IMPORTANCE OF U.S. 395 CORRIDOR FOR LOCAL AND REGIONAL COMMERCE IN SOUTH CENTRAL WASHINGTON

EWITS Research Report Number 8
April 1995

by:
Kenneth L. Casavant, EWITS Project Director
Department of Agricultural Economics
Washington State University
103 Hulbert Hall
Pullman, WA 99164-6210
(509) 335-1608

and

William R. Gillis
The Gillis Group
1932 Summit Lake Shore Road, NW
Olympia, WA 98502

in cooperation with

HDR Engineering, Inc.
500 108th Ave., NE, Suite 1200
Bellevue, WA 98004-5538

EWITS Research Reports:
Background and Purpose

This is the eighth of a series of 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, Regional Administrator (WSDOT, Eastern Region); Richard Larson (WSDOT, South Central Region); Don Senn (WSDOT, North Central Region); Charles Howard (WSDOT, Planning Manager), and Jay Weber (Douglas County Commissioner). Linda Tompkins 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 authors, who are responsible for the facts and accuracy of 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 Ericksen, 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.

ACKNOWLEDGMENTS

This report was developed with HDR Engineering, Inc. as the economic analysis portion of the U.S. 395 CORRIDOR STUDY, TRI-CITIES TO PENDLETON. Data reported on in this report were derived from a local spot survey for that study, as well as the overall Washington State Truck Origin and Destination Study of EWITS.

TABLE OF CONTENTS

INTRODUCTION 1

. 1

Section I: Data Sources and Methodological Issues 3

Data Sources 3

Methodological Issues 4

Section II: Economic Importance of Freight Traffic Passing Through and Within the Study Area 7

Section III: Overview of the Regional Economy and Implications for Highway Transportation Needs 18

Overview of the Local Economy 18

Transportation Flows Serving the Regional Economy 24

Local transportation flows serving agriculture 26

Local transportation flows serving food manufacturers 28

Local transportation flows serving wood and paper product manufacturers 29

CONCLUSIONS 31

LIST OF TABLES

Table 1: Organizations and Firms Providing Information on Regional Transportation Movements. . . . 3
Table 2: Major Sources of Economic and Demographic Data. . . . 4
Table 3: Number of Trucks Interviewed at Roadside Locations. . . . 5
Table 4: Volume and Economic Value of Cargo Moving Through and Within the Study Region. . . . 8
Table 5: Percent of Trucks with Cargo That Are Pass-Through Traffic by Data Collection Site. . . . 9
Table 6: State Origins and Destinations for Trucks Carrying Cargo Through the U.S. 395 Corridor Area. . . . 10
Table 7: Volume and Economic Value for Specific Commodities Moving Through and Within the Study Region. . . . 12
Table 8: Volume and Economic Value of Cargo Originating from Communities Within Study Area. . . . 17
Table 9: Volume and Economic Value of Cargo Destined for Communities Within Study Area. . . . 18
Table 10: Growth in Regional Agricultural Sales, 1987-1992. . . . 19
Table 11: Diversified Regional Agricultural Production and Sales. . . . 19
Table 12: County Level Agricultural Production and Sales for High Tonnage Commodities, 1992. . . . 20
Table 13: Regional Non-Agricultural Employment Growth by Major Sector, 1985-1993. . . . 21
Table 14: Regional Distribution of Food Manufacturing Employment. . . . 21
Table 15: Population Growth for Counties and Communities Over 10,000. . . . 23
Table 16: Employment at Hanford, 1980-1993. . . . 23
Table 17: Volume and Economic Value of Commodities Shipped from Communities In the Study Region. . . . 25
Table 18: Volume and Economic Value of Commodities Shipped to Communities In the Study Region. . . . 26
Table 19: Regional Destinations for Raw Agricultural Commodies. . . . 27
Table 20: Transportation Modes for Wheat Shipped from Local Warehouses. . . . 28
Table 21: Regional Origins of Manufactured Food Products. . . . 29
Table 22: Regional Destinations of Wood and Paper Products. . . . 30
Table 23: Regional Origins of Wood and Paper Products. . . . 31

INTRODUCTION

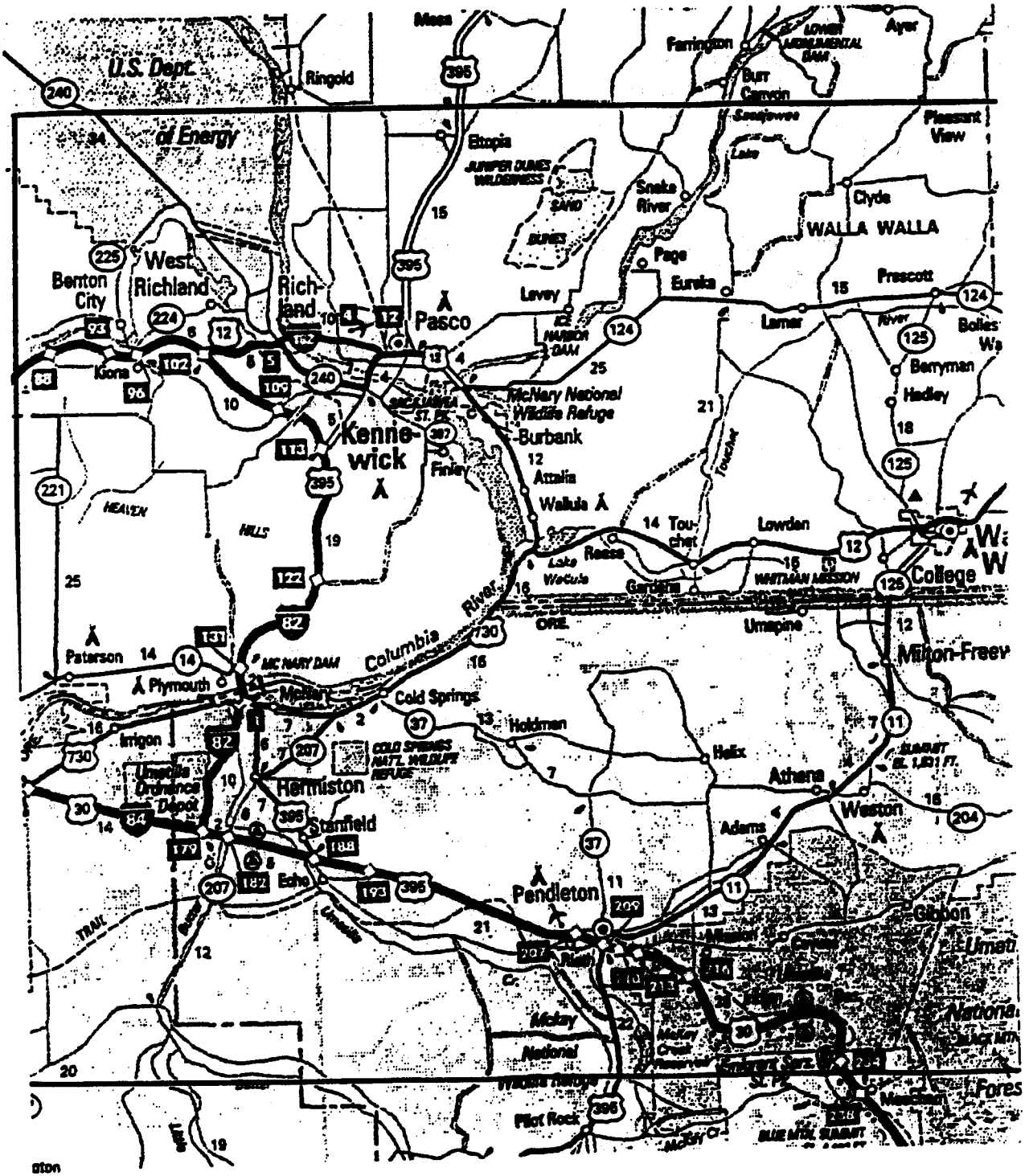
This study examined the importance of the U.S. 395 corridor area for local and regional commerce. For the purposes of analysis, the U.S. 395 corridor is defined as the state highway system within the study area described on Map 1. The study area includes portions of Walla Walla, Benton, and Franklin counties in the state of Washington as well as portions of Umatilla and Morrow counties in the state of Oregon. In addition to U.S. 395, the corridor area is served by two major interstate highways I-82 and I-84. Other highways such as U.S. 12, U.S. 730, and Oregon State Route 11 also carry substantial freight traffic volumes within and through the study area.

The analysis focuses on the use and importance of the highway system for local and regional commerce. However, it is recognized that the highway system is only one component of an extensive intermodal network serving the area. In particular, regional commerce is closely linked to water transportation located at several Columbia River port facilities. The area is also served by Burlington Northern and Union Pacific railroads as well as regional airports in Pasco, Pendleton, and Walla Walla. Future regional highway needs will be heavily influenced by future development and use of these other modes of a full transportation system.

The following are sequentially summarized in this report:

- Data sources and methodology utilized for the analysis;
- Economic importance of freight traffic passing through and within the study area; and
- An overview of the local economy and implications for regional highway transportation needs.

Map 1:
Geographic Area Defined for the U.S. 395 Corridor Study



Section I: Data Sources and Methodological Issues

Data Sources

Several sources of data provide the basis for this analysis. First, numerous personal interviews of local economic development leaders and key shippers were conducted by the authors (Table 1). These interviews helped identify key local economic generators and their transportation needs. Major regional firms such as Simplot, Lamb-Weston, Louisiana-Pacific, Boise Cascade, and Iowa Beef provided information on daily freight shipments of both key inputs and products.

Table 1: Organizations and Firms Providing Information on Regional Transportation Movements.

Port of Umatilla	Port of Morrow
Port of Pasco	Port of Walla Walla
Benton-Franklin Regional Council	Simplot
Lamb-Weston	Louisiana-Pacific
Boise Cascade	Iowa Beef
Tri-City Industrial Development Council	Westinghouse
Washington State University Extension	Oregon State University Extension

Available economic and demographic data, as well as published research reports, were reviewed and utilized in preparing this analysis. Several of the major economic and demographic data sources are listed in Table 2. Several previous research reports documenting recent economic and industry trends for the region also provided key insights. Examples include a "Regional Economic Profile for Umatilla and Morrow" prepared by the Oregon Employment Department, and the "1994 Overall Economic Development Plan" prepared by the Benton-Franklin Economic Development District. State level reports such as the "Washington Ports and Transportation Systems Study" and an "Appraisal of the Washington Study Fruit and Vegetable Processing Industry" also provided background information for the study. Finally, personal interviews of labor market economists working within the study region helped to clarify major economic trends impacting the region's transportation needs.

Table 2: Major Sources of Economic and Demographic Data.

Type of Data	Source
Nonagricultural employment by industry and county	Oregon Employment Department
	Washington State Department of Employment Security
Agricultural production and sales by commodity and county	Oregon Agricultural Statistics Service Washington State Agricultural Statistics Service
Population trends and forecasts	U.S. Census Bureau

Roadside interviews of truck drivers passing through and within the study region provided an important database for this study. The number of trucks interviewed at eight elected roadside interview sites within the study region is identified in Table 3. Truck driver interviews along I-84, Oregon State Route 11, and near Pilot Rock were conducted in June 1994 specifically for the U.S. 395 Corridor Study. Interviews at the other four sites were conducted in May 1994 as part of the Washington State Freight Truck Origin and Destination Study of EWITS. There were several differences in data collection methodology between the two field studies. Truck interviews in Oregon (with the exception of the Umatilla Port of Entry) were conducted between 7 a.m. and 7 p.m. on consecutive days within a single week. Interviews at the Umatilla Port of Entry and the three Washington sites were conducted over a full 24-hour period on consecutive Wednesdays. However, a consistent interview questionnaire was utilized for both data collection efforts. The questionnaire was completed through a brief two-minute roadside interview conducted by trained project personnel.

Methodological Issues

Implementation of carefully designed database management procedures is key to providing an accurate representation of state-wide and regional freight truck movements. Effective data management systems help minimize errors due to both inaccurate field data collection and data entry.

There are at least three potential sources of error associated with field interviews of truck drivers. First, there are systematic problems caused by inappropriately worded questions, interview procedures, and/or site selection. Second, the truck drivers may provide inaccurate responses to questions. Third, interviewers may incorrectly record vehicle data or responses provided by drivers.

Table 3: Number of Trucks Interviewed at Roadside Locations.

Roadside Interview Location	Number of Trucks Interviewed	24-Hour Truck Count
Pasco weigh station (U.S. 395 southbound, milepost 33)	277	1,305
Plymouth weigh station (I-82 northbound near Coffin Road)	325	1,137
Umatilla Port of Entry (I-82 at the Oregon border)	223	1,059
U.S. 395 northbound near Pilot Rock	69	215
Oregon SR 11 near Weston	127	355
I-84 eastbound (near milepost 160 at the rest area)	240	840
I-84 westbound (near milepost 227 at truck weigh station)	517	1,421
Wallula Junction (at the intersection of U.S. 12 and U.S. 730)	128	768

Potential systematic errors caused by flaws in the survey methodology were minimized through ongoing evaluation and adjustments to the interview questionnaire and site survey procedures. Improving the clarity of interview questions also helped to minimize potential errors due to drivers providing inaccurate responses. An ongoing program to provide training and supervision to interview personnel helped reduce errors associated with interviewers incorrectly recording responses provided by truck drivers. With these safeguards, field data collection errors, while not eliminated completely, were minimized.

A data integrity review was implemented for each completed questionnaire prior to entering information into the database. Each questionnaire was reviewed to ensure the answers were logically consistent. Among the most frequent errors were completed questionnaires with a total combined payload and empty vehicle weight substantially above the legal limit for a particular axle configuration. In these cases, the driver was generally providing the interviewer with the gross weight rather than the requested cargo weight. Another common error was when a truck driver reported carrying cargo but in actuality was empty. The data integrity review process included the development of specific decision rules to revise incorrect

data utilizing other information recorded on the questionnaire. For example, trucks with a reported combined cargo and empty vehicle weight in excess of 110 percent of the legal limit were assumed to be gross weights. Revised payload weights were estimated as gross weight minus the reported empty vehicle weight. Empty vehicle weights were generally reported accurately.

Using these techniques, data recorded potentially incorrect on the field interview questionnaires were identified and corrected prior to data entry. The research team utilized the Conway Survey-It software package for data entry purposes. Survey-It provides a user friendly menu driven data entry screen but only limited database capabilities. Data entered into Survey-It were then exported into Borland Paradox. Paradox was used as the primary database software for the project. Additional data integrity checks were implemented utilizing cross-tab, edit and search functions of Paradox.

Several key methodological challenges surfaced in the course of analyzing the freight truck database. First, the data collection design in Oregon only captured freight truck movements into the region. Products exported from Morrow or Umatilla counties on routes other than through the state of Washington were not captured in the survey. To adjust for this data gap, in-bound empty trucks reporting Morrow or Umatilla county destinations were assumed to have been loaded trucks traveling in the opposite direction. Utilizing information on the truck configuration, company ownership and knowledge of the local economy, the commodity could also then be generally inferred. For example, an empty five-axle refrigerated van traveling from Portland to Hermiston is likely hauling frozen produce from Hermiston to Portland. Survey collection procedures for the EWITS Washington Freight Truck Origin and Destination Study were designed to capture freight truck movements in all directions. For example, data was collected along I-82 northbound at the Plymouth weigh station and southbound at the Umatilla Port of Entry. Consequently, the problem of converting empty trucks to cargo content was avoided for these sites. An exception was data collected for southbound trucks along U.S. 395 near Pasco. Data conversion procedures similar to those used in Oregon were carried out for this site.

A second major methodological issue involved converting sample data to 24-hour truck counts. In all cases, traffic counters were placed near data collection sites to determine the total number of trucks passing through a given location over a 24-hour period. Total 24-hour truck counts at each site were utilized to convert sample data to represent the total population of trucks traveling through and within the study region. Adjustments were also made to eliminate double counting of trucks passing through more than one data collection point within the study area. For example, a truck traveling from Boise, Idaho to Wallula, Washington would potentially be interviewed at both I-84 (near milepost 227) and Wallula Junction. To the extent possible, the potential of double counting trucks carrying cargo was eliminated by dividing the relevant site weight by 2, creating an average weight for a truck traveling from a given destination to origin. Personal interviews of major shippers within the study region provided information to further calibrate weights utilized to estimate the total number of trucks passing through and within the study region. Overall, the estimated number of trucks traveling

to and from key regional freight generators match closely with daily truck volumes identified by major local industries.

Estimating the economic value of commodities passing through and within the study region was an important goal of this study. Secondary data sources were utilized to estimate the economic value of cargo transported through the U.S. 395 study area. Information on the type of cargo and payload weight was obtained directly from truck driver interviews. Cargo reported for each truck was assigned a Standard Industrial Classification (SIC) code. Based on SIC categories and reported cargo tonnage, an economic value of each payload was estimated using the 1977 U.S. Bureau of Census Transportation Commodity Flow Study which reports cargo value per ton for specific SIC categories in 1977 dollars. To obtain current value of cargo, the 1977 values were multiplied by the increase in the U.S. Producer Price Index for each commodity category. Spot checks of prices for key commodities were conducted to calibrate and verify the accuracy of adjusted tonnage values estimated from the Census of Transportation data.

Section II: Economic Importance of Freight Traffic Passing Through and Within the Study Area

The volume and economic value of cargo passing within and through the U.S. 395 corridor area are described in Table 4. During a typical weekday, 5,600 trucks carrying over 100,000 tons of cargo pass within or through the region over a 24-hour period. Based on 1994 prices, this daily cargo volume is valued at over 139 million dollars. This total includes only trucks carrying cargo and does not count empty trucks passing through the region.

Freight truck flows are separated into four types of cargo movements in Table 4. It should be noted that within region flows are significantly underestimated by the survey methodology used for this study. For example, data collection sites utilized would not capture movements between Richland and Pasco or Hermiston and Umatilla. Consequently, within region flows represent only non-local movements between communities within the study area.

Nearly two-thirds of the recorded cargo movements are freight trucks passing through the region. However, there are substantial differences in the percentage of pass-through trucks among the data collection sites (Table 5). The highest percentage of trucks with cargo that are pass-through traffic was identified along I-84 at Emigrant Springs and the two I-82 sites. As would be expected, non-interstate highways tend to serve more localized traffic flows.

The dominance of pass-through traffic as a component of regional cargo movements has important implications for corridor planning in the U.S. 395 study area. In particular, the volume of cargo moving through the U.S. 395 corridor is more heavily dependent upon economic conditions outside the study region than on local economic trends and industry needs.

Table 4: Volume and Economic Value of Cargo Moving Through and Within the Study Region.

Type of Cargo Movement	24-Hour Count: Trucks with Cargo	24-Hour Cargo Volume *(tons)*	24-Hour Cargo Volume *(dollars)*
Within Region (non-local)	340	4,251	3,685,478
Regional Imports	1,216	24,261	24,559,255
Regional Exports	609	10,211	11,044,331
Pass-through Traffic	3,437	61,567	99,826,907
Regional Total	5,602	100,290	139,115,971
	Percent of Total Daily Trucks		
Type of Cargo Movement	24-Hour Count: Trucks with Cargo	24-Hour Cargo Volume	24-Hour Cargo Value
Within Region (non-local)	6.07	4.24	2.65
Regional Imports	21.71	24.19	17.65
Regional Exports	10.87	10.18	7.94
Pass-through Traffic	61.35	61.35	71.76
Regional Total	100.00	100.00	100.00

Table 5: Percent of Trucks with Cargo That Are Pass-Through Traffic by Data Collection Site.

Data Collection Site	24-Hour Count Pass-through Trucks with Cargo	Percent of Total with Cargo
I-84		
Westbound at Emigrant Springs (milepost 227)	930	77.24
Eastbound near Boardman (milepost 160)	385	59.14
U.S. 395/I-82		
Umatilla Port of Entry (at Oregon border)	708	77.29
Plymouth weigh station (near Coffin Road)	697	80.30
Pasco weigh station (milepost 33)	520	53.06
U.S. 395 northbound (near Pilot Rock)	34	10.69
Wallula Junction (at the intersection of U.S. 12 and U.S. 730)	136	29.57
Oregon SR 11 near Weston	28	13.79

Trucks carrying cargo through the U.S. 395 corridor area reported origins and destinations for nearly every state in the continental U.S. as well as six Canadian Provinces and Mexico (Table 6). However, Oregon and Washington account for two-thirds of the total origins and nearly three-quarters of the total destinations.

Table 6: State Origins and Destinations for Trucks Carrying Cargo Through the U.S. 395 Corridor Area.

	Origins		Destinations	
	24-Hour Count Trucks with Cargo	Percent of Total Daily Trucks With Cargo	24-Hour Count Trucks with Cargo	Percent of Total Daily Trucks with Cargo
Washington	1,865	33.30	2,343	41.82
Oregon	1,722	30.74	1,816	32.42
Idaho	483	8.61	332	5.93
Utah	252	4.50	118	2.11
California	242	4.33	230	4.11
Texas	117	2.09	140	2.50
Alberta	58	1.04	18	0.32
Montana	57	1.02	54	0.96
Illinois	46	0.81	12	0.21
Colorado	46	0.81	50	0.89
Florida	43	0.77	21	0.37
Nevada	42	0.74	4	0.07
Ohio	41	0.73	22	0.39
Missouri	40	0.71	5	0.09
British Columbia	40	0.71	62	1.11
Tennessee	38	0.68	12	0.21
Arkansas	37	0.66	17	0.30
Georgia	37	0.65	12	0.21
Wisconsin	28	0.51	18	0.32
North Carolina	26	0.47	0	0.00
Pennsylvania	22	0.38	25	0.45
Kentucky	22	0.38	8	0.14
Indiana	21	0.38	12	0.21
Minnesota	21	0.37	23	0.41
Kansas	21	0.37	19	0.34
Iowa	21	0.37	11	0.20
Alabama	19	0.33	5	0.09
Michigan	19	0.33	38	0.68
Arizona	18	0.32	18	0.32
South Carolina	18	0.32	8	0.14
Oklahoma	13	0.23	8	0.14
New York	13	0.23	11	0.20
New Jersey	13	0.23	4	0.07
Nebraska	12	0.21	8	0.14
Mexico	9	0.16	0	0.00
Saskatchewan	9	0.16	0	0.00
Louisiana	8	0.15	14	0.25
Massachusetts	7	0.12	4	0.07
Mississippi	6	0.11	5	0.09

(continued)

Table 6: Continued.

	Origins		Destinations	
	24-Hour Count Trucks with Cargo	Percent of Total Daily Trucks With Cargo	24-Hour Count Trucks with Cargo	Percent of Total Daily Trucks with Cargo
Wyoming	6	0.10	0	0.00
Maryland	6	0.10	13	0.23
Dist. of Columbia	6	0.10	0	0.00
Quebec	5	0.08	4	0.07
South Dakota	4	0.07	7	0.12
North Dakota	4	0.07	14	0.25
Virginia	4	0.06	12	0.21
Rhode Island	4	0.06	0	0.00
Ontario	3	0.05	0	0.00
New Mexico	3	0.05	5	0.09
New Brunswick	3	0.05	0	0.00
Connecticut	3	0.05	0	0.00
Alaska	3	0.05	16	0.29
Unknown	3	0.05	24	0.43
Total	5,602	100.00	5,602	100.00

The diverse range of commodities that are transported within and through the U.S. 395 corridor area is illustrated in Table 7. Food and kindred products provide both the largest cargo tonnage and economic value among commodity categories. Wood products and agricultural commodities also account for a significant share of total daily cargo tonnage. However, several higher value commodities such as general freight, machinery and equipment, metal products, manufactured plastics and paper products account for a large share of total economic value among commodities transported through the corridor area.

Overall, the data illustrate the economic importance of the U.S. 395 corridor for commerce in both Washington and Oregon. The diversified cargo base suggests fairly stable freight traffic flows that are relatively independent of economic changes that may occur within the five-county study region.

Table 7: Volume and Economic Value for Specific Commodities Moving Through and Within the Study Region.

Commodity Category	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume (tons)	24-Hour Cargo Value (dollars)
Crop and livestock products	802	16,299.12	3,199,680
Grain	81	2,033.19	356,181
Fresh Potatoes	277	6,463.37	646,336
Forage crops	14	318.55	26,757
Fresh vegetables	137	2,450.38	245,038
Fruit	126	2,618.09	1,047,236
Nursery products	72	717.83	179,456
Livestock	60	1,208.85	604,423
Poultry	3	55.00	39,600
Small animals	9	102.63	71,837
Landscaping materials	8	129.00	32,250
Tree farms	15	202.25	50,562
Rock, sand, and organic soils	85	1,508.53	48,896
Crushed rock	23	483.65	2,901
Sand products	43	663.72	2,654
Fertilizer (organic)	20	361.16	43,339
Food and kindred products	1,171	21,972.37	21,613,813
Meat: fresh, chilled, frozen	157	2,998.24	5,462,800
Dairy products	59	810.03	737,130
Frozen or canned produce	507	10,279.68	11,112,337
Grain mill products	138	2,510.57	836,019
Bakery products	29	419.39	616,462
Sugar, beet, and cane	56	1,052.61	451,570
Beverage and flavoring extracts	82	1,713.62	837,961
Misc. food preparations	48	753.34	477,616

(continued)

Table 7: Continued.

Commodity Category	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume (tons)	24-Hour Cargo Value (dollars)
Tobacco products	4	10.50	69,888
Apparel and textile products	63	720.03	6,943,586
Textile mill products	3	31.63	127,765
Floor coverings	21	211.25	820,495
Finished textile products	28	456.90	5,843,751
Caps, hats, and millinery	4	2.40	26,786
Misc. fabricated textile prod.	7	17.85	1 24,789
Lumber and wood products	771	19,224.01	5,340,292
Sawlogs	265	7,014.52	575,190
Pulpwood and other wood chips	146	4,262.70	110,830
Millwood and prefab. wood products	85	1,716.62	2,161,218
Wood containers	31	398.73	366,827
Misc. wood products	39	855.31	319,885
Sawmill and planing mill products	204	4,976.14	1,806,339
Furniture and fixtures	94	743.52	2,928,294
Household and office furniture	82	694.88	2,732,943
Partitions and fixtures	8	28.52	83,556
Misc. furniture and fixtures	4	20.13	111,794
Pulp and paper products	235	4,287.20	6,456,116
Paper pulp	4	110.25	2,646
Paperboard products, exc. containers	152	2,891.84	5,161,931

(continued)

Table 7: Continued.

Commodity Category	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume (tons)	24-Hour Cargo Value (dollars)
Paperboard containers and boxes	79	1,285.11	1,291,539
Printed matter	15	219.51	734,706
Chemicals and allied products	306	5,773.98	3,280,645
Industrial chemicals	46	1,036.79	316,221
Medical chemicals	4	1.58	24,995
Soap and other detergents	49	734.75	1,318,882
Paint	16	332.54	227,789
Agricultural chemicals	117	2,162.87	465,016
Misc. chemical products	38	781.31	506,290
Products of petroleum refining	145	3,260.86	526,010
Fuel and oil	111	2,563.31	443,452
Rubber and plastic products	132	1,674.32	7,912,303
Rubber tires	36	362.70	1,514,272
Rubber tubes	15	104.00	347,880
Molded plastic products	82	1,207.62	6,050,151
Leather products	3	26.37	294,015
Stone, clay, glass, and concrete	124	2,280.22	360,719
Glass and glassware	13	161.47	105,924
Cement	3	92.07	5,800
Structural clay products	11	352.93	52,232
Pottery and related products	3	34.38	62,803
Concrete and plaster products	36	823.69	28,828
Abrasives and asbestos products	31	366.57	69,648

(continued)

Table 7: Continued.

Commodity Category	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume (tons)	24-Hour Cargo Value (dollars)
Primary metal products	155	3,127.73	5,108,666
Steel works and rolling mill products	91	1,676.40	903,578
Nonferrous metal products	6	95.63	141,046
Nonferrous metal basic shapes	18	418.00	1,079,696
Nonferrous metal castings	27	667.83	2,751,439
Fabricated metal products	181	2,110.82	6,468,029
Metal cans	49	447.70	206,835
Hand tools and general hardware	26	543.73	3,859,360
Plumbing and heating apparatus	17	110.41	561,447
Fabricated structural metal products	73	903.24	1,645,701
Misc. fabricated metal products	16	105.75	194,685
Machinery, except electrical	185	2,504.15	15,785,657
Farm machinery and equipment	21	292.25	1,426,764
Construction equipment	51	829.88	4,084,661
Special industry machinery	15	304.75	4,034,890
General industrial machinery	6	110.42	1,018,293
Office and computing machines	7	111.83	4,702,768
Service industry machines	10	101.37	508,066
Misc. machinery and parts	4	1.65	10,213
Electrical machinery and equipment	202	2,333.45	10,327,278

(continued)

Table 7: Continued.

Commodity Category	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume (tons)	24-Hour Cargo Value (dollars)
Elec. transmission equip.	14	194.38	1,472,779
Elec. industrial apparatus	5	37.05	167,836
Household appliances	16	242.39	831,389
Electric lighting and wiring equip.	17	182.54	876,350
Electronic components	6	47.16	1,175,902
Misc. elec. equip.	24	436.33	1,920,266
Transportation equipment	202	2,333.45	11,412,278
Motor vehicles and equip.	167	2,117.23	9,447,066
Aircraft and parts	6	17.60	1,381,464
Boat building and repair	5	42.75	226,318
Railroad equipment	6	38.50	101,986
Misc. transp. equip.	12	61.38	255,442
Electronic instruments	6	16.45	162,871
Misc. manufacturing	20	204.88	1,262,321
Toys and athletic goods	15	176.00	1,102,816
Misc. manuf. products	6	28.88	159,505
General freight	300	4,633.00	16,956,763
Household goods	144	1,169.20	4,279,258
Mail and packages	66	966.26	3,536,520
Solid waste	61	1,529.77	139,208
Recycled materials	55	1,184.90	303,333
Unknown	145	802.58	2,937,424

While the U.S. 395 corridor is very important in the support of commerce in both Washington and Oregon, it is essential to the economy within the five-county study region. The volume and economic value of cargo transported to and from regional communities are illustrated in Tables 8 and 9. Overall, 949 trucks carrying 14,462 tons of cargo originate from communities within the study area on a typical weekday. Freight truck cargo originating from the five-county study region over a 24-hour period is valued at almost 15 million dollars. The volume

and value of imports into the region are double that of exports. Approximately 28,500 tons of cargo valued at over 28 million dollars are destined for local communities each day.

The Pasco/Kennewick area is both the highest volume origin and highest volume destination among communities within the study area. While Walla Walla has a slightly higher total 24-hour truck count among regional destinations, Hermiston has a slightly higher 24-hour cargo volume and value compared to Walla Walla. Hermiston also ranks second among regional communities as a center of origin for truck freight cargo.

The volume and value of cargo transported to and from regional destinations is closely linked to factors such as community population size and the presence of major industries. The next section of this report focuses specifically on key freight traffic generators for the five-county study area and the implications for traffic flows within the region.

Table 8: Volume and Economic Value of Cargo Originating from Communities Within Study Area.

Origin City	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume *(tons)*	24-Hour Cargo Value *(dollars)*
Pasco/Kennewick	329	5,557.07	4,603,888
Hermiston	149	2,459.32	2,219,717
Pendleton	72	727.08	739,943
Milton-Freewater	64	514.50	904,848
Walla Walla	61	847.53	1,534,763
Umatilla	55	409.87	1,218,244
Wallula	54	1,118.56	1,612,816
Pilot Rock	46	1,013.73	1,013,397
Boardman	33	502.42	263,779
Weston	24	361.63	316,168
Finley	17	283.89	70,453
Richland	13	191.88	119,126
Plymouth	10	277.56	91,740
Athena	8	39.20	8,591
Block 17	4	50.00	300
Eltopia	4	8.20	820
Irrigon	4	10.50	2,257
Patterson	4	89.51	8,951
Regional Total	949	14,462.45	14,729,809

Table 9: Volume and Economic Value of Cargo Destined for Communities Within Study Area.

Destination City	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume *(tons)*	24-Hour Cargo Value *(dollars)*
Pasco/Kennewick	351	5,444.52	8,053,462
Walla Walla	227	3,391.92	4,335,280
Hermiston	216	4,038.12	5,901,267
Wallula	162	4,523.67	1,653,049
Boardman	100	2,151.21	764,143
Milton-Freewater	95	1,451.22	2,056,229
Pendleton	89	1,181.70	2,947,199
Pilot Rock	53	1,392.28	1,905,554
Richland	49	753.30	607,843
Umatilla	39	823.88	377,652
Finley	21	396.17	296,476
Weston	20	102.20	426,638
Burbank	16	376.00	47,376
Athena	12	149.60	9,868
Eltopia	12	90.00	193,180
Irrigon	10	109.18	25,436
Echo	7	235.20	21,403
Touchet	4	104.64	31,915
Plymouth	4	63.00	15,750
Umapine	3	25.00	5,375
Region Total	1,559	28,512.49	28,444,752

Section III: Overview of the Regional Economy and Implications for Highway Transportation Needs

Overview of the Local Economy

Agriculture is the cornerstone of the economy in the five-county study region. In 1992, total regional agricultural sales reached nearly one billion dollars (Table 10). Over a five-year period between 1987 and 1992, regional agricultural sales increased by over one-third, with sales in Benton County expanding by 60%. In Benton, Franklin, Walla Walla, and Umatilla counties, 1992 agricultural sales exceeded 190,000,000 dollars. Morrow County agricultural sales were significantly less than in the other four counties, primarily due to a less diversified crop base.

Table 10: Growth in Regional Agricultural Sales, 1987-1992.

	Total Agricultural Sales:		Change 1987-1992:	
County	1987	1992	Total	Percent
Benton	$133,136,000	$213,877,000	$80,741,000	60.65
Franklin	176,358,000	239,528,000	63,170,000	35.82
Walla Walla	132,034,000	197,442,000	65,408,000	49.54
Umatilla	141,500,000	190,063,000	48,563,000	34.32
Morrow	90,800,000	88,967,000	-1,833,000	-2.02
Region	$673,828,000	$929,877,000	$256,049,000	38.00

SOURCE: U.S. Census of Agriculture, 1987 and 1992.

Indeed, the strong diversified crop base in the Lower Columbia River Region is the key to a prosperous and growing agricultural sector. Potatoes represent the dominant regional commodity in terms of both annual tons produced and economic value (Table 11). Hay also ranks high in terms of tons produced within the region each year; however, the annual value of hay sales is only about one-half that of potatoes or wheat. On the other hand, the annual tons of fruit produced each year are significantly less than the leading crops, but the economic value is relatively high.

Table 11: Diversified Regional Agricultural Production and Sales.

Commodity	Annual Tons Produced, 1992	Total Value of Sales, 1992 *(millions of dollars)*
Potatoes	1,786,919	167.46
Wheat	1,532,406	194.06
Hay	1,388,046	80.32
Corn	464,040	49.69
Fruit	448,506	148.52
Onions	168,900	45.14
Carrots	97,408	33.57
Asparagus	27,030	53.18

SOURCE: U.S. Census of Agriculture, 1992.

The diversified nature of agriculture within the five-county region results in widely differing local commodity flows, depending on the particular crop harvest that is occurring. However, the largest transportation volumes are associated with potatoes, wheat, and hay. While potatoes are grown throughout the region, Benton and Franklin counties account for about two-thirds of the region's total production (Table 12). Walla Walla and Umatilla are the region's largest wheat producing counties; Franklin County also produces 60 percent of the region's hay crop. The transportation implications of these key commodity flows are discussed in a later section of this report.

Table 12: County Level Agricultural Production and Sales for High Tonnage Commodities, 1992.

	Total Production, 1992		Percent of Total Region, 1992	
Commodity/County	Tons	Million Dollars	Tons	Million Dollars
Potatoes:				
Benton	652,200	65,222	36.50	38.95
Franklin	545,673	51,839	30.54	30.96
Morrow	296,996	25,411	16.62	15.17
Umatilla	292,050	24,988	16.34	14.92
Walla Walla	NA	NA	NA	NA
Region	1,786,919	167,460	100.00	100.00
Wheat:				
Walla Walla	550,920	69,783	35.95	35.96
Umatilla	415,350	52,563	27.10	27.09
Franklin	288,960	36,601	18.86	18.86
Morrow	170,676	21,619	11.14	11.14
Benton	106,500	13,490	6.95	6.95
Region	1,532,406	194,056	100.00	100.00
Hay:				
Franklin	834,600	43,995	60.13	54.77
Umatilla	174,260	9,186	12.55	11.44
Morrow	154,682	8,154	11.14	10.15
Walla Walla	135,800	11,535	9.78	14.36
Benton	88,704	7,451	6.39	9.28
Region	1,388.046	80,321	100.00	100.00

SOURCE: U. S. Census of Agriculture, 1992; NA indicates data not available.

In addition to agricultural production, the five-county study region has a relatively diversified manufacturing and service economy. Food processing represents more than one-half of the region's manufacturing base, accounting for nearly 9,000 jobs in 1993 (Table 13). Food manufacturing employment is distributed throughout the region with the highest employment concentration in the Morrow/Umatilla County region (Table 14). Fresh pack and frozen potato processing represent the majority of food processing activity within the region. In particular, Simplot and Lamb-Weston have processing and storage facilities located throughout the region, with heaviest concentrations in Hermiston and the Tri-Cities. Iowa Beef represents another major food processing industry, employing approximately 1,100 people near Wallula in Walla Walla County. A number of smaller food manufacturers within the region fresh pack or process a wide array of other local crops ranging from asparagus, to peas and onions.

Table 13: Regional Non-Agricultural Employment Growth by Major Sector, 1985-1993.

Sector	1985 Employment	1993 Employment	Change 1985-1993 Total	Change 1985-1993 Percent
Construction	4,011	5,290	1,279	31.9
Manufacturing	14,701	15,737	1,036	7.1
Food manufacturing	8,580	8,975	395	4.6
Lumber and wood products	1,597	1,810	213	13.0
Chemicals and allied products	1,350	1,300	-50	-3.7
Other manufacturing	3,174	3,652	478	15.0
Transportation/Utilities	3,968	4,540	572	14.4
Retail/Wholesale Trade	20,031	24,020	3,989	19.9
Finance/Real Estate	7,054	8,980	1,926	27.3
Services	29,169	39,310	10,141	34.8
Government	18,615	23,920	5,305	28.5
Total Nonagricultural	115,358	131,437	16,079	13.9

SOURCE: Oregon Employment Office and the Washington State Dept. of Empl. Security.

Table 14: Regional Distribution of Food Manufacturing Employment.

County/Region	Total Employment 1993	Percent of Region's Total Food Manufacturing
Morrow/Umatilla	3,925	43.73
Benton/Franklin	3,000	33.43
Walla Walla	2,050	22.84
Region	8,975	100.00

Continued economic growth of manufactured food industries within the region is expected. Expanding production of potatoes and other vegetable products provides a ready supply for manufacturing. Local ports and economic development organizations are aggressively pursuing the development of new food manufacturing industries for the region. Current efforts include the creation of a new agri-business park north of Pasco. This new facility is the site of a major new frozen vegetable processing facility to be located within the region along with several smaller food processing plants. Development of refrigerated container handling facilities at the Port of Pasco and the Port of Umatilla has created additional incentives for food manufacturers to expand production within the region.

Wood and lumber products represent the region's second largest manufacturing sector. However, regional wood products activity is heavily concentrated at the Boise Cascade plant near Wallula in Walla Walla county and at the Louisiana-Pacific plants in Walla Walla and Pilot Rock. Several smaller mills and plants located primarily in Umatilla County also contribute to regional wood products employment. Overall, regional lumber and wood products employment expanded by 13 percent over the past seven years. Personal interviews with area plant managers suggest continued stable economic growth for these regional industries can be expected.

Within the Tri-Cities area, chemical and petroleum industries are important contributors to the local economy. In 1993, regional chemical and allied products industries employed 1,300 people (Table 13), primarily in Kennewick and Pasco. Convenient access to inland water port facilities is a major factor that has aided the development of a stable chemical and petroleum industry within the Tri-Cities area.

Agriculture and manufacturing do provide the foundation for the region's economic base. However, retail/wholesale trade and services represent both the largest share of regional employment and the fastest growing segment of the economy. There are several driving forces for retail and service employment growth within the region. First are the needs of a growing population base within the region. Total population in the five-county study region increased at a relatively slow 0.27 percent annual rate during the 1980s. Beginning in 1990, the region's annual growth rate has increased to 2.75 percent (Table 15). The overall regional population growth rate during the 1990s is equal to the average for the state of Washington and somewhat higher than the average population rate for the state of Oregon.

Fifty-seven percent of the region's population is centered in Benton and Franklin counties. Kennewick is the largest and fastest growing city within the region. On the Oregon side of the border, population growth continues to be relatively slow in both Pendleton and Hermiston. However, beginning in 1990, county-wide growth in Umatilla and Morrow counties has kept pace with regional population growth trends.

Table 15: Population Growth for Counties and Communities Over 10,000.

	Total Population			Annual Percent Change	
County	1980	1990	1993	1980-1990	1990-1993
Benton County	109,444	112,560	122,800	0.28	3.03
Kennewick	34,397	42,152	45,110	2.25	2.34
Richland	33,578	32,315	34,080	-0.01	1.82
Franklin County	35,025	37,473	41,100	0.70	3.23
Pasco	18,428	20,337	21,370	1.04	1.69
Walla Walla County	47,435	48,439	51,800	0.21	2.31
Walla Walla	25,619	26,482	28,820	0.34	2.94
Umatilla County	58,861	59,249	63,000	0.07	2.11
Pendleton	14,550	15,175	15,400	0.43	0.49
Hermiston	9,490	10,075	10,155	0.62	0.28
Morrow County	7,519	7,625	8,450	0.14	3.61
Region Total	258,284	265,346	287,150	0.27	2.74
Washington Total	4,167,000	4,867,000	5,255,000	1.5	2.7
Oregon Total	2,631,000	2,842,000	3,032,000	0.8	2.2

SOURCE: Oregon Center for Population Research, Portland State University; Washington State Office of Financial Management; United States Census Bureau.

Economic activity at the U.S. Department of Energy Hanford Reservation near the Tri-Cities has a major influence on both population growth and service sector employment opportunities within the region (Table 16). During the 1980s, overall activity at the Hanford Reservation declined dramatically due to the phasing out of planned nuclear power supply activities. However, beginning in 1990, overall activity at the Hanford Reservation has expanded significantly due to the new Department of Energy hazardous material handling and clean-up programs. Overall employment at the Hanford Reservation has increased 7.36 percent annually between 1990 and 1993. Concerns do exist as to the sustainability of this recent rigorous growth pattern.

Table 16: Employment at Hanford, 1980-1993.

	Total Population			Annual Percent Change	
	1980	1990	1993	1980-1990	1990-1993
Supply System	7,390	1,762	1,888	-7.62	2.38
DOE Contractors	12,100	14,152	17,097	1.7	6.94
Hanford Total	20,030	15,551	18,985	-2.25	7.36

SOURCE: Washington State Department of Employment Security, Nonagricultural Wage and Salary Series.

A third major trend influencing regional service sector growth is the role of the Tri-Cities area as a regional service center. The development of the Columbia Center Mall and recruitment of major department chains such as COSTCO and Wal-Mart has created a draw for shoppers within a 100-mile radius of the Tri-Cities. Smaller regional shopping centers have developed in other communities such as Walla Walla and Pendleton.

Transportation Flows Serving the Regional Economy

A close look at the economy of the five-county study region indicates five major local economic generators of highway transportation needs within the region including:

1. Agricultural production;
2. Food manufacturing;
3. Wood and paper products;
4. Chemical and petroleum products;
5. Regional service industries.

The contribution of these major economic generators is reflected by the freight truck cargo shipped from local origins and to local destinations within the region (Tables 17 and 18). Food and kindred products represent the single largest source of both cargo tonnage and economic value among commodities shipped from communities within the region. Crop and livestock products, lumber and wood products, as well as chemical and petroleum products are each responsible for a substantial volume of freight truck shipments each day.

Shipments into regional communities reflect two major transportation needs. First, local manufacturing plants rely on the highway system to receive raw materials such as crop and livestock products, logs, wood chips, hanging beef, and cattle. Second, the local population relies on the highway system to obtain food, clothing, and consumer merchandise, building materials, and a wide variety of other items required for daily living.

The following analysis provides a closer examination of regional transportation flows for the largest freight generators: agriculture; food manufacturing; and wood and paper products.

Table 17: Volume and Economic Value of Commodities Shipped from Communities In the Study Region.

Commodity	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume *(tons)*	24-Hour Cargo Value *(dollars)*
Food and Kindred Products	180	3,726.11	4,449,077
Frozen or canned produce	125	2,722.27	2,942,769
Other manuf. food products	55	1,003.84	1,506,308
Crop and Livestock Products	109	2,284.57	403,535
Potatoes	71	1,596.33	159,632
Other crops	20	352.07	75,820
Livestock	18	336.17	168,082
Lumber and Wood Products	75	1,624.30	1,103,107
Chemicals and Allied Products	61	995.73	385,102
Products of Petroleum Refining	32	730.60	126,393
Pulp and Paper Products	26	514.38	918,159
Machinery, Except Electrical	17	273.00	2,321,725
General Freight	17	131.83	482,479
Electrical Machinery and Equipment	14	171.00	707,006
Recycled Materials	10	264.81	67,792
Mail and Packages	8	30.94	113,231
Fabricated Metal Products	8	99.63	55,546
Primary Metal Products	6	145.75	78,559
Solid Waste Materials	5	106.88	9,725
Rubber and Plastic Products	4	96.20	481,962
Furniture and Fixtures	3	2.10	8,259
Printing and Publishing	3	22.09	73,941
Stone, Clay, Glass, and Concrete	3	21.00	13,776

Table 18: Volume and Economic Value of Commodities Shipped to Communities In the Study Region.

Commodity	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume *(tons)*	24-Hour Cargo Value *(dollars)*
Lumber and Wood Products	261	7,122.96	632,527
Sawlogs	98	2,682.17	171,873
Pulpwood and other wood chips	114	3,555.02	92,430
Manufactured wood products	49	885.77	368,223
Crop and Livestock Products	215	4,661.23	696,003
Grain	47	1,249.23	157,402
Potatoes	90	2,349.01	234,900
Other crops	49	644.23	113,540
Livestock	18	336.17	168,082
Food and Kindred Products	175	3,362.18	3,595,852
Meat, fresh, chilled, frozen	52	998.59	1,819,437
Frozen or canned produce	48	969.24	1,047,745
Other manufactured foods	75	1,394.35	728,668
Fabricated Metal Products	56	699.54	2,545,855
Transportation Equipment	55	428.80	1,905,517
Chemicals and Allied Products	53	929.50	447,505
General Freight	46	441.53	1,615,994
Products of Petroleum Refining	44	1,193.81	175,589
Pulp and Paper Products	34	497.62	671,878
Machinery, Except Electrical	31	516.53	3,551,000
Stone, Clay, Glass, and Concrete	25	379.80	36,101
Solid Waste Materials	25	691.22	62,900
Apparel and Textile Products	24	281.10	3,391,910
Primary Metal Products	24	270.40	194,053
Mail and Packages	22	452.33	1,655,509
Electrical Machinery and Equipment	20	338.83	1,605,822
Rubber and Plastic Products	19	161.33	719,456
Rock, Sand, and Organic Soils	7	161.00	966
Recycled Materials	7	101.75	26,048
Furniture and Fixtures	3	0.96	2,820

Local transportation flows serving agriculture

A profile of regional destinations for raw agricultural commodities shipped by freight truck is provided in Table 19. While the locations of major destinations are indicative of key

agricultural flows, the volume and value of local shipments is likely underestimated by the truck survey methodology utilized for this study. In particular, truck interviews were primarily collected near the borders of the region. Consequently, cargo originating from fields within the region would not be a part of truck interviews. More importantly, the interviews provide a one-day, snapshot of truck movements. Local harvests take place in a specific season. Consequently, the agricultural flows will vary considerably from season to season and this snapshot survey will miss some of those flows..

Table 19: Regional Destinations for Raw Agricultural Commodities.

Community	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume *(tons)*	24-Hour Cargo Value *(dollars)*
Hermiston	71	1,699.08	183,316
Walla Walla	44	363.38	400,420
Pasco	42	994.27	267,212
Wallula	36	876.47	1,298,154
Boardman	36	879.91	87,991
Burbank	16	376.00	47,376
Milton-Freewater	12	204.20	53,540
Pendleton	11	157.65	262,636
Richland	11	224.26	22,426
Kennewick	8	208.00	26,208
Finley	4	107.80	10,780
Plymouth	4	63.00	15,750
Irrigon	3	69.63	8,773
Pilot Rock	3	61.88	30,937
Umatilla	3	1.38	962

Despite these qualifications, agricultural flows summarized in Table 19 are representative of significant agricultural product flows. For example, most potatoes are stored at regional facilities and transported year-around to local processors as needed for production purposes. Hermiston, Boardman, Pasco, and Richland are regional centers for frozen potato processing. At the time the truck survey was conducted, commodity shipments to communities such as Walla Walla and Milton-Freewater were more closely tied to other regional vegetables such as peas and onions.

While potatoes and vegetables represent a major share of commodity tonnage shipped within the corridor study area, hanging beef and live cattle represent a significant share of commodity value. In particular, approximately 36 truck loads of hanging beef or live cattle are shipped to Wallula each day. Daily beef shipments to Wallula are valued at nearly 1.3 million dollars. Other regional communities including Pendleton and Walla Walla also were significant destinations for hanging beef and cattle.

Columbia River train terminals also are a major commodity destination within the study region. Approximately 46 trucks reported grain cargo destined for barge facilities in Burbank, Pasco, Kennewick, and Irrigon. Of critical importance is the fact that truck interviews were conducted during the months of May and June, the period of lowest volume of grain shipments from eastern Washington facilities.

Intermodal facilities play a key role in agricultural transportation within the region. As noted, Columbia River handling facilities are major destinations for eastern Washington and eastern Oregon grain producers. Personal interviews of warehouse operators in the three Washington counties indicate that 70-93 percent of local grain is shipped by truck-barge to final market (Table 20). The small percentage that is shipped from warehouses by truck only represents transfers between storage facilities rather than shipments to final market. Consequently, the overall pattern of grain shipments is from the field to warehouse facilities during the months of July and August, followed by local shipments to area river ports as market factors make shipments profitable. The highway system supports local transfers of grain from the fields to warehouses as well as shipments from the warehouse to river ports.

Table 20: Transportation Modes for Wheat Shipped from Local Warehouses.

	Percent Shipped from Warehouse by:		
	Truck Only	Truck/Barge	Rail
Walla Walla County	9	81	10
Franklin County	0	93	7
Benton County	15	70	15

SOURCE: Eastern Washington Intermodal Transportation Study.

While grain represents the largest share of fresh agricultural commodities shipped by barge, hay farmers are increasingly utilizing the rivers as a means to reach international markets. The Port of Morrow, for example, ships approximately 200,000 tons of hay each year by container to international markets. The Port of Pasco also reports hay shipments and is considering the development of additional local processing facilities. The continued development of the waterways as a major mode for local hay shipments could lead to increased highway traffic leading from regional fields to river port processing facilities.

Local transportation flows serving food manufacturers

Shipments of raw agricultural products often represent inputs into the region's important manufactured food industry. As noted, Hermiston is the largest center of frozen potato manufacturing within the region (Table 21). Approximately 68 trucks ship frozen potatoes from Hermiston each day. Potato products shipped by truck from Hermiston are valued at 1.2 million dollars per day. Frozen potato products and other processed vegetables are shipped in all directions from major regional processors, with heaviest flows to the Portland region.

Table 21: Regional Origins of Manufactured Food Products.

Cargo Origin	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume *(tons)*	24-Hour Cargo Value *(dollars)*
Hermiston	68	1,316.97	1,284,538
Kennewick	39	590.40	640,788
Wallula	33	733.13	1,120,904
Pendleton	22	269.11	180,424
Pasco	22	456.63	571,046
Walla Walla	15	275.60	355,372
Weston	12	257.40	278,249
Richland	9	101.88	110,126
Milton-Freewater	8	36.40	27,445
Boardman	8	192.14	207,707

Prepared meat products from the Iowa Beef packing plant in Wallula represent the region's highest value manufactured food shipments. Approximately 733 tons of prepared meat products, valued at 1.2 million dollars, are shipped by truck from the Wallula facility each day. Meat prepared by the Iowa Beef facility is shipped to markets throughout the United States.

Both rail and water modes play an important role in the shipment of manufactured food products from the region. Managers of potato processing facilities within the five-county area indicate that between 40-50 percent of the manufactured product is shipped to markets by rail. Development of refrigerated container handling facilities at the Port of Umatilla and the Port of Pasco has led to an increased use of river transportaiton to ship frozen products to export markets. Should events occur (such as rail line abandonments/railcar shortages or river drawdowns) that would significantly reduce the availability of either rail or water transportation within the region, the volume of processed product on the regional highway system would increase dramatically.

Local transportation flows serving wood and paper product manufacturers

Regional wood products activity is centered near the Boise Cascade plant in Wallula and Louisiana-Pacific facilities in Walla Walla and Pilot Rock. Raw inputs for these plants, primarily sawlogs and pulp wood, are shipped by truck on the regional highway network. Over 90 log truck shipments to Pilot Rock were recorded by the June roadside interview process (Table 22). The total number of log truck shipments in a given day can vary substantially depend upon production needs. The transportation manager of the Louisiana-Pacific plant indicated that 50 loads of logs is a more typical day. Shipment of wood chips to the Boise Cascade paper plant are relatively steady, between 80 and 100 loads per day. Wood chips used by the Wallula plant are obtained primarily from sites in Oregon. Wood chips are a heavy tonnage but a low value commodity.

Table 22: Regional Destinations of Wood and Paper Products.

Cargo Destination	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume *(tons)*	24-Hour Cargo Value *(dollars)*
Wallula	95	2,844.37	219,075
Pilot Rock	50	1,330.40	159,617
Walla Walla	49	1,251.04	205,952
Boardman	39	1,012.92	229,499
Umatilla	23	581.01	48,445
Hermiston	23	345.96	319,121
Kennewick	11	238.14	124,733
Pasco	10	144.90	137,607
Milton-Freewater	9	90.85	40,976
Pendleton	6	96.25	19,202
Weston	3	21.00	1,722

Pilot Rock and Wallula are the leading sources of wood products within the region (Table 23). The Pilot Rock plant ships between 5 and 10 loads of finished lumber per day. However, the logs and wood chips are also shipped from Pilot Rock to other Louisiana Pacific facilities including Walla Walla. At times, finished products are also shipped to Walla Walla to obtain favorable rail shipping rates.

The Boise Cascade plant in Wallula produces both rolled paper and cartons. Seven to twenty loads of rolled paper products are shipped by truck from the plant each day. Fifteen to twenty loads of cartons are shipped from the Wallula plant. Rolled paper is sold to markets throughout the western United States, with the greatest volume going to the Portland and California area. Approximately three-quarters of the carton production goes to the fruit shipping industry in the Yakima and Wenatchee valleys.

Table 23: Regional Origins of Wood and Paper Products.

Cargo Destination	24-Hour Count Trucks with Cargo	24-Hour Cargo Volume *(tons)*	24-Hour Cargo Value *(dollars)*
Pilot Rock	42	923.73	923,426
Wallula	26	514.38	918,159
Walla Walla	12	263.00	14,286
Pendleton	7	166.25	13,632
Umatilla	4	90.08	2,342
Milton-Freewater	4	87.50	31,762
Kennewick	3	92.34	116,249
Athena	3	1.40	1,407

CONCLUSIONS

The volume and economic value of cargo passing within and through the U.S. 395 corridor area is substantial. During a typical week day, 5,600 trucks carrying over 100,000 tons of cargo, worth over $139 million in 1994 prices, pass within and through the region over a 24-hour period.

Nearly two-thirds of the recorded cargo movement and over 70 percent of the cargo value are pass-through traffic in the region. Regional imports comprise 22 percent of the trucks with cargo and almost 18 percent of the cargo value. The highest percentage of trucks with cargo that are pass-through traffic occur along I-84 and I-82; as expected, non-interstate highways tend to serve more localized traffic flows.

Food and kindred products provide both the largest cargo tonnage and economic value among commodity categories. Wood products and agricultural commodities, along with several higher value commodities such as general freight, machinery and equipment, metal products, manufactured plastics, and paper products, account for a significant share of total daily cargo tonnage.

Overall, the diversified cargo base suggests relatively stable freight traffic flows that are relatively independent of changing economic conditions that may occur within the five-county study area. While the U.S. 395 corridor is very important to the support of commerce in both Washington and Oregon, it is essential to the economy within the five-county region.

The Pasco/Kennewick area is both the highest volume origin and highest volume destination among communities within the area. While Walla Walla has a slightly higher total 24-hour truck count among regional destinations, Hermiston has a slightly higher 24-hour cargo volume and value compared to Walla Walla.

Agriculture remains the cornerstone of the economy in the five-county study region, with over one billion dollars in total regional agricultural sales in 1992. Between 1987 and 1992, regional agricultural sales increased by 38 percent, with sales in Benton County expanding by 60 percent. The strong diversified crop base (potatoes, wheat, hay, fruit, etc.) in the Lower Columbia River region is the key to the growing agricultural sector.

This diversified agriculture results in differing local commodity flows, mainly associated with potatoes, wheat, and hay. Food processing also contributes over one-half of the region's manufacturing base and a heavy movement of high value products, followed by wood and lumber products, chemical and petroleum industries, and a growing retail/wholesale trade and services sector.

Finally, shipments into regional communities reflect two major transportation needs. Local manufacturing plants, or transhipment areas, require raw inputs while the local population requires a wide variety of daily living consumption items.

ewits\imp395.kld