

Portland Freight Data Collection *Project Team Workshop*

presented to
TPAC

presented by
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Transportation leadership you can trust.

Phase One: Freight Data Questions

- **Goods Movement and the Economy**
- **Land Use and Goods Movement**
- **Truck Routes and Utilization**
- **Relationship of Trucking to Other Modes**
- **Corridor/Project Specific Data Needs**

Phase II Regional Freight Data Collection Program

Data Type	Roadside Intercept Survey	Terminal Gateway Survey	Truck Following Study	Vehicle Classification Counts	Motor Carrier Surveys
Origin-Destination Data	✓	✓	✓		
Freight Facility Flow Information		✓		✓	✓
Transportation Network Information	✓	✓			✓
Truck Count Data	✓			✓	
Commodity Information	✓	✓			✓
Routing Information	✓	✓	✓		
Temporal Variability of Freight Flows	✓	✓	✓	✓	✓
Truck Classification and Carrier Information	✓	✓	✓	✓	✓

ROADSIDE INTERCEPT SURVEYS

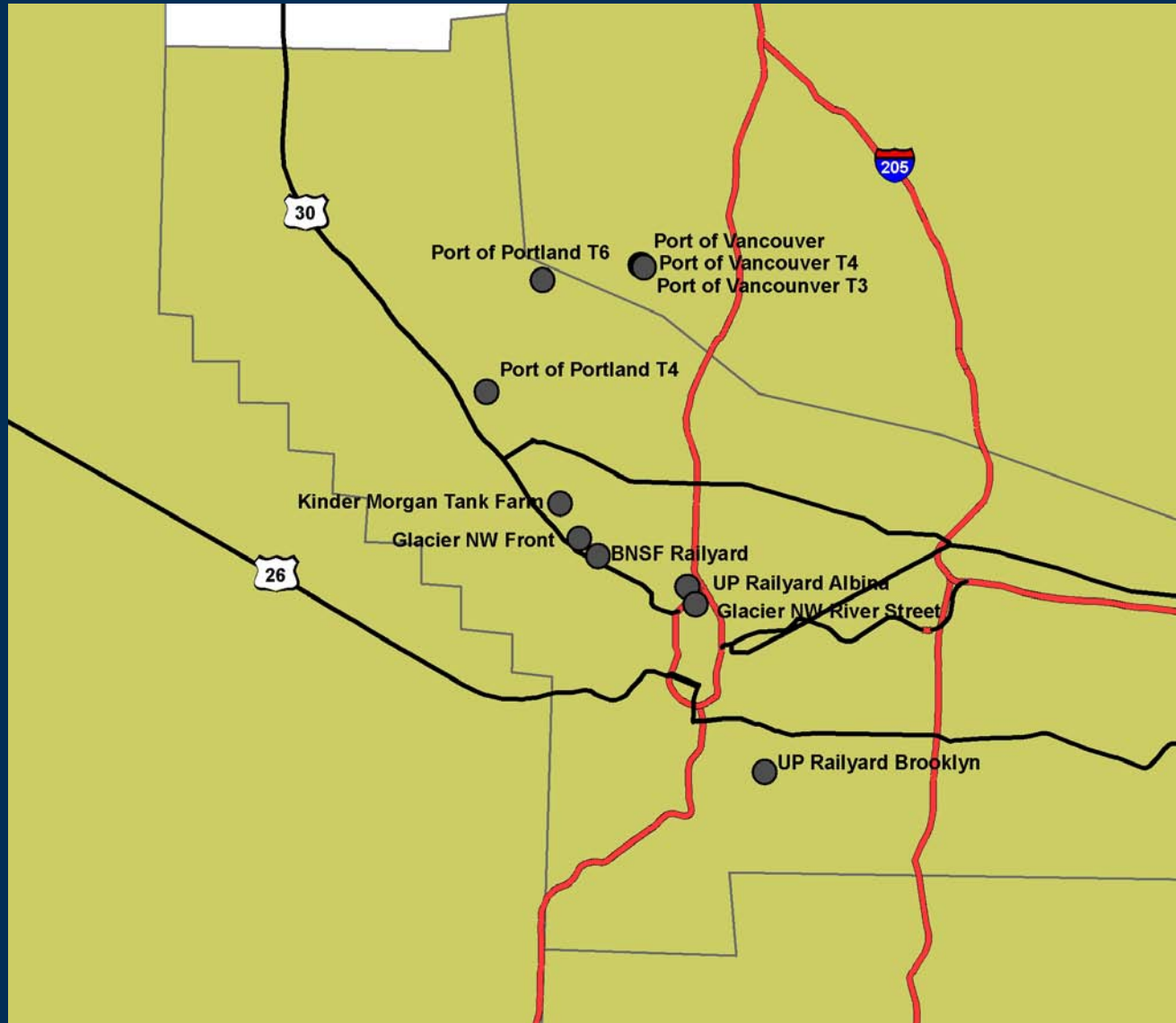
Roadside Intercept Surveys – Completes

- A total of 4,159 external surveys were collected (estimated sampling rate of 6.3 percent)

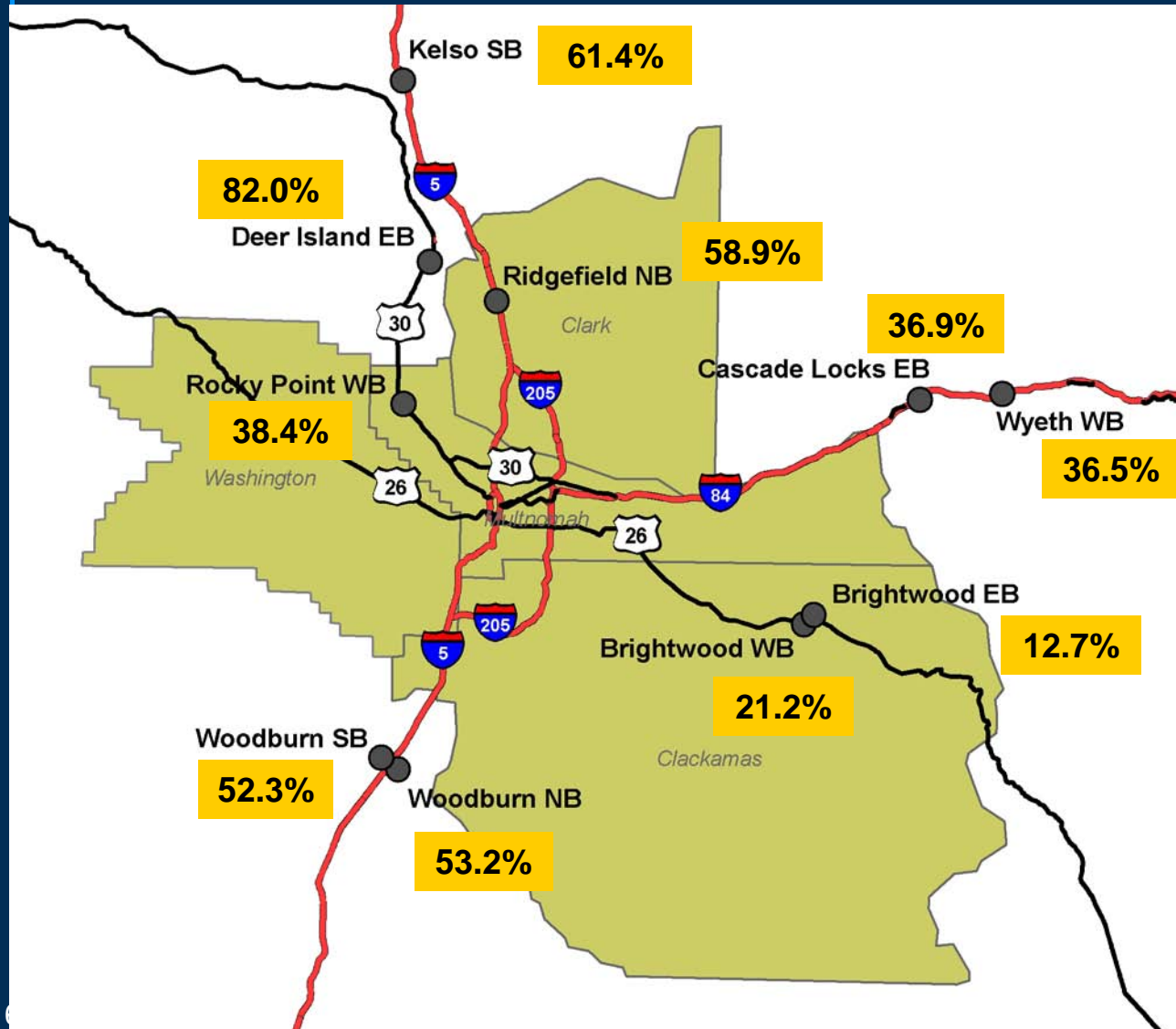
Location					Dates of Data Collection	Total Hours of Data Collection	# of Surveys Collected	Estimated Sampling Rate
ID	Highway	Direction	Milepost	Description				
1	I-5	NB	274	Woodburn Weigh Station	Nov 1	24	275	4.0%
					Dec 7-8	24	274	3.9%
2	I-5	SB	274	Woodburn Port of Entry	Nov 1	24	364	5.8%
					Dec 7-8	24	352	5.6%
3	I-5	NB	15	Ridgefield WA Port of Entry	Oct 26-27	24	351	5.0%
					Nov 29-30	24	256	3.7%
4	I-5	SB	46	Kelso WA Weigh Station	Nov 16-17	24	356	5.6%
					Nov 29-30	24	250	4.0%
5	I-84	EB	45	Cascade Locks Port of Entry	Nov 3	14	150	10.4%
					Nov 8-9	31	384	12.0%
					Nov 30-Dec 1	14	152	10.5%
6	I-84	WB	54	Wyeth Weigh Station	Nov 2-3	24	207	8.7%
					Nov 8-9	30	381	12.8%
7	US 26	EB	36	Brightwood Weigh Station	Dec 6	14	78	19.6%
8	US 26	WB	36	Brightwood Weigh Station	Dec 7	14	47	13.4%
9	US 30	WB	16	Rocky Point Weigh Station	Nov 15	14	171	32.4%
10	US 30	EB	33	Deer Island Weigh Station	Nov 16	14	111	21.0%
Total - All Locations						361	4,159	6.3%

All data was collected in the year 2005

Terminal Gateway Survey Locations

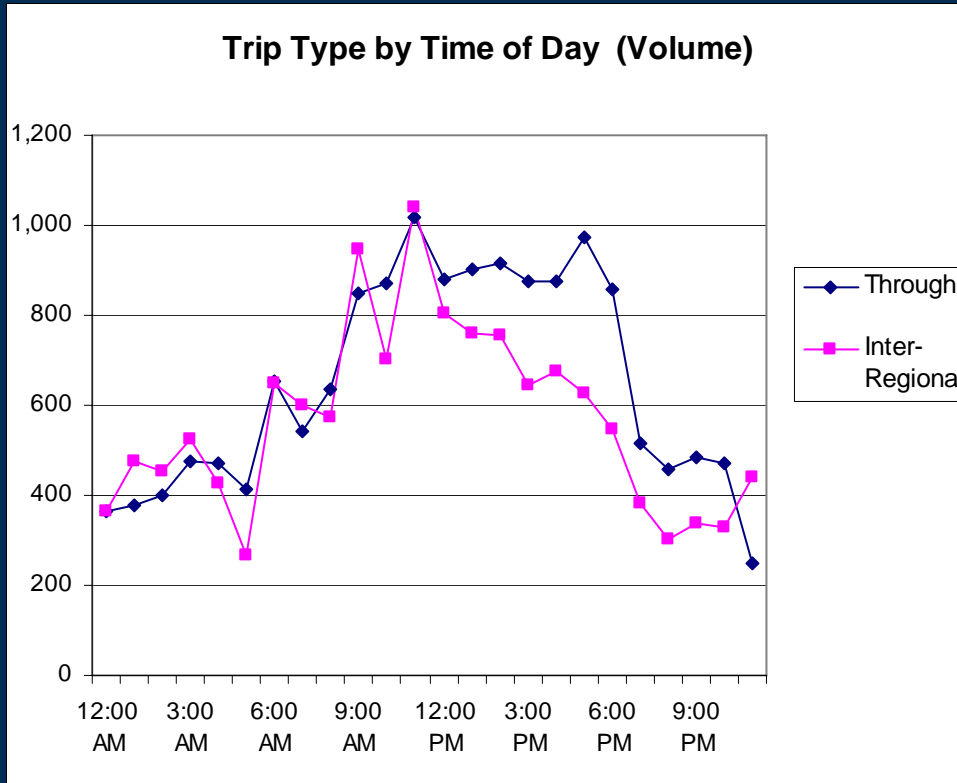


External Trips



More than 50% of trucks entering the region don't stop inside the region.

External Trips

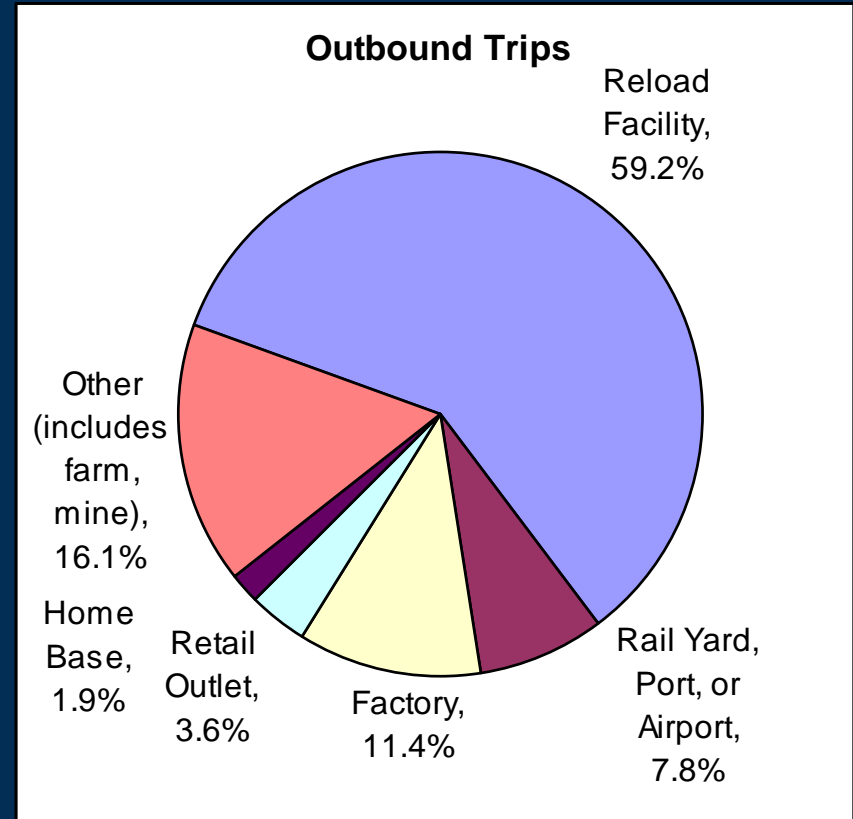
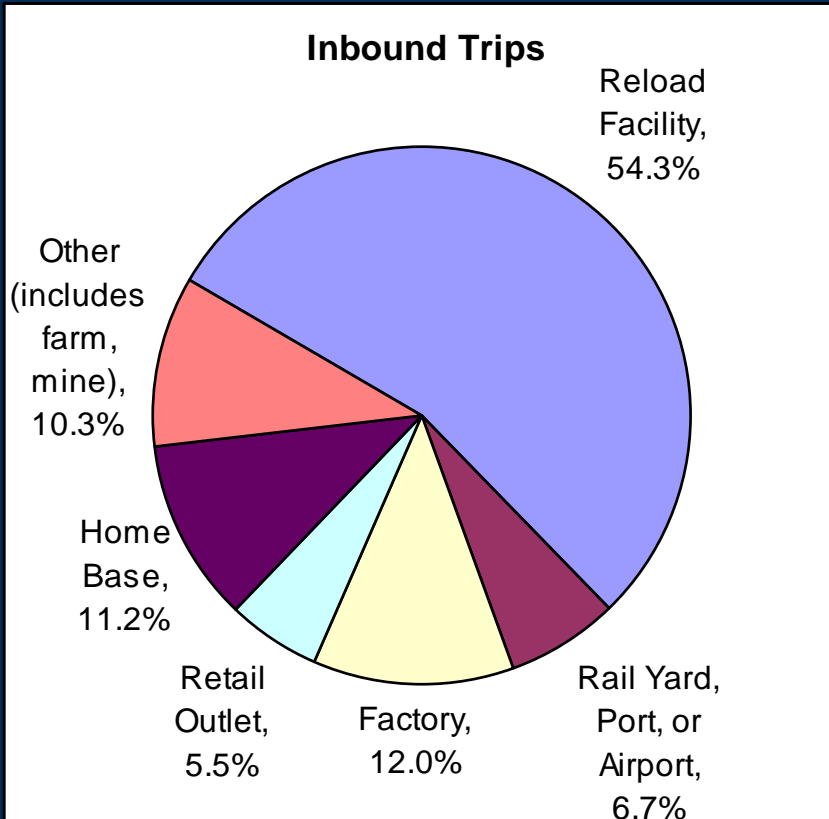


Through trips pick up in mid-morning and are steady into PM peak.

Trips with an origin or destination in the region peak late morning and decline steadily through PM peak.

Roughly 60 percent of all external trips from late afternoon and beyond PM peak are through trips.

External Trips



More than half of all external trips move to/from a re-load facility.

Reload facilities are a critical component of the movement of goods.

External Trips

Percent of Truck Trips Entering/Leaving the Region Using Highways	
Commodity Group	Total
Empty	19.8%
2: Food Products	15.5%
8: Lumber or Wood Products, Furniture	13.2%
5: Non-Metallic Minerals and Mineral Products	7.2%
9: Pulp, Paper, Printed Matter	6.1%

About 20% of trucks were empty. 4 commodity groups comprise about 42% of all truck trips with food products as the largest.

Lumber is the largest through-trip commodity (19%). A smaller percentage of through trips were empty (15%) than for inbound/outbound trips (25%).

External Trips

Pass-through Trips by Direction of Travel

Origin	Destination	Facility	Locations	Percent of Through Traffic
South	North	I-5	Woodburn-Ridgefield	32.8%
North	South	I-5	Kelso-Woodburn	27.4%
South	East	I-5 to I-84	Woodburn-Cascade Locks	6.0%
East	South	I-84 to I-5	Wyeth-Woodburn	5.4%
East	North	I-84 to I-5	Wyeth-Ridgefield	4.5%
North	East	I-5 to I-84	Kelso-Cascade Locks	4.5%

The I-5 corridor is the route for 60% of the region's pass-through trips.

External Trips

Direction of Travel					
Gateway Location	Facility	Inter-Regional (stopped in region)	I-5 NB (exited north of region)	I-5 SB (exited south of region)	I-84 EB (exited east of region)
Woodburn (south of region)	I-5 NB	46.8%	39.4%	-	9.2%
Kelso (north of region)	I-5 SB	38.6%	-	37.4%	6.3%
Wyeth (east of region)	I-84 WB	63.5%	15.3%	19.5%	-

Trucks entering the region from I-84 are more likely to stop in the region than trucks entering the region from I-5 (either from the north or south).

TRUCK FOLLOWING STUDY: EAST MULTNOMAH COUNTY

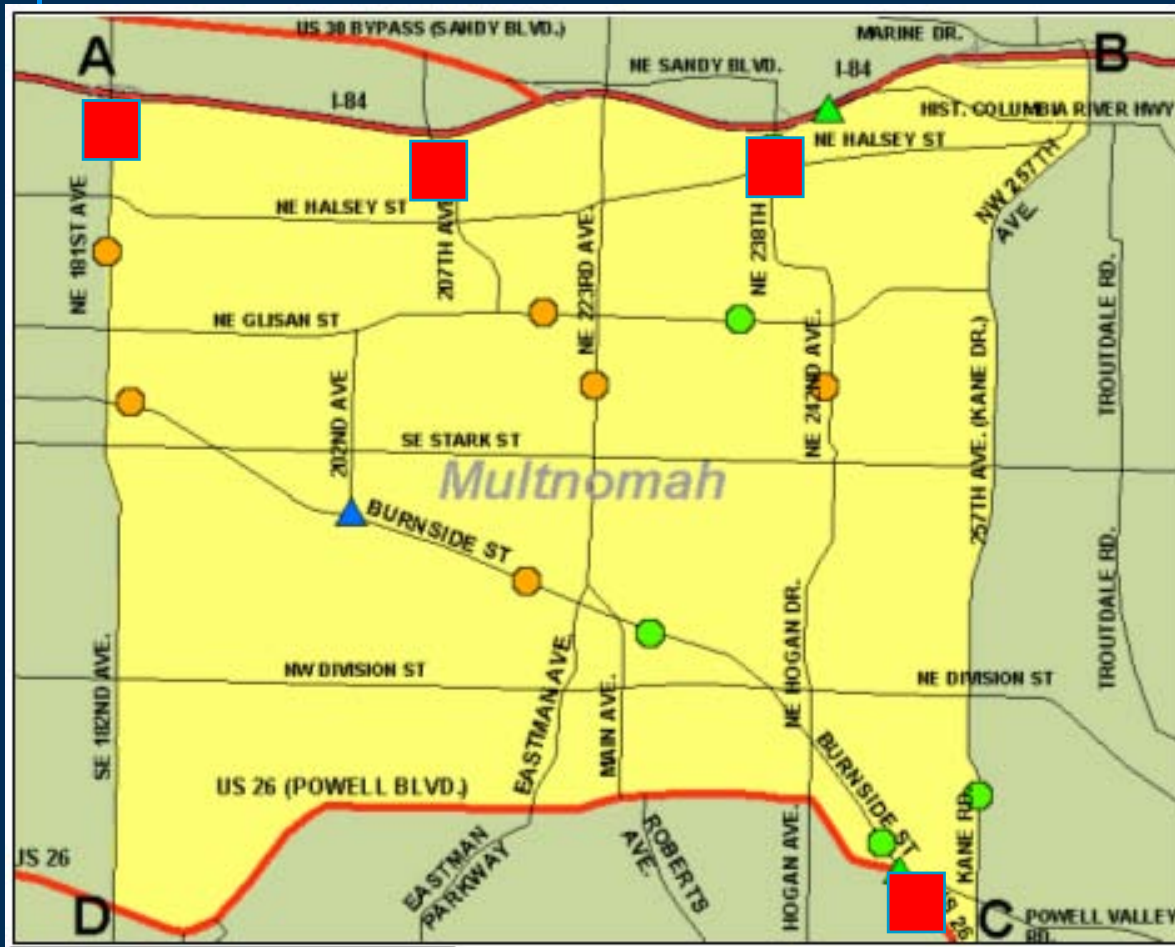
Multnomah County O-D Data Collection Options

- **Research Question:**

How many truck trips entering east Multnomah County are local trips vs. through trips?

Characteristics	Truck-Following Study	License Plate Matching
Number of hours of data collection	200	24
Flexibility of data collection times	Yes	No
Ease/accuracy of data collection	High	Low-to-Mid
Capture routing information	Yes	No
Capture destination data within study area	Yes	No
Number of vehicles surveyed	100 for each point of interest	All vehicles in traffic stream

Truck Following Study Methodology



- Dates: July 10-13 (Mon-Thu) & July 29-30 (Sat-Sun)
- Times: 4 am – 8 pm
- Four starting locations noted in red
- Total of 667 trucks were followed: 562 weekday, 105 weekend

Truck Following Study – Data Collected

- **Data collection by truck class:**
 - 159 were 2 axle 6 tire, single-unit (23.8 percent)
 - 98 were 3+ axle, single-unit (14.7 percent)
 - 83 were 4- axle, multiple-unit (12.4 percent)
 - 321 were 5+ axle, multiple-unit (48.1 percent)
- **Weekday expansion factors (by location, by time period) were calculated by scaling to truck count volumes**

Truck Following Study – Data Collected: Through Trips

Routing Combination	Percentage of Interregional Trips
US 26 - Burnside - 181 st Ave	15.2%
181 st Ave - Burnside	9.2%
207 th Ave - Glisan - 242 nd Ave - Hogan - Burnside	8.2%
US 26 - Burnside - Hogan - 242 nd Ave - 238 th Ave	7.9%
238 th Ave - 242 nd Ave - Hogan - Burnside	4.7%
207 th Ave - Glisan - 223 rd Ave - Burnside	4.4%

Truck Following Study – Data Collected: Destined Trips

Routing Combination	Percentage of Intraregional Trips
US 26 - Burnside	14.5%
181 st Ave - San Rafael	14.2%
207 th Ave - Halsey	8.0%
238 th Ave - Halsey	6.8%
207 th Ave - Glisan - 223 rd Ave	5.7%
181 st Ave - Burnside	5.1%
238 th Ave - 242 nd Ave	4.0%
US 26 - Powell	3.4%
207 th Ave - Glisan - 242 rd Ave	3.1%
181 st Ave - Halsey	2.6%

Truck Following Study – Data Collected: Destined Trips

Top Destinations	Percentage of Intraregional Trips
Albertson's Distribution: 17505 NE San Rafael	2.8%
Charlie's Produce: 18332 NE San Rafael	2.6%
Fred Meyer Produce: 22855 Wood Village Blvd	1.4%
Lowes: 1000 Wood Village Blvd	1.4%
Penske Truck Rental: 18900 NE San Rafael	1.4%

Truck Trips Between I-84 & US 26, Eastern Multnomah County

Entry Point	Percentage of Weekday Pass-through Trips				
	4:00 – 6:00 am	6:00 – 9:00 am	9:00 am– 3:00 pm	3:00 – 8:00 pm	Total
238 th Avenue just south of I-84	58.3%	19.2%	22.0%	52.9%	30.1%
Total Area	47.7%	36.7%	33.2%	48.2%	38.0%

Most truck trips stayed within the study area.

Pass-through trips tend to represent a greater portion of truck trips during the very early AM and again at the PM peak, similar (not identical) to the regional data for external trips.

REGIONAL TRUCK COUNTS

Truck Count Program (TCP) – Locations

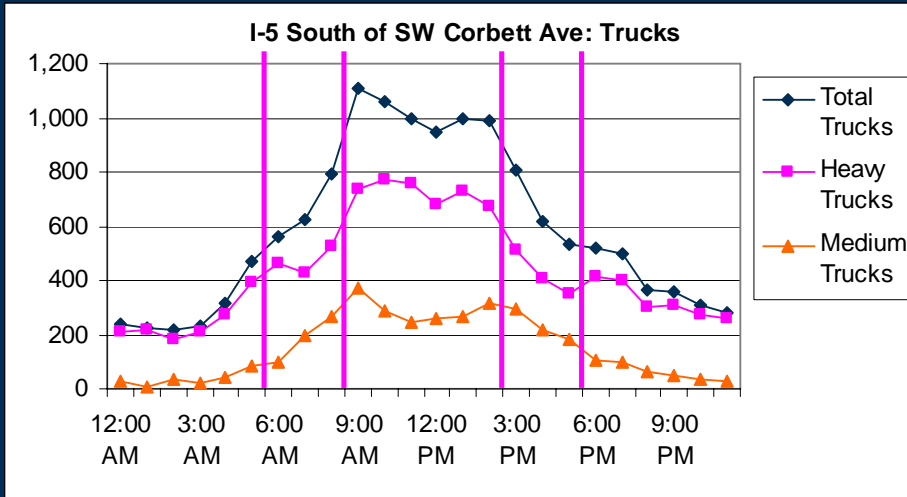
- Total of 108 locations (56 72-hour; 52 24-hour):
 - Collected Tuesdays – Thursdays, April – June 2006
 - 106 of 108 locations had complete data collection

Area	Number of Locations
Clackamas County	12
Port of Vancouver	5
Clark County (rest)	9
Downtown Portland	9
Port of Portland (marine & airport)	22
Multnomah County (rest)	34
Washington County	17
Total	108

TCP – Data Collected: Day of Week Variation

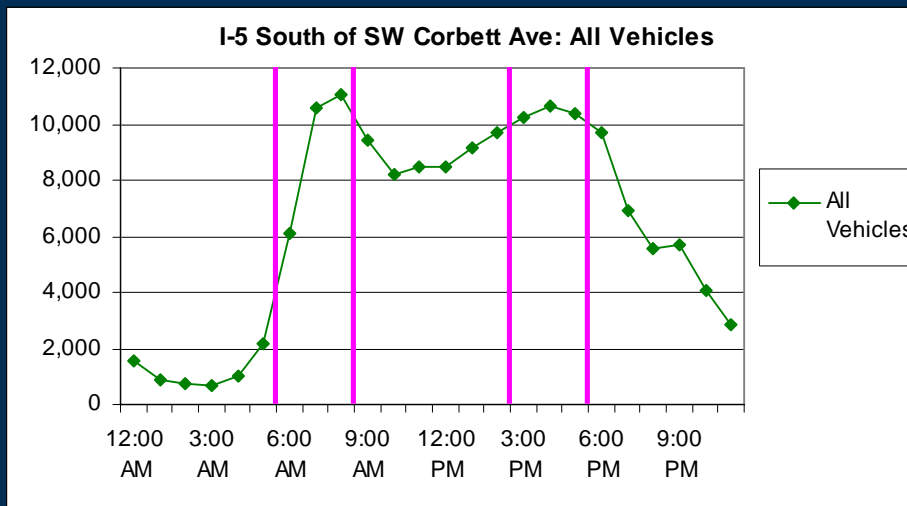
- **Freeway: 0 – 5%**
- **State Highway: 0 – 10%**
- **Local Arterial: 0 – 15%**

Truck Counts



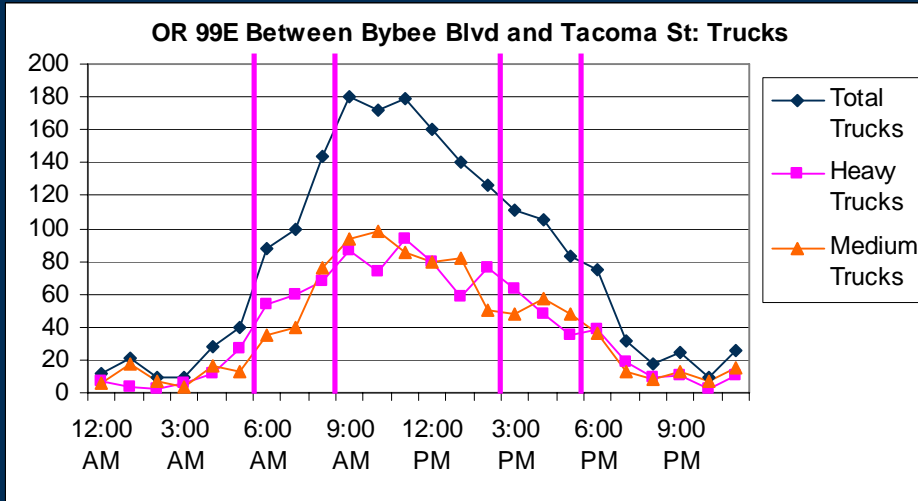
Majority of truck trips on I-5 South are heavy trucks

Truck traffic peaks mid-day in comparison to autos, which have distinct AM & PM peaking

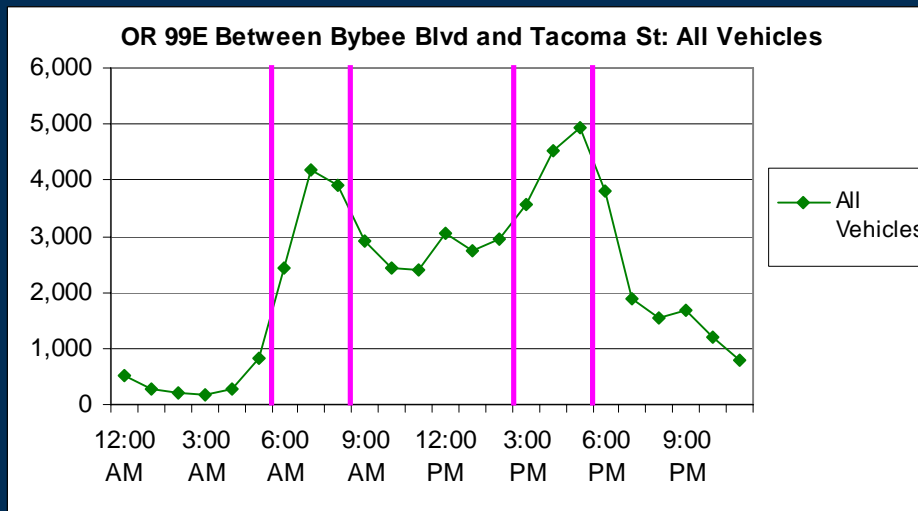


Vertical bands represent auto peaks (6-9 am; 3-6 pm)

Truck Counts

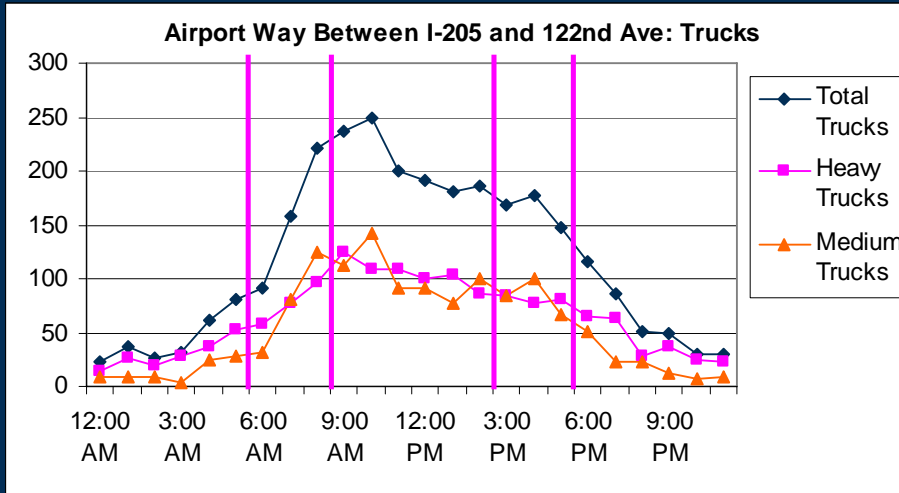


Pattern holds for State Highways...

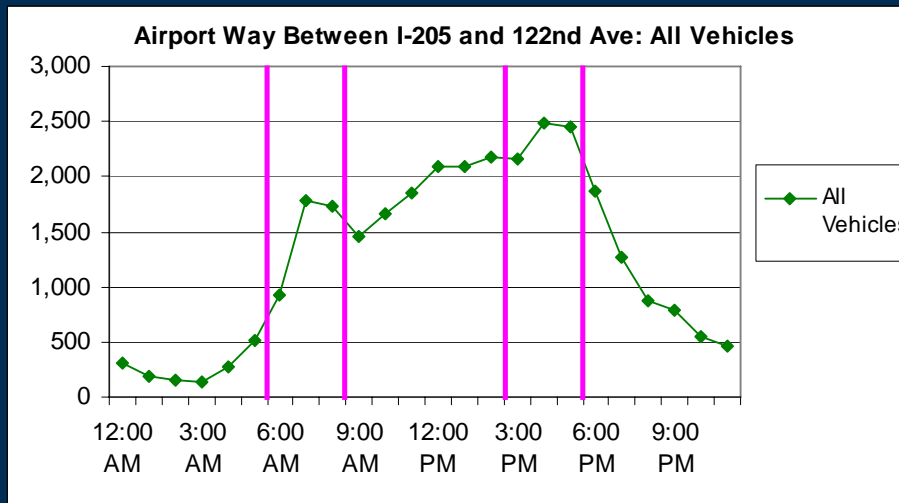


Vertical bands represent auto peaks (6-9 am; 3-6 pm)

Truck Counts



...and arterial freight routes.



Vertical bands represent auto peaks (6-9 am; 3-6 pm)

RELOAD FACILITY DATA

Facility Flow & Operations

- Interviews uncovered a blurring of lines between services offered by truckload, private, and LTL fleets
- Generally speaking, LTL fleets typically make fewer empty trips than truckload or private fleets
- Motor carrier facilities operate based on customer need
- No pattern in hours or size of operation
- Payloads substantially lighter for freight moving inside the region than that moving in and/or out

DATA COLLECTION CONCLUSIONS/ FUTURE DATA NEEDS

Conclusions – What Worked Well?

- **Start with focus on freight planning questions**
 - **Satisfy freight planning efforts of local and state agencies**
 - **Satisfy regional travel demand model needs**
- **Hourly vehicle classification counts**
 - **Understanding patterns by truck type, facility type and trip type**
 - **Validating analytical tools**
 - **Collecting vehicle classification data for first 15 minutes every hour maximized project resources**
 - **24-hour count data for interstates, 72-hour counts for other roads**

Conclusions – What Worked Well?

- **Roadside truck O-D surveys**
 - Detailed understanding of inter-regional trip patterns
 - Routing information should be useful for future planning
 - Understanding of land use relationships
- **Roadside truck O-D surveys at port terminals and intermodal yards**
 - Should allow for better modeling of gateway facilities
- **Truck-following survey**
 - Well-suited for collecting truck O-D data for small subregion
 - Useful routing information ...

Conclusions – Lessons Learned

- **Need immediate data QA/QC for all data elements – multiple levels, while expensive can save money in long term**
- **Establishment surveys and data collection should be re-evaluated**
 - **Requires extensive access to establishments**
 - **Dispatch data not provided**
 - **May be more effective for focusing on supply chain patterns**
- **Collecting truck origin-destination data for truck movements internal to the region**
 - **Continues to be an elusive element – trip diaries may still be best approach or move to GPS**

What are the Next Steps?

- **Regional Truck Count Program**
- **More Data Collection for Trips that Stay in the Region**
- **Mapping of Supply Chain Flow Process**
 - **Warehouse Trip Purpose Module**
 - **Understanding how investments affect supply chain performance**