

Our Traffic Congestion Challenges and Opportunities

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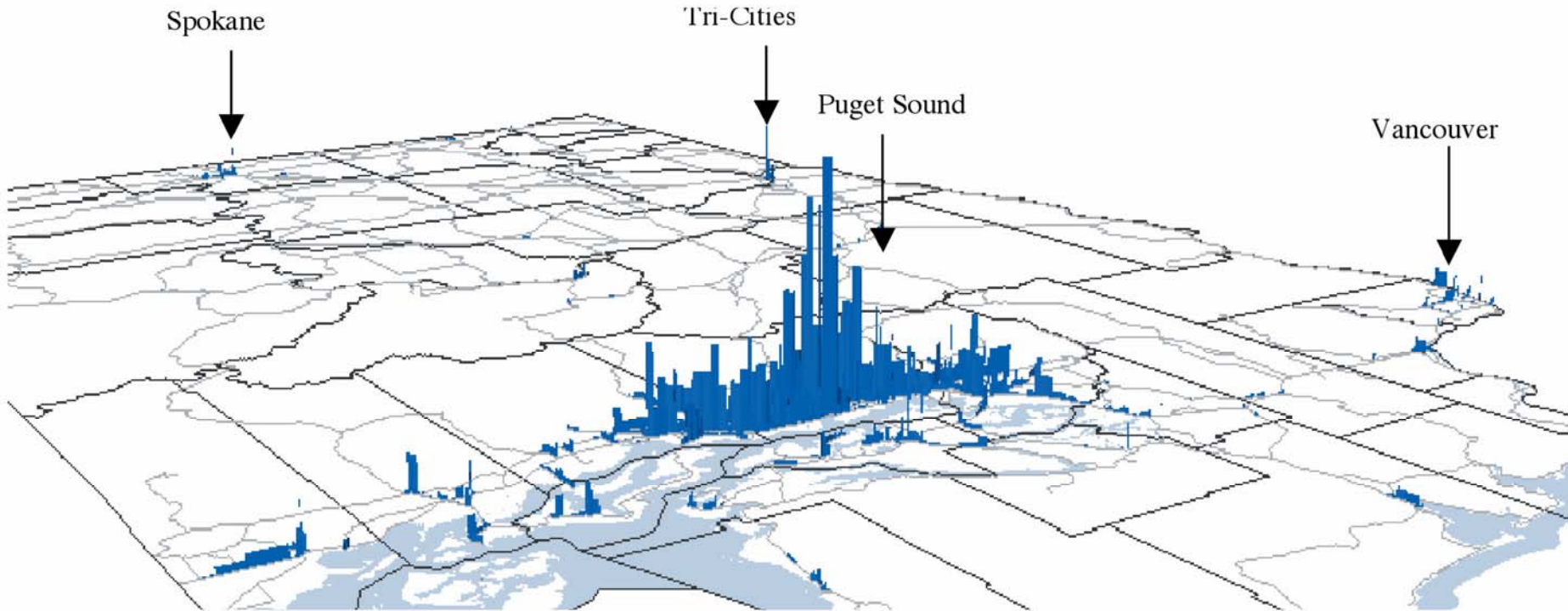
**Washington State
Department of Transportation**

Congestion – Challenges and Opportunities

- Statewide Context
- What causes it – Traffic Math 101
- How bad is it – Two minute summary
- What are we doing about now

Highway Congestion – Statewide Perspective

Annual hours of vehicle delay on state highway segments in urban areas

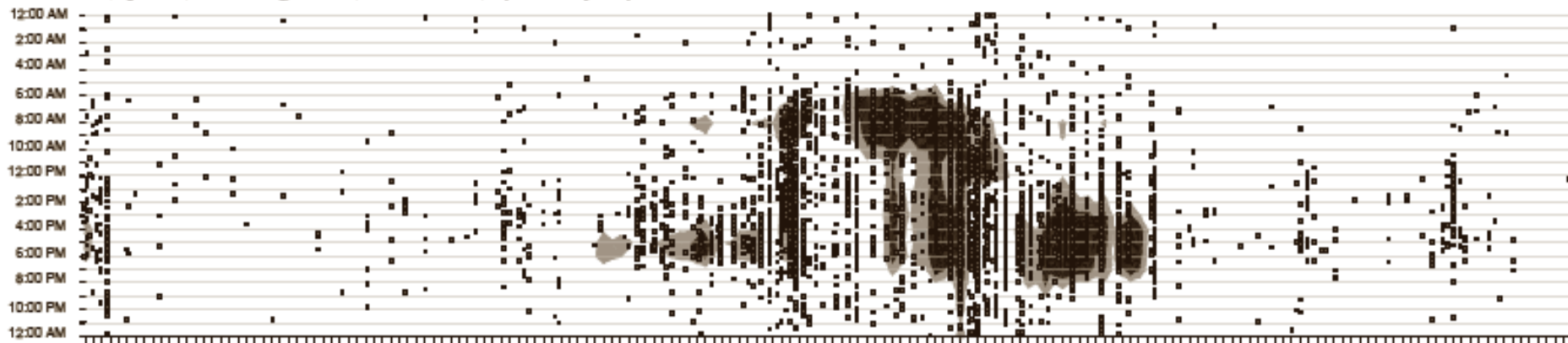


- 370,000 vehicle hours (520,000 person hours) daily delay (2004)
- Chiefly affecting urban areas and especially the Puget Sound region

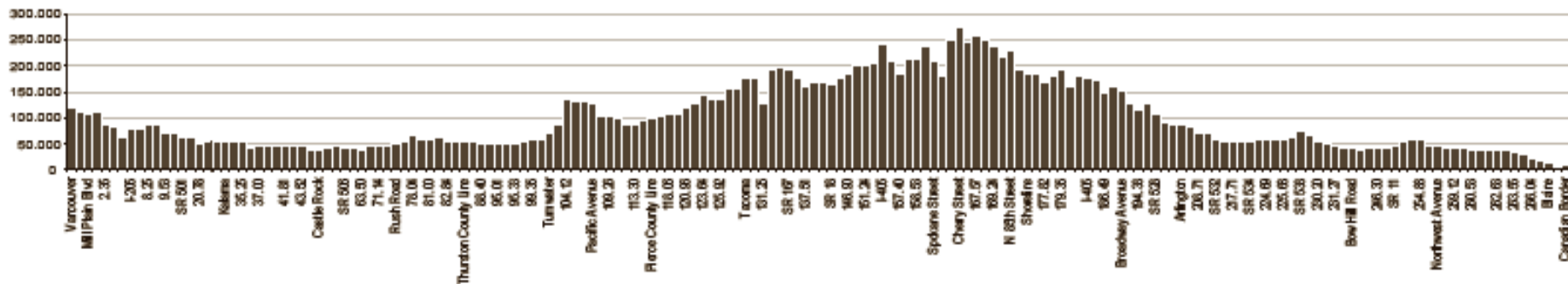
Linking Congestion and Safety

Northbound Interstate 5: 2005 Rear End Collisions and Congestion Occurances

Collisions (squares) and Congestion (shaded areas) by Time of Day and Location



2005 Annual Average Daily Traffic, Hours of Delay by Milepost (correlates with graph above)



Estimated 2005 General Purpose Lane Performance

* Federal Law Title 23 U.S. Code Section 409 prohibits the discovery or admission into evidence of this data in Federal or State Court proceedings or consideration in any action for damages.

Traffic Math 101- Exercise

Calculating Maximum Lane Capacity

Everybody is a Traffic Engineer

How is maximum lane capacity calculated?

What is the recommended separation (following distance) between vehicles?

The two-second rule or 2 seconds

How many seconds in an hour?

60 seconds times 60 minutes = 3,600 Seconds

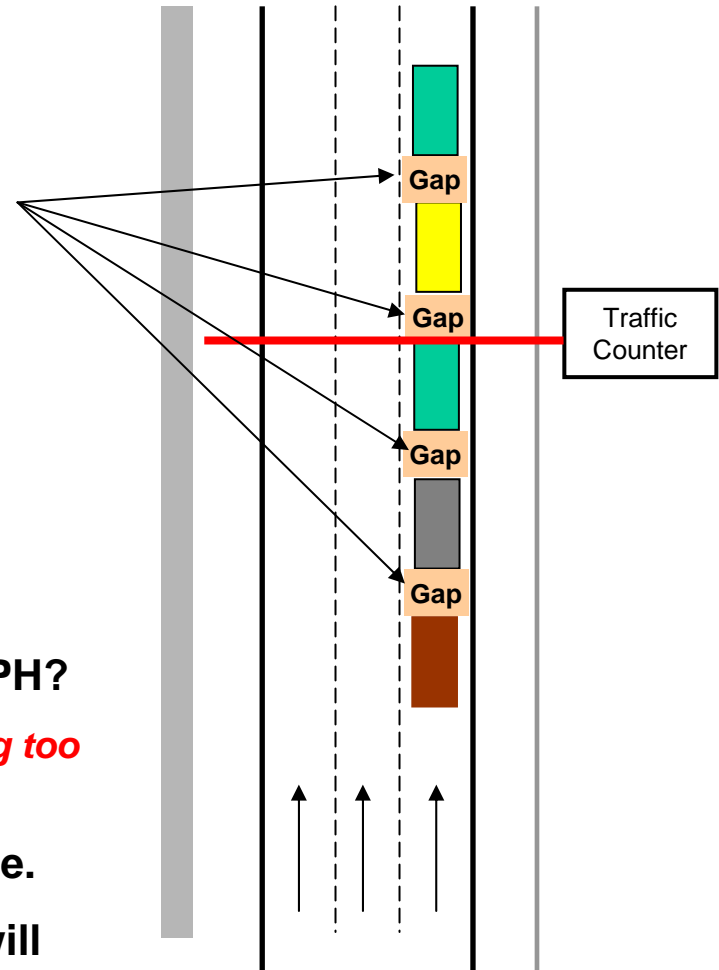
3,600 seconds divided by 2 second gap = 1,800 VPH

So how do we get traffic flows at 2000 or 2200 VPH?

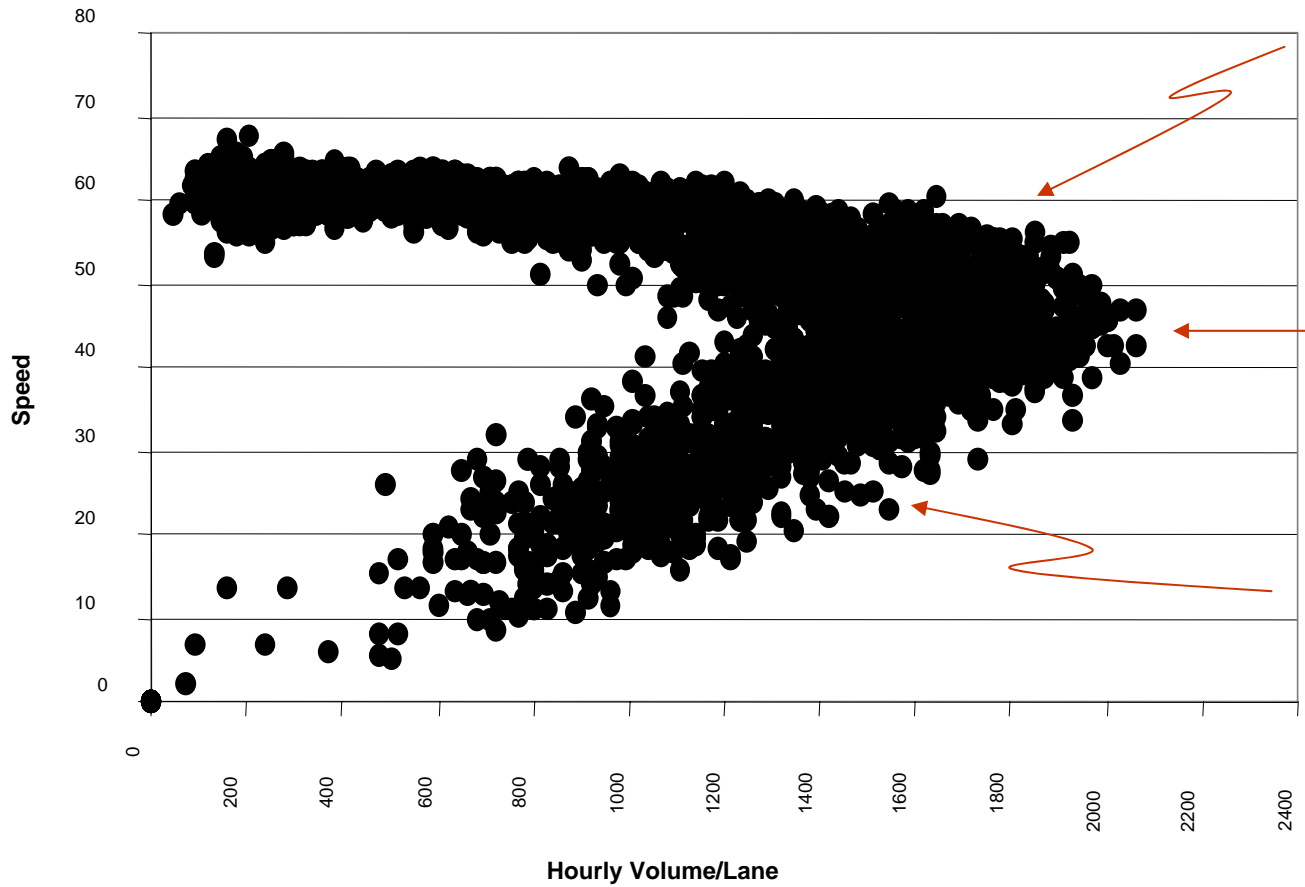
Smaller Gaps- which means that everyone is following too closely!

That is why fragility increases as speeds increase.

Fragility means that just about any distraction will cause a capacity reduction!



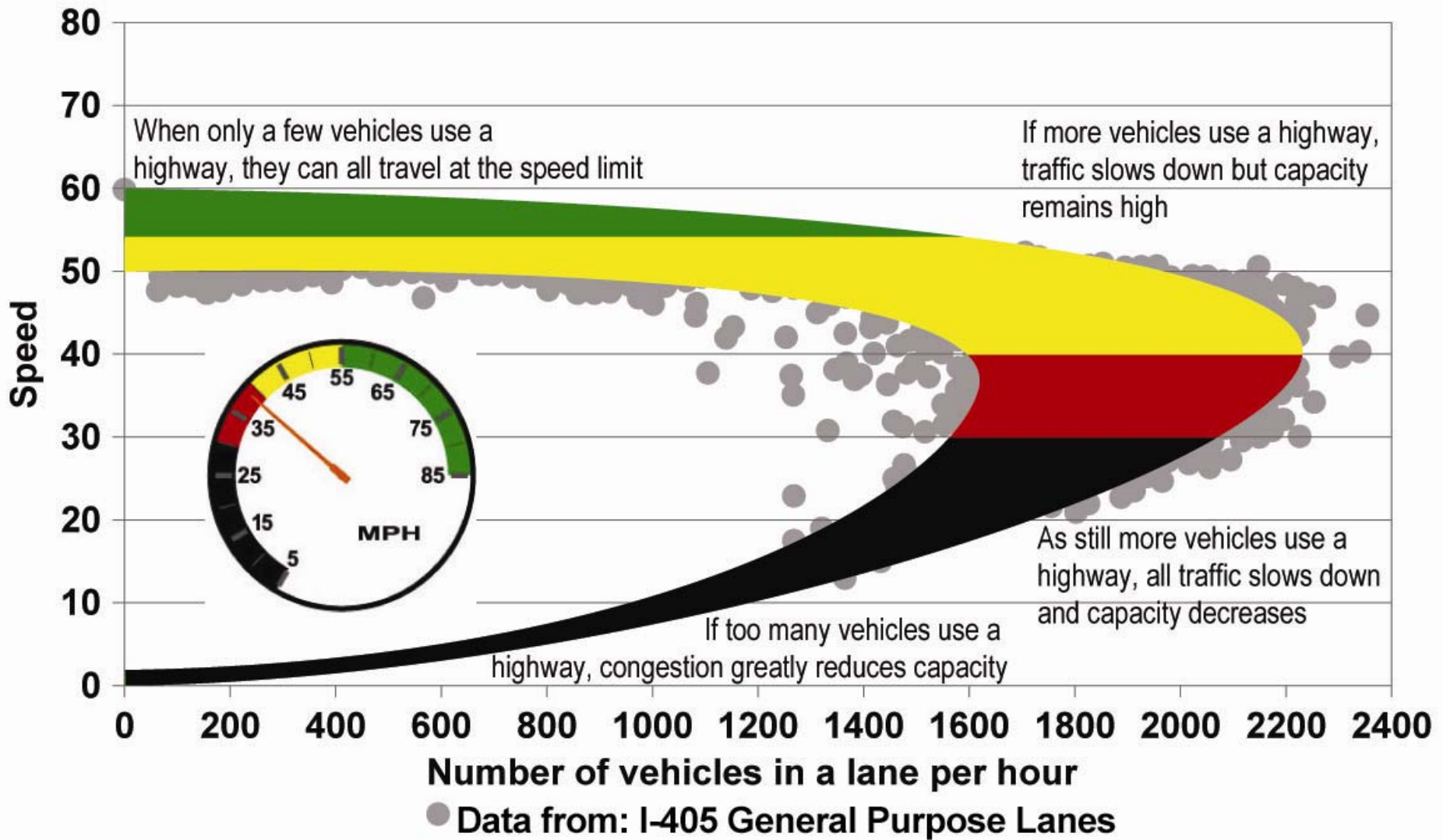
I-405 NB @ 24th NE, Weekdays in May, 2001



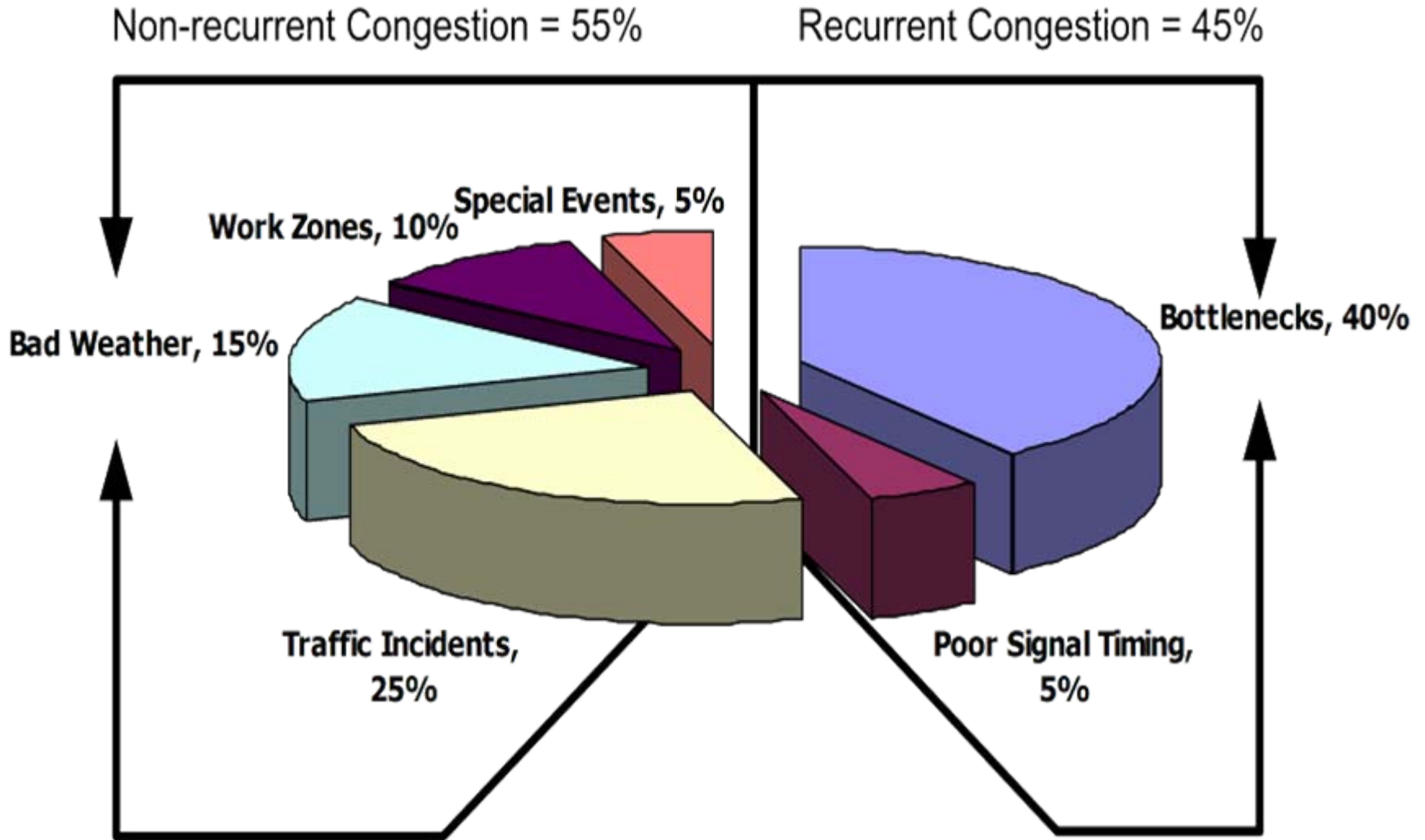
Slightly higher speed,
lower throughput

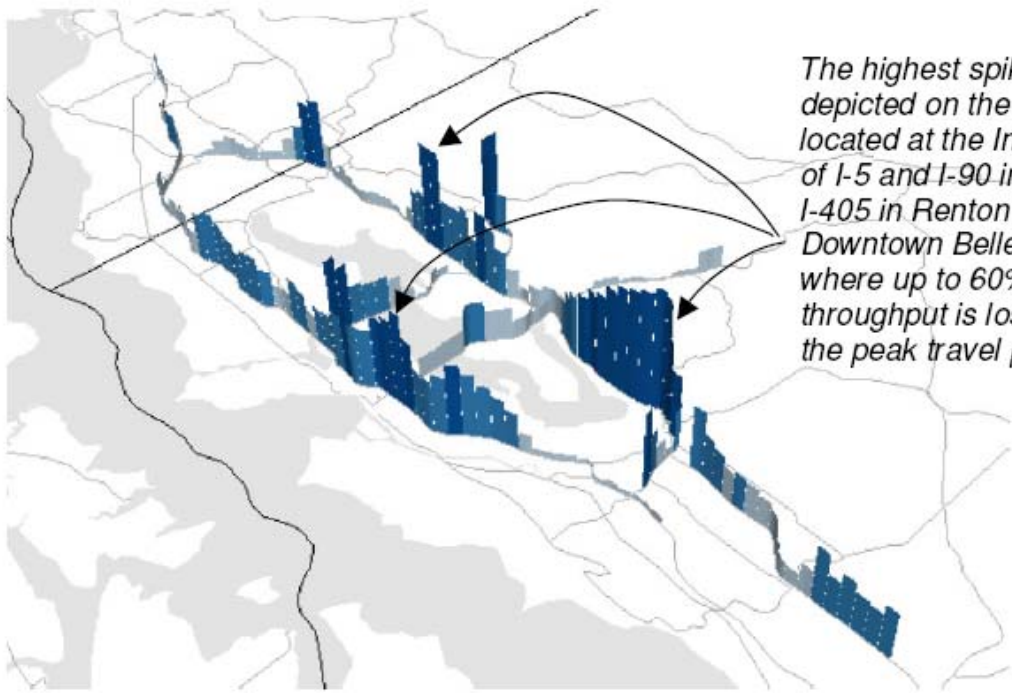
Max throughput is reached at
roughly 45 mph

Much lower speed,
lower throughput



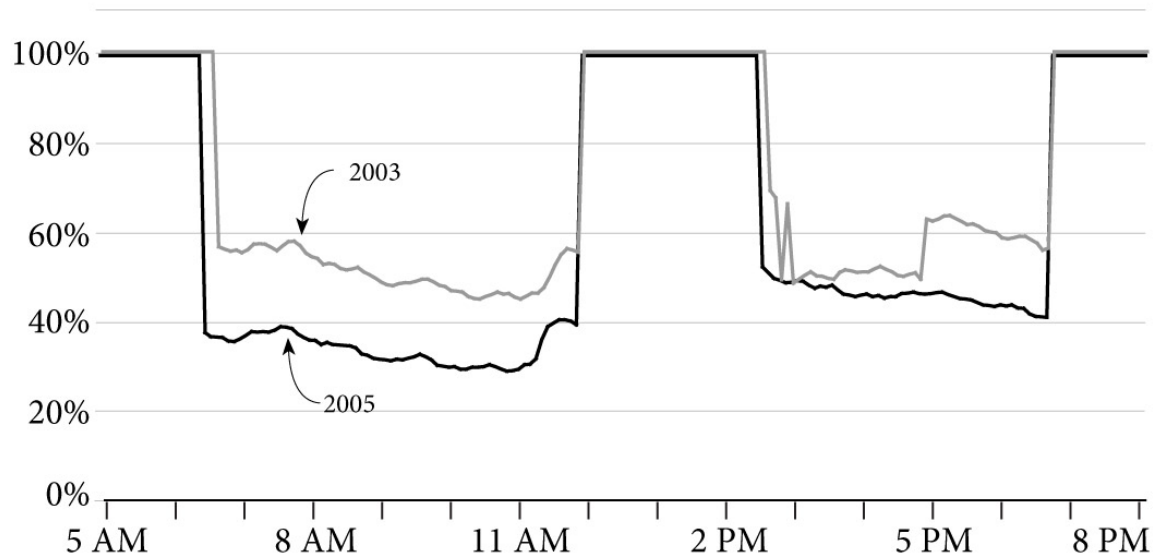
Causes of Congestion





The highest spikes depicted on the map are located at the Interchange of I-5 and I-90 in Seattle, I-405 in Renton and Downtown Bellevue where up to 60% of the throughput is lost during the peak travel period.

I-5 at I-90



What We Can Do About Congestion...

- Optimize traffic signal timing
- Minimize impact of crashes and disruptions
- Minimize weather impacts
- Manage traffic in construction work zones and during special events
- Provide traffic information and warnings
- Maximize system capacity through managed lane approaches

Progression of Traffic Management in Washington State...

- I-5 Express lanes in Seattle
- Variable message signs
- Highway Advisory Radio
- Ramp meters
- High occupancy vehicle lanes
- Incident response program
- Traveler information
- Signal system management
- Managed lanes
- Vehicle-infrastructure integration approaches

1970

|

1980

|

1990

|

2000 +

Early Traffic Management - 1967

I-5 Express Lanes

In 1967, WSDOT opened express lanes in Seattle

This led to:

- The first traffic management center in Seattle
- Freeway cameras



Signs and Radios

Variable Message Signs

(VMS): The WSDOT VMSs are capable of displaying messages remotely from the TMC or locally.



Highway Advisory Radio

(HAR): HAR is used as a driver information tool to warn motorists via their car radio of:

- Roadway closures
- Road restrictions
- Weather conditions
- Major traffic incidents



Technology and Congestion Management

- Detectors
- Ramp meters
- High occupancy vehicle (HOV) lanes



Incident Response and Congestion Management

- First Incident Response truck in 1963
- Goodwill Games pilot program
- Expansion of IR Program

"I waited less than 5 minutes when he showed up - whole thing done in less than 15! Great! I had my toddler with me"

- Jessica Guthrie, Everett

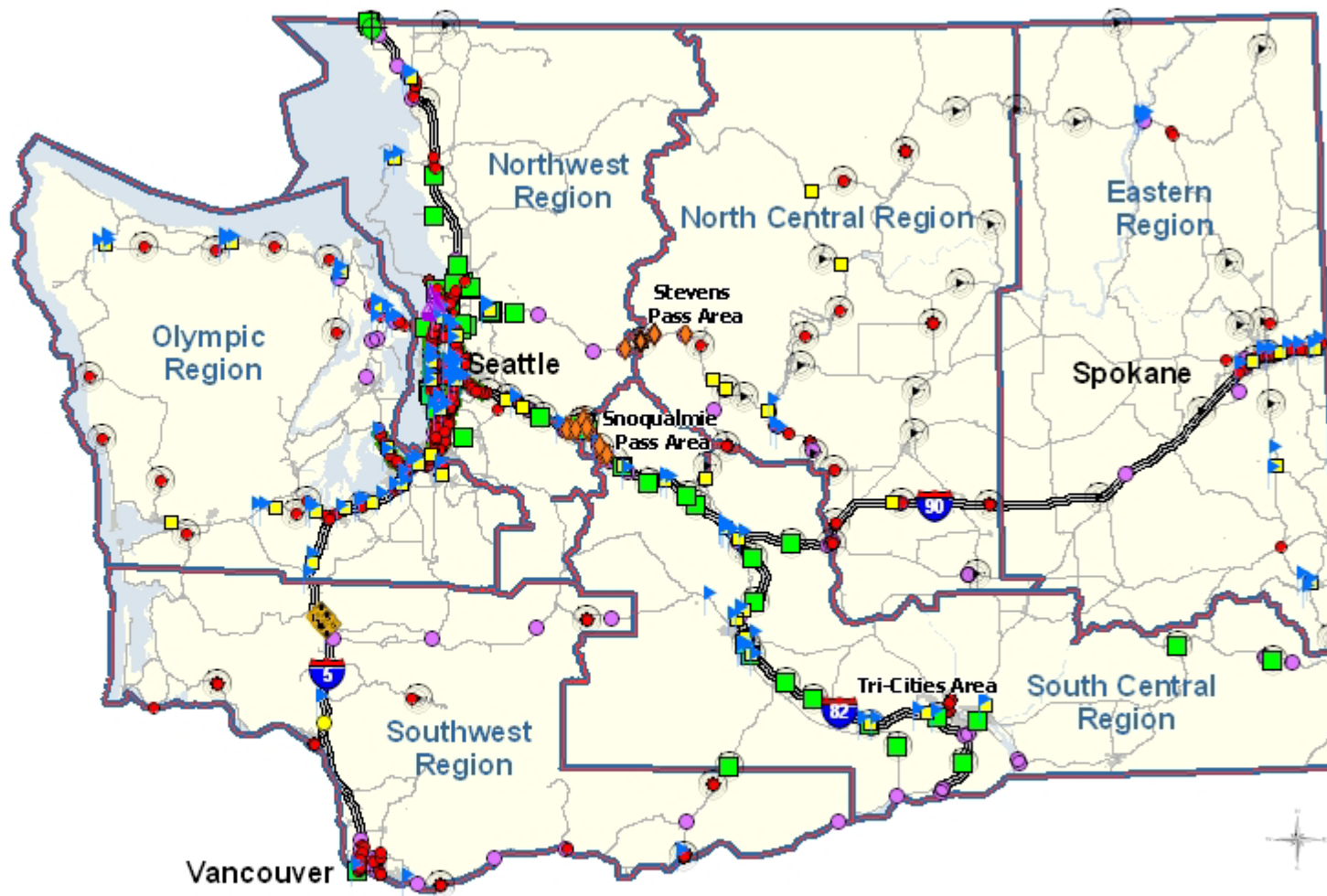
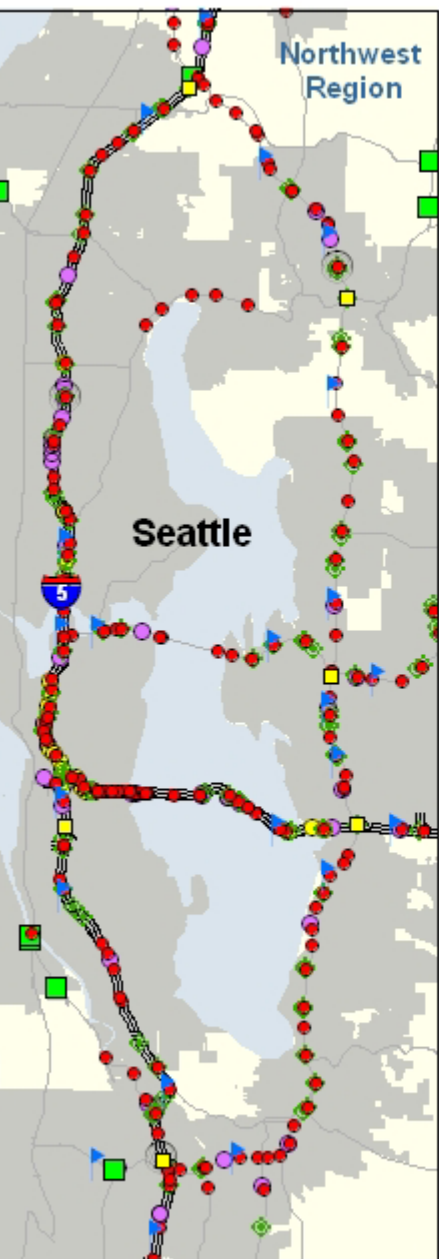


Transportation Management Centers

- Seven traffic management centers monitor and coordinate operations on the state highways. They are the central point for ramp metering operations, traveler information distribution, and incident response operations



2007 Washington State Department of Transportation Intelligent Transportation System Locations



All ITS Types Located Statewide

- | | | |
|-------------------------------|------------------------------------|-------------------------------------|
| Remote Traffic Microwave Sens | Highway Advisory Radio Transmitter | Roadway Weather Information Station |
| Over Height Detector | HART (Portable) | Ramp Meter |
| License Plate Reader | CCTV | Changeable Message Sign |
| Variable Speed Limit Sign | Snap Shot Camera | Variable Message Sign |
| | | CCTV, Existing |

ENTERPRISE Travel Time Best Practices Manual

Washington State

WSDOT - Seattle Area Travel Times - Microsoft Internet Explorer

Address: <http://www.wsdot.wa.gov/traffic/seattle/traveltimes/>

Washington State Department of Transportation

TRAFFIC & ROADS PROJECTS BUSINESS ENVIRONMENTAL MAPS & DATA

SEATTLE AREA TRAFFIC

SEATTLE TRAFFIC

- Seattle Area Home
- Local Travel Alerts and Slowdowns
- Incidents
- Travel Times
- Variable Message Signs
- Puget Sound Camera List + City/County Links
- North Detail Map
- Bridges Detail Map
- Bus/Trains/Carpool/Vanpool/Etc.

TRAFFIC & CAMERAS

- State View
- » Seattle Area
 - Ferry Cameras
 - Tacoma
 - Gig Harbor
 - Olympia
 - Vancouver Area
 - Mount Vernon
 - Bellingham
 - Canadian Border
 - Spokane
 - Wenatchee

STATE TRAVEL INFO

- Travel Alerts & Slowdowns
- Mountain Passes
- Weather
- Construction
- Cross-state Travel Routes
- Winter Driving Tips
- Safety Rest Areas
- State Highway Map
- Interstate Exits
- Featured Services

ADDITIONAL INFO

- Bordering State Travel

Central Puget Sound Travel Times

Travel times as of 6:55 P.M. Thursday, January 25, 2007

State Route/ Interstate	Route Description	Distance (miles)	Average Travel Time (minutes)	Current Travel Time (minutes)	Via HOV (min.)
	Auburn to Renton	9.8	11	10	10
	Bellevue to Bothell	9.7	14	21	12
	Bellevue to Everett	23.2	33	44	28
	Bellevue to Federal Way	24.9	39	40	29
	Bellevue to Issaquah	9.8	13	15	13
	Bellevue to Redmond	6.8	12	11	11
	Bellevue to Seattle	10.7	20	20	17
	Via Westbound Express Lanes	N/A	N/A	N/A	N/A
	Bellevue to Seattle	10.5	22	22	15
	Bellevue to Tukwila	13.5	26	27	16
	Bothell to Bellevue	9.7	11	10	10
	Everett to Bellevue	23.5	27	25	24
	Everett to Seattle	23.7	32	28	26
	Via Southbound Express Lanes	N/A	N/A	N/A	N/A
	Federal Way to Bellevue	23.5	26	34	25
	Federal Way to SeaTac	8.9	9	9	9
	Federal Way to Seattle	21.8	26	38	29
	Issaquah to Bellevue	9.7	11	10	10
	Issaquah to Seattle	15.5	22	20	20
	Lynnwood to Seattle	15.5	18	19	18

Case Study: Traffic Stop/Shooting I-5 Northbound at Boeing Field

0240 - All lanes closed- Detour established

0500 - 2 lanes opened moving 2,200 vph

0600 – Demand builds to 8,700 vph

0810 - All lanes reopened (backlog of
13,000+ vehicles in addition to
normal volumes

1130 - Traffic free-flow resumes

Economic Impact

12,700 Hours of vehicle delay

\$232,000 lost time due to delay



If A Picture Is Worth A Thousand Words...

What is video worth?



A Thousand Words...

What is video worth?



Empty gas tank leads to fatal I-5 accident

May 3, 2006

SEATTLE – Accident investigators were trying to piece together Wednesday what happened in the final moments leading up to fatal crash on the I-5 express lanes in Seattle.

What began as a mere annoyance for a man driving a blue pick-up truck quickly escalated into a dangerous situation when he ran out of gas on the Ship Canal Bridge, where there is nowhere to safely pull over. The driver jumped out and tried to get the truck out of the way, pushing it to get it moving. But the traffic moves fast through that area, and the state patrol said the motorist following the disabled truck tried to get around him. The victim was driving this pick-up, with his sister as a passenger.

"A box van also traveling in lane one came up and hit the driver and tragically the driver is deceased at the scene," said WSP trooper Kelly Spangler. Police said the van driver who hit the man showed no signs of intoxication.

To add to the tragedy, the victim's sister was riding in the passenger's seat and witnessed her brother's death. The 49-year-old Seattle man's identity has not yet been released.



Opportunities

- WSDOT is considered by many as a leader in traffic management systems
 - Willingness to explore innovative techniques to maximize the productivity of our corridors
- Major construction projects upcoming
 - Need to implement regional construction traffic management
- Congestion Pricing
 - SR 167 HOT Lanes Pilot
 - SR 520 Urban Partnership

Questions?

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