

Washington State Freight Truck Origin and Destination Study: Columbia County



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by

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in cooperation with

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EWITS Research Report: Background and Purpose

This is the twenty-first in a series of Research Reports prepared from the Eastern Washington Intermodal Transportation Study (EWITS). The reports prepared as a part of this study provide information to help shape the multimodal network necessary for the efficient movement of both freight and people into the next century.

EWITS is a six-year study funded jointly by the Federal government and the Washington State Department of Transportation as a part of the Intermodal Surface Transportation Efficiency Act of 1991. Dr. Ken Casavant of Washington State University is Director of the study. A state-level Steering Committee provides overall direction pertaining to the design and implementation of the project. The Steering Committee includes Jerry Lenzi, Chair and Regional Administrator (WSDOT, Eastern Region); Richard Larson, Regional Administrator (WSDOT, South Central Region); Don Senn, Regional Administrator (WSDOT, North Central Region); Charles Howard (WSDOT, Planning Manager), and Eric Berger, Executive Director, County Road Administration Board. Pat Patterson represents the Washington State Transportation Commission on the Steering Committee. An Advisory Committee with representation from a broad range of transportation interest groups also provides guidance to the study. The following are key goals and objectives for the Eastern Washington Intermodal Transportation Study:

- *Facilitate existing regional and state-wide transportation planning efforts.*
- *Forecast future freight and passenger transportation service needs for eastern Washington.*
- *Identify gaps in eastern Washington's current transportation infrastructure.*
- *Pinpoint transportation system improvement options critical to economic competitiveness and mobility within eastern Washington.*

For additional information about the Eastern Washington Intermodal Transportation Study or this report, please contact Ken Casavant at the following address:

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The contents of this report reflect the views of the author, who is responsible for the facts and accuracy the data presented herein. The contents do not necessarily reflect the official views or policies of the Washington State Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification or regulation.

EWITS PREVIOUS REPORTS NOW AVAILABLE

1. Gillis, William R. and Kenneth L. Casavant. "Linking Transportation System Improvements to New Business Development in Eastern Washington." EWITS Research Report Number 1. February 1994.
2. Gillis, William R. and Kenneth L. Casavant. "Lessons from Eastern Washington: State Route Mainstreets, Bypass Routes and Economic Development in Small Towns." EWITS Research Report Number 2. February 1994.
3. Gillis, William-R. and Kenneth L. Casavant. "Washington State Freight Truck Origin and Destination Study: Methods, Procedures, and Data Dictionary." EWITS Research Report Number 3. December 1994.
4. Gillis, William R. and Kenneth L. Casavant. "Major Generators of Traffic on U.S. 395 North of Spokane: Including Freight Trucks and Passenger Vehicles Crossing the International Border." EWITS Research Report Number 4. January 1995.
5. Newkirk, Jonathan, Ken Eriksen, and Kenneth L. Casavant. "Transportation Characteristics of Wheat and Barley Shipments on Haul Roads To and From Elevators in Eastern Washington." EWITS Research Report Number 5. March 1995.
6. Jessup, Eric and Kenneth L. Casavant. "A Quantitative Estimate of Eastern Washington Annual Haul Road Needs for Wheat and Barley Movement." EWITS Research Report Number 6. March 1995.
7. Gillis, William R., Emily Gruss Gillis, and Kenneth L. Casavant. "Transportation Needs of Eastern Washington Fruit, Vegetable and Hay Industries." EWITS Research Report Number 7. March 1995.
8. Casavant, Kenneth L. and William R. Gillis. "Importance of U.S. 395 Corridor For Local and Regional Commerce in South Central Washington." EWITS Research Report Number 8. April 1995.
9. Gillis, William R., Eric L. Jessup, and Kenneth L. Casavant. "Movement of Freight on Washington's Highways: A Statewide Origin and Destination Study." EWITS Report Number 9, November 1995.
10. Chase, Robert A. and Kenneth L. Casavant. "Eastern Washington Transport-Oriented Input Output Study: Technical Report." EWITS Research Report Number 10. March 1996.

11. Chase, Robert A. Kenneth L. Casavant. "The Economic Contribution of Transport Industries to Eastern Washington." EWITS Report Number 11. April 1996.
12. Lee, Nancy S. and Kenneth L. Casavant. "Waterborne Commerce on the Columbia-Snake." EWITS Report Number 12. October 1996.
13. Alderson, Lynn C., Kenneth L. Casavant and Eric Jessup. "Transportation Characteristics and Needs of Forest Products Industries Using Eastern Washington Highways: Part I Economic Structure of the Industry." EWITS Research Report Number 13. January 1997.
14. Eriksen, Ken and Kenneth L. Casavant. "Impact of North American Free Trade Agreement (NAFTA) on Washington Highways - Part 1: Commodity and Corridor Projections." EWITS Research Report Number 14. January 1997.
15. Alderson, Lynn C. and Kenneth L. Casavant. "Transportation Characteristics and Needs of Forest Products Industries Using Eastern Washington Highways: Part 2 Movement of Raw Logs." EWITS Research Report Number 15. May 1997.
16. Alderson, Lynn C. and Kenneth L. Casavant. "Transportation Characteristics and Needs of Forest Products Industries Using Eastern Washington Highways: Part 3 Shipment from Mills." EWITS Research Report Number 16. May 1997.
17. Alderson, Lynn C. and Kenneth L. Casavant. "Transportation Characteristics and Needs of Forest Products Industries Using Eastern Washington Highways: Part 4 Commercial Shipments." EWITS Research Report Number 17. February 1997.
18. Jessup, Eric L., John Ellis, and Kenneth L. Casavant. "A GIS Commodity Flow Model for Transportation Policy Analysis: A Case Study of the Impacts of a Snake River Drawdown." EWITS Research Report Number 18. May 1997.
19. Lee, Nancy S. and Kenneth L. Casavant. "A Commodity and Origin-Destination Analysis of Rail Traffic in Washington--1990-1995. EWITS Research Report Number 19. May 1997.
20. Edwards, Richard, Eric L. Jessup, and Kenneth L. Casavant. "Eastern Washington On-Farm and Commercial Grain Storage." EWITS Research Report Number 20. January 1998.

EWITS Previous Working Paper Series Now Available

1. Lee, Nancy and Ken Casavant. "Grain Receipts at Columbia River Grain Terminals." EWITS Working Paper #1, March 1996.
2. Lenzi, Jerry, Eric Jessup, and Ken Casavant. "Prospective Estimates for Road Impacts in Eastern Washington from a Drawdown of the Lower Snake River." EWITS Working Paper #2, March 1996.
3. Ellis, John, Eric Jessup, and Ken Casavant. "Modeling Changes in Grain Transportation Flows in Response to Proposed Snake River Drawdowns: A Case Study for Eastern Washington." EWITS Working Paper #3, March, 1996.
4. Painter, Kate and Ken Casavant. "A Comparison of Canadian Versus All Truck Movements In Washington State With A Special Emphasis On Grain Truck Movements." EWITS Working Paper #4, March 1996.
5. Jessup, Eric L., John Ellis and Kenneth L. Casavant. "Estimating the Value of Rail Car Accessibility for Grain Shipments: A GIS Approach." EWITS Working Paper #5. April 1996.
6. Painter, Kathleen M. and Kenneth L. Casavant. "Truck Movement Characteristics on Selected Truck Routes in Washington State." EWITS Working Paper #6. August 1996.
7. Lee, Nancy S. and Kenneth L. Casavant. "Grain Receipts at Columbia River Grain Terminals, 1980-81 to 1995-96." EWITS Working Paper #7. January 1997.
8. Jessup, Eric L. and Ken Casavant. "Economic Evaluation of Grain Shipment Alternatives: A Case Study of the Coulee City and Palouse River Railroad." EWITS Working Paper #8, March 1997.

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Introduction

A large statewide survey of truck traffic origination, destination, and freight characteristics provided the data for in-depth county level reports of freight truck movement in Washington State. Considerable detail on road usage, truck weight, truck configuration, commodity type, and seasonal traffic variation is available in this survey. We were able to examine a rich set of characteristics for trucks whose freight was either destined for or originating from a particular county. It is important to note the survey does not capture truck movement that did not pass through one of 20 survey sites located on major routes throughout the state (see Table 1A for survey sites). For this reason, considerable intra- and intercounty traffic will not be included for some counties depending on their proximity to a survey site. Again, these truck characteristics reflect only the truck movements as reported at the statewide survey locations.

Table 1A--Survey Sites and Traffic Direction

Weigh Station	Site Number	Direction of Traffic	Road Designation
Brady West, WA	1	West	SR12
Brady East, WA	2	East	SR12
Cle Elum East, WA	3	East	I90
Cle Elum West, WA	4	West	I90
Deer Park South, WA	6	South	SR395
Douglas POE (BC Border	7	North	I5
Everett North, WA	8	North	I5
Everett South, WA	9	South	I5
Goldendale, WA	10	North/South	SR97
Kelso South, WA	11	South	I5
Othello, WA	12	All Four	SR17
Pasco, WA	13	South	SR395
Peshastin West, WA	15	West	SR2
Plymouth POE, WA	16	North	SR395
East Port Angeles Westbound, WA	17	West	SR101
Sea Tac South, WA	19	South	I5
Sea Tac North, WA	20	North	I5
East Spokane POE, WA	21	West	I90
Tokio East, WA	22	East	I90
Tokio West, WA	23	West	I90
Umatilla POE, WA	24	South	SR395
Vancouver North, WA	25	North	I5
Wallula POE, WA	26	All Four	SR12, SR395, & SR 370
Osoyoos, BC (BC Border	28	North	SR97
Oroville, WA (US Border	29	South	SR97

Information for this report was provided by an extensive study of freight truck movements on major Washington State highways conducted under the Eastern Washington Intermodal Transportation Study (EWITS). This study was the first in the United States to collect statewide freight truck origination and destination data through direct interviews of truck drivers at weigh stations. Over 300 persons conducted these personal interviews of a total of 30,000 truck drivers, providing an extensive database on freight and goods movements in Washington State.

Method of Analysis

Truck traffic characteristics at the county level were analyzed for trucks whose trips either originated or ended in a particular county. Given the survey data, there was no feasible method for analyzing truck traffic that was simply passing through the county. Detailed truck traffic characteristics for each of Washington's 39 counties by season included number of trucks with freight destined for that county per day, their payload weight and commodity type; road usage, including number of trucks per day, freight weight and commodity type; and number of trucks per day, freight weight and commodity type by city of cargo origin and destination. Truck traffic was analyzed on an annual basis for the following characteristics: county road usage, average and total truck tonnage, and number of trucks by commodity; distribution of freight weight by commodity and by road; type of commodity hauled by truck configuration; and truck carriers' home base for truck trips originating or ending in that county. Truck traffic data is likely to be more accurate in terms of relative differences by road, season, etc., than actual magnitude for any one characteristic due to the nature of the survey approach.

Presentation of Results

Detailed truck traffic characteristics are presented for Washington's 39 counties in a set of nine tables for each county. Table 1 presents information by road for truck traffic either originating or ending in that county for each season. Characteristics include total number of trucks, number of trucks with freight, average payload, and total tonnage. In addition, the percentage of loads by commodity on each road is calculated.

Tables 2 and 3 present seasonal truck traffic characteristics by city of cargo origin and city of cargo destination, respectively. For each city, the daily number of trucks, trucks with freight, their average payload weight, and total truck traffic weight are presented. Again, there is a breakdown by commodity type for each city.

Table 4 summarizes truck traffic characteristics for trucks whose trips end in that county by season. Total daily truck traffic, number of trucks with freight, average payload weight, and the total tonnage per day as well as the percentage of truckloads by commodity are presented.

Table 5 analyzes truck traffic originating or ending in that county by commodity. The number of trucks per day as well as the average and total payload by commodity is presented. In addition, truck traffic usage by road is detailed for each commodity.

Table 6 shows distribution of payload weight by commodity for truck traffic originating or ending in that county. Five weight categories in five-ton increments are used. Table 7 presents distribution of payload weight by road for truck traffic originating or ending in that county. Weight characteristics by commodity and by road are easily identified from these two tables.

Table 8 shows truck configuration by commodity for truck traffic originating or ending in that county. The percentage of trucks with freight by configuration is presented for each commodity. Table 9 presents truckers' home base by city and the number of Washington-based carriers for truck traffic originating or ending in the county.

Overall, this county-by-county disaggregation of truck movements shows the powerful impact of particular commodity movements on certain roads and during certain seasons. Farm commodities are hauled from the field to the processor or market on a seasonal basis. Lumber harvest has considerable seasonal variation as well. Construction or closures on major roads used for these purposes will need to be planned accordingly. As different industries grow or shrink, they create specific demands on the transportation infrastructure that may need to be accommodated in future transportation planning.

These results represent a summary of truck traffic origin and destination information at the county level. This information should be useful for state and county planning with respect to traffic sources, either origin or destination, and the characteristics of this traffic. It should also be valuable for planning road maintenance and construction at the county and regional level.

Columbia County Results

The main truck route in Columbia County is State Route 12 (SR12). Truck traffic on this route ranges from 19 trucks per day in summer to five in winter (Table 1). In the fall, all trucks with loads carried chemicals, while in the spring all trucks with loads carried agricultural products. Freight in winter and summer consisted of agricultural products, rubber or plastic products, and lumber or wood products. Given the small numbers of trucks with freight heading into or out of Columbia County in this survey, commodity composition may not give an accurate representation of actual freight types for this county.

All of the surveyed trucks coming from Columbia County originate from the town of Dayton (Table 2). No observations were obtained for freight movement leaving Columbia County in fall, winter, or spring. In summer, 12 trucks per day left Dayton, three-fourths with lumber or wood products and one-fourth carrying agricultural products. The average payload weight averaged 32 tons.

All of the surveyed trucks destined for Columbia County are heading to the town of Dayton (Table 3). Truck traffic ranges from five trucks per day in winter to 16 trucks per day in fall. The main freight categories include agricultural products, rubber or plastic products, chemicals, and lumber or wood products. (Again, there are few observations in the survey for this county, so freight types and average truck numbers per day are not as reliable as for counties with larger numbers of observations.) Average payload weight ranges from 7 tons in winter to 34 tons in summer.

Total truck traffic heading for or leaving from Columbia County ranges from five trucks per day in winter to 19 trucks per day in summer (Table 4). In fall, trucks with freight in the survey transport chemicals, with an average payload weight of 23 tons. In winter, freight types consist mainly of lumber or wood products and rubber or plastic products, with an average payload weight of 7 tons. Agricultural products make up 86% of the freight hauled in spring, with an average payload for all loaded trucks of 25 tons. In summer, lumber or wood products comprise 58% of the freight, with the remaining freight made up of agricultural products. Average payload weight in summer is 33 tons.

Table 5 shows road usage by type of freight for the major commodities hauled into or out of Columbia County over the entire year. Agricultural products and lumber or wood products each make up approximately one-third of trucks with freight. Chemicals and rubber or plastic products each make up an additional 12% of trucks with freight. All of the trucks in the survey use the major truck route for this county, SR12. The average payload weight is highest, 30 tons, for trucks carrying chemicals.

All of the trucks carrying chemicals fall into the over 30-ton weight category, as well as 82% of the trucks carrying lumber or wood products (Table 6). Half of the trucks carrying agricultural products also fall in this category, with the remaining half weighing between 25 and 30 tons. Trucks carrying rubber or plastic products in the survey have loads of less than five tons.

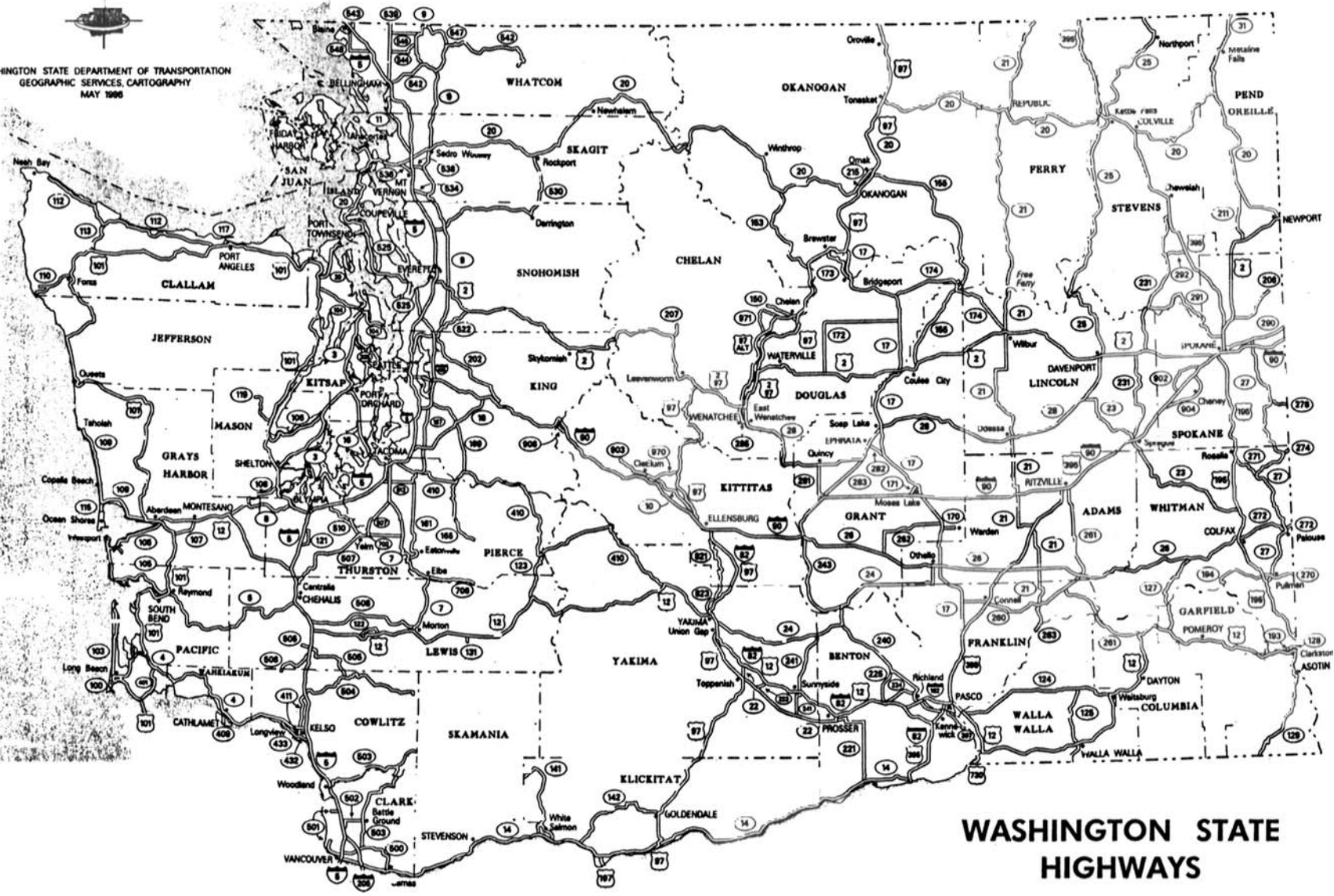
Table 7 shows weight category by roadway for truckloads originating or ending in Columbia County. Of the loaded trucks on SR12, 60% carry payloads of 30 tons or more. Twelve percent of the loads weigh less than five tons, and another 12% fall in the 5- to 10-ton weight category. The remaining trucks with freight have payloads weighing between 20 and 30 tons.

The most common truck configuration for trucks carrying loads into or out of Columbia County is a truck and trailer, accounting for 45% of the loaded trucks (Table 8). The next most common configuration is a tractor and two trailers, accounting for 42% of trucks with loads. Another 13% are tractors with one trailer. None of the trucks in the survey were straight trucks.

Over a four-day survey period (one day in each season), a total of 47 trucks were either heading for or leaving Columbia County (Table 9). Of these trucks, 40 or 84% were Washington based carriers. Dayton was home base for 28% of the surveyed trucks. Longview was the next most common carrier city, with 20% of the trucks in the survey. Connell was home base for another 12% of the surveyed trucks.



WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
GEOGRAPHIC SERVICES, CARTOGRAPHY
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WASHINGTON STATE HIGHWAYS

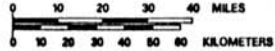


Table 1--Daily Truck Traffic by Road for Each Season, Columbia County

Season/ Road	Total Trucks Per Day (No.)	Loaded Trucks Per Day (No.)	Average Payload (Tons)	Total Tonnage ¹	Commodity	
					Category	Percent
Fall: SR 12	16	4	23	92	Chemicals	100
Winter: SR 12	5	5	7	37	Lumber, wood Rubber, plastic	29 61
Spring: SR 12	6	6	25	154	Agricultural	100
Summer: SR 12	19	16	33	504	Agricultural Lumber, wood	42 58

¹Total tonnage may differ from the number of trucks per day multiplied by the average payload due to rounding of values for average number of loaded trucks per day and average payload.

Table 2--Daily Truck Traffic by City of Cargo Origin for Each Season, Columbia County

Season/ Town	Total Trucks Per Day (No.)	Loaded Trucks Per Day (No.)	Average Payload (Tons)	Total Tonnage ¹	Commodity	
					Category	Percent
No observations for fall, winter, or spring in survey.						
Summer: Dayton	12	12	32	309	Agriculture Lumber, wood	26 74

¹Total tonnage may differ from the number of trucks per day multiplied by the average payload due to rounding of values for average number of loaded trucks per day and average payload.

Table 3--Daily Truck Traffic by City of Cargo Destination for Each Season, Columbia County

Season/ Town	Total Trucks Per Day (No.)	Loaded Trucks Per Day (No.)	Average Payload (Tons)	Total Tonnage ¹	Commodity	
					Category	Percent
Fall: Dayton	16	4	23	82	Chemicals	100
Winter: Dayton	5	5	7	37	Lumber, wood Rubber, plastic	29 61
Spring: Dayton	6	6	25	154	Agriculture	100
Summer: Dayton	6	3	34	108	Agriculture	100

Table 4--Truck Traffic for Trips Originating or Ending in Columbia County by Season

Season	Total Trucks Per Day (No.)	Loaded Trucks Per Day (No.)	Average Payload (Tons)	Total Tonnage ¹	Commodity	
					Category	Percent
Fall:	16	4	23	82	Chemicals	100
Winter:	5	5	7	37	Lumber, wood Rubber, plastic	29 61
Spring:	6	6	25	154	Agriculture	86
Summer:	19	16	33	504	Agriculture Lumber, wood	42 58

¹Total tonnage may differ from the number of trucks per day multiplied by the average payload due to rounding of values for average number of loaded trucks per day and average payload.

Table 5--Truck Trips by Commodity for Truck Traffic Originating or Ending in Columbia County

Commodity	Truck Trips	Total Weight		Avg. Payload (Tons)	County Roads Used	
	Per Year (%)	Tons	% of Total		Road	% of Trips
Agriculture	38	378	54	30	12	100
Lumber, wood	34	216	31	20	12	100
Chemicals	12	92	13	23	12	100
Rubber, plastic	12	18	3	5	12	100

Table 6--Weight Category by Commodity for Truck Loads Originating or Ending in Columbia County

Weight Category (tons)	Commodity							
	Agriculture		Rubber, Plastic		Lumber & Wood		Other	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<5	0	0	5	100	0	0	0	0
5 - <10	0	0	0	0	0	0	2	18
10 - <15	0	0	0	0	0	0	0	0
15 - <20	0	0	0	0	0	0	0	0
20 - <25	0	0	0	0	0	0	0	0
25 - <30	6	50	0	0	0	0	0	0
>30	6	50	0	0	11	100	9	82
Total	12	100	5	100	11	100	11	100

Table 7--Weight Category by Road for Truck Loads Originating or Ending in Columbia County

Weight Category (tons)	Road SR12	
	Number	Percent
<5	4	12
5 - <10	4	12
10 - <15	0	0
15 - <20	0	0
20 - <25	2	5
25 - <30	3	10
>=30	18	60
Total	31	100

Table 8--Type of Commodity Hauled by Truck Configuration, Columbia County

Commodity	Truck Configuration					No. of Loads
	1	2	3	4	5	
Agricultural products	0	0	0	0	100	13
Lumber, wood	0	0	0	0	0	11
Chemicals	0	100	0	0	0	4
Rubber & plastic	0	100	0	100	0	4
Total	0	45%	0	13%	42%	32

Legend: 1 = straight truck, 2 = truck and trailer, 3 = tractor only,
4 = tractor and trailer, 5 = tractor and two trailers

Table 9--Truckers' Home Base for Truck Trips Originating or Ending in Columbia County

Location	Number	Percent
By Town:		
Connell	5	12
Dayton	13	28
Longview	9	20
Omaha, NE	4	8
Spokane	4	8
Wallowa	4	8
Other	8	16
Total	146	100
Wash. State carriers:	40	85