



Session 16: Transportation Data Solutions to Fit the Needs of Oregon's Future



Oregon State University
CH2M Hill Alumni Center

RITIS for Project Planning, System Monitoring and Incident Analysis

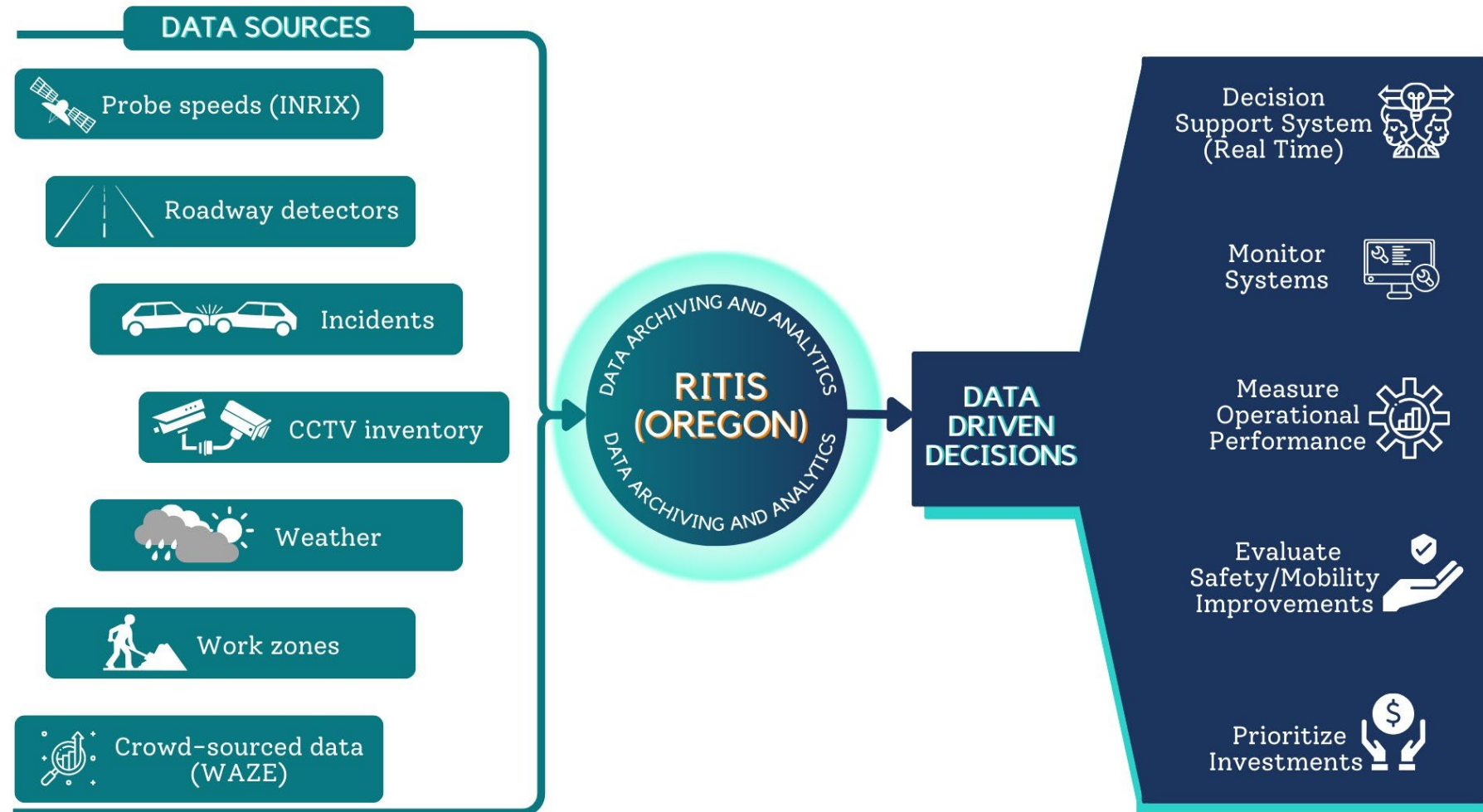
Chi Mai, PE

Transportation System Analysis Engineer

March 5, 2024



Regional Integrated Transportation Information System (RITIS)



Who can access RITIS?

Public agencies within
Oregon and Clark
County, WA

Consultants and
Universities working
on a public agency
contract

RITIS Use Cases

- Covid traffic data reporting
- Region 1 Traffic Performance Monitoring
- Before-After analysis
- Work zone traffic monitoring
- Safety corridor traffic evaluation (excessive speeds)
- Traffic model calibrations

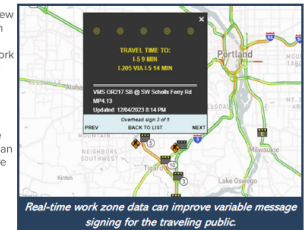
Oregon Department of Transportation: Region 1
December 2021

RITIS FOR WORK ZONE MANAGEMENT

RITIS has numerous tools to help construction traffic managers monitor and respond to work zone traffic issues as they occur, and anticipate and reduce work zone delays as construction plans are prepared.

Monitoring and Responding to Work Zone Delays

By giving construction offices a real-time view of traffic conditions at highway construction sites, RITIS significantly reduces the time, effort and personnel needed to monitor work zones. In the past, probe cars driving back and forth through construction zones were often used to monitor traffic delays. Using RITIS, construction managers can now monitor work zone queues, delays, and speeds from their desks, with a click on the RITIS map. And, traffic management staff can set notifications in RITIS so that they receive an immediate notice of traffic delays that exceed established thresholds, such as 20 minutes on weekdays or 15 minutes on weekends.



Anticipating Work Zone Traffic Issues

RITIS is also helpful to plan for cases when known events coincide with construction activities. For example, we can use historic data for holiday travel dates to anticipate how heavier volumes or different peak periods over a holiday weekend might impact travel through a work zone. Adjusting work zone traffic control before problems occur helps to minimize delays for the traveling public.



Post Action Evaluation of Work Zone Decisions

Using RITIS, we can look back to see how drivers responded to different traffic control strategies and official detours. For example, RITIS can help to compare tradeoffs between complete highway closures to get the work done fast and partial closures that extend traffic impacts over a longer period. This forensic information helps us know where to focus attention on secondary roads if those same traffic management strategies are used again. And, if a certain strategy was not effective, RITIS can help us understand why, so the strategy can be altered, or avoided, in the future.



















Example User Delay Cost Evaluation for OR-217, from US-26 to I-5

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	\$2.4M	\$2.1M	\$2.2M	\$2.2M	\$2.6M	\$2.4M	\$1.9M	\$1.7M	\$2M	\$2M	\$2.3M	
2022	\$0.9M	\$1.4M	\$1.3M	\$2.7M	\$2.2M	\$2.3M	\$2M	\$3.1M	\$2.8M	\$2.6M	\$2.4M	\$2.8M
2021	\$0.3M	\$1M	\$0.8M	\$1M	\$0.9M	\$1.3M	\$1.3M	\$1M	\$1.1M	\$1.3M	\$1.6M	\$2.2M
2020	\$1.5M	\$1.2M	\$0.4M	\$0M	\$0M	\$0.1M	\$0.2M	\$0.3M	\$0.4M	\$0.6M	\$0.6M	\$0.9M

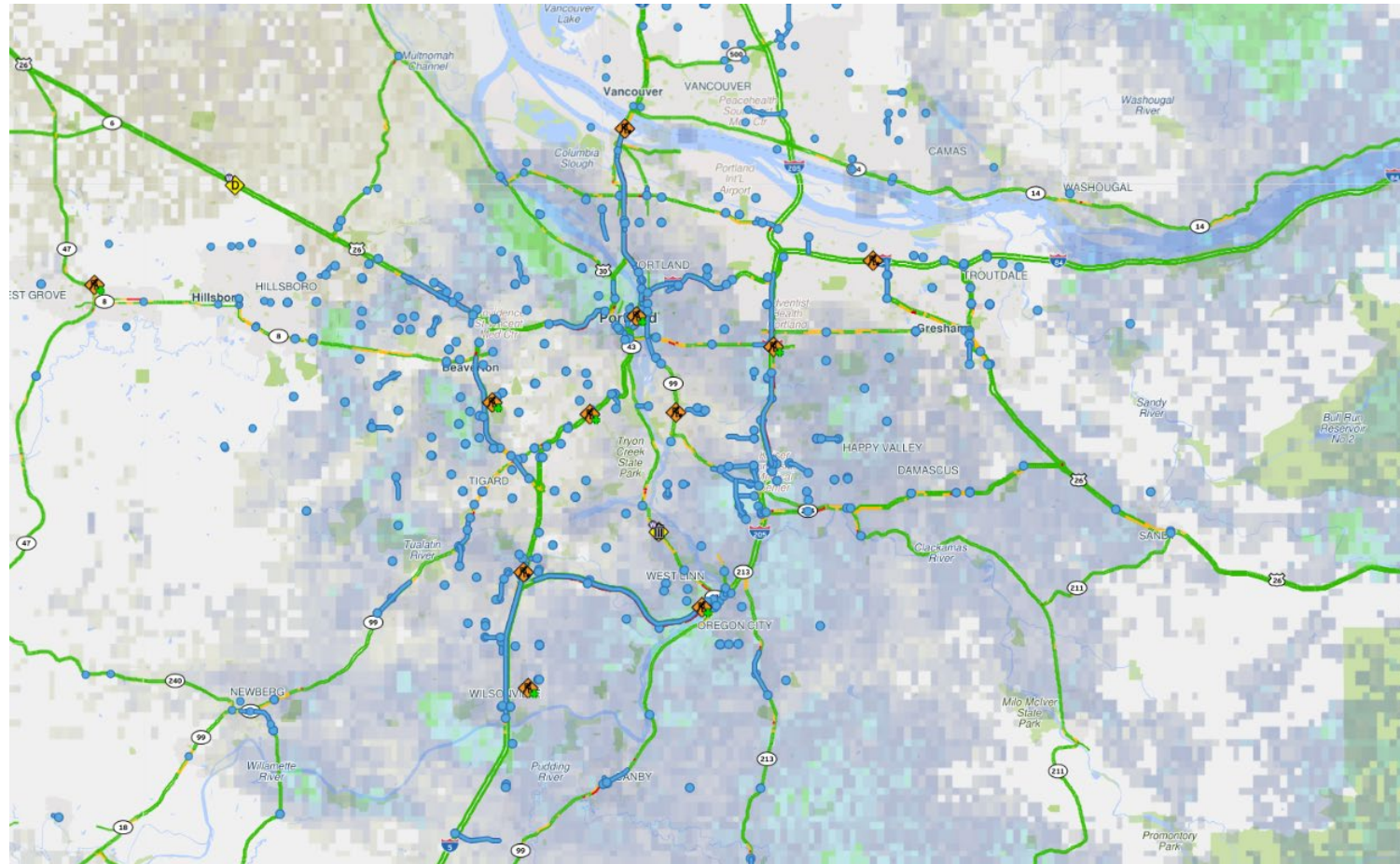
RITIS Demo



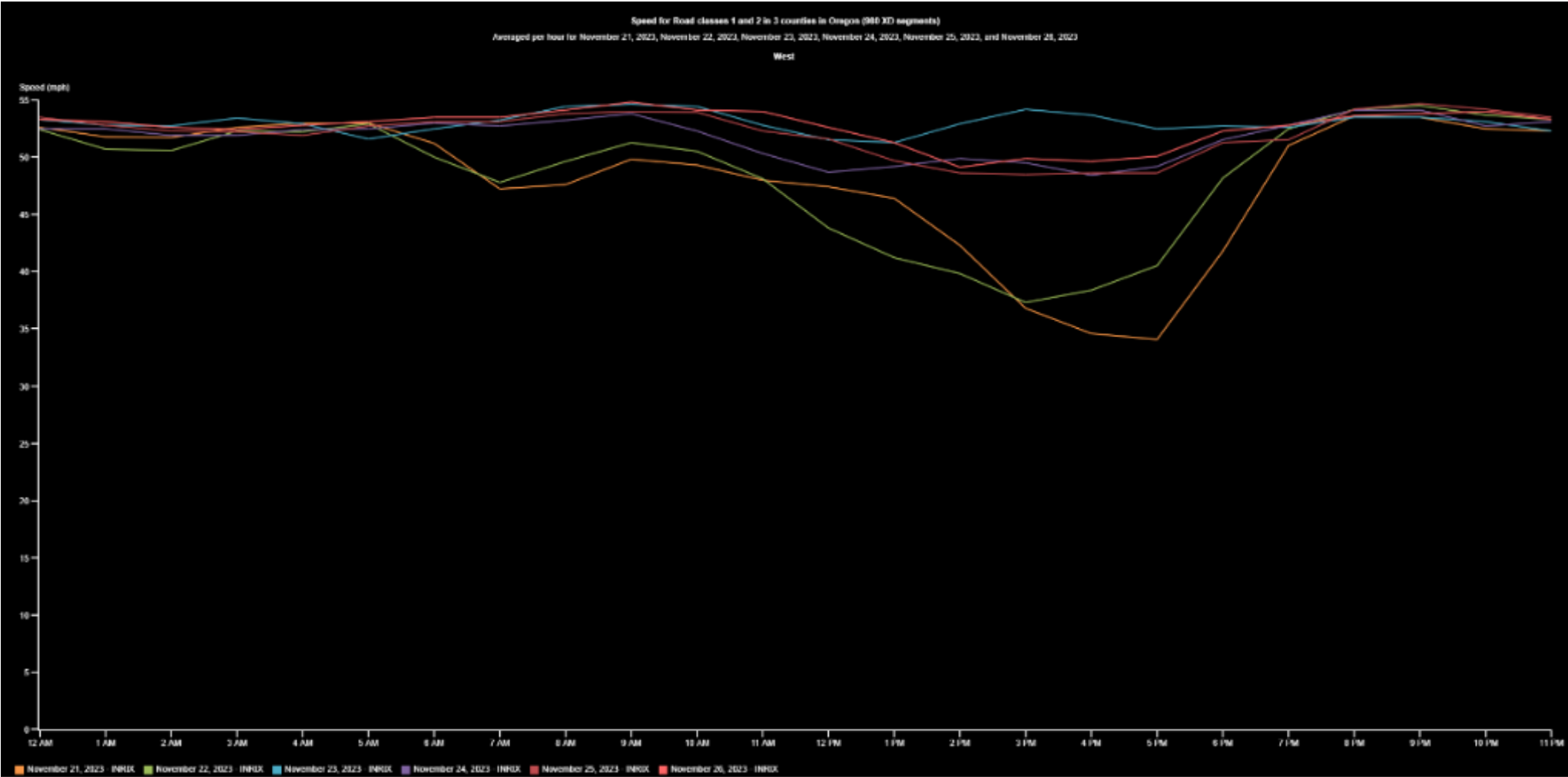
What's New
11/1/22

 REGION EXPLORER Explore the relationships between bottlenecks and traffic events in real-time and in the past. Tutorial Help	 MASSIVE DATA DOWNLOADER Download raw probe data from our archive for offline analysis. Tutorial Help History
 CONGESTION SCAN Analyze the rise and fall of congested conditions on a stretch of road. Tutorial Help History	 CORRIDOR TIME COMPARISON View congestion metrics as a function of location on a road. Help History
 TREND MAP Create animated maps of roadway conditions. Tutorial Help History	 PERFORMANCE CHARTS Chart performance metrics over time. Tutorial Help History
 PERFORMANCE SUMMARIES Report on Buffer Time Index, Planning Time Index, and other performance metrics. Tutorial Help History	 BOTTLENECK RANKING Rank bottlenecks and discover which ones have the greatest impact. Tutorial Help History
 USER DELAY COST ANALYSIS Put a dollar amount on how much a road's performance impacts its users. Tutorial Help History	 DASHBOARD Create your own personal dashboards to monitor corridor performance in regions of interest. Tutorial Help
 NPMRDS COVERAGE MAP Explore the coverage completeness of the NPMRDS on a month-by-month basis. Tutorial Help	 TRAVEL TIME DELTA RANKING Rank roads based on their change in travel time performance between two time periods. Tutorial Help History
 TRAVEL TIME COMPARISON Chart travel times to compare performance for different time periods. Tutorial Help History	 TEMPORAL COMPARISON MAPS Analyze performance metrics of any road segment by one or more time ranges. Help History
 CAUSES OF CONGESTION GRAPHS Discover the magnitude and causes of congestion on customizable geographies and time periods. Help History	 TUTORIALS Learn how to use each of the tools in the suite.
 MAP-21 Create a dashboard widget to monitor states', MPOs', and Urbanized Areas' performances against the new MAP-21 ruling. Help	 REPORT TEMPLATES Learn how to transform data from tools in our suite into professional storytelling reports, documents, and pamphlets.

Probe Data Analytics – Region Explorer (Real Time Traffic)



Probe Data Analytics – Performance Charts



2023 Thanksgiving Travel

Portland Metro Freeways • Nov. 21st to 26th



TUE 21



CONGESTION
Noon – 7 PM

WED 22



CONGESTION
11 AM – 6 PM

THU 23



Light
Traffic

FRI 24



Light
Traffic

SAT 25

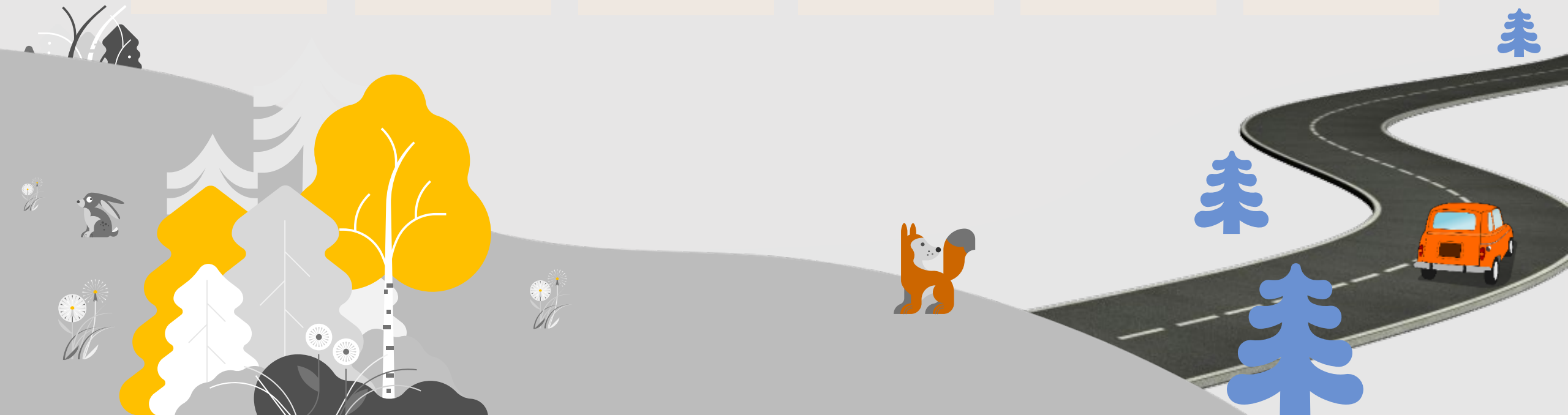


Light
Traffic

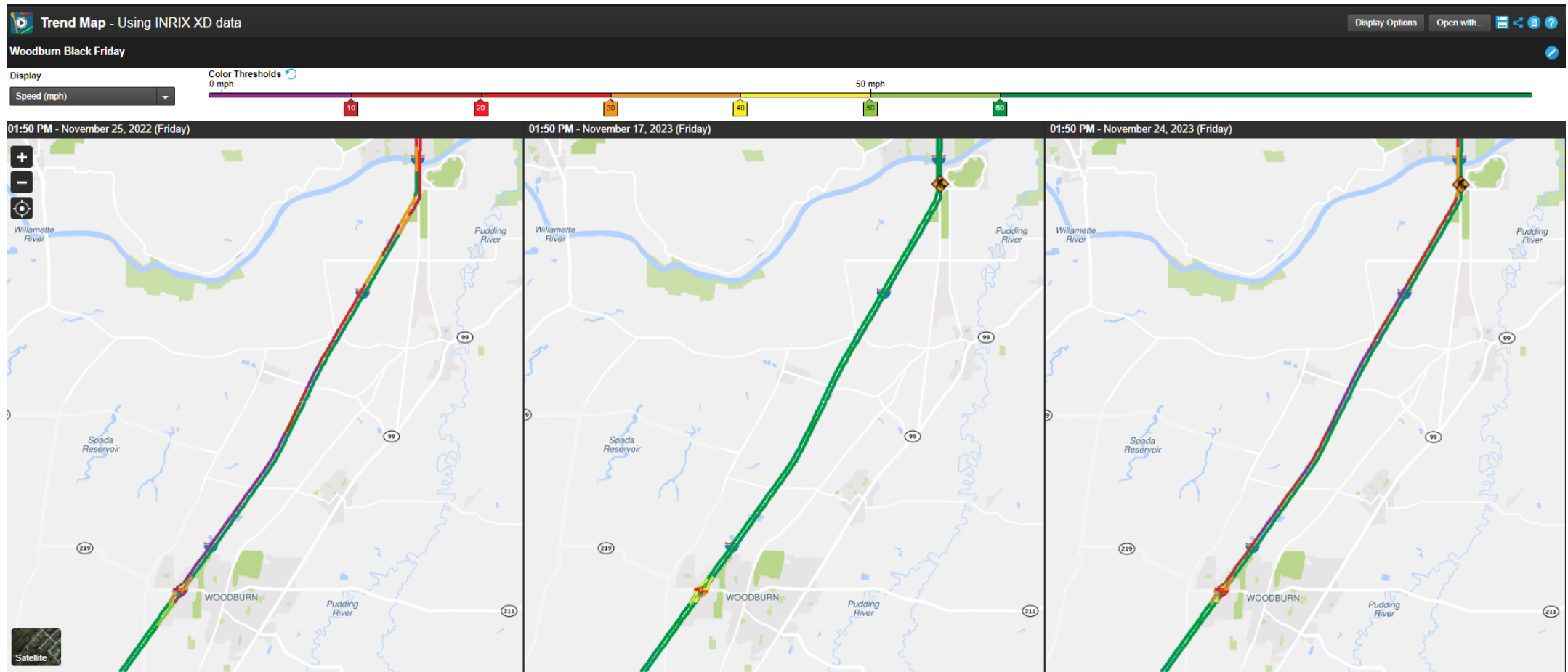
SUN 26



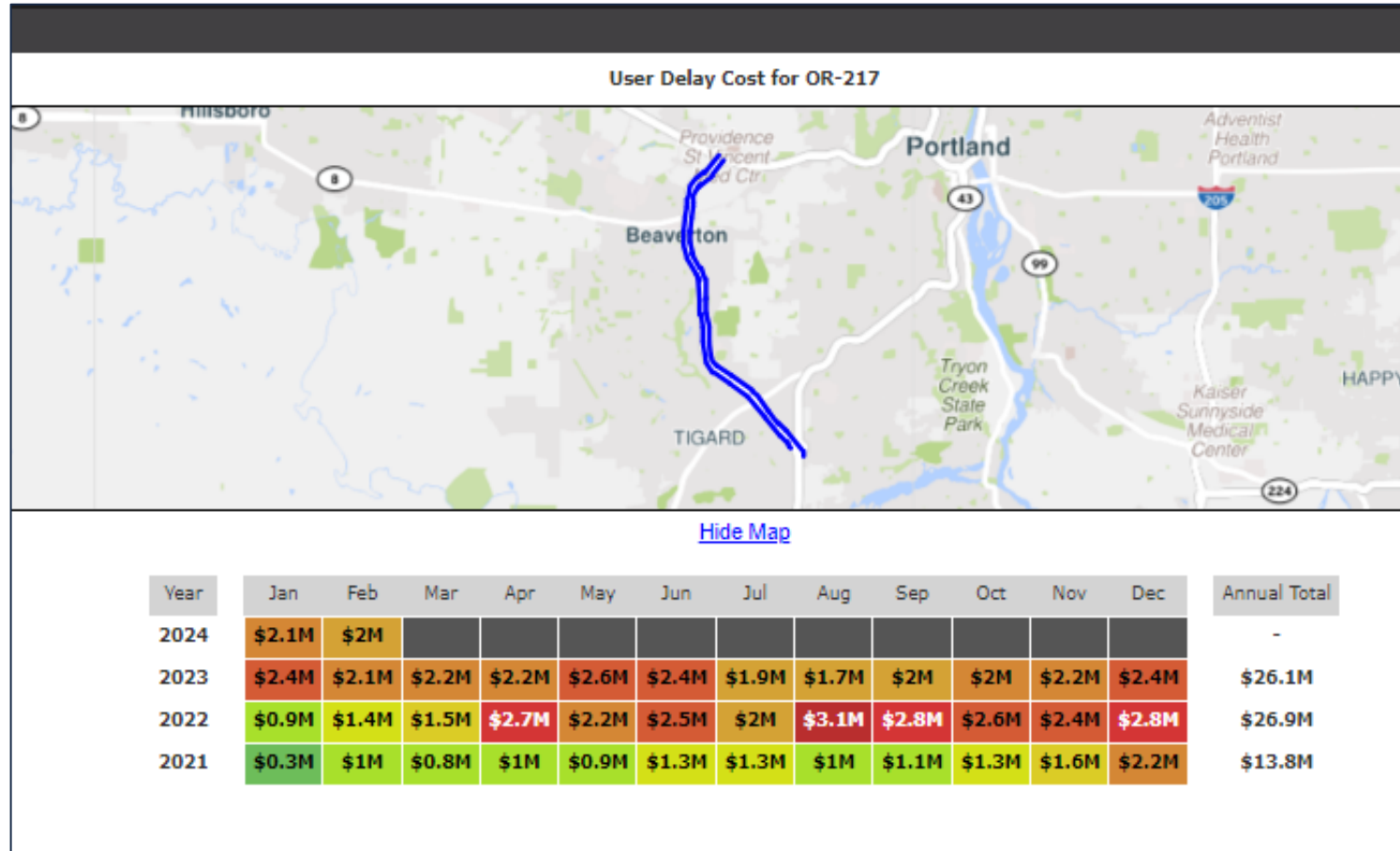
Light
Traffic



Probe Data Analytics – Trend Map (Animated Map Over Time)



Probe Data Analytics – Dashboard (System Monitoring)



Probe Data Analytics – Dashboard (System Monitoring)

OR217 Construction Work Zone							
Corridor	Average Speed			Travel Time			
	Differential	Current	Historical	Differential	Current	Historical	
OR-217 NB	↓ 9	22 mph	31 mph	↑ 5	20 m	15 m	
OR-217 SB	↓ 15	18 mph	33 mph	↑ 11	24 m	13 m	

Data source: INRIX Updated Nov 29, 2023 6:00 PM (10s ago)

Reliability during the PM Peak (5-6pm) for OR-217 Northbound and OR-217 Southbound							
	Location	Planning Time Index: Free Flow Speed			Planning Time Index: Posted Speed Limit		
		Differential	Current Week to ...	11/27/2022-12/0...	Differential	Current Week to ...	11/27/2022-12/0...
1	OR-217 North...	↓ 0.12	3.14	3.26	↓ 0.08	3.01	3.09
2	OR-217 South...	↓ 0.07	4.30	4.37	↑ 0.05	4.19	4.14

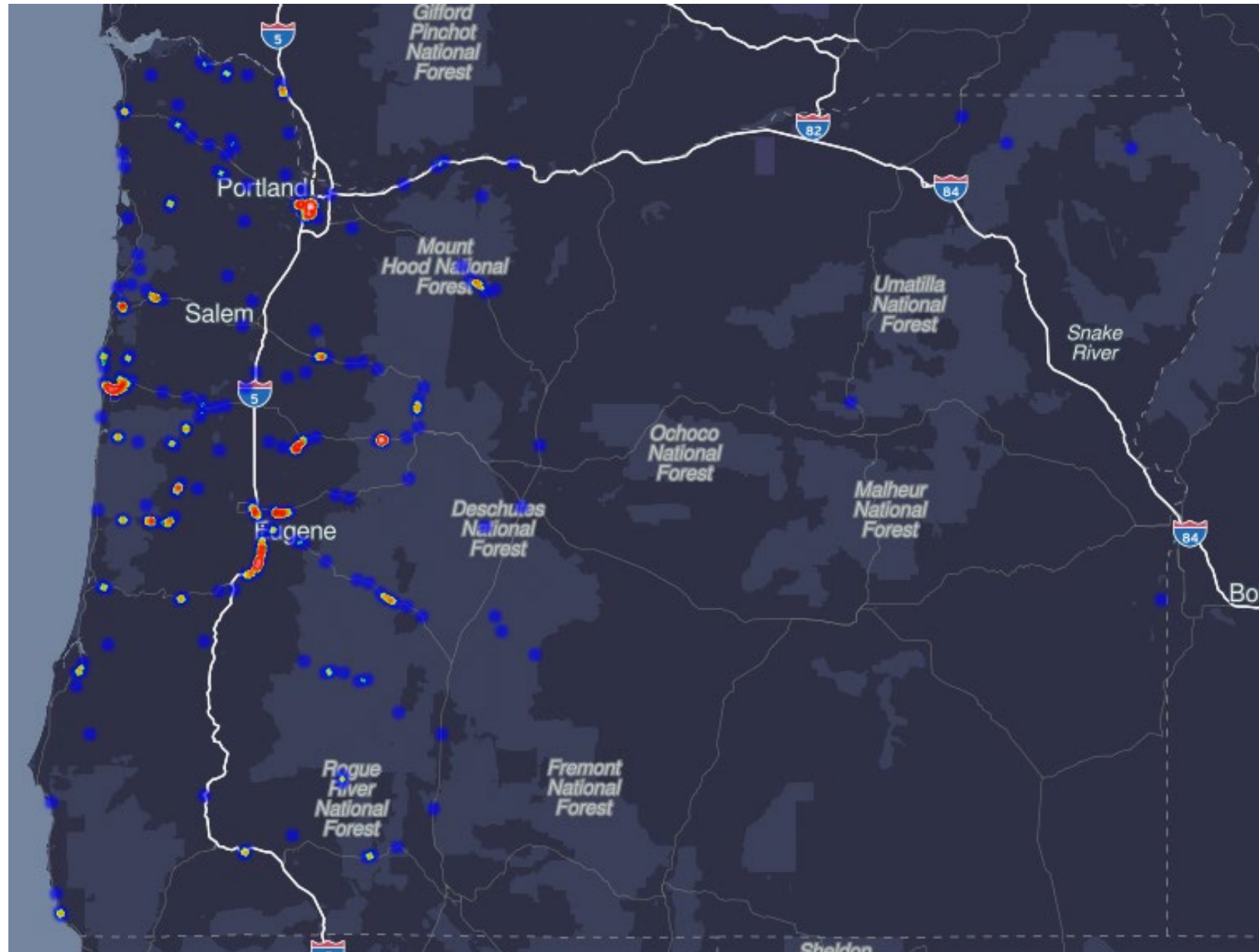
Data source: INRIX Updated Nov 29, 2023 5:58 PM (2m 20s ago)

Probe Data Analytics – User Delay Analysis (Congested Periods)

Vehicle-hours of delay for all vehicles on Interstates, US routes, and state routes in Oregon (6,185 TMC segments)

	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Daily Totals	
01/01/24	0K hrs	0K hrs	0K hrs	0K hrs	0K hrs	0.1K hrs	0.2K hrs	0.2K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.2K hrs	0.2K hrs	0.2K hrs	0.2K hrs	0.3K hrs	0.3K hrs	0.4K hrs	0.2K hrs	0.1K hrs	0.1K hrs	0.2K hrs	0.1K hrs	0K hrs	3.4K hrs	
01/02/24	0K hrs	0K hrs	0K hrs	0K hrs	0K hrs	0.1K hrs	0.3K hrs	1.1K hrs	1.2K hrs	0.5K hrs	0.8K hrs	0.9K hrs	0.8K hrs	1.1K hrs	1.3K hrs	2.6K hrs	4.3K hrs	3.8K hrs	0.6K hrs	0.2K hrs	0.2K hrs	0.1K hrs	0.1K hrs	0K hrs	19.7K hrs	
01/03/24	0K hrs	0K hrs	0K hrs	0.1K hrs	0.1K hrs	0.2K hrs	0.8K hrs	2.9K hrs	4.1K hrs	2.1K hrs	1K hrs	0.7K hrs	0.7K hrs	0.8K hrs	1.2K hrs	2.9K hrs	5.6K hrs	5.8K hrs	1.6K hrs	0.4K hrs	0.2K hrs	0.1K hrs	0.1K hrs	0K hrs	31K hrs	
01/04/24	0K hrs	0K hrs	0K hrs	0K hrs	0.1K hrs	0.1K hrs	0.4K hrs	2.6K hrs	4K hrs	0.8K hrs	1K hrs	1.4K hrs	1.8K hrs	2.3K hrs	2.3K hrs	4.7K hrs	7.2K hrs	6.8K hrs	1.3K hrs	0.2K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0K hrs	38.3K hrs	
01/05/24	0.1K hrs	0.1K hrs	0K hrs	0K hrs	0.1K hrs	0.1K hrs	0.3K hrs	1.2K hrs	1K hrs	0.5K hrs	0.5K hrs	0.8K hrs	1K hrs	1.2K hrs	2.1K hrs	4K hrs	6.2K hrs	3.4K hrs	0.6K hrs	0.2K hrs	0.1K hrs	0.1K hrs	0K hrs	0K hrs	22.8K hrs	
01/06/24	0K hrs	0K hrs	0K hrs	0K hrs	0.1K hrs	0.2K hrs	0.4K hrs	1.4K hrs	1.6K hrs	1.6K hrs	1.4K hrs	1.8K hrs	1.6K hrs	1.7K hrs	1.9K hrs	2.3K hrs	2.5K hrs	2.7K hrs	2K hrs	1.1K hrs	0.5K hrs	0.4K hrs	0.2K hrs	0.2K hrs	25.4K hrs	
01/07/24	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.2K hrs	0.4K hrs	0.7K hrs	0.8K hrs	0.9K hrs	0.8K hrs	0.9K hrs	0.8K hrs	0.9K hrs	1K hrs	0.7K hrs	0.8K hrs	0.3K hrs	0.2K hrs	0.1K hrs	0.1K hrs	0K hrs	0K hrs	10.1K hrs	
01/08/24	0K hrs	0K hrs	0K hrs	0K hrs	0.1K hrs	0.2K hrs	0.8K hrs	3.4K hrs	5.3K hrs	2.5K hrs	1K hrs	1K hrs	1K hrs	1.2K hrs	1.7K hrs	4.1K hrs	6.9K hrs	5.9K hrs	1.5K hrs	0.8K hrs	0.7K hrs	0.4K hrs	0.9K hrs	0.9K hrs	37.5K hrs	
01/09/24	0.2K hrs	0.2K hrs	0.2K hrs	0.2K hrs	0.2K hrs	0.4K hrs	1.1K hrs	4.7K hrs	8.8K hrs	4.4K hrs	2K hrs	1.5K hrs	1.7K hrs	1.8K hrs	2.7K hrs	5.3K hrs	7.5K hrs	8.6K hrs	2.4K hrs	0.9K hrs	0.8K hrs	0.8K hrs	0.5K hrs	0.3K hrs	54.7K hrs	
01/10/24	0.3K hrs	0.2K hrs	0.2K hrs	0.3K hrs	0.3K hrs	0.5K hrs	2.2K hrs	5.9K hrs	7.9K hrs	5.6K hrs	3.3K hrs	3K hrs	2.4K hrs	2.6K hrs	3.6K hrs	5.4K hrs	8.4K hrs	9.9K hrs	3.4K hrs	1.3K hrs	1.7K hrs	1.1K hrs	0.8K hrs	0.8K hrs	71.1K hrs	
01/11/24	0.3K hrs	0.2K hrs	0.2K hrs	0.2K hrs	0.3K hrs	0.5K hrs	1.2K hrs	4K hrs	5.4K hrs	3.2K hrs	2.3K hrs	2.3K hrs	2.6K hrs	2.5K hrs	3.2K hrs	7K hrs	11K hrs	11.7K hrs	5.1K hrs	1.9K hrs	0.8K hrs	0.6K hrs	0.5K hrs	0.4K hrs	67.5K hrs	
01/12/24	0.3K hrs	0.2K hrs	0.2K hrs	0.2K hrs	0.3K hrs	0.5K hrs	1.1K hrs	2.2K hrs	2.6K hrs	2.7K hrs	2.8K hrs	3.5K hrs	4.3K hrs	4.5K hrs	3.9K hrs	3.8K hrs	3.5K hrs	3.9K hrs	2.2K hrs	1.2K hrs	0.9K hrs	0.7K hrs	0.5K hrs	0.5K hrs	45.8K hrs	
01/13/24	0.4K hrs	0.3K hrs	0.2K hrs	0.3K hrs	0.6K hrs	1.1K hrs	1.8K hrs	3.3K hrs	5.2K hrs	7.5K hrs	9.9K hrs	11.6K hrs	12K hrs	13K hrs	13.3K hrs	14.5K hrs	14.6K hrs	13.9K hrs	10.3K hrs	8.1K hrs	7.1K hrs	5.8K hrs	3.9K hrs	2.2K hrs	160.9K hrs	
01/14/24	1.3K hrs	0.8K hrs	0.8K hrs	0.9K hrs	0.7K hrs	1K hrs	1.7K hrs	2.6K hrs	4.5K hrs	7.5K hrs	9.9K hrs	11.4K hrs	12.6K hrs	11.3K hrs	17.7K hrs	19.4K hrs	21.9K hrs	17.9K hrs	11.5K hrs	10.2K hrs	9.5K hrs	6.3K hrs	4.5K hrs	2.9K hrs	188.5K hrs	
01/15/24	2.1K hrs	1.6K hrs	1.8K hrs	1.5K hrs	2.5K hrs	3.8K hrs	6.7K hrs	12.1K hrs	12.9K hrs	11.2K hrs	18.3K hrs	23.5K hrs	23.7K hrs	20.7K hrs	18.7K hrs	17.1K hrs	22.2K hrs	23.6K hrs	16.4K hrs	11.2K hrs	8K hrs	3.4K hrs	3.2K hrs	1.8K hrs	264.6K hrs	
01/16/24	1K hrs	0.8K hrs	1K hrs	0.5K hrs	0.8K hrs	1.8K hrs	3.8K hrs	6.1K hrs	5.9K hrs	5.6K hrs	6.1K hrs	8.1K hrs	5.6K hrs	5.8K hrs	6.5K hrs	8.9K hrs	12.3K hrs	15K hrs	10.6K hrs	7.9K hrs	8.4K hrs	5.2K hrs	3.9K hrs	2.2K hrs	128K hrs	
01/17/24	1.2K hrs	0.8K hrs	0.9K hrs	1K hrs	1.8K hrs	4.3K hrs	7.4K hrs	10.8K hrs	9.8K hrs	8.3K hrs	6.6K hrs	6.2K hrs	6.3K hrs	4.8K hrs	4.3K hrs	4.9K hrs	5.2K hrs	4.8K hrs	3.1K hrs	1.8K hrs	1.5K hrs	1.2K hrs	0.8K hrs	0.5K hrs	96.9K hrs	
01/18/24	0.8K hrs	0.5K hrs	0.4K hrs	0.4K hrs	0.8K hrs	1.2K hrs	2.8K hrs	4K hrs	4.4K hrs	4.9K hrs	5.9K hrs	6.2K hrs	6.6K hrs	7.3K hrs	8.4K hrs	10.8K hrs	11.9K hrs	10.8K hrs	6.9K hrs	5.7K hrs	5.3K hrs	4.3K hrs	3.1K hrs	1.8K hrs	113.9K hrs	
01/19/24	1.1K hrs	0.9K hrs	0.7K hrs	0.8K hrs	1K hrs	2.1K hrs	3.3K hrs	5.1K hrs	4.9K hrs	4.8K hrs	5.2K hrs	4.7K hrs	3.9K hrs	3.6K hrs	3.7K hrs	4.9K hrs	5.1K hrs	5.1K hrs	2.7K hrs	1.4K hrs	1K hrs	0.5K hrs	0.4K hrs	0.2K hrs	86.4K hrs	
01/20/24	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.2K hrs	0.3K hrs	0.4K hrs	0.9K hrs	1.1K hrs	1.2K hrs	1.3K hrs	1.7K hrs	1.9K hrs	1.7K hrs	2.3K hrs	2.1K hrs	1.7K hrs	2.2K hrs	2.8K hrs	1.9K hrs	1.1K hrs	0.7K hrs	0.5K hrs	0.3K hrs	0.3K hrs	24.8K hrs
01/21/24	0.3K hrs	0.2K hrs	0.2K hrs	0.2K hrs	0.2K hrs	0.3K hrs	0.3K hrs	0.5K hrs	0.8K hrs	0.6K hrs	0.9K hrs	0.9K hrs	0.7K hrs	0.7K hrs	0.7K hrs	0.8K hrs	0.6K hrs	0.8K hrs	0.4K hrs	0.3K hrs	0.3K hrs	0.2K hrs	0.1K hrs	0.1K hrs	9.9K hrs	
01/22/24	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.2K hrs	0.8K hrs	3K hrs	5K hrs	2.7K hrs	1.3K hrs	1.1K hrs	1.4K hrs	1.4K hrs	1.9K hrs	4.6K hrs	8.1K hrs	8.8K hrs	3.5K hrs	0.4K hrs	0.3K hrs	0.3K hrs	0.2K hrs	0.1K hrs	45.1K hrs	
01/23/24	0K hrs	0K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.3K hrs	1.2K hrs	5K hrs	6.7K hrs	3.6K hrs	2.1K hrs	1.9K hrs	2.1K hrs	2.1K hrs	3.1K hrs	6.2K hrs	10K hrs	11.4K hrs	5.4K hrs	1.2K hrs	0.4K hrs	0.2K hrs	0.1K hrs	0.1K hrs	63.8K hrs	
01/24/24	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.2K hrs	0.3K hrs	0.8K hrs	3.9K hrs	6.2K hrs	3.9K hrs	2.1K hrs	1.6K hrs	1.3K hrs	1.4K hrs	2.3K hrs	5.8K hrs	9.3K hrs	11.6K hrs	5.7K hrs	1.1K hrs	0.2K hrs	0.2K hrs	0.1K hrs	0.1K hrs	68.2K hrs	
01/25/24	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.4K hrs	1.4K hrs	5.1K hrs	6.5K hrs	3.3K hrs	1.4K hrs	1.1K hrs	1.2K hrs	1.3K hrs	2.3K hrs	5.2K hrs	8.2K hrs	8.7K hrs	3.5K hrs	0.4K hrs	0.2K hrs	0.2K hrs	0.1K hrs	0.1K hrs	50.9K hrs	
01/26/24	0K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.5K hrs	2.1K hrs	2.6K hrs	1.7K hrs	1.3K hrs	1.8K hrs	2.8K hrs	3.7K hrs	3.7K hrs	8.3K hrs	10K hrs	12K hrs	10.8K hrs	5.3K hrs	1.3K hrs	0.3K hrs	0.2K hrs	0.2K hrs	63.5K hrs	
01/27/24	0.1K hrs	0.1K hrs	0.1K hrs	0K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.2K hrs	0.2K hrs	0.2K hrs	0.4K hrs	0.8K hrs	1.4K hrs	2K hrs	1.9K hrs	1.8K hrs	1.3K hrs	1.4K hrs	0.8K hrs	0.2K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	13.2K hrs	
01/28/24	0.1K hrs	0K hrs	0K hrs	0K hrs	0K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.2K hrs	0.4K hrs	0.4K hrs	0.4K hrs	0.4K hrs	0.5K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0K hrs	4.1K hrs	
01/29/24	0K hrs	0K hrs	0K hrs	0K hrs	0.1K hrs	0.1K hrs	0.4K hrs	2.2K hrs	2.8K hrs	0.9K hrs	0.8K hrs	0.8K hrs	0.8K hrs	0.8K hrs	1.4K hrs	3.4K hrs	5K hrs	4.7K hrs	1.2K hrs	0.2K hrs	0.1K hrs	0.1K hrs	0K hrs	0K hrs	26K hrs	
01/30/24	0K hrs	0K hrs	0K hrs	0K hrs	0.1K hrs	0.1K hrs	0.8K hrs	3.5K hrs	5.2K hrs	2.7K hrs	1K hrs	0.7K hrs	1.3K hrs	1K hrs	2.2K hrs	4.8K hrs	6.7K hrs	8.9K hrs	2.6K hrs	0.3K hrs	0.1K hrs	0.1K hrs	0.1K hrs	0K hrs	41.5K hrs	
01/31/24	0K hrs	0.1K hrs	0K hrs	0K hrs	0K hrs	0.1K hrs	0.8K hrs	3.6K hrs	5.5K hrs	3.3K hrs	1.1K hrs	1.1K hrs	1.4K hrs	1.5K hrs	2.9K hrs	5.8K hrs	8K hrs	7.9K hrs	3.2K hrs	0.5K hrs	0.4K hrs	0.1K hrs	0.1K hrs	0K hrs	47.3K hrs	
Hourly Totals	10.1K hrs	7.8K hrs	7.5K hrs	7.6K hrs	10.9K hrs	21.2K hrs	42.4K hrs	104K hrs	129.8K hrs	99.1K hrs	91.6K hrs	100.4K hrs	104.7K hrs	105K hrs	124.9K hrs	172.7K hrs	227.2K hrs	230.8K hrs	116.3K hrs	62.1K hrs	44.6K hrs	33.1K hrs	23.5K hrs	15K hrs	Grand Total 1892122h 16m 2s	

Data Archive – Event Query Tools



RITIS Resources



- RITIS weblink: <https://ritis.org>
- ODOT RITIS webpage: <https://www.oregon.gov/odot/Data/Pages/RITIS.aspx>
- RITIS Best Practices Handbook (ODOT RITIS webpage)
- ODOT Quarterly User Group Meetings (10am-noon on the 3rd Tues in March, June, Sept & Dec)
- Annual RITIS Training in the Fall
- Contact:
ritis@odot.oregon.gov
Transportation Planning Analysis Unit
Oregon Department of Transportation