667	45,459	52,928,020	
2	<input type="checkbox"/>	US-26 E @ OR-217/EXIT 69	2.19	11 m	5 h 47 m	13	22	765	31,924	2,484	3,372,482	
3	<input type="checkbox"/>	US-26 E @ OR-99W/SW NAITO PKWY	3.38	19 m				1,041	33,957	2,282	3,072,838	
4	<input type="checkbox"/>	US-26 E @ MURRAY BLVD/EXIT 67	1.77	34 m				1,579	84,391	2,834	2,520,545	
5	<input type="checkbox"/>	US-26 W @ CORNELL RD/EXIT 65	2.53	10 m	5 h 39 m	22	56	893	32,839	1,728	2,244,696	
6	<input type="checkbox"/>	US-26 E @ CEDAR HILLS BLVD/EXIT 68	2.52	20 m	10 h 38 m	6	26	1,333	44,212	2,114	2,214,162	

Map US-26 E @ I-405/MARKET ST

Graphics US-26 E @ I-405/MARKET ST

The center represents the beginning of May 1, 2022 and the outer edge represents the end of May 31, 2022.

Maximum queue length in miles Grayscale

#1 Bottleneck Ranking, Continued



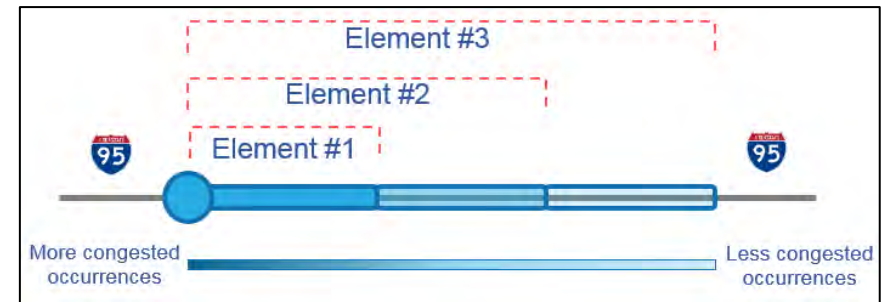
You can interact with your report using the following:

Bottleneck Ranking Table - the table displays: Rank, Map checkbox, Head Location, Bottleneck Profile (queue length and duration), Influence (events), Base Impact (the aggregation of queue lengths over time) and Base Impact Weighted by Speed Differential, Congestion and Total Delay. By default, the table is sorted by the base impact weighted by the total delay. Users can re-sort the bottleneck list based on the descending values of the weighted metrics by clicking on the column title of interest. Clicking on the checkboxes will refresh the map with additional bottleneck locations. On the far right are three icons: Show Segment IDs, Open in Performance Charts tool, and Open in User Delay Cost Analysis tool. Clicking on an icon will apply the appropriate action to that bottleneck.

Map – bottleneck locations will be displayed here. Use the Display Options button to change the look of the bottleneck: show rank, highlight (in blue), show Traffic Events, and head label. Click on the segments (elements) to see how often congestion affected that location. Click an event icon to get more detail. Change the background from map to satellite. Use the dropdown to display other tables and graphics.

Graphics (Time Spiral shown) - click on an icon – bottleneck band or event icon – to see more detail. Use the dropdown to display other tables and graphics. Click the Display Options to manage events (Agency-reported and Waze).

Bottleneck Elements – Bottlenecks are made up of elements. Each element occurring at the selected location is layered on the map, extending upstream from the head location to the maximum length of the specific element. As each element adds another layer on the map, road segments become more opaque. Segments closest to the head become the most opaque as they are more frequently affected by congestion at the selected location:



Weighted Base Impact — The base impact weighted by speed differential, congestion, or total delay provides additional insight into the effects of bottlenecks on traffic in your area:

- **Speed Differential** — Base impact weighted by the difference between free-flow speed and observed speed. Use this metric when you want to identify and rank bottlenecks from the individual vehicle perspective.
- **Congestion** — Base impact weighted by the measured speed as a percentage of free-flow speed. Similar to the speed differential metric, use the congestion metric when you want to identify and rank bottlenecks from the individual vehicle perspective.

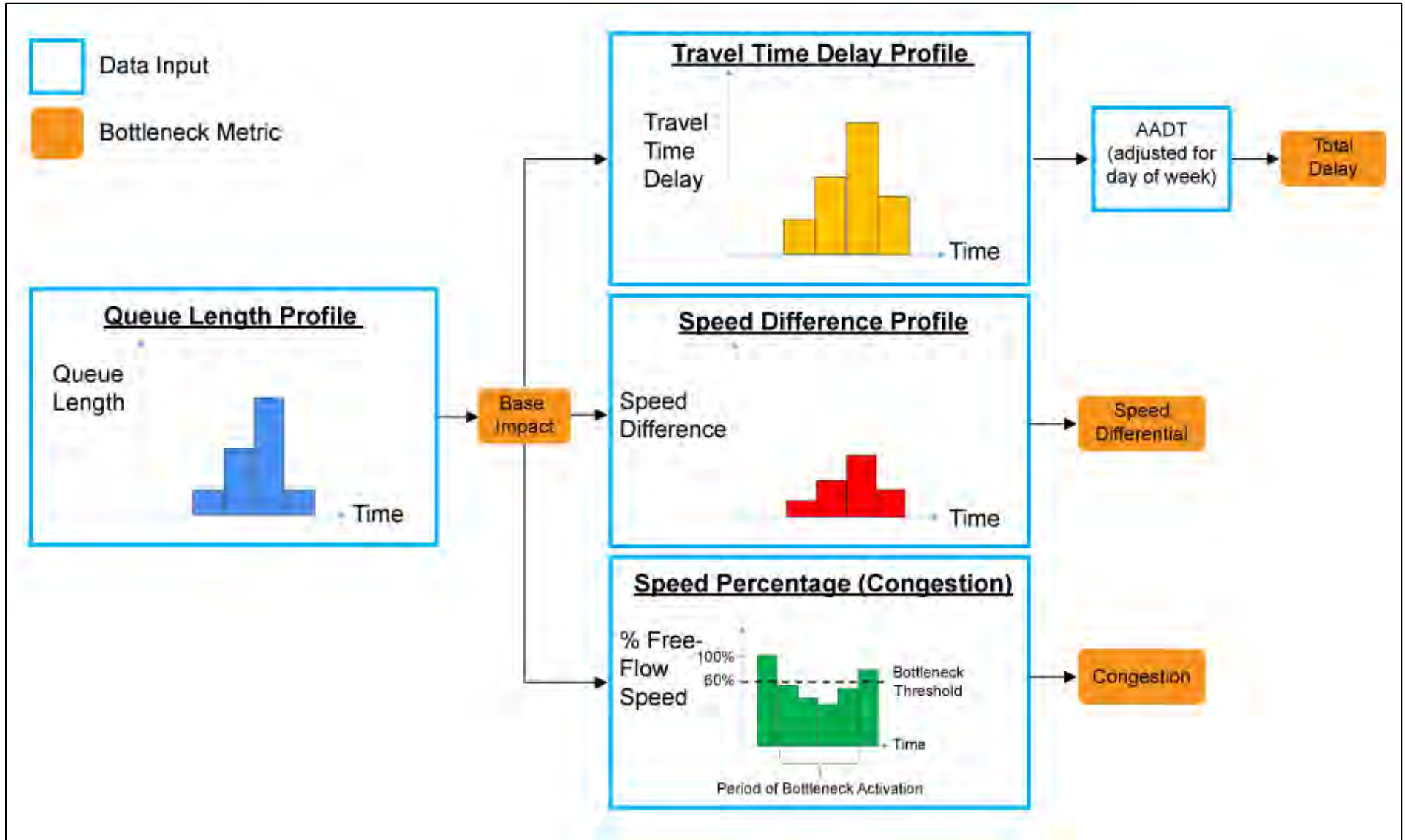
(NOTE: The term congestion is defined as "measured speed as a percent of the free-flow speed")

- **Total Delay** — Base impact weighted by the difference between free-flow travel time and observed travel time multiplied by the average daily volume (AADT), adjusted by a day-of-the-week factor. This metric should be used to rank and compare the estimated total delay from all vehicles within the bottleneck.

#1 Bottleneck Ranking Supplemental Information, Continued

?

Relationship between Bottleneck Metrics



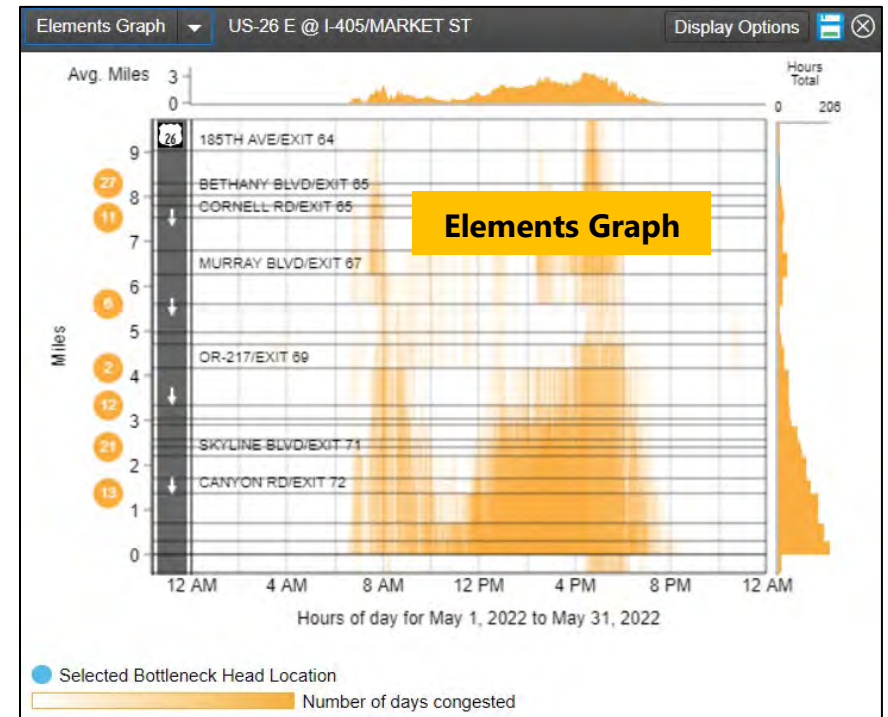
#1 Bottleneck Ranking Supplemental Information, Continued



Graphs and Tables

The **Elements Graph** allows you to explore the spatial and temporal characteristics of elements occurring at the selected location.

The "Avg. Miles" graph (at the top of the Elements Graph) shows the average length of roadway congested by time of day. The "Hours Total" graph (on the right side of the Elements Graph) shows the total number of hours the location on the roadway was congested



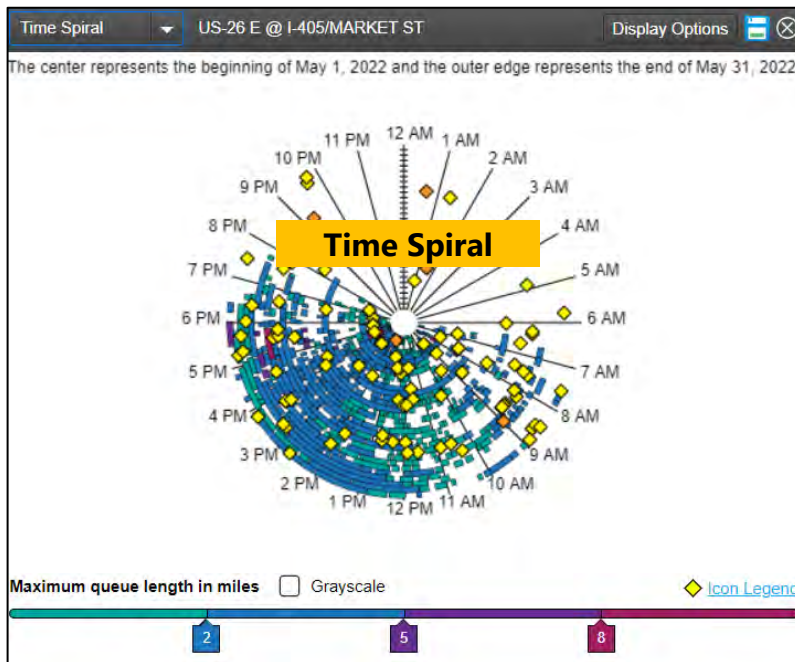
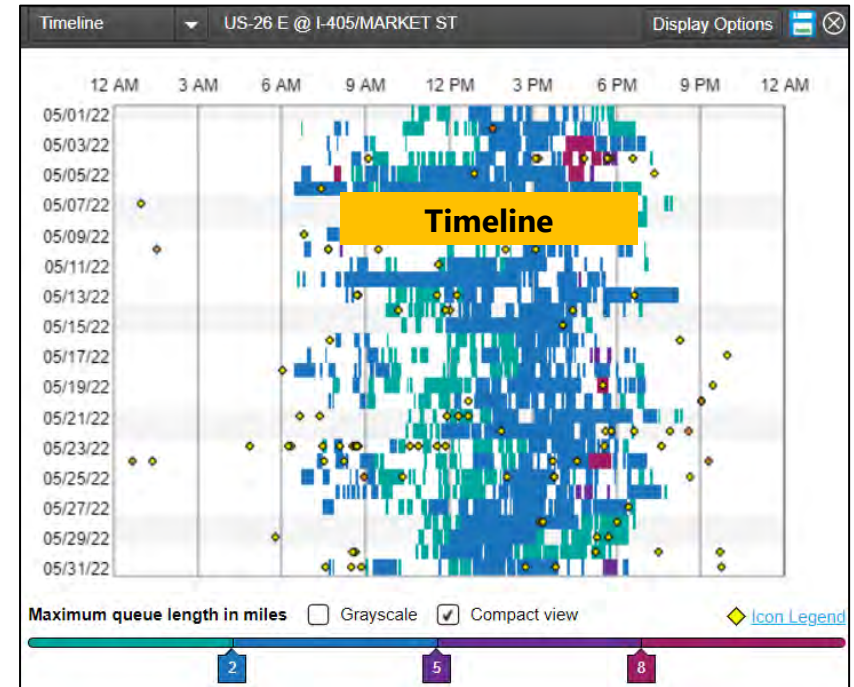
Start Time	End Time	Duration	Max Le...	Impact	Spe...	Con...	Agency...	Waze ...
Sun, May...	Sun, May...	6 m	0.71	2.79	71.32	3.25	0	0
Sun, May...	Sun, May...	26 m	1.38	26.08	718.03	32.89	0	0
Sun, May...	Sun, May...	28 m	1.7	42.14	1,310.08	60.79	0	0
Sun, May...	Sun, May...	22 m	4.16	64.51	2,267.46	111.21	0	0
Sun, May...	Sun, May...	29 m	4.16	93.54	3,290.45	162.32	0	0
Sun, May...	Sun, May...	19 m	3.04	55.62	1,986.88	99.59	0	0
Sun, May...	Sun, May...	10 m	3.04	22.91	779.65	39.39	0	0
Sun, May...	Sun, May...	12 m	4.16	41.57	1,507.77	76.52	0	0
Sun, May...	Sun, May...	14 m				56.55	0	0
Sun, May...	Sun, May...	5 m				19.81	0	0
Sun, May...	Sun, May...	6 m	2.57	15.09	529.45	25.77	0	0
Sun, May...	Sun, May...	12 m	2.91	31.81	1,123.14	56.15	0	0
Sun, May...	Sun, May...	5 m	2.22	11.09	379.08	17.91	0	0
Sun, May...	Sun, May...	7 m	1.7	11.91	399.42	19	0	0
Sun, May...	Sun, May...	6 m	1.38	8.27	240.87	10.92	0	0
Sun, May...	Sun, May...	5 m	1.38	6.89	224.51	10.8	0	0
Sun, May...	Sun, May...	9 m	1.38	12.41	400.96	19.28	0	0
Sun, May...	Sun, May...	6 m	1.38	6.27	194.77	9.65	0	0
Mon, May...	Mon, Ma...	5 m	0.71	1.98	52.1	2.36	0	0

The **Elements Table** lists all the individual elements occurring at the selected location, along with the attributes assigned to each element.

#1 Bottleneck Ranking Supplemental Information, Continued



The **Timeline** shows elements and events occurring at the selected location in a timeline-style graphic. Each row on the timeline represents a different day. Elements are displayed as colored boxes. The width indicates the element's duration, the color indicates maximum queue length. Traffic events are represented by colored diamonds with hash marks extending outwards to indicate duration.



Time Spiral shows elements and events occurring at the selected location in a spiral graphic. Each rotation on the spiral represents a different day of the year, with dates progressing as you move out from the center of the spiral. Elements occurring at a specific time are displayed as colored boxes. The width indicates element duration, and the color indicates maximum queue length. Traffic events at the selected location are represented by colored diamonds.



User Delay Cost Analysis

User Delay Cost Analysis combines probe speed data with volume data to estimate the cost of delay experienced by drivers as a result of congestion (video demonstration [here](#))



The very first thing a user sees while accessing the User Delay Cost Analysis tool (UDC) is a pop-up that reads “The volume profile data used to generate this report may not be precise enough for your analysis. Read more [here](#).”

In order to calculate the user delay, volumes are needed for each segment. ODOT provides RITIS with a volume profile for each NHS segment based on the average annual HPMS count data. INRIX also provides their volume profile derived from probe data estimates for each segment to RITIS. These are generic average sets of volumes and do not correspond 1:1 with the time period queried. In other words, for any section of roadway and time period selection, the travel times and speeds would be reflective of the traffic conditions but the volumes are just a proxy. Knowing this, the performance metrics derived from this tool should be used appropriately. It is best used for scenario comparison analysis.



User Delay Cost Analysis, Continued



1. Select roads - For this tool, TMC is the only segment type available. Select TMC segments from INRIX

- **Selection Options** - choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets.

2. Select time periods - This step allows the user to choose one time period to analyze.

3. Select volume data source - Users can select multiple volume data providers for their report. These data providers are ranked by descending order of preference for the report. If volume data for a segment is not found in the first volume data set, UDC will search for data in the second-ranked data set, etc.

ODOT volume profiles are available for each year from 2018 to 2021. INRIX has also provided a data set comprised of volume data for 2019.

4. Select speed data source - for most analyses, users should select INRIX.

QUERY SCREEN

User Delay Cost Analysis

User delay cost analysis reports allow you to put a dollar amount on how much a road's performance impacts its users.

1. Select roads

TMC segments from INRIX

Road Region Segment codes Map Saved [Advanced](#)

Search in Oregon...

Your selected roads [Remove all](#)

I-205

Directions:

Northbound Southbound

Intersections: 21

Entire Partial

51 miles of roadway selected (82 TMC segments)

Segments from INRIX [Report a problem with this road](#)

Show segment IDs Save as segment set

2. Select a time period to analyze

07/01/2022 - through - 07/26/2022

3. Select volume data source

Oregon 2021 and fall back on Inrix 2019

Change provider

4. Select speed data source

- INRIX
- HERE ?
- TomTom ?
- NPMRDS from INRIX (Passenger vehicles) ?
- NPMRDS from INRIX (Trucks and passenger vehicles) ?
- NPMRDS from INRIX (Trucks) ?
- NPMRDS from HERE (Passenger vehicles) ?
- NPMRDS from HERE (Trucks and passenger vehicles) ?
- NPMRDS from HERE (Trucks) ?



User Delay Cost Analysis, Continued



5. Confirm avg. cost / % vehicle types - For hourly costs, \$27 and \$33 are recommended for passenger vehicles and commercial vehicles, respectively. See also the [Value of Time write-up under the Data Section](#). Additional information about this is available [here](#).

For percent of passenger and commercial vehicles, use collected values whenever available. If unavailable, a rule of thumb is 5% and 95% for passenger and commercial vehicles, respectively

6. Define where delay should be calculated - At the writing of this report, there is no guidance on this yet. For the time being, users can select free-flow speed minus 5 mph if they are unsure of what to select. Additional information about this is available [here](#).

7. Calculate the delay cost against - At the writing of this report, there is no guidance on this yet. For now, users can select free-flow speed if they are unsure of what to select.

8. Provide title - Provide a title for this export. If left blank, a description of the export parameters will be shown in My History and the default file name will be "Export."

9. Notification - If you opt out of the notification email, you can check the status of your export using the "My History" link in the top right corner of screen.

QUERY SCREEN, CONT'D.

5. Confirm the average cost and percent of volume for passenger and commercial vehicle types

Cost

Default hourly costs are provided by Texas Transportation Institute

Passenger vehicles in 2022: \$ 27

Commercial vehicles in 2022: \$ 33

Percent

Percent of passenger and commercial volume is based on data provided by the DOT on an annual basis. If no value is provided, the default will be:

Passenger vehicles: 95%

Commercial vehicles: 5%

Use these values for all road segments

6. Define where delay should be calculated

- Where speed falls below historical average speed
- Where speed falls below free-flow speed minus 5 mph
- Where speed falls below posted speed limit
- Where speed falls below absolute speed
- For all segments

7. Calculate user delay cost against

- Free-flow speed
- Posted speed limit
- Historical average speed

8. Provide title

I-205, From I-5 to South of Lewis and Clark Trail Hwy

9. Notifications

Send me an email when this report is ready

SUBMIT

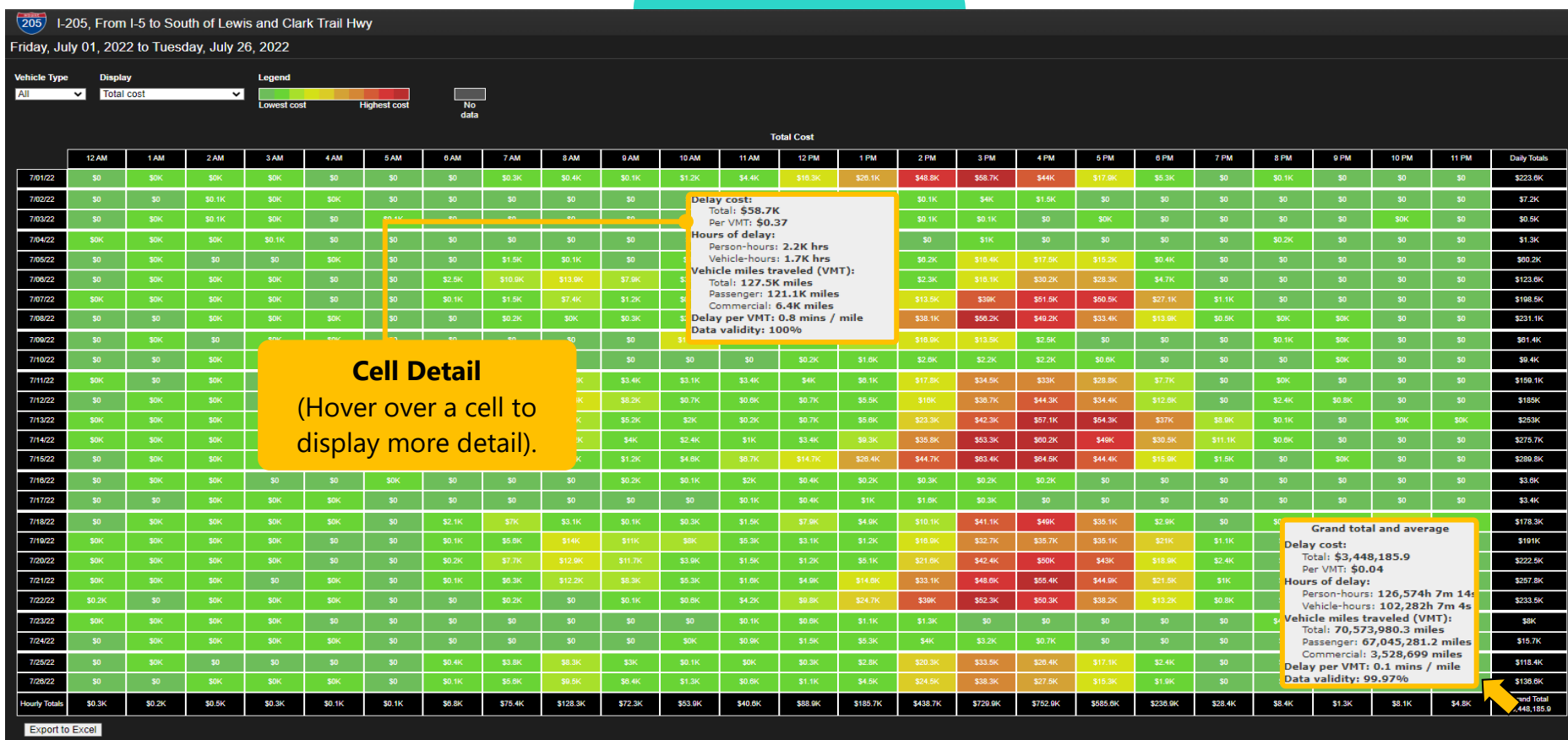
SUBMIT



User Delay Cost Analysis, Continued



RESULTS SCREEN



Cell Detail
(Hover over a cell to display more detail).

Delay cost:
Total: \$58.7K
Per VMT: \$0.37
Hours of delay:
Person-hours: 2.2K hrs
Vehicle-hours: 1.7K hrs
Vehicle miles traveled (VMT):
Total: 127.5K miles
Passenger: 121.1K miles
Commercial: 6.4K miles
Delay per VMT: 0.8 mins / mile
Data validity: 100%

Grand total and average
Delay cost:
Total: \$3,448,185.9
Per VMT: \$0.04
Hours of delay:
Person-hours: 126,574h 7m 14s
Vehicle-hours: 102,282h 7m 4s
Vehicle miles traveled (VMT):
Total: 70,573,980.3 miles
Passenger: 67,045,281.2 miles
Commercial: 3,528,699 miles
Delay per VMT: 0.1 mins / mile
Data validity: 99.97%

You can interact with your report using the following:

The report is a heat map displaying each day within the time period on the Y axis, and each hour of the day on the X axis. Hover over any cell to see a summary of all metrics for that date and time. You can also click on the cell to link to a Congestion Scan query screen.



User Delay Cost Analysis, Continued



The **Vehicle Type** dropdown option allows users to select from passenger, commercial or all.

The **Display** dropdown allows users to select from these performance metrics: total cost, cost per VMT, person-hours of delay, vehicle-hours of delay, vehicle miles of traveled (VMT), delay per VMT, and coverage.

Click on "Export to Excel" to download the data into an Excel file. For an image, simply take a screenshot.

At this time, the only two metrics recommended for use are vehicle-hours of delay and total cost; the other performance metrics are based on very high-level assumptions and would be more appropriately attained through other ODOT publications. Even with these two metrics, caution should be taken on how they are reported. See the introduction paragraph of this tool and also read up on the volume profile data under the Data Section.

For report parameters that are shown underneath the table, see next page.



User Delay Cost Analysis, Continued



Report parameters

Data sources

- Volume Data - CATTWORKS_NHS
- Speed Data - INRIX

Report Parameters at the bottom of the UDC Table

(To learn how user delay cost is calculated, click [here.](#))

Vehicle costs

- 2022 - Passenger: \$27.00 Commercial: \$33.00

Percent of vehicle distribution is based on each individual road segment.

For segments that do not have percent information, the defaults of 95% passenger and 5% commercial are used.

Delay is calculated against the freeflow speed for segments whose speeds fall 5 mph or more below freeflow.

⚠ Please be advised...

To get accurate per-person and per-vehicle costs, use VMT rates. See how you can use the provided VMT metrics below to calculate cost [here.](#)

Notes

- The values in the 'Total cost' display mode are rounded to the nearest hundredth and displayed in thousands when values larger than \$1K exist.
- The range of values for the colored backgrounds of each cell are based on the data of the selected display mode.
- Delay metrics are displayed for every hour of every day within the selected time range.
- The totals for every hour are shown in the bottom row while the totals for every day are shown in the rightmost column.
- The grand total for the entire time period is shown as the actual value and displayed at the bottom right corner.
- For non-summable metrics, like delay per VMT and cost per VMT, averages for every hour are shown in the bottom row, while daily averages are shown in the rightmost column.
- The average for the entire time period is shown at the bottom right corner.



Dashboard

Dashboard allows you to create collections of widgets that help you monitor the performance of roadways of interest (video demonstration [here](#))



Creating a Dashboard - click on the Dashboard icon in the PDA Suite landing page, the Dashboard tool opens.

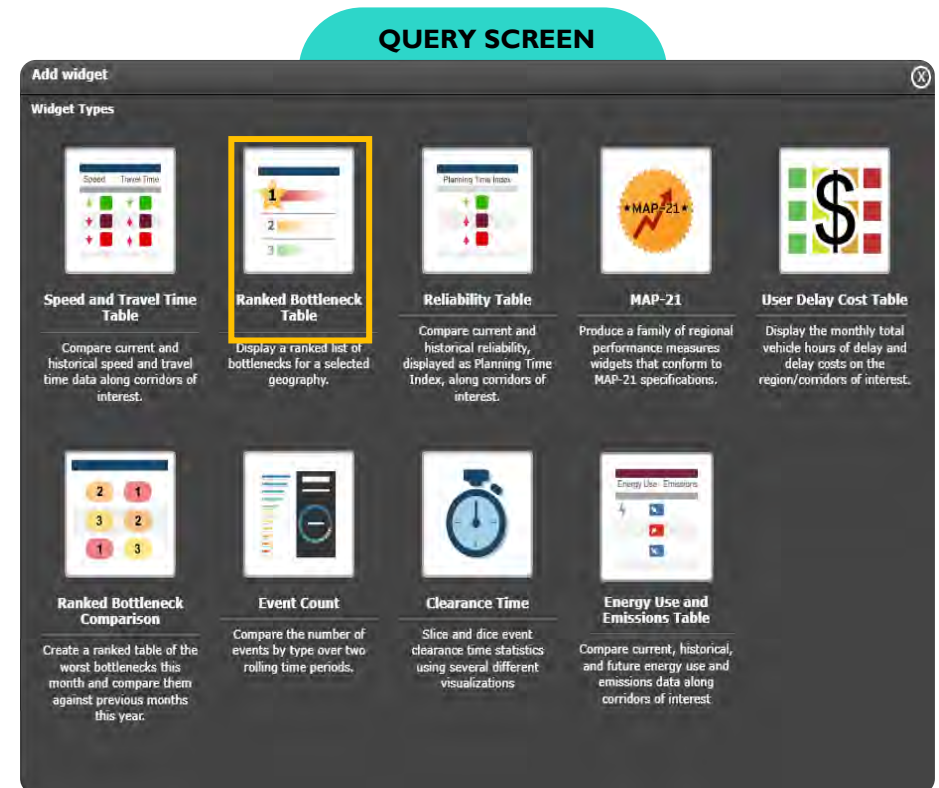
You first need to name your Dashboard.

Next, select the "widgets" you wish to add to your Dashboard (*for this example, we selected Ranked Bottleneck Table.*)

A query screen will open.

Complete the required info, then click submit. A widget will be created.

You can add several widgets to your Dashboard as well as create multiple Dashboards.





Dashboard, Continued



- Select roads** – For this tool, TMC is the only segment type available. *Users should select TMC segments from INRIX.*
 - Selection Options** - choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets. In this example we used a Road search for the entirety of I-5 for the query.
- Add columns** - check the data columns you would like to include in the table – State, bottleneck length and/or bottleneck duration.
- Select data sources** - *select INRIX.*
- Display the number of bottlenecks** - use the up and down arrows to select the number of lengthiest bottlenecks you wish to display.
- Name ranked bottleneck table** - use the default name or add your own.

QUERY SCREEN, CONT'D.

The screenshot shows the 'Ranked Bottleneck Table' interface. It includes a search bar for 'Oregon', a dropdown for 'I-5', and options for 'Directions' (Northbound, Southbound) and 'Intersections' (Entire, Partial). The interface also shows '617 miles of roadway selected (568 TMC segments)'. Below the search area, there are checkboxes for 'State', 'Length', and 'Duration'. The 'Data source' section has checkboxes for 'INRIX', 'HERE', and 'TomTom'. The 'Display the' section has a dropdown set to '10' and the text 'lengthiest bottlenecks'. The 'Name ranked bottleneck table' section has a radio button for 'Ranked Bottleneck Table' and a text input field containing 'I-5 Top 10 Bottlenecks'. There are two '+ ADD WIDGET' buttons at the bottom.

1. Select roads:

TMC segments from INRIX

Road Region Segment codes Map Saved

Search in Oregon...

Your selected roads

I-5

Directions:

Northbound Southbound

Intersections: 147

Entire Partial

617 miles of roadway selected (568 TMC segments)

Segments from INRIX

Show segment IDs Save as segment set

2. Add columns:

State Length Duration

3. Select data source:

INRIX HERE TomTom

4. Display the 10 lengthiest bottlenecks

5. Name ranked bottleneck table

Ranked Bottleneck Table

-or-

I-5 Top 10 Bottlenecks

+ ADD WIDGET

+ ADD WIDGET

+ ADD WIDGET



Dashboard, Continued



RESULTS SCREEN

Speeds and Travel Time

Reliability

Average Clearance Time

Event Count

Ranked Bottleneck Comparison

Ranked Bottleneck Table

Speeds and Travel Time

Direction	Current Speed	Historical Speed	Differential	Current Travel Time	Historical Travel Time
I-5 NB	45 mph	59 mph	↓ 14	6 h 54 m	5 h 13 m
I-5 SB	35 mph	59 mph	↓ 24	5 h 40 m	5 h 12 m

Reliability

Location	Differential	Current Week to Date	Historical	Differential	Current Week to Date
I-5 Southbound	0.16	1.24	1.40	0.19	1.44
I-5 Northbound	0.03	1.37	1.35	0.07	1.38

Average Clearance Time

For Incident, Collision, Traffic Conditions, Obstructions, Disturbances, and 4 others

Past 3 years

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	2 h 58 m	1 h 31 m	1 h 48 m	1 h 33 m	52 m	53 m						
2022	1 h 52 m	1 h 20 m	1 h 46 m	1 h 25 m	20 h 5 m	1 h 1 m	1 h 14 m	1 h 3 m	1 h 7 m	14 h 55 m	6 h 49 m	4 h 2 m
2021	2 h 13 m	2 h 35 m	56 m	1 h 6 m	59 m	1 h 33 m	1 h 13 m	1 h 21 m	1 h 1 m	1 h 39 m	1 h 54 m	3 h 17 m
2020	1 h 37 m	1 h 37 m	1 h 3 m	48 m	1 h 6 m	56 m	1 h 36 m	53 m	1 h 19 m	1 h 40 m	58 m	1 h 53 m

Event Count

Events from ODOT for I-5 using standardized event types

- Collision
- Obstructions
- Incident
- Disturbances
- Roadwork
- Traffic Conditions
- Weather

Category	Current Week	Same Week Last Year
All	82 total Events	223 total Events

Ranked Bottleneck Comparison

Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Ranking	3	1	1	1	3	1	1	4	3	2	2	2
Location	1	2	2	2	1	2	2	5	1	1	1	2
Location	2	3	3	3	2	3	3	3	2	3	3	3
Location	-	5	-	-	5	-	-	-	-	-	-	4
Location	-	-	10	-	-	-	-	-	-	-	-	5
Location	4	4	4	4	-	10	4	6	-	-	4	6
Location	5	6	7	8	-	-	-	-	-	-	-	7
Location	-	-	8	6	6	-	6	-	5	5	-	8
Location	9	7	-	-	10	-	-	-	-	7	9	9
Location	6	-	5	9	-	7	9	-	4	6	6	10

Ranked Bottleneck Table

Rank	Location	Length (miles)	Duration
1	I-5 @ I-170/MARION COUNTY BORDER	12.09	02 h 15 m 21 s
2	I-5 N @ INTERSTATE BRIDGE	11.49	55 m 21 s
3	I-5 S @ WILSONVILLE RD/EXIT 283	6.80	01 h 18 m 21 s
4	I-5 S @ SANTIAM BLUFFS RD/EXIT 239	5.03	02 h 11 m 21 s
5	I-5 S @ CORBETT AVE/EXIT 298	1.58	37 m
6	I-5 N @ EXIT 300	4.10	26 m 21 s
7	I-5 S @ I-84/US-30/EXIT 301	3.85	37 m 21 s
8	I-5 S @ CORBETT AVE/EXIT 298	2.72	15 m 21 s
9	I-5 S @ CORBETT AVE/EXIT 298	1.58	21 m 37 s
10	I-5 S @ MULTNOMAH BLVD/EXIT 296	0.65	18 m 24 s



Dashboard, Continued



How to use Dashboard's widgets:

Speed and Travel Time - a live widget (updated every minute) of current & historical average speed and travel time along stretches of road. Use the differential between current and historical performance to monitor and address problem areas.

Reliability - a widget that displays AM/PM peak period reliability. Use to see how the selected roads have either increased or decreased in reliability over time. Use to improve project selection and deployment.

Clearance Times - annual clearance time comparisons of standardized event types, for selected years. Use to improve incident management.

Event Count - compare event types between current time period (week, month, etc.) to same time last year or prior (week, month, etc.). Hover over bars to see counts for that event type in the comparison visualizations. Use to set and monitor incident reduction goals.

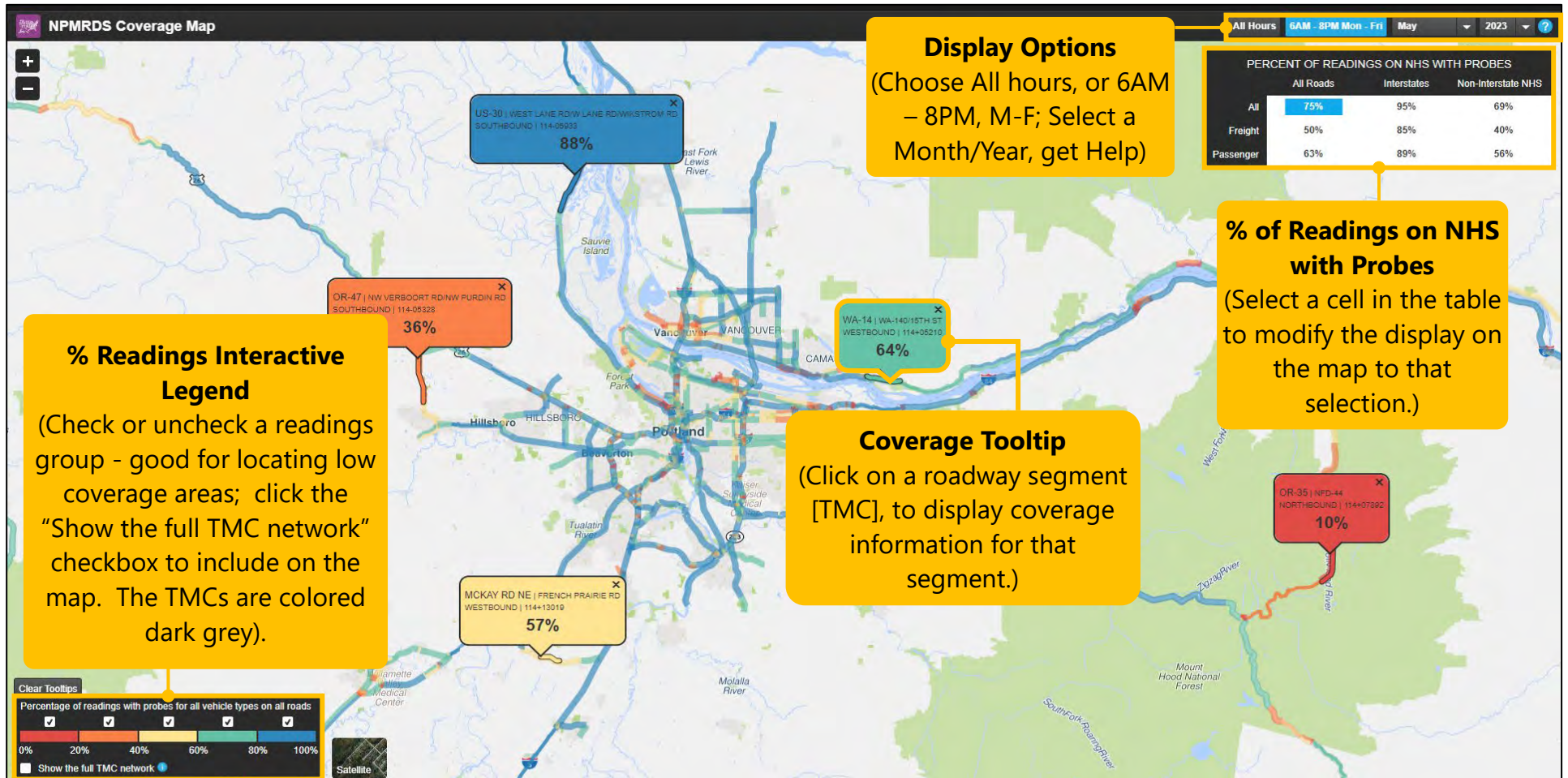
Ranked Bottleneck Comparison – a widget (updated every month) ranked table of the current month's worst bottleneck locations, compared to prior months. Use for project prioritization.

Ranked Bottleneck Table – a live widget (updated every minute) of ranked bottlenecks occurring throughout the day. Use to monitor hot spots.



NPMRDS Coverage Map

The NPMRDS Coverage Map lets you explore the coverage of the NPMRDS for different vehicle types (video demonstration [here](#))



Note: Our source data shows readings per TMC in 5-minute segments. Thus, a day of data would have 288 readings (12 five-minute segments per hour × 24 hours). Coverage is defined as the percent of readings per TMC that contain data. If only 88 of a day's readings contain data, the coverage is 88/288, or approximately 30.5%. See NPMRDS FAQs [here](#).



Travel Time Delta Ranking

The Travel Time Delta Ranking tool allows you to rank and compare the change in performance of corridors between two time periods (video demonstration [here](#)).



QUERY SCREEN

1. **Select a country** (default - US)
2. **Select roads** – INRIX XD segments are the only option for this tool.
 - **Selection Options** - choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets. In this example we chose three roadways to analyze: I-5, US-26 and I-405 (N/S).

1. Select a country
United States

2. Select roads
segments from INRIX

Road Region Segment codes Map Saved [Advanced](#)

Search in Oregon...

Your selected roads [Remove all](#)

I-5 bearing north between Exit 298/Sw Corbett Ave and Exit 304/...
Intersections: 204
 Entire Partial
From: Intersection To: Intersection
EXIT 298/SW CORBETT AVE EXIT 304/N ROSA PARKS WAY/N
6.70 miles of roadway selected (17 XD segments) [Report a problem with this road](#)

US-26 bearing west between Exit 68/Sw Cedar Hills Blvd and S...
Intersections: 123
 Entire Partial
From: Intersection To: Intersection
EXIT 68/SW CEDAR HILLS BLVD SE 9TH AVE
6.90 miles of roadway selected (32 XD segments) [Report a problem with this road](#)

I-405 bearing north
Intersections: 12
 Entire Partial
3.12 miles of roadway selected (12 XD segments) [Report a problem with this road](#)

I-405 bearing south
Intersections: 9
 Entire Partial
2.62 miles of roadway selected (9 XD segments) [Report a problem with this road](#)

Show segment IDs Save as segment set



Travel Time Delta Ranking, Continued

?

- 1. Select two time periods** - use the dialog boxes or calendar icons to define the dates of your query. You can choose a maximum of 2 time periods to analyze. Then select whether you want to create a single time period for this range, or for each day within the range.

If you select a single time period, you can limit the analysis to specific days of the week by checking or unchecking the days of week you want to include in your query.

You also have the option to select Months or Years for your analysis – simply click on the associated tab.

- 2. Select a time range** - select the Peak hours (6-9AM and 4-7PM) or click on “Custom hours” and select your own time ranges.
- 3. Select data source** - *for analyses, select INRIX.*

QUERY SCREEN, CONT'D.

3. Select two time periods to analyze

Days Months Years

05/08/2023 - through - 05/12/2023

Create a single time period for this range

Limit to specific days of the week

Sun Mon Tue Wed Thu Fri Sat

Create a time period for each day within this range ?

A maximum of 2 time periods are allowed

+ Add time period

Your selected time periods

Remove All ✕

- May 01, 2023 through May 05, 2023 (5 days)
Every weekday ✕
- May 08, 2023 through May 12, 2023 (5 days)
Every weekday ✕

4. Select a time range to analyze within each time period

- Peak hours (6-9 AM and 4-7 PM)
- Custom hours

5. Select data sources

- INRIX

SUBMIT

SUBMIT



Travel Time Delta Ranking, Continued



RESULTS SCREEN

Travel Time Delta Ranking - Using INRIX XD data

Before: 05/01/2023 - 05/05/2023 SMTWTFSS After: 05/08/2023 - 05/12/2023 SMTWTFSS Hours of day: 6 AM - 9 AM, 4 PM - 7 PM

Rank	Show	Corridor	Bearing	TTSL	Median Before	Median After	Delta Median	IQR Before	IQR After	Delta IQR	Trending
1	<input checked="" type="checkbox"/>	I-5 bearing north between Exit 298/Sw Corbett Ave and Exit 304/N Rosa Parks Way/N Missouri Ave	North	7 m	103%	117.5%	14.5	84%	225.6%	141.6	Trending Worse
2	<input checked="" type="checkbox"/>	US-26 bearing west between Exit 68/Sw Cedar Hills Blvd and Se 9Th Ave	West	8 m							
3	<input checked="" type="checkbox"/>	I-405 bearing north	North	3 m							
4	<input checked="" type="checkbox"/>	I-405 bearing south	South	3 m							

Corridor Detail
(Hover over a roadway to display more detail.)

Signal Detail
(Hover over a signal icon to display more detail.)

Visualizations
Use this dropdown to view other visual displays offered.)

Chart Line Detail
(Hover over a line to display more detail.)

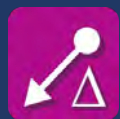
Display Options
(check or uncheck the columns to view, click column headings to sort on that column.)

Reliability Chart Data:

Corridor	Rank	Median Before	Median After	Delta Median	IQR Before	IQR After	Delta IQR	Trending
I-5 bearing north between Exit 298/Sw Corbett Ave and Exit 304/N Rosa Parks Way/N Missouri Ave	1	103%	117.5%	14.5	84%	225.6%	141.6	Trending Worse
US-26 bearing west between Exit 68/Sw Cedar Hills Blvd and Se 9Th Ave	2							
I-405 bearing north	3							
I-405 bearing south	4							

Signal Detail:
TTSU ID: 28CP939
Streets: SW BROADWAY, SW JACKSON ST.
City/County: PORTLAND
District: 2
ODOT Owned: Y
ODOT Maintained: N
Condition Rating: 42%

Reliability Chart Legend:
 Trending Better
 More Reliable
 Less Congested
 Trending Worse



Travel Time Delta Ranking, Continued



You can interact with your report using the following:

Ranking Table - the ranking table will show your queried corridors ranked by performance. Corridor performance is measured by change in median travel time and interquartile range (IQR) to assess reliability. The " Δ Median" and " Δ IQR" columns show the difference between before and after values for median travel time and IQR, respectively. Medians and IQRs are shown as a percentage of speed limit travel time so that results are normalized. Reference speed is used on segments where speed limit data is not provided.

Map - The map shows all corridors check marked in the table. The selected corridor from the table (blue highlight) and is highlighted on the map. Each road is colored based on a combination of its Δ Median and Δ IQR metrics: **Green** - both values indicating improvement **Red** - both values indicating degraded performance **Yellow** - one metric indicates improvement but the other indicates degraded performance, or both metrics are unchanged. Corridor ranks and any traffic signals also appear on the map, unless changed in Display Options.

Slope Chart - The slope chart plots the median travel time and IQR on opposing axes. Each corridor with a change in either metric is rendered as an arrow with a circle plotted at the point represented by the "Median Before" and "IQR Before" values leading to an arrowhead plotted at the point represented by the "Median After" and "IQR After" values. As a result, **green** lines that slope down and to the left indicate corridors trending better in both median travel time and IQR between the two periods. **Red** lines that slope up and to the right indicate corridors trending worse in both metrics. **Yellow** lines that slope in other directions indicate a mixed result. If there is no significant change between the two periods, a corridor is plotted as a single yellow circle. Use the Chart dropdown to select other visualization options (Bar, Delta, Scatterplot).



Travel Time Comparisons

The Travel Time Comparison tool allows you to compare travel time distributions on a selected pair of corridors during specified times of day (video demonstration [here](#))



QUERY SCREEN

1. **Select a country** (default - US)
2. **Select roads** – INRIX XD segments are the only option for this tool.
 - **Selection Options** - choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets. In this example we used our Saved TMC set from a previous analysis. Simply click on the Saved tab, locate your set, then click on the “Add selected segment sets” button.

Travel Time Comparison

Chart cumulative distributions of travel times to compare performance for different time periods. You can compare up to two roads or two sides of the same road.

1. Select a country
United States

2. Select roads
XD segments from INRIX

Road Region Segment codes Map Saved [Advanced](#)

Search in Oregon...

Your selected roads [Remove all](#)

US-26 bearing west between US-26/Se Orient Dr and Nw Sunse...

Intersections: 123
 Entire Partial

From: Intersection To: Intersection
US-26/SE ORIENT DR NW SUNSET HWY

51 miles of roadway selected (137 XD segments)
Segments from INRIX [Report a problem with this road](#)

Show segment IDs Save as segment set



- 3. Create two time periods** - use the dialog boxes or calendar icons to define the dates of your query. You must choose at least 2 time periods to analyze. Then select whether you want to create a single time period for this range, or for each day within the range. If you select a single time period, you can limit the analysis to specific days of the week by checking or unchecking the days of week you want to include in your query. Finally, click on the "Add time period" button.

You also have the option to select Months or Years for your analysis – simply click on the associated tab.

- 4. Select up to three time ranges to analyze** - select the Peak hours (6-9AM and 4-7PM) or click on Custom hours and select your own time ranges (you can create up to three custom time ranges).
- 5. Select data source** - *for most analyses select INRIX.*

QUERY SCREEN, CONT'D.

The screenshot shows a dark-themed query configuration interface. At the top, there are tabs for 'Days', 'Months', and 'Years'. Below these, a date range is set from '05/08/2023' to '05/12/2023'. There are three radio button options: 'Create a single time period for this range' (selected), 'Limit to specific days of the week' (with an unchecked checkbox), and 'Create a time period for each day within this range'. A yellow warning icon with an exclamation mark and an arrow points to a green '+ Add time period' button. Below this is a section titled 'Your selected time periods' with a 'Remove All' button and two entries: 'May 01, 2023 through May 05, 2023 (5 days)' and 'May 08, 2023 through May 12, 2023 (5 days)'. Further down, there are radio button options for 'Peak hours (6-9 AM and 4-7 PM)' (selected) and 'Custom hours'. Below that, a section titled '5. Select data sources' has a checked checkbox for 'INRIX'. At the bottom right is a blue 'SUBMIT' button. Three blue callout boxes with lines pointing to the interface highlight the following steps: '3. Create at least two time periods' (pointing to the date range and options), '4. Select up to three time ranges to analyze' (pointing to the radio button options), and '5. Select data sources' (pointing to the INRIX checkbox).

SUBMIT

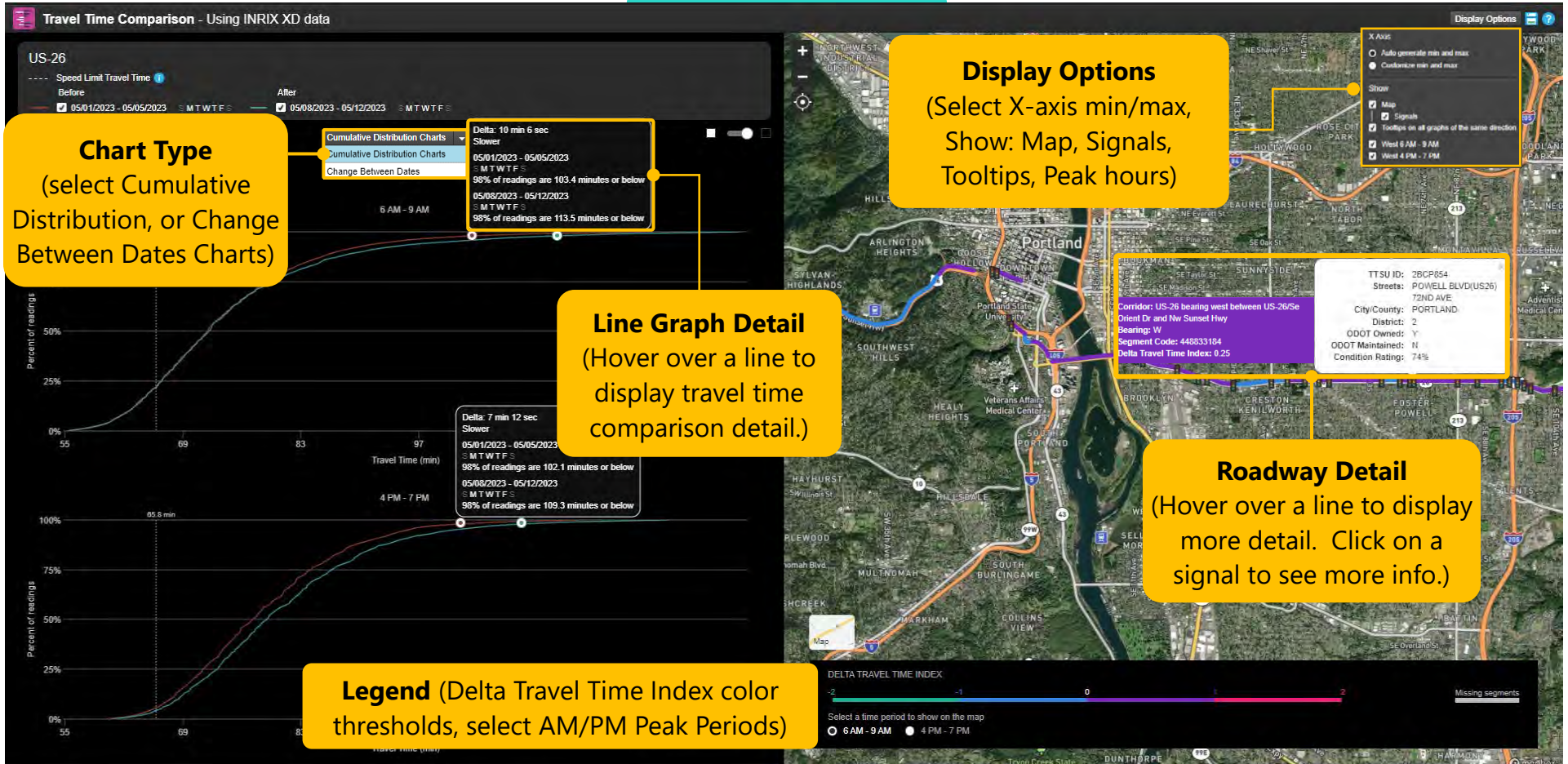
SUBMIT



Travel Time Comparisons, Continued



RESULTS SCREEN





Travel Time Comparisons, Continued



You can interact with your report using the following:

Line Chart - shown for each corridor and each time of day you selected, with a different colored line for each date range. The charts represent the cumulative distributions of travel times for the given corridor, date range, and time of day. There is also a reference line for the speed limit travel time. PDA will use reference speed if speed limit data is not provided for any segment included in your results.

Tooltips - will pop up with travel time values for each line at the percentile. The chart key shows the colors that correspond to each date range. You can click on each line in the key to change the color shown on the graphs. You can also uncheck date ranges here to hide them from the charts.

Map - The map to the right shows the corridors you selected and any traffic signals along those corridors if PDA has traffic signal data for your region. Hover over a segment to see location details and Delta Travel Time Index.

Display - You can use the display options to provide a custom range for travel times on the charts, hide the map, hide the traffic signals on the map, toggle when chart tooltips display, or hide individual charts. By default, the chart tooltips enable tooltips for charts sharing the same direction, but you also have the option of just displaying one chart's tooltip at a time.



Temporal Comparison Maps

The Temporal Comparison Maps allows you to evaluate performance of a road segment over select time ranges, and includes a delta map and histogram (video tutorial not available)



1. **Select roads** – INRIX XD segments are the only option for this tool.

- **Selection Options** - choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets. In this example we selected I-5 from Exit 288 to end of road.

2. **Select time periods** - use the dialog boxes or calendar icons to define the dates of your query. Then select whether you want to create a single time period for this range, or for each day within the range. If you select a single time period, you can limit the analysis to specific days of the week by checking or unchecking the days of week you want to include in your query. Finally, click on the “Add time period” button.

You also have the option to select Months or Years for your analysis – simply click on the associated tab.

QUERY SCREEN

The screenshot shows the 'Temporal Comparison Maps' interface. At the top, it says 'Analyze performance metrics of any road segment by one or more time ranges.' Below this, there are tabs for 'Road', 'Region', 'Segment codes', 'Map', and 'Saved'. The 'Road' tab is selected. A search bar contains 'Search in Oregon...'. Under 'Your selected roads', there is a dropdown menu showing 'I-5 bearing north starting at EXIT 288/1-205 N'. Below this, there are options for 'Entire' and 'Partial' (selected), and fields for 'From: Intersection' (EXIT 288/1-205 N) and 'To: Intersection' ((END OF ROAD)). It shows '21 miles of roadway selected (51 XD segments)'. There are buttons for 'Show segment IDs' and 'Save as segment set'. Below this, there are tabs for 'Days', 'Months', and 'Years'. The 'Days' tab is selected, showing a date range from '05/08/2023' to '05/12/2023'. There are options to 'Create a single time period for this range' (selected) or 'Create a time period for each day within this range'. Under the first option, there is a checked box for 'Limit to specific days of the week' and a row of buttons for 'Sun', 'Mon', 'Tue', 'Wed', 'Thu', 'Fri', and 'Sat'. A green '+ Add time period' button is visible. At the bottom, there is a section for 'Your selected time periods' with two entries: 'May 01, 2023 through May 05, 2023 (5 days) Every weekday' and 'May 08, 2023 through May 12, 2023 (5 days) Every weekday'. A yellow exclamation mark icon is overlaid on the 'Add time period' button.

1. Select roads

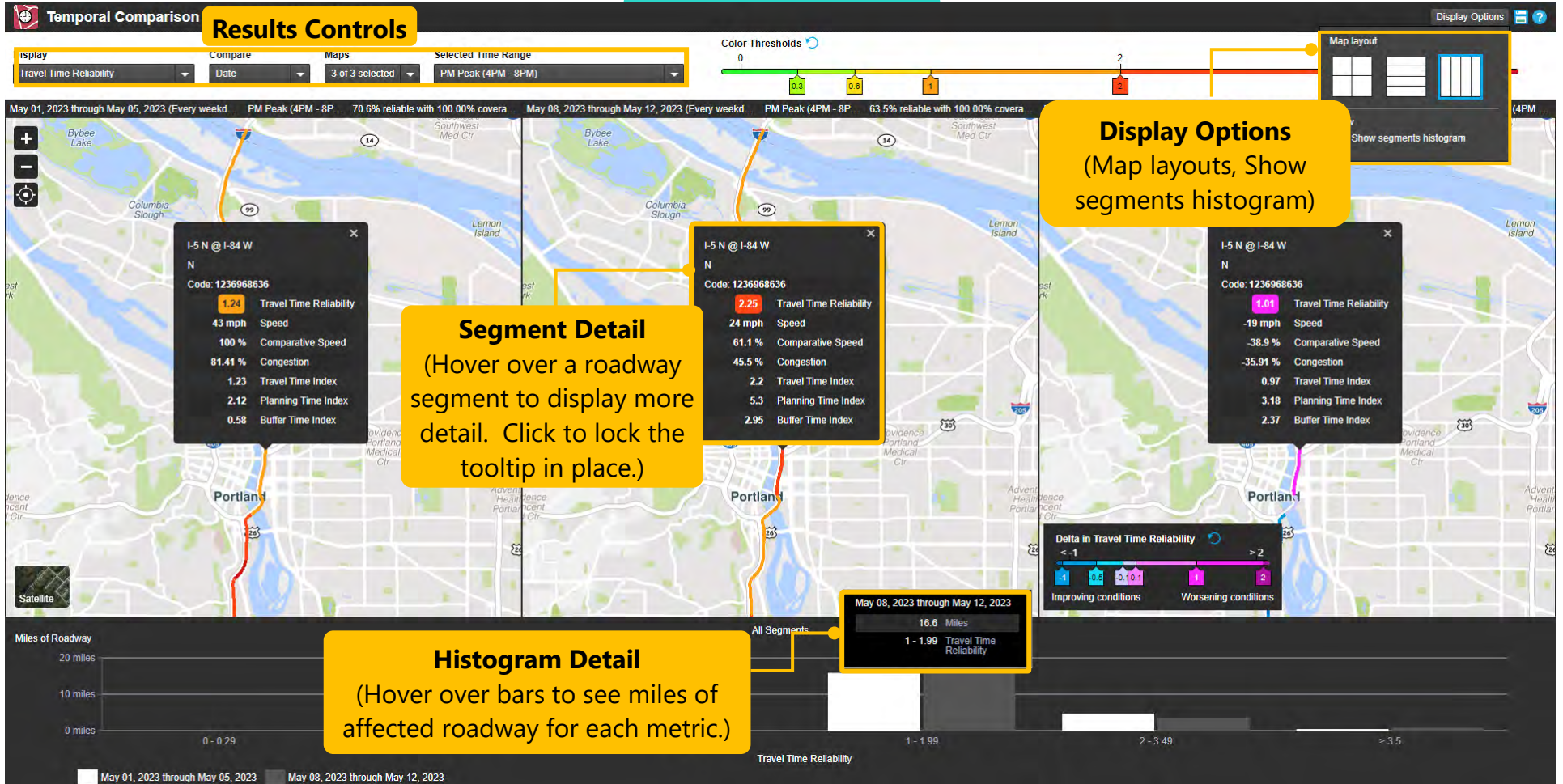
2. Select one or more time periods to analyze



Temporal Comparison Maps, Continued



RESULTS SCREEN





Temporal Comparison Maps, Continued



You can interact with your report using the following:

Results Controls - use the **Display** dropdown to select from a list of seven performance metrics, then use the **Compare** dropdown to select a date or time range. Next, choose the maps to display (available date + delta map) and what time ranges to use (five choices selected during the query process).

Color Thresholds - use the color slider tabs to modify the threshold colors for the selected metric.

Display Options - click the button to change the map layout, and to show a segments histogram.

Map - click on a roadway segment to display metric detail (your selected metric will be color-coded). Grab and hold the map to move around – all maps will recenter after the move. The values will update automatically as you select or unselect maps or change the Data Type (metric) in the drop-down. If you choose a Delta Map, a Delta Color slider appears that can be used to modify the metric thresholds and colors by moving the tags.

Histogram – hover over the bars to see number of miles of affected roadway for each performance metric range.

Save as – save the data as an XML file (for use in Excel). To save an image, take a screenshot.



Causes of Congestion Graphs

Building on [Congestion Causes](#), Causes of Congestion Graphs allows you to assess similar metrics on custom road and date selections (video tutorial not available)



- 1. Select roads** - choose *INRIX* from the dropdown.
 - Selection Options** - choose how to define your roads: by selecting a road, an entire region; or by a group of segment codes. You can also use map controls to define an area for analysis or use previously saved segment sets. In this example we selected I-5 from Exit 288 to end of road (from a Saved TMC set), then clicked the green "Add selected segment sets" button.
- 2. Select time periods** - use the dialog boxes or calendar icons to define the dates of your query. You can query up to a year's worth of data.

QUERY SCREEN

Causes of Congestion Graphs

Causes of Congestion Graphs allows you to discover the magnitude and contribution of various causes of congestion based on user delay cost. The primary causation categories include: (1) recurrent, (2) weather, (3) work zone, (4) incident, (5) signals, (6) holiday, (7) multiple causes, and (8) unclassified.

1. Select roads

TMC segments from **INRIX**

Road Region Segment codes Map Saved

Showing 51 of 387 available segment sets Display Options

Segment set	Segments	Owner
I-75 DDI	8	jallen35@umd.edu
I-75 DDI	432	jallen35@umd.edu
Colonial Blvd. DDI Work Zone	29	jallen35@umd.edu
CSB Demo for Complete Team - US-1	156	jallen35@umd.edu
ODOT Handbook - I-5 Use Case	568	jallen35@umd.edu
I-5 Portland, OR TMC Set	568	jallen35@umd.edu
Phila. to AC (ACE)	125	jallen35@umd.edu

! + Add selected segment sets

Your selected roads Remove all

I-5 between I-205/Exit 288 and Interstate Bridge

Directions:
 Northbound Southbound
Intersections: 147
 Entire Partial

From: Intersection To: Intersection

43 miles of roadway selected (126 TMC segments)
Segments from INRIX [Report a problem with this road](#)

Show segment IDs Save as segment set

2. Select a date range to analyze

05/01/2023 - through - 05/05/2023



Causes of Congestion Graphs, Continued



- 3. Select days of week** - check or uncheck the days you wish to include in your analysis.
- 4. Select time ranges** - use the sliders to define your time ranges (all day, AM peak, PM peak, etc.). Click the green "Add another time of day" to add more time periods.
- 5. Choose vehicle costs** - use the default values for average hourly cost or enter your own. *For Oregon hourly costs, \$27 and \$33 are recommended for passenger vehicles and commercial vehicles, respectively.*
- 6. Provide a title** (optional) – the title will appear on the results page and My History.
- 7. Notes** (optional) - add any notes then, click the green "Add Notes" button.

QUERY SCREEN, CONT'D.

3. Select days of week

Sun Mon Tue Wed Thu Fri Sat

4. Select one or more times of day

12:00 AM 12:00 PM 12:00 AM

6:00 AM 10:00 AM

12:00 AM 12:00 PM 12:00 AM

4:00 PM 7:00 PM

+ Add another time of day

5. Choose the average hourly cost for passenger and commercial vehicles

Passenger vehicles: \$ 27.00

Commercial vehicles: \$ 33.00

6. Provide a title for this report (optional)

Enter a title for the report that will appear in the results page and My History

7. Notes (optional)

+ Add notes

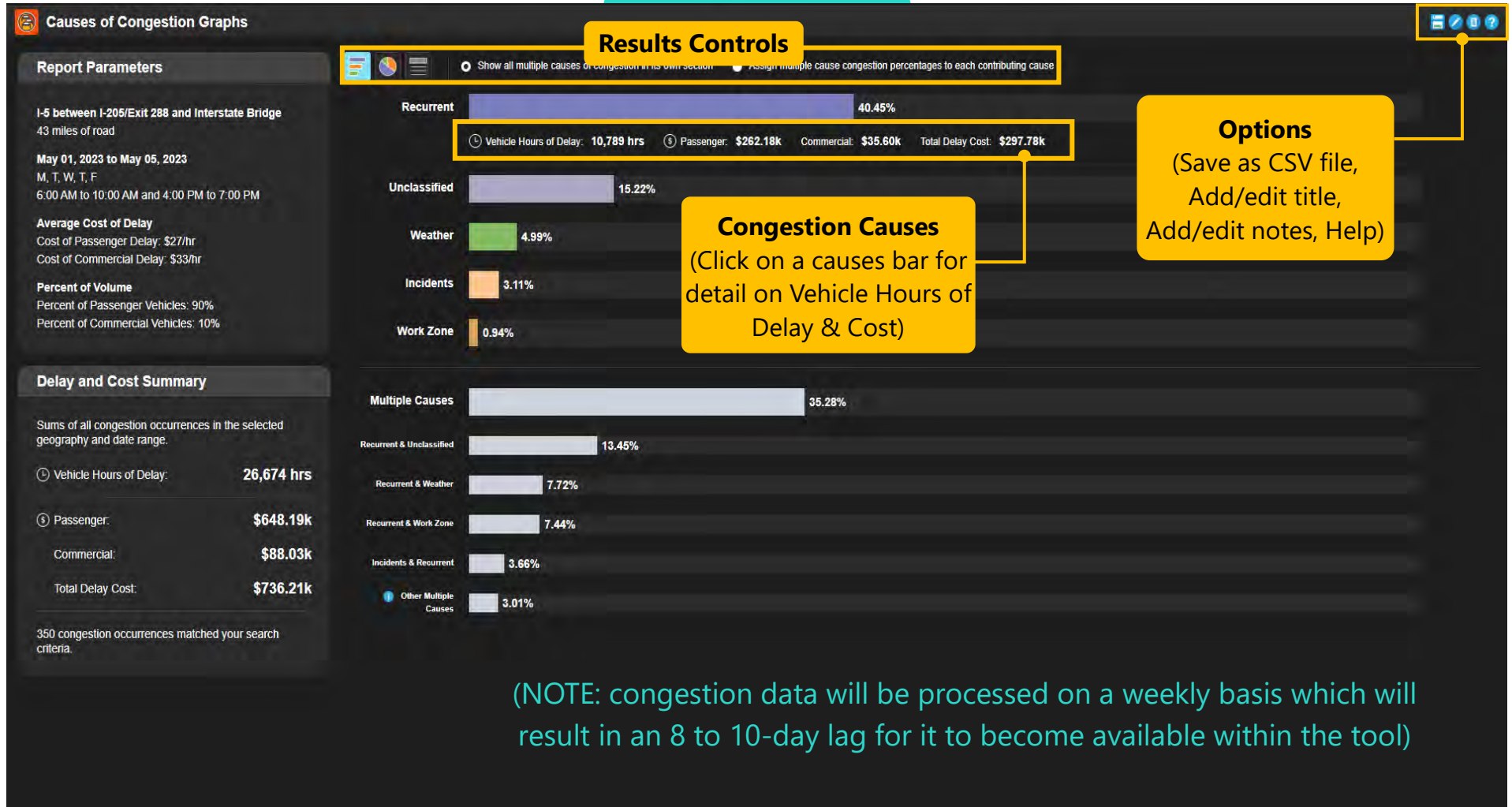
SUBMIT



Causes of Congestion Graphs, Continued

?

RESULTS SCREEN



(NOTE: congestion data will be processed on a weekly basis which will result in an 8 to 10-day lag for it to become available within the tool)



Causes of Congestion Graphs, Continued



You can interact with your report using the following:

Results Controls – use the three icons on the left-hand side to view bar chart (example shown on previous page), pie chart and table (examples on following pages). Click on the radio buttons to display all causes of congestion in one graph section (above) or assign multiple-cause congestion percentages to each contributing cause, which will display percentage ranges.

Results Summaries – two sidebars summarize information – “Report Parameters” shows a summary of input parameters, and “Delay and Cost Summary” summarizes the total Vehicle Hours of Delay, along with Passenger and Commercial vehicle congestion costs.

Causes of Congestion chart - the result page displays the breakdown of the causes of congestion. Click on a category to get information pertaining to vehicle hours of delay and cost for that category.

Save as - save the data in a CSV file. You can also save an image by taking a screenshot of the chart or table.

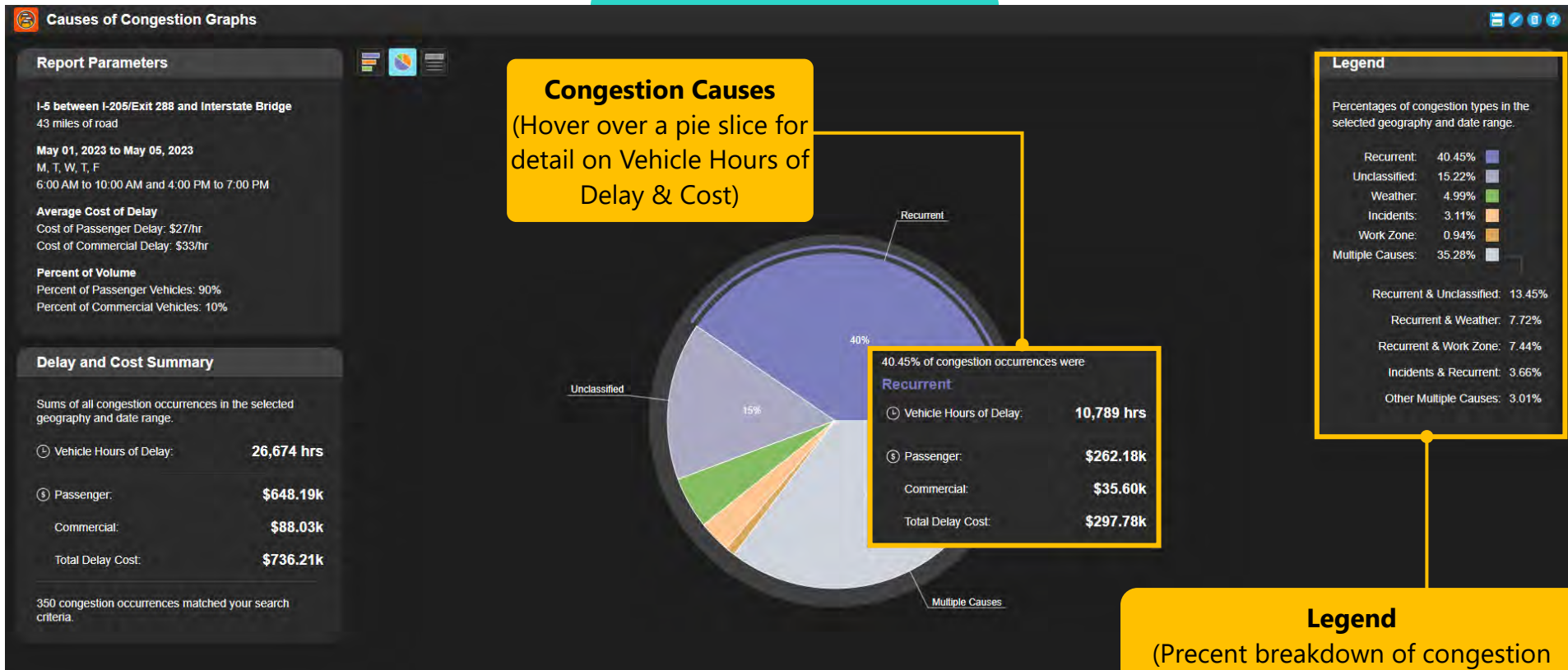
Edit Title - click to open the title bar to edit or add a title for your results.

Edit notes - click to open a notepad for adding notes about the query and/or results (charts or table).

Help – click to go to the “Causes of Congestion Graphs” help pages.



PIE CHART RESULTS SCREEN



Pie Chart

In the pie chart view, details of each category can be discovered by hovering the mouse over the category of interest. When using the pie chart, a legend is available on the right side of the chart. Here you can view the color scheme used to represent each causation category. Further details on the top four most common multiple-cause categories are also provided.



TABLE RESULTS SCREEN

Report Parameters

I-5 between I-205/Exit 288 and Interstate Bridge
43 miles of road

May 01, 2023 to May 05, 2023
M, T, W, T, F
6:00 AM to 10:00 AM and 4:00 PM to 7:00 PM

Average Cost of Delay
Cost of Passenger Delay: \$27/hr
Cost of Commercial Delay: \$33/hr

Percent of Volume
Percent of Passenger Vehicles: 90%
Percent of Commercial Vehicles: 10%

Delay and Cost Summary

Sums of all congestion occurrences in the selected geography and date range.

- Vehicle Hours of Delay: **26,674 hrs**
- Passenger: **\$648.19k**
- Commercial: **\$88.03k**
- Total Delay Cost: **\$736.21k**

350 congestion occurrences matched your search criteria.

Causes of Congestion	Percentages	Vehicle Hours of D...	Cost of Passenger Del...	Cost of Commercial D...	Total Cost of Delay
Holiday	40.45%	10,789 hrs	\$262.18k	\$35.60k	\$297.78k
Incidents	15.22%	4,060 hrs	\$98.65k	\$13.40k	\$112.05k
Weather	13.45%	3,586 hrs	\$87.15k	\$11.84k	\$98.98k
Work Zone	7.72%	2,059 hrs	\$50.04k	\$6.80k	\$56.84k
Signals	7.44%	1,985 hrs	\$48.23k	\$6.55k	\$54.79k
Recurrent & Weather	4.99%	1,331 hrs	\$32.34k	\$4.39k	\$36.73k
Recurrent & Work Zone	3.66%	977 hrs	\$23.74k	\$3.22k	\$26.96k
Weather	3.11%	831 hrs	\$20.18k	\$2.74k	\$22.93k
Incidents & Recurrent	1.8%	481 hrs	\$11.68k	\$1.59k	\$13.27k
Incidents	0.94%	252 hrs	\$6.12k	\$831.08	\$6.95k
Recurrent, Weather & Work Zone	0.58%	156 hrs	\$3.79k	\$514.24	\$4.30k
Work Zone	0.4%	107 hrs	\$2.59k	\$352.32	\$2.95k
Weather & Work Zone	0.23%	61 hrs	\$1.49k	\$202.23	\$1.69k
Incidents & Weather					
Incidents & Work Zone					

- List all causes
- List all causes
- Holiday
- Incidents
- Weather
- Work Zone
- Signals

List of Causes
(Use this dropdown to filter a cause and sub-causes)

Table

The table view displays all single and multiple-cause categories. The table can be filtered to only list causes that contain a specific single-cause category. As with the bar chart, the filter provides a minimum and maximum range for each single-cause category.



MAP-21

The MAP-21 tool uses Dashboard widgets to provide maps and graphs (that help set targets and track progress) and a form that allows states to generate reports suitable for submission to FHWA (find out more [here](#))



Creating a MAP-21 Dashboard – when you first click on the MAP-21 selection in PDA Suite, you will be taken to the query screen. A notice will appear, informing you that results less than ~100% are caused by incomplete speed limit data or missing travel time data. To provide speed limit data, please follow the procedure described here or contact us at intake@ritis.org.

Clicking OK will remove the notice and reveal the query screen.

NOTICE SCREEN

Notice

Please be aware that some PHED results may be generated using less than 100% of the NHS system in the area of interest.

2017 Annual Hours of Peak Hour Excessive Delay Per Capita for Detroit (MI)

Detroit, MI

MAP-21 Annual Hours of Peak Hour Excessive Delay Per Capita

2017 Target: less than 15h

Year-to-Date 2017: 13h 53m

Target: The system should have a PHED per capita less than 15h

Calculated using 99.95% of miles in Detroit

Updated Mar 7, 2018 9:55 AM (30r ago)

This percentage can be viewed in the bottom left corner of each widget as shown in the red box above.

Results less than ~100% are caused by incomplete speed limit data or missing travel time data. To provide speed limit data, please follow the procedure described [here](#) or contact us at intake@ritis.org.

Click [here](#) to learn more about the inputs for these calculations.

Don't show me this message again.

OK



MAP-21, Continued



1. **Select geography** - choose your state, a Metropolitan Planning Area (MPO Region) or UZA (Urbanized Area)
2. **Select measures** - choose one or more reliability measures (Interstate, Non-Interstate and Truck), and set your target values. When selecting a UZA can choose Annual Hours of Peak Hour Excessive Delay Per Capita, set a target (hours), and choose from two different evening peak periods.
3. **Select one or more years** - choose a year that you would like generate results, then click "Add time period."
4. **Show data as** - choose to display the results in a graph, map, or both.
5. **Name MAP-21 widgets** - the names for your widgets will be auto-generated.

+ ADD WIDGET

QUERY SCREEN

The screenshot shows the MAP-21 Query Screen interface. It is titled "MAP-21" and includes a header with a logo and a message: "Our MAP-21 tools are fully up to date with the final MAP-21 ruling. Learn about them in our [blogs](#), [guides](#) for notices, FAQ's, and the upcoming certification cycle." The screen is divided into five main sections, each highlighted with a blue box and a callout line:

- 1. Select geography:** Includes radio buttons for "State" (selected), "MPAs", and "UZAs". The "State" dropdown is set to "Oregon".
- 2. Select measures:** Includes three checked checkboxes: "Percent of the Person-Miles Traveled on the Interstate That Are Reliable (the Interstate Travel Time Reliability measure)" with a target of "90.0%", "Percent of the Person-Miles Traveled on the Non-Interstate NHS That Are Reliable (the Non-Interstate NHS Travel Time Reliability measure)" with a target of "90.0%", and "Truck Travel Time Reliability Index (for interstate roads only)" with a target of "1.50". There is also a link for "Annual Hours of Peak Hour Excessive Delay Per Capita".
- 3. Select one or more years:** Includes a dropdown menu set to "2020" and a green "+ Add time period" button with a yellow warning icon.
- 4. Show data as:** Includes two checked checkboxes: "Graph" and "Map".
- 5. Name MAP-21 widgets:** Lists three auto-generated widget names: "Interstate Travel Time Reliability for Oregon", "Non-interstate NHS Travel Time Reliability for Oregon", and "Truck Travel Time Reliability Index for Oregon".

At the bottom right, there is a blue "+ ADD WIDGET" button.



MAP-21, Continued



RESULTS SCREEN

Controls

2020 Interstate Travel Time Reliability for Oregon

MAP-21 Percent of the Person-Miles Traveled on the Interstates That Are Reliable (the Interstate Travel Time Reliability measure)

2020 Target at least **90.0%** Year-to-Date 2020 **93.9%**

Target: At least 90% of the system should have a LOTTR less than 1.50

Calculated using 100.00% of miles in Oregon
Data source: NPMRDS INRIX

2020 Non-interstate NHS Travel Time Reliability for Oregon

MAP-21 Percent of the Person-Miles Traveled on the Non-Interstate NHS That Are Reliable (the Non-Interstate NHS Travel Time Reliability measure)

2020 Target at least **90.0%** Year-to-Date 2020 **93.9%**

84.8% January

Target: At least 90% of the system should have a LOTTR less than 1.50

Calculated using 99.91% of miles in Oregon
Data source: NPMRDS INRIX

2020 Truck Travel Time Reliability Index for Oregon

MAP-21 Truck Travel Time Reliability Index (for interstate roads only)

2020 Target at least **1.50** Year-to-Date 2020 **1.28**

Target: The system should have a TTR less than 1.50

Calculated using 100.00% of miles in Oregon
Data source: NPMRDS INRIX

Segment Detail
(Click on a segment to display detail.)

Graph Settings

- Show Year: 2020
- Show Visualization:
 - Total
 - Graph
- Show years chronologically
- Show trend line

Map Settings

- Show on map
- Map controls

93.9% Reliable

1.00 1.00 1.25 1.50 1.75 2.00+

1.28



How to use MAP-21's widgets:

Graphs – first, look at the “calculated using X percent of miles in Oregon” at the bottom left-hand corner of the chart. It should be very close to or at 100%. At the top of the graph, you’ll see the target value set in the query, and the year-to-date target value, with a “thumbs-up” or “thumbs-down” to indicate whether the target is being met (the target is spelled out just below). Next, a bar graph is shown, with values represented by green or red bars, depending on whether the target was met for that month. Hover over a bar to get the monthly measure. Finally click on the “Show map...” icon to see a map of your geography. Save as Excel file or screenshot. **NOTE:** CSVs from graphs will only show the metric values per month.)

Use the **Controls** in the upper right to create a PM3 Report, Add a widget or Select a Dashboard.

Use **Settings** on the graph, edit the graph (Show Year, Totals, Graph, and Show years chronologically and Show trend line); **Edit** will open a new query screen for input; **Save** will create an Excel CSV file and Metadata Text Document, and **Help** will take you to the MAP-21 [help page](#).

Maps - The MAP-21 map widget will display each segment in the selected geography, color-coded based on the degree to which they satisfy (or do not satisfy) your target threshold. The percentage shown in the upper-right corner represents the geography's overall adherence to the target.

Use the zoom controls (or mouse wheel) to see more detailed geography. Hover over any segment to see more detail. Use the **Settings** control to display the Map controls and display one to all colored segments – good for visualizing those not satisfying target thresholds. **Save** creates a compressed file with metadata and a CSV including the full information of included segments and all calculations of the selected MAP-21 metric.



RITIS Templates

The [RITIS Templates](#) gallery provides everything you need to create informative, professional performance reports that are easy to read and easy to understand.

Many agencies have taken advantage of this special RITIS feature and find them useful in “telling an effective story” to peers, upper management, senior leadership, the public and the media.

Each report package includes:

- A Basic Template
- Design Resources
- Agency Use Case Examples*
- A Step-by-Step How-to Guide

To get started, click on any of the report icons.

* These examples contain fully editable reports that you can also use to create your own report.



RITIS Templates, Continued

The **Overview** section contains links to Templates, Design Resources and a selection of Agency Use Cases that will give you everything you need to build a report for your situation.

To create a good report, you'll first want to gather information such as news media stories, pictures taken by your agency, field personnel notes or other available material. This additional intel will help tell your story more accurately and completely.

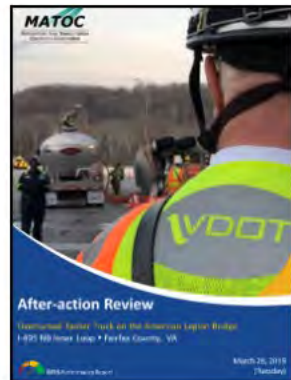
Use a template and design resources documents, along with results from RITIS tools to create your report – an easy-to-follow, step-by-step How-to Guide makes running the tools, getting results, and putting everything together a snap.

Your report can now be shared with virtually any audience – RITIS Performance Reports are designed to be clear, concise, and easy to understand.

After Action Review

Use this template package along with RITIS tool results and your agency's content to create an after-action review report, including front and back covers, an event high-level summary page and an impact evaluation page that graphically depicts mainline and regional impacts, delay costs, vehicle hours of delay, key takeaways, and more. There are also several use case examples with varying levels of event complexities and some more technically-oriented report examples.

Overview



1. Click to download the PowerPoint template to create an after action review of a major incident.



Download Template



Download Design Resources

2. Download Agency Use Case examples below to see how other agencies have used these templates or have created similar reports using content from RITIS:

- [MATOC Overturned Tanker Truck on the American Legion Bridge \(using this template\)](#)
- [GDOT I-75 Pedestrian Fatality \(executive-level template\)](#)
- [MATOC Vehicle Collision and Truck Fire on the Woodrów Wilson Bridge \(1 technical, 3 executive templates\)](#)
- [massDOT Truck Bridge Strike I-95 SB at Exit 30B \(includes Trend Map animation\)](#)
- [massDOT Vehicle Collision on WB I-290 \(executive-level template\)](#)

3. Scroll down to learn how to create this report or click on the 'How To Create Report' in the navigational menu.



RITIS Templates, Continued

The **RITIS Template download** is a fully editable MS PowerPoint report that you can use to build your own report, following the instructions in the How-to Guide (AAR Incident Summary, front page shown here).

AAR Icons/Graphics

These icons were obtained from the PowerPoint Icons Library (or custom made) and added to the reports to give them a certain look and style. You can simply right-click on each icon to copy it, then paste it into your template (as a Picture). Change the color of each icon by clicking on it, then click Graphic Format on the Menu bar, then click Graphics Fill. You can also select other icons from the PowerPoint library, use your agency's, or create your own unique icon set.

To find other icons in PowerPoint you may want to use, follow these steps:

1. On the Tab Menu, click Insert then click Icons:
2. Click on an icon, then the Insert button:
3. Use the icon as is, or modify it (crop, etc.):

Incident Types

Incident Location (on Map)

Response Vehicles

Congestion

Equipment

Personnel

Roadway/Vehicle/User Impact

Specialized

Weather

These icons can be edited to show what lanes were affected during an event, what time it occurred and DMS lane status.

The **Agency Use Case examples** section contains links to a selection of fully editable MS PowerPoint reports that you can also use for your own reporting purposes (MATOC Incident Summary - front page - shown here).

Incident Summary (add event description here)

Agency logo here

Roadway Location, County, State • Date

Add location map here

Briefly describe what happened...

Summarize how the event affected traffic...

Summarize any key points about the event response & management...

Briefly mention important outcomes...

Add image here

Add image here

Add image here

Incident Timeline | Show Total Elapsed Time here for the event, (e.g., from 1st detection to traffic returning to free-flow conditions)

Add a timeline here - the **Design Resources** document has two, editable timeline graphics:

- A simple timeline with hourly tic marks to help related to the incident response and clearance
- A TIM element timeline with incident elements and timeline structure that was developed by the USDOT ITS Joint Program Office and includes key incident measures and times

Add a legend here

The **Design Resources download** can include custom icons and graphics, and simple, illustrated examples of how to hyperlink text or objects, add ToolTips (ScreenTips) or embed code to make your report more robust and informative (AAR Icons/Graphics shown here).

MATOC Metropolitan Area Transportation Operations: Coordination

Incident Summary Vehicle Collision & Fire on the Woodrow Wilson Bridge
Occurred on the I-95/495 NB Outer Loop in Prince Georges County, MD • Wednesday, June 20, 2018

The incident occurred at about 10:45 AM, with traffic back to normal about 10:31 PM.

A tractor trailer hit two utility vehicles on the Woodrow Wilson Bridge.

The I-95/I-495 NB Outer Loop on the bridge was closed for 10 hr, 20 min.

17 agencies and over 100 responders actively participated in this operation.

One of the utility vehicles caught fire from a fuel leak.

A work crew trapped below the bridge had to be rescued.

There were 12mi backups NB into VA, and 4mi backups SB into MD.

Injuries included:
• 1 fatality
• 3 hospitalized
• 7 treated & released

3x to 8x
Increase in travel time on alternate routes for the day of the accident is typical free-flow conditions.

59K - 74K
(232% - 338%)
Increase in vehicle-hours of delay for the region on the day of the accident vs normal June Wednesdays.

\$1.79M - \$2.22M
(232% - 338%)
Increase in delay cost for the region on the day of the accident vs normal June Wednesdays.



RITIS Templates, Continued

The **Tools Used in This Report** section lists what RITIS tools were used to create the performance results. Click on a tool name to watch a video tutorial on how to query data and get the results.



Tools Used In This Report (click on the links for a brief video tutorial on using a tool)



Congestion Scan

Analyze conditions on one or more stretches of roads or corridors.



Event Query Tool (optional)

Find events for a specific time range and geography, along with visualizations and operator/responder summaries.



Performance Charts

Visualize performance metrics in a variety of charts - line, bar, candlestick, etc.



Trend Map

Create animated maps of probe data performance metrics over the course of time.



User Delay Cost Tool

Produce reports of seven different performance metrics for different time periods (each day of week, all weekdays, etc.)



Microsoft Powerpoint

Used to edit images and present report.

The **Design Recommendations to Keep in Mind** section contains selected "Lessons Learned" from [FHWA's Performance Reporting Prototype Technical Report](#) that reinforce key aspects as you build your own report.



Design Recommendations To Keep In Mind

We've strived to make the Guides simple and easy to understand, but if you have any questions or need help, please contact us at support@ritis.org. To start off, we think these abbreviated Lessons Learned from [FHWA's Performance Reporting Prototype Technical Report](#) are very instructive and important to keep in mind:



Tailor report content and format to engage and inform your audience

- Keep reports for the general public engaging and simple
- Reserve greater complexity for professional transportation audience
- Consider how the audience experiences transportation - the general public typically doesn't care about agency business process silos



Relevant, easy-to-understand graphics are likely to be shared

- "Single issue, single page" graphics-heavy infographics are a valuable tool to draw in a larger audience



Snapshots are not enough

- Make sure to include trends and contextual information
- Link to actions being taken by the organization



Don't emphasize appearance over effectiveness

- Information should be conveyed clearly and concisely
- Simplicity over embellishment is usually best



Tell a story so the data comes alive

The story must be delivered at the right technical level for the audience and targeted on an area of interest



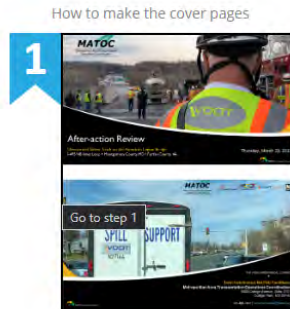
RITIS Templates, Continued

The **How to Create a Report** section contains the steps you'll need to construct every aspect of a report – from report covers to summary pages to performance detail pages.



How to Create the Report

Click on each numbered box below to learn how to create the content in each section and how we used RITIS to generate charts and produce performance data.



Each section provides step-by-step instructions with illustrations. Clicking on a magnifying glass icon resizes an image so you can see detail. There are also helpful hints (shown with a blue arrow ▶) and Tips – just hover over the light bulb icon.



Learn more about RITIS Templates by clicking [here](#).

- Corridor Performance Report
- Monthly Congestion Report
- Project Assessment Report
- Top 10 Bottlenecks Report
- After Action Review
 - Overview
 - Tools Used in This Report
 - Design Recommendations
 - How To Create The Report
- Holiday Travel Forecast

2 How to make the Incident Summary page

a Open the Incident Summary page template

- Open the Incident Summary page template
- Gather some images of the incident, related items (download Design Resources for "uphill" and "location" map. You will also be using the Event Query Tool to gather operators' logs, responder's timetable and an incident timeline graphic) (see step 4b). Next, choose one of the two timeline graphics available in the Design Resources packet (I chose your own timeline or other graphic/table or other information).
- If your agency does not provide the data to run EQ1, or if the data there is lacking, you will have to gather operator's logs and responder's timetables from your TMC/ATMS.

b Add an agency logo, heading, location map, images, icons, and some summary text

- Fill in the top half of the Summary page by adding your Agency's logo, a heading (what happened, where, and when it happened) and a simple location map.
- For the Location Map, we used a screenshot from a RITIS Map, added some large route shields and a crash icon to show its approximate location.
- We then added four icons across the top of the image, parentheses from the IAR Icons/Graphics page – an overturned tanker "leaking fuel", a clock (with the time set to the approximate time when the incident occurred), a roadway section (with the NB direction colored red to show impact) and an emergency.
- We then added brief narrative to summarize what, where and when things happened.
- Next, we added images (obtained from the Agency, or ones gathered from images from the Media content in RITIS Incident Timeline (see below), then captioned them. We also added a lock box behind the images to give them more definition.
- The top half of the Incident Summary is now complete.

Appendix

Appendix A – INRIX Data License Terms

Agency/ODOT

Agreement No. 33855

Attachment A to Exhibit C Additional Terms and Conditions License Agreement

It is the intent of this contract to secure for Sublicensee, and their officially designated representatives' full rights to the traffic data to use in support of internal organization operations

consistent with the organizations' traffic management, planning, and operations responsibilities subject to the following terms and conditions. INRIX data license terms apply to all data services

detailed in the License Agreement between INRIX and Agency.

- 1.** INRIX, Inc., a Delaware corporation (and its suppliers) shall retain all intellectual property and other rights with respect to the INRIX Products and all related and derivative technology.
- 2.** The INRIX license granted hereunder shall be for use solely by Sublicensee as part of its projects with Agency, and shall be nonexclusive, nontransferable and non-sublicensable. All presentations of the INRIX Products by the Sublicensee, with the exception of travel times on roadway signing, shall contain proprietary notices and logos and/or website links of INRIX and/or the INRIX suppliers in a form reasonably provided by INRIX from time to time. A single notation within a report that contains INRIX data and single logo on web pages that draw from INRIX data is acceptable. All use by Sublicensee customers shall be made available by the Sublicensee free-of-charge.
- 3.** All INRIX Products are provided "AS IS", "with all faults", "as available" and without warranty or obligation of any kind, and to the maximum extent permitted by law, any and all representations, warranties and conditions of any kind whatsoever (including express, implied or statutory warranties of merchantability, fitness for a particular purposes, title, accuracy or quality) are expressly excluded.

Appendix A – INRIX Data License Terms

4. The INRIX Products shall be the designated products that INRIX and Agency have expressly agreed upon in writing, and which INRIX customarily provides to its other customers (and which is therefore subject to modification from time-to-time).

5. The INRIX Products shall not be merged or combined with any other traffic data not provided by INRIX in a manner to produce a merged speed or travel time value without permission from INRIX. The INRIX Products may not be resold or openly posted to the public such that it would be available to private sector competitors of INRIX. INRIX shall not have any specific on-the-ground responsibilities.

6. If INRIX receives data from the Sublicensee hereunder, INRIX shall not receive any personally identifiable information in relation to the data (or the PII component would be deleted prior to transmission to INRIX).

7. Neither party nor its direct or indirect suppliers shall, under any circumstances, be liable to the other or its customers or any other third parties for consequential, incidental, special, punitive or any indirect damages (including damages for lost profits or anticipated revenues, business interruption or loss of business information) arising out of or related to the INRIX Products, or for any damages whatever arising out of or in relation to any malfunctions, data delays, loss of data or interruption of service, even if advised of the possibility of such damages, or if such possibility was reasonably foreseeable.


8. INRIX's suppliers shall not have any liability whatever in relation to the use of the INRIX Products hereunder. INRIX and its suppliers shall not be liable for any claim, loss or penalty resulting from use or delayed delivery of the INRIX Products by or to Sublicensee customers, and the Sublicensee would use all reasonable efforts to ensure such limited liability in its end user license agreements (or other applicable terms) with those customers, if any.

9. Under no circumstances shall INRIX's aggregate liability for all claims, acts and/or omissions arising out of related to this Agreement, regardless of whether any claim or action is based on contract, tort or otherwise, exceed the total amount paid by the Sublicensee to INRIX during the 12-month period prior to the date on which the claim arose.

Appendix A – INRIX Data License Terms

10. There shall be no withholding or offsets by the Sublicensee with respect to any compensation due to INRIX, and no state income or other taxes withheld. INRIX reserves the right, at its sole discretion, to use third parties to provide data and services hereunder. Neither party shall be responsible for failures or delays due to circumstances beyond its reasonable control, except for the obligation to pay monies due. The parties each agree to do all things reasonably necessary to effectuate the intent of these terms, and to act in good faith.

Appendix B – RITIS Frequently Asked Questions

 RITIS FAQs [here](#)

Appendix C – Example Use Case for RITIS Tools & Templates: Armed Carjacking and Police Pursuit on I-5

1. Gather background info

Identify the date of the incident (Monday, Dec 6, 2021), collect as much information as possible about the incident through news coverage.

2. Run User Delay Cost Analysis*

User Delay Cost Analysis

1. Select roads

2. Select a time period to analyze

3. Select volume data source

4. Confirm the average cost and percent of volume for passenger and commercial vehicle types

5. Define where delay should be calculated

6. Calculate user delay cost against

7. Provide title

8. Notifications

3. Use the results with a RITIS template to create a report

I-5 closed in North Portland (near Rosa Parks Way) Monday, December 6, 2021

Armed carjacking suspect fleeing police drove wrong way on I-5, shot at person in another vehicle, and was fatally shot by police.

Injuries included:

- 1 fatality
- 1 wounded

I-5 NB & SB lanes were shut down from 10:30 AM to 5:30PM (7 hours) for crime scene investigation.

I-5 traffic re-routed: WSDOT re-routed I-5 SB traffic across Oregon to I-205. ODOT rerouted I-5 N traffic to parallel routes.

<p>Widespread congestion on Multnomah Co and Clark Co roadways WSDOT officials reported 10-mile back-ups on I-205 SB during early PM rush hour traffic</p>	<p>20,900 hr (+95%)</p> <p>Multnomah County 90-95% increased in vehicle-hours of delay and delay cost on the day of the incident vs normal Mondays</p>	<p>\$618k (+90%)</p>	<p>25,700 hr (+430%)</p> <p>Clark County 430% increased in vehicle-hours of delay and delay cost on the day of the incident vs normal Mondays</p>	<p>\$809k (+430%)</p>
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* Run separate analyses for Multnomah and Clark Counties

To see more RITIS templates, design resources, agency use cases and step-by-step how-to guides, click [here](#).