

Near Real-Time Truck Travel Data in Rural Corridors

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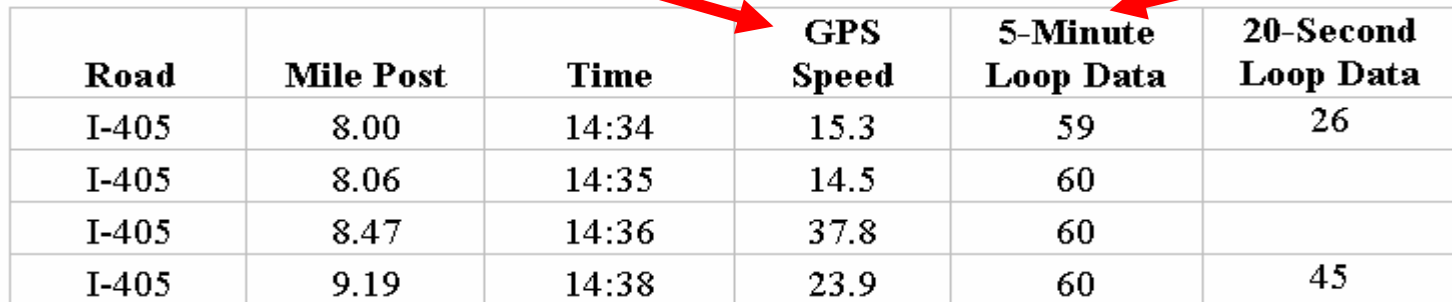
Rural ITS Conference
2006

Truck Travel Time Data

- Existing dynamic travel time information is for cars and in urban corridors
- Most states' commercial vehicle Web sites have information on weather, travel restrictions, but not typically travel times
- Minimal performance data on trucks available

Truck Data vs. Car Data

GPS Speeds (Trucks) vs. Freeway Loop Speeds (Cars)



Road	Mile Post	Time	GPS Speed	5-Minute Loop Data	20-Second Loop Data
I-405	8.00	14:34	15.3	59	26
I-405	8.06	14:35	14.5	60	
I-405	8.47	14:36	37.8	60	
I-405	9.19	14:38	23.9	60	45

- Which is right?
- It turns out trucks have different travel patterns and speeds than cars

Growing Use of Transponders Creates an Opportunity

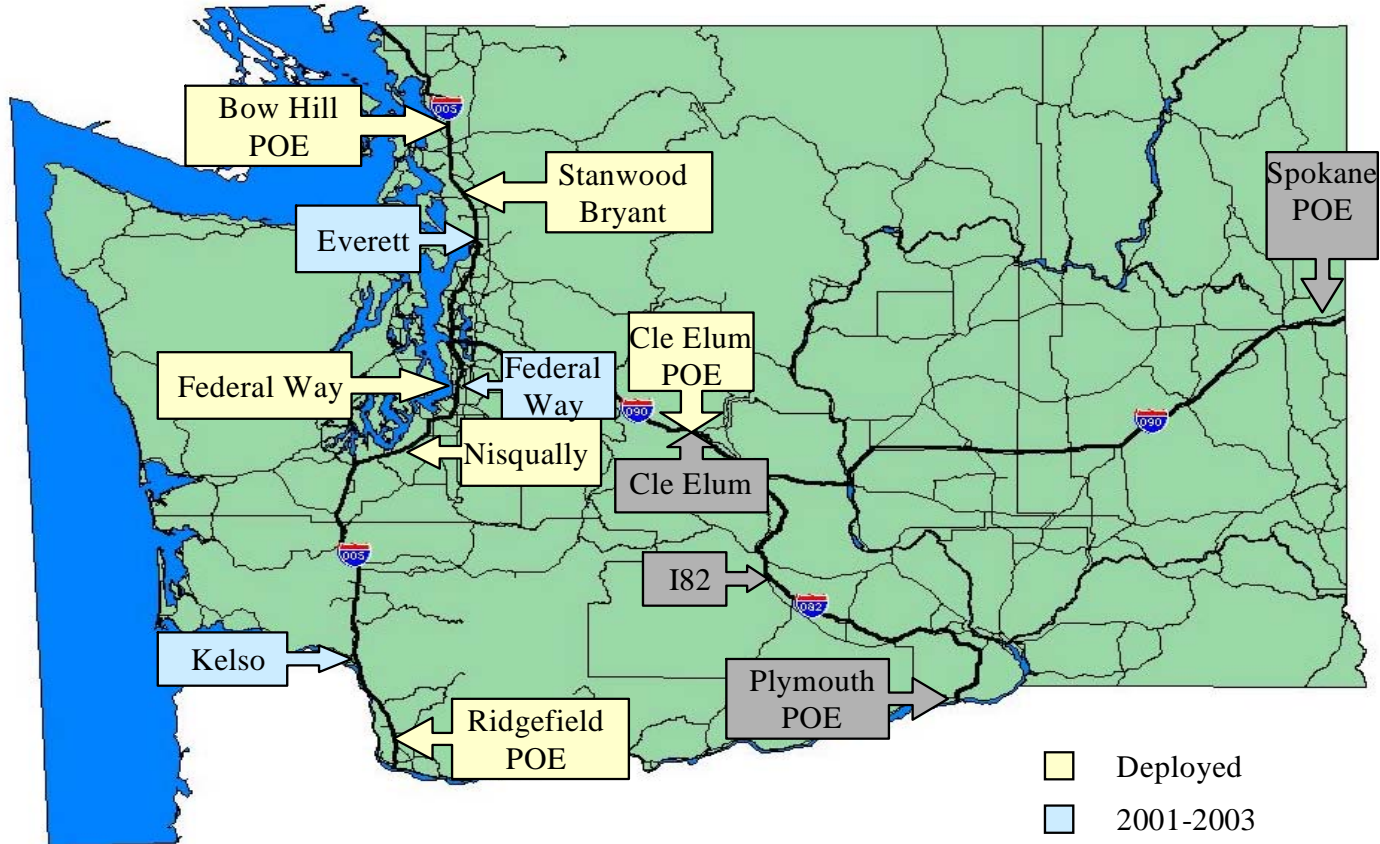
- Transponder are an electronic device used for vehicle-to-roadside communication
- Increasingly used in trucks for weigh-in-motion, tolls, Customs, etc
- Transponders plus a network of roadside readers can turn trucks into travel time probes

Transponders

- 30,000 CVISN transponders (and growing) in use in Washington for weigh-in-motion
- Readers along Interstates in Washington



Weigh-in-Motion Stations (Readers)



Other Transponders Showing Up on Roads

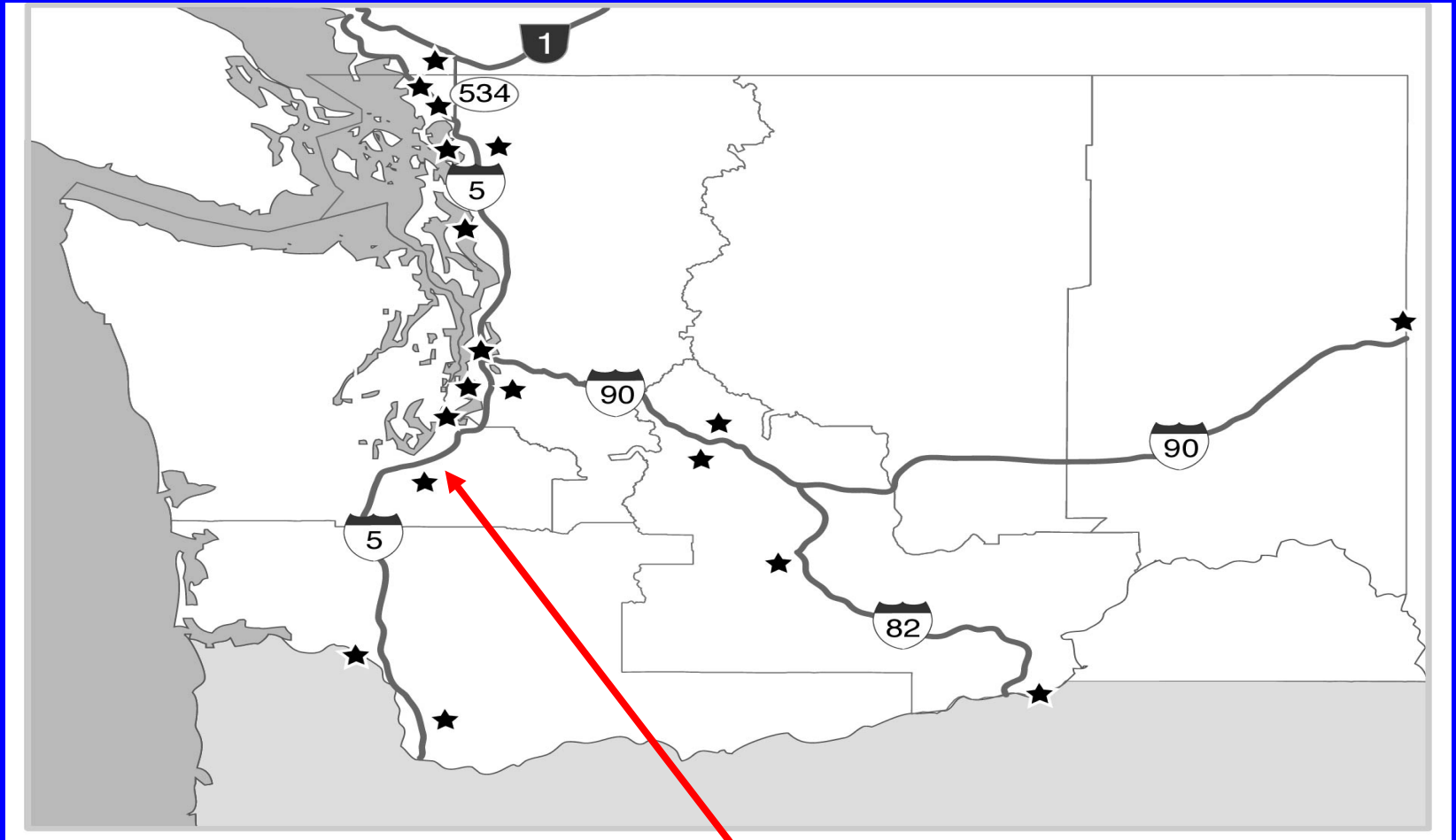
- Some electronic container door security seals are transponders
- Custom's FAST truck windshield tags
- Toll Transponders



Readers at Ports, Borders & Bridges



Data Reader Locations



Readers planned every 50 miles on Interstate-5

Readers –Smaller and Cheaper



2001 – \$18,000



2006 – \$4,000

Transponder Information

- Use transponder reads at Weigh-in-Motion stations and other reader stations to compute travel times between locations
- Provide near real-time truck traveler information on major corridors
- Low cost
- Summarize and report travel times over time to measure the performance of major rural interstates

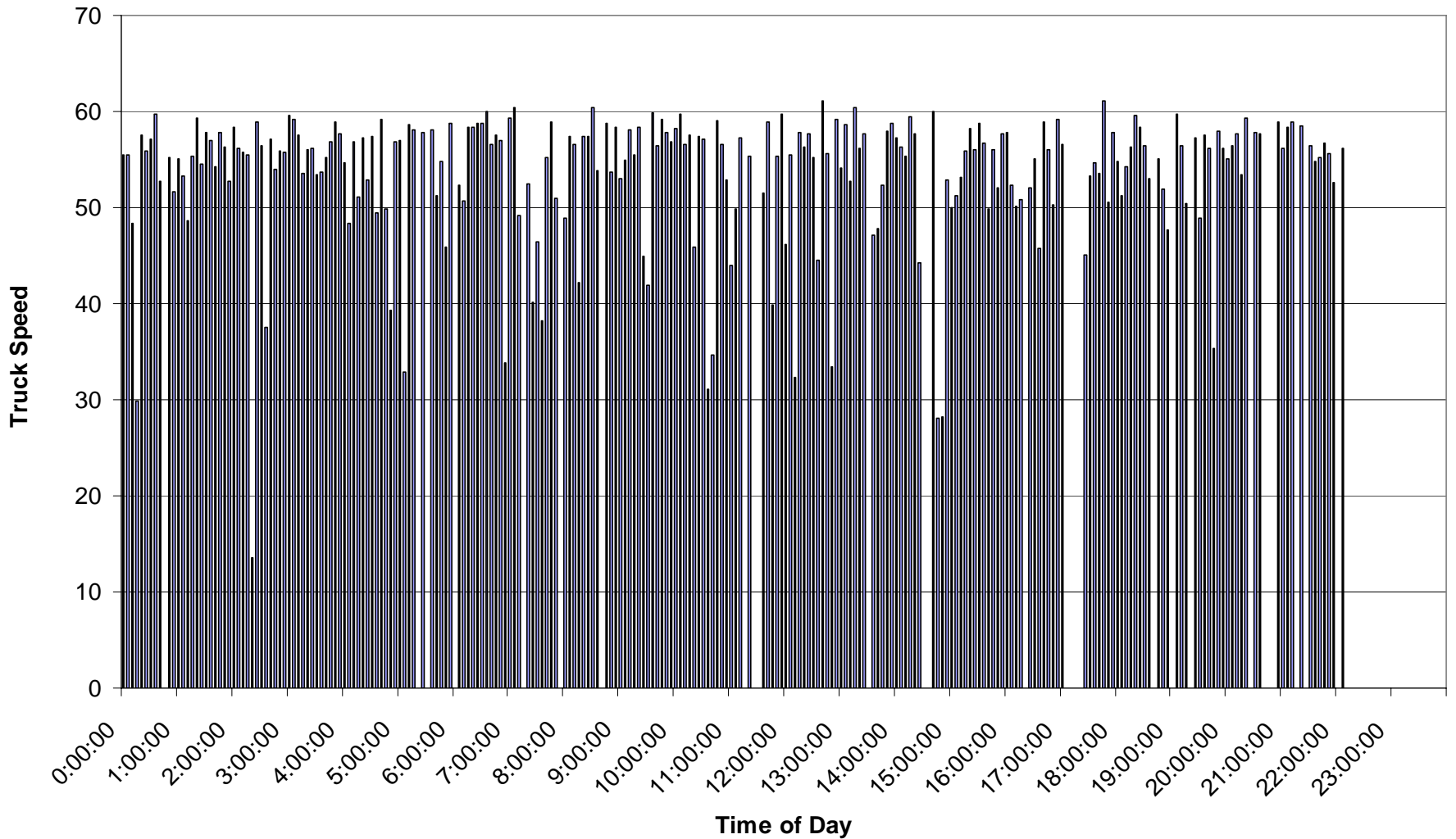
Software

- Secure connections have been made to the WSDOT WIM computers
- “Anonymizer” software ensures the privacy of tag IDs used to compute travel times
- The system is currently running, computing near real-time travel times
- Foundation for traveler info. for trucks

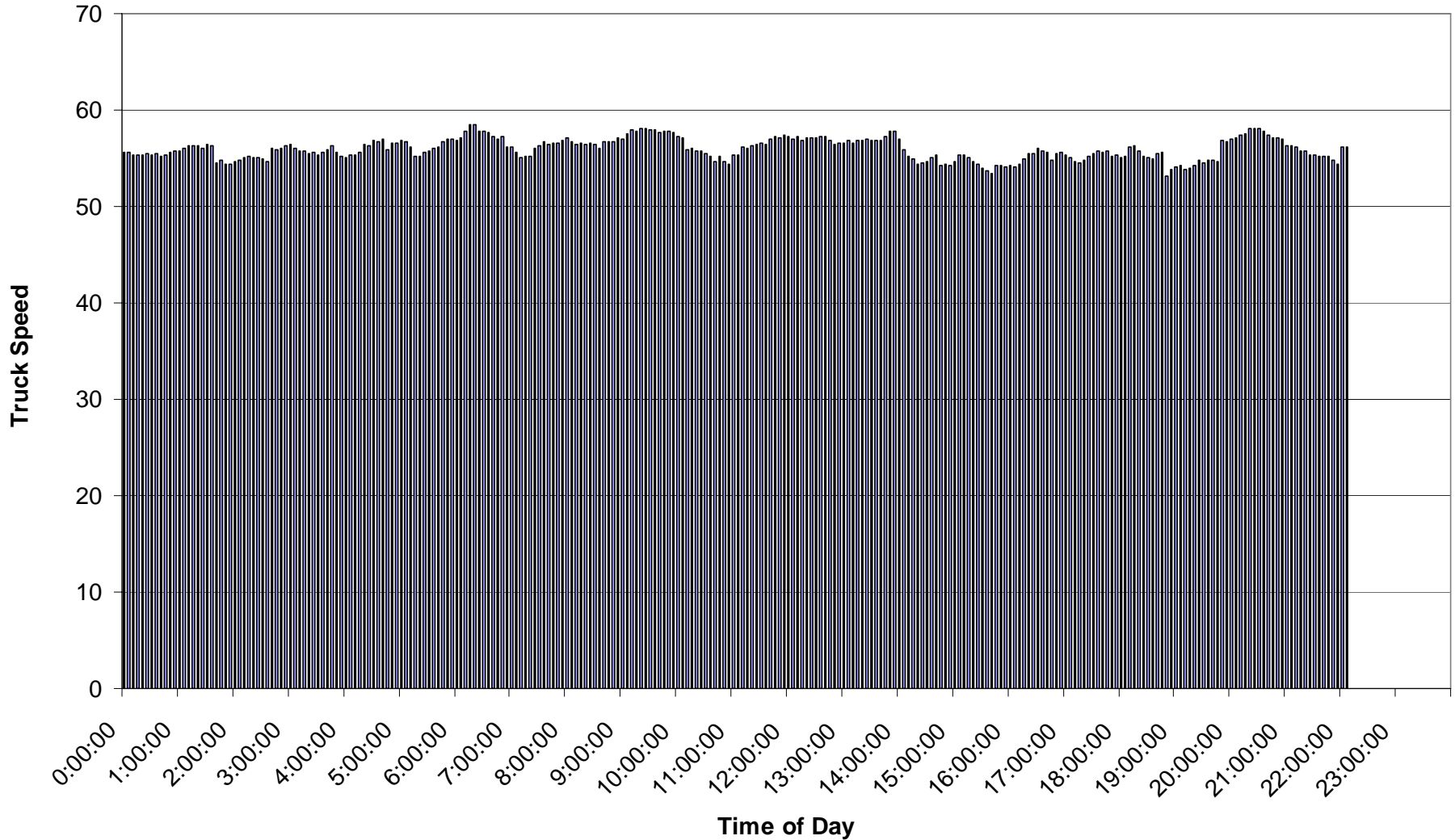
Fastest Truck Algorithm

- Assumes if one truck can make a trip between 2 readers in a stated time, other trucks can also make the trip in that time
- Any truck traveling slower does so by choice of the driver
- When truck volumes are moderately high, this algorithm good at removing trucks that voluntarily stopped between readers

Average Truck Speed (max value for each 5-min interval)
I-5 NB, Ridgefield to Fort Lewis (102 miles) Monday, 3/25/02



Average Truck Speed (rolling hour) - Filtered
I-5 NB, Ridgefield to Fort Lewis (102 miles) Monday, 3/25/02



Transponder Database

- Data clean-up
- Archives data
- Used for analysis
- Truck travel time web site and basis for near-real time info.

m - Microsoft Internet Explorer

Favorites Tools Help Back Forward Stop Home Search Favorites

http://trac24.trac.washington.edu:8080/reports/requestreport.jsp

Request a Tag Report

You may request a tag report from this page.

Segments

Display all segments

Display selected segments (you may select more than one)

If no segments are selected, then all are shown by default

- stanwood bryant to wasthanwoodn
- vancouver (ridgefield) to aplseattle.gates
- vancouver (ridgefield) to blainepoea
- vancouver (ridgefield) to blainepoen
- vancouver (ridgefield) to blainepoex
- vancouver (ridgefield) to bow hill**
- vancouver (ridgefield) to cle elum
- vancouver (ridgefield) to fort lewis
- vancouver (ridgefield) to msktacoma.gates

Ensure that stations match directions

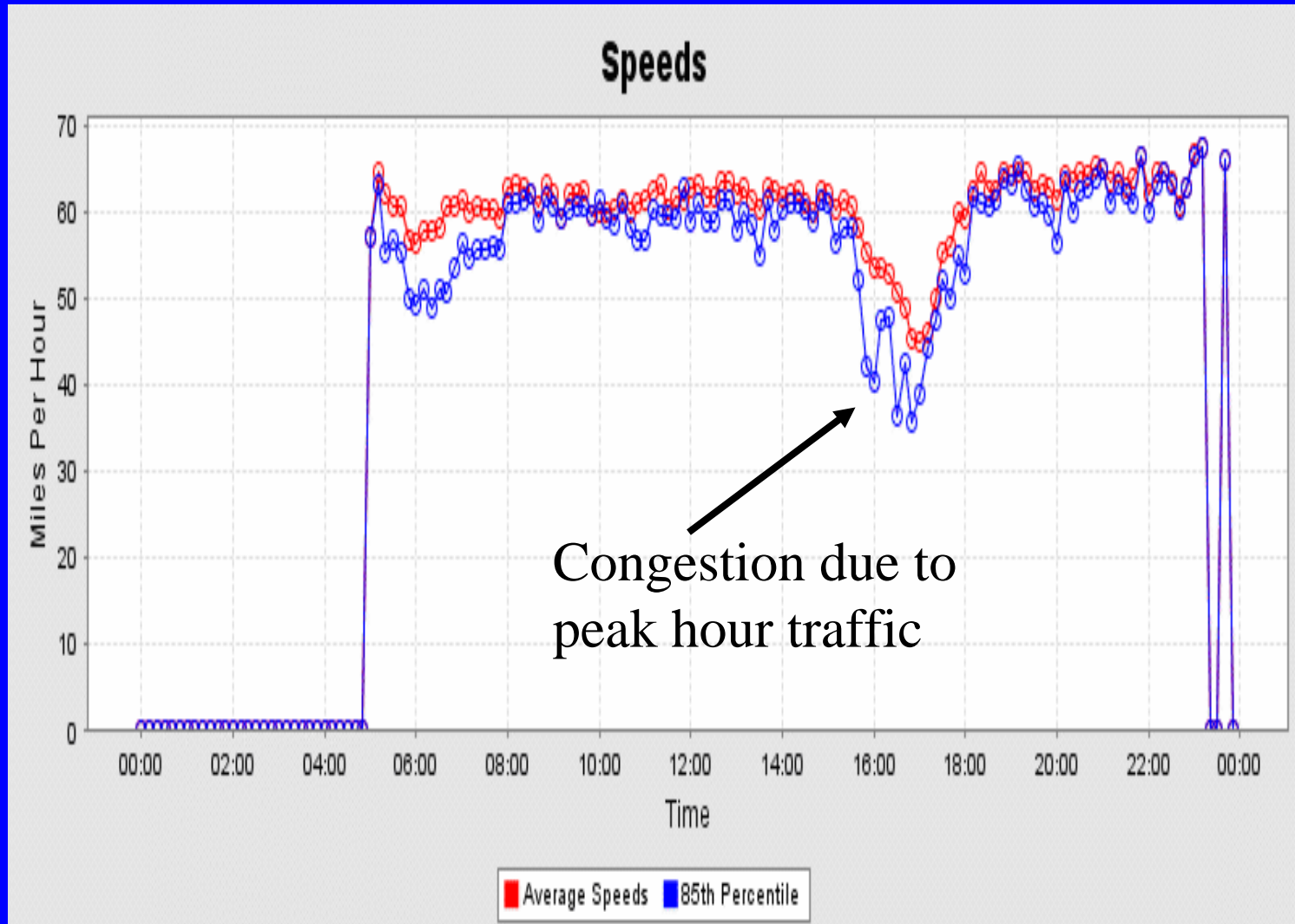
Dates

Enter the first date to be displayed

Enter the last date to be displayed

McCormack ITS... ITS Devices Re... Document1 - Mi... My Computer

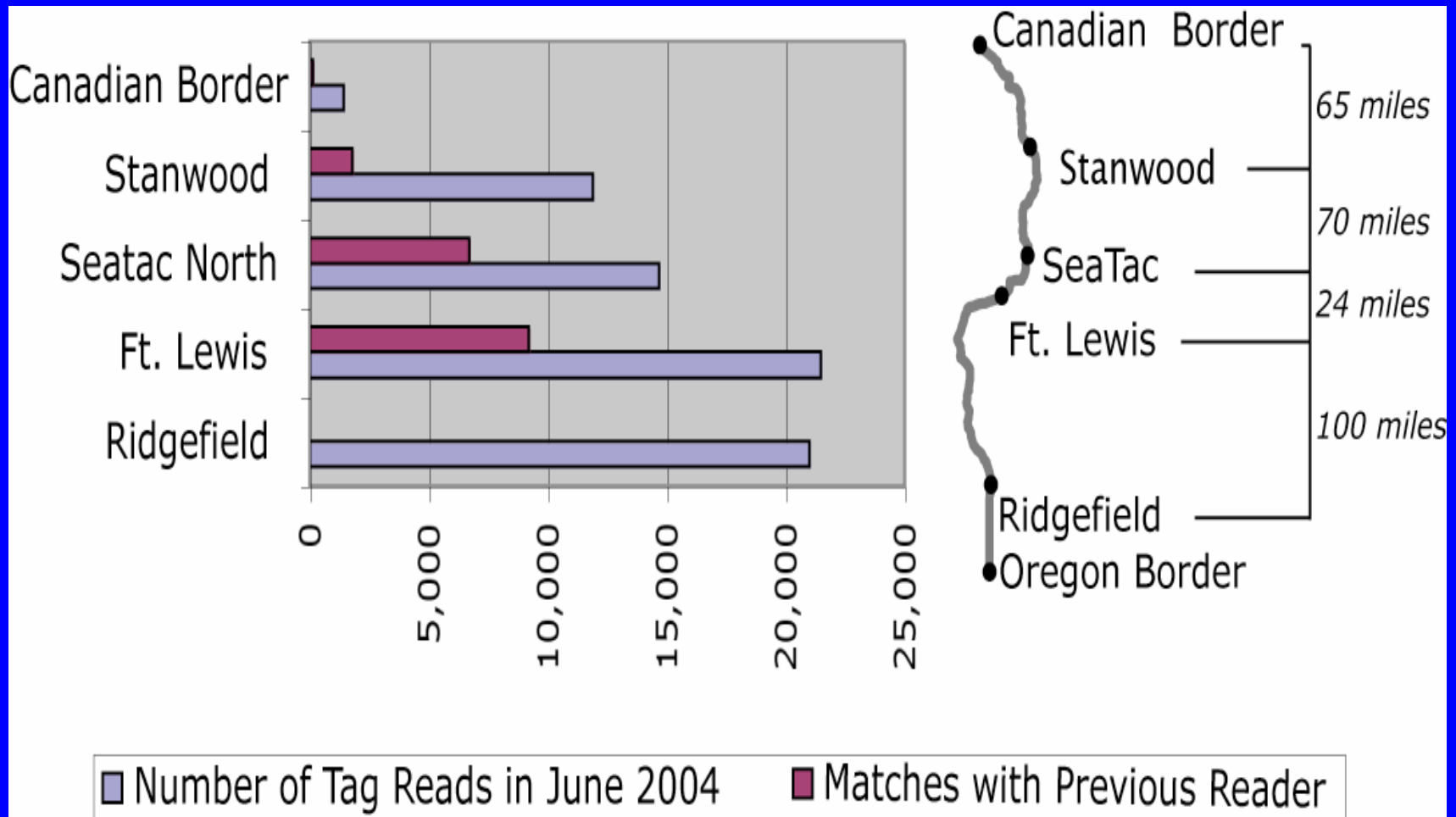
Speeds



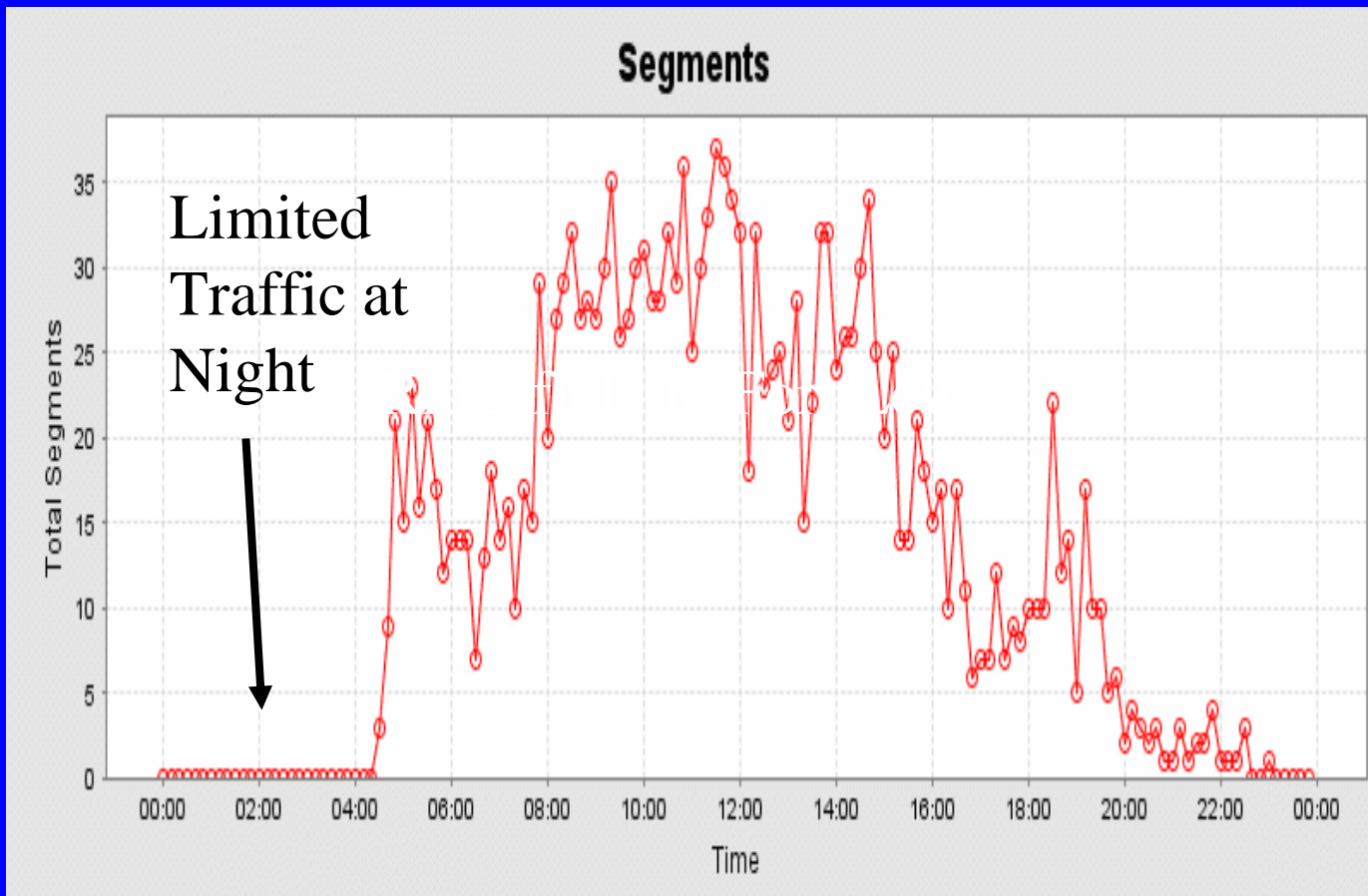
Congestion due to peak hour traffic

Ridgefield to Fort Lewis

Tag Read by I-5 Segments

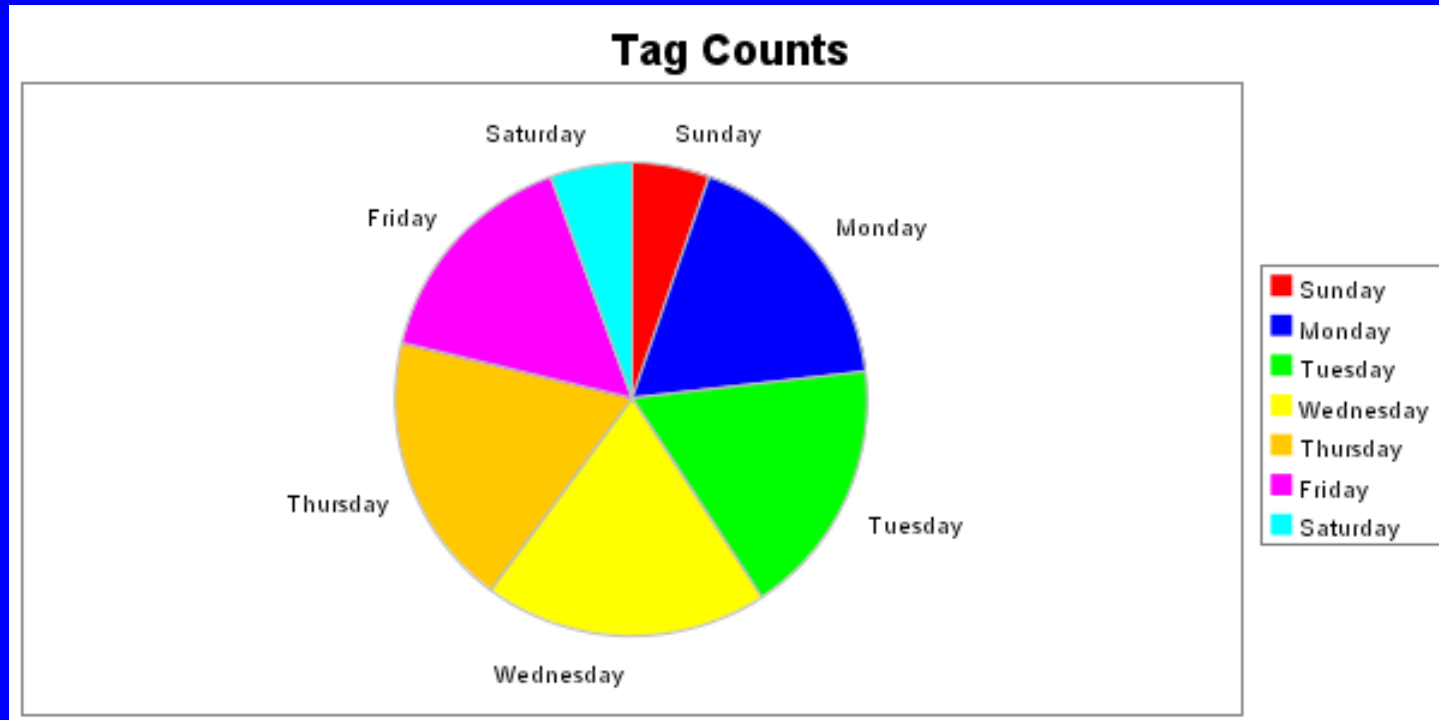


Volumes



Ridgefield to Fort Lewis

Data Limited By Day of Week



Borders

- Border readers provide data on processing time of trucks through Customs.

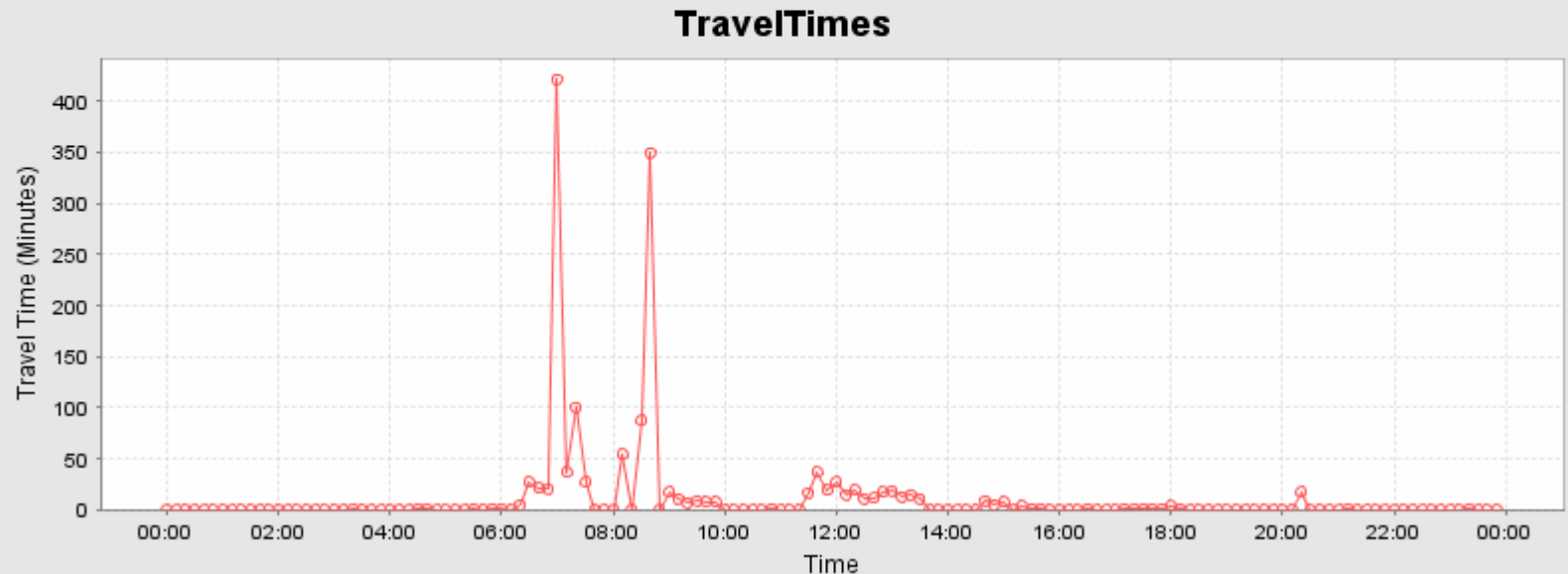
blainepoea to blainepoex

Started: Apr 1, 2005

Ended: Apr 2, 2005

Distance: 0 miles

Minimum Travel Times



A Bonus – Rural Truck Performance Data

- Increasing need to know trucks' travel time for planning and policy needs
- Many sources of travel time data are expensive (manual counts, floating car)
- Transponder reads offer a partial and low cost source of performance data

Truck Performance Measures

Roadway Segment	Time Period	Mean Speed	Median Speed	Standard Deviation of Speed	Speed for 80th Percentile Travel Time
Fort Lewis to SeaTac	Early AM	57	62	13	49
	AM Peak	58	63	14	57
	Midday	58	63	14	56
	PM Peak	47	50	12	48
	Evening	58	63	14	53

Travel Times From Transponders (Benefits)

- Low cost
- Serves rural areas
- Increasing number of readers and transponders on highways
- Provides rural roadway performance data
- Can be linked between multiple states (Washington linking with Oregon)

Travel Times From Transponders (Limitations)

- How do you get information to truckers?
- Need enough truck volumes – limited data on weekends and in middle of night
- Older readers still unreliable
- Multiple transponder frequencies in use

Questions?

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<http://depts.washington.edu/trac/>