

Washington State Freight Truck Origin and Destination Study: Wahkiakum County



EWITS Research Report Number 21-Wahkiakum
January 1998

by

Kathleen M. Painter

in cooperation with

Kenneth L. Casavant, EWITS Project Director
Washington State University
Department of Agricultural Economics
101 Hulbert Hall
Pullman, WA 99164-6210

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:

Ken Casavant, Project Director
Department of Agricultural Economics
Washington State University
Pullman, WA 99164-6210
(509) 335-1608

DISCLAIMER

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.

Table of Contents

Introduction	1
Method of Analysis	2
Presentation of Results	3
Wahkiakum County Results	4

List of Figures

Figure 1	Washington State Highways	5
----------	---------------------------------	---

List of Tables

Table 1A	Survey Sites and Traffic Direction.....	1
Table 1	Daily Truck Traffic by Road for Each Season, Wahkiakum County	6
Table 2	Daily Truck Traffic by City of Cargo Origin for Each Season, Wahkiakum County.....	6
Table 3	Daily Truck Traffic by City of Cargo Destination for Each Season, Wahkiakum County.....	7
Table 4	Truck Traffic for Trips Originating or Ending in Wahkiakum County by Season.....	7
Table 5	Truck Trips by Commodity for Truck Traffic Originating or Ending in Wahkiakum County.....	7
Table 6	Weight Category by Commodity for Truck Loads Originating or Ending in Wahkiakum County.....	8
Table 7	Weight Category by Road for Truck Loads Originating or Ending in Wahkiakum County.....	8
Table 8	Truck Configuration by Type of Commodity Hauled, Wahkiakum County (%)	8
Table 9	Truckers' Home Base for Truck Trips Originating or Ending in Wahkiakum County.....	9

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.

Wahkiakum County Results

Wahkiakum County is located in the southwest corner of Washington State. State Route 4 (SR4) is the only major truck route through the county. According to our survey, truck traffic averages 10 to 23 trucks per day across the seasons (Table 1). Freight includes food products, wood pulp, and chemicals.

According to our survey, Cathlamet is the only city from which freight originated during the year (Table 2). Freight consists of chemicals, and has an average payload of 26 tons. Skamokawa and Grays River are the only freight destinations in Wahkiakum County in the survey (Table 3). Freight to Skamokawa consists of food products while pulp or paper make up the freight to Grays River. The trucks hauling pulp or paper into Grays River have an average payload weight of 33 tons. (Due to the small number of trucks for each town and season, this survey data may not be an accurate reflection of actual truck traffic in each season.)

Daily truck traffic counts for trucks either destined for or originating from Wahkiakum County show that total traffic is highest in spring at 23 per day and lowest in winter with no trucks with loads in the survey (Table 4). Due to the small number of trucks in the survey for this county, the percentage of each commodity type being hauled is probably not an accurate representation of actual freight types. According to the survey, chemicals make up all of the freight hauled in fall; freight in spring consists entirely of food; and freight in summer is made up of pulp or paper products. The highest payloads, averaging 33 tons, occur in summer when the freight consists of pulp or paper products.

Table 5 shows the breakdown by commodity of freight hauled into or out of Wahkiakum County. It shows a fairly equal distribution of the three freight types mentioned above, with food making up 36% of the trucks with loads, pulp or paper comprising 33%, and chemicals making up the final 31% of trucks with loads. The heaviest freight is pulp or paper products, as this freight accounts for 44% of the total tonnage and has an average payload weight of 33 tons.

Payload weight is broken down by 5-ton increments for each major category of freight in Table 6. Again, due to the few observations in the survey for this county, weight distribution by commodity may not be representative of actual weight distribution. Food products had payloads weighing between 15 and 20 tons, pulp or paper weighed over 30 tons, and chemicals were in the 25- to 30-ton range.

The distribution of weight categories by major routes for all truck traffic heading into or out of the county is presented in Table 7. In our survey, SR4 had 33 trucks with freight heading into or leaving from Wahkiakum County. One-third of these trucks had payloads of over 30 tons. Another 36% had payloads weighing between 15 and 20 tons and the remaining 31% had payloads between 25 and 30 tons.

Type of truck configuration by commodity hauled is presented in Table 8. Trucks hauling food used tractor-trailer configurations, and trucks with pulp or paper used tractors plus two trailers. Chemicals were hauled by truck and trailer configurations.

Table 9 presents the distribution of truckers' home base for truck trips originating or ending in this county. The most common base is Cathlamet with 41% of the truck trips. Portland, Oregon, Tacoma, and Langley are the next most common bases, with 22%, 20%, and 19% truck trips, respectively. Washington-based carriers represented 80% of all truck trips in the survey for this county.

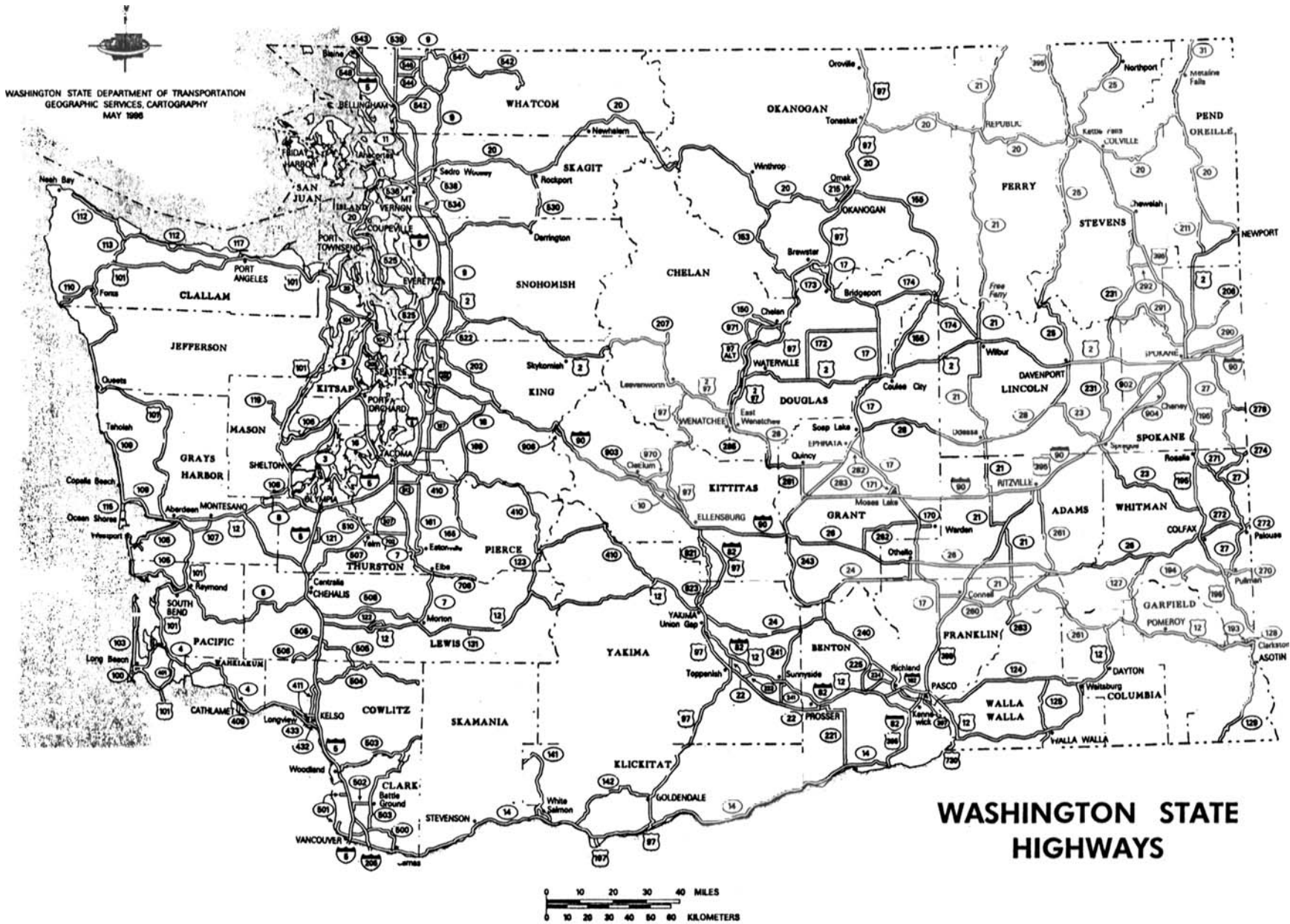


Table 1--Daily Truck Traffic by Road for Each Season, Wahkiakum County

Season/ Road	Total Trucks Per Day (No.)	Loaded Trucks Per Day (No.)	Average Payload (Tons)	Total Tonnage ¹	Commodity	
					Category	Percent
Fall: SR4	10	10	26	263	Chemicals	100
Winter: SR4	10	0	0	0	Empty	100
Spring: SR4	23	12	16	185	Food	100
Summer: SR4	11	11	33	347	Paper, pulp	100

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, Wahkiakum County

Season/ Town	Total Trucks Per Day (No.)	Loaded Trucks Per Day (No.)	Average Payload (Tons)	Total Tonnage ¹	Commodity	
					Category	Percent
Fall: Cathlamet	10	10	26	263	Chemicals	100
Winter: No trucks in survey.						
Spring: No trucks in survey.						
Summer: No trucks in survey.						

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, Wahkiakum County

Season/ Town	Total Trucks Per Day (No.)	Loaded Trucks Per Day (No.)	Average Payload (Tons)	Total Tonnage ¹	Commodity	
					Category	Percent
Fall: No trucks in survey.						
Winter: No trucks in survey.						
Spring: Skamokawa	12	12	16	185	Food	100
Summer: Grays River	11	11	33	347	Pulp, paper	100

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

Season	Total Trucks Per Day (No.)	Loaded Trucks Per Day (No.)	Average Payload (Tons)	Total Tonnage ¹	Commodity	
					Category	Percent
Fall:	11	10	26	263	Chemicals	100
Winter:	No trucks in survey.					
Spring:	23	12	16	185	Food	100
Summer:	11	11	33	347	Pulp, paper	100

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 Wahkiakum County

Commodity	Truck Trips Per Year (%)	Total Weight		Avg. Payload (Tons)	County Roads Used	
		Tons	% of Total		Road	% of Trips
Food	36	192	24	16	SR4	100
Pulp, paper	33	358	44	33	SR4	100
Other	31	255	32	26	SR4	100

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

Weight Category (tons)	Commodity					
	Food		Pulp, Paper		Chemicals	
	No.	%	No.	%	No.	%
<5	0	0	0	0	0	0
5 - <10	0	0	0	0	0	0
10 - <15	0	0	0	0	0	0
15 - <20	12	100	0	0	0	0
20 - <25	0	0	0	0	0	0
25 - <30	0	0	0	0	10	100
>30	0	0	11	100	0	0
Total	12	100	11	100	10	100

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

Weight Category (tons)	Road SR4	
	No.	%
<5	0	0
5 - <10	0	0
10 - <15	0	0
15 - <20	12	36
20 - <25	0	0
25 - <30	10	31
>=30	11	33
Total	44	100

Table 8--Truck Configuration by Type of Commodity Hauled, Wahkiakum County (%)

Commodity	Truck Configuration			Total Loads
	2	4	5	
Food	0	100	0	12
Pulp and paper	0	0	100	11
Chemicals	100	0	0	10
Total	31%	36%	33%	33

Legend: 2 = truck and trailer, 4 = tractor and trailer, 5 = tractor and two trailers

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

	Location	Number	Percent
By Town:			
	Cathlamet	22	40
	Portland, OR	12	22
	Tacoma	11	20
	Langley	9	18
	Total	54	100
Wash. State carriers:		43	80