

Transportation Needs of Eastern Washington Fruit, Vegetable and Hay Industries

**EWITS Research Report Number 7
March 1995**

by

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EWITS Research Reports: Background and Purpose

This is the seventh 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, Chairperson (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:

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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.

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TRANSPORTATION NEEDS OF EASTERN WASHINGTON FRUIT, VEGETABLE AND HAY INDUSTRIES

INTRODUCTION

Agriculture is the dominant freight traffic generator in most eastern Washington counties. County Public Works Departments, RTPOs, MPOs and the Washington State Department of Transportation are challenged with the task of supporting the efficient transportation of agricultural commodities within their respective jurisdictions. A central objective of the Eastern Washington Intermodal Transportation Study (EWITS) is to develop research-based information to help state and local transportation authorities effectively meet this challenge. The transportation needs and usage of eastern Washington grain producers were summarized in EWITS Research Report Number 5. The transportation needs of the region's fruit, vegetable and hay industries is the focus of this report.

We begin with a brief overview of the current level, and geographic location, of production and processing activity within these key eastern Washington agricultural industries. Eighty percent of total tonnage produced within the broad industry categories of fruit, vegetable and hay crops is attributed to three specific commodities: apple, potatoes, and hay (see Table 1.1 on page 2). Because the volume of a commodity transported is directly related to the tons produced, these three commodities were selected for detailed analysis in this study. However, it is recognized that many other commodities, such as sweet corn, dry peas, asparagus and sweet cherries are also of major local economic importance and interest to transportation planners.

A mail/telephone survey of eastern Washington potato, hay and apple processing and distribution firms was conducted during October and November of 1994. Survey and procedures utilized are described on pages 6 and 7 of this report. Plant managers responding to the mail/telephone survey provided information on major transportation flows, modes of transportation utilized and current barriers to efficient movement of eastern Washington agricultural commodities. Results from the survey and implications for transportation policies and programs are the major focus of the analysis presented in this report.

EASTERN WASHINGTON'S DIVERSIFIED AGRICULTURE BASE

Eastern Washington has one of the most diverse and prosperous agricultural industries in the nation. The 1993 production level and value for the state's major agricultural commodities is summarized in Table 1.1 below. Overall, farm level sales for Washington field crops, fruits and vegetables was approximately 3 billion dollars in 1993. Approximately 20 million tons of farm products are transported annually from fields located primarily in eastern Washington to storage facilities, processors or final markets.

**Table 1.1: Production and Value of
Major Washington Agricultural Crops, 1993**

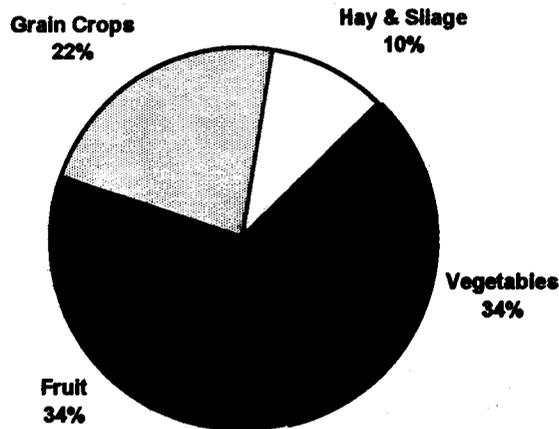
	<u>Production (1,000) Tons</u>	<u>Value of Production (\$1,000)</u>
<i>Wheat</i>	5,327	572,026
<i>Potatoes</i>	4,425	469,050
<i>Hay</i>	2,835	282,150
<i>Apples</i>	2,500	698,000
Corn for Silage	1,040	27,040
Corn for Grain	912	47,120
Sweet Corn	587	47,697
Barley	520	46,230
Pears	383	93,771
Grapes	292	89,929
Onions	250	83,250
Carrots	180	23,409
Dry Edible Peas	118	16,464
Green Peas	93	22,115
Sweet Cherries	80	94,036
Lentils	58	19,589
Asparagus	45	55,790
Hops	29	101,220
Peaches	24	10,145
Raspberries	22	28,126
Apricots	8	6,280
Strawberries	6	5,946
Total for Selected Commodities	19,734	2,839,383

Source: Washington Agricultural Statistics Service, Washington Agricultural Statistics 1993-1994

Wheat is the single largest eastern Washington commodity as measured by both annual production and farm level value. Within the region's dry land areas, wheat and other small grains are the dominant farm crops. However, a remarkably diversified agriculture sector exists in much of eastern Washington with its access to irrigation.

The transportation needs of eastern Washington's wheat and barley industries were discussed in EWITS Research Report Number 5. This report focuses on the transportation needs of eastern Washington farm commodities other than grain. Nongrain commodities account for 78% of Washington's total farm level crop sales. The vast majority of these sales are from farms located in eastern Washington counties. Fruit and vegetable commodities represent more than two-thirds of total farm level sales value within the state.

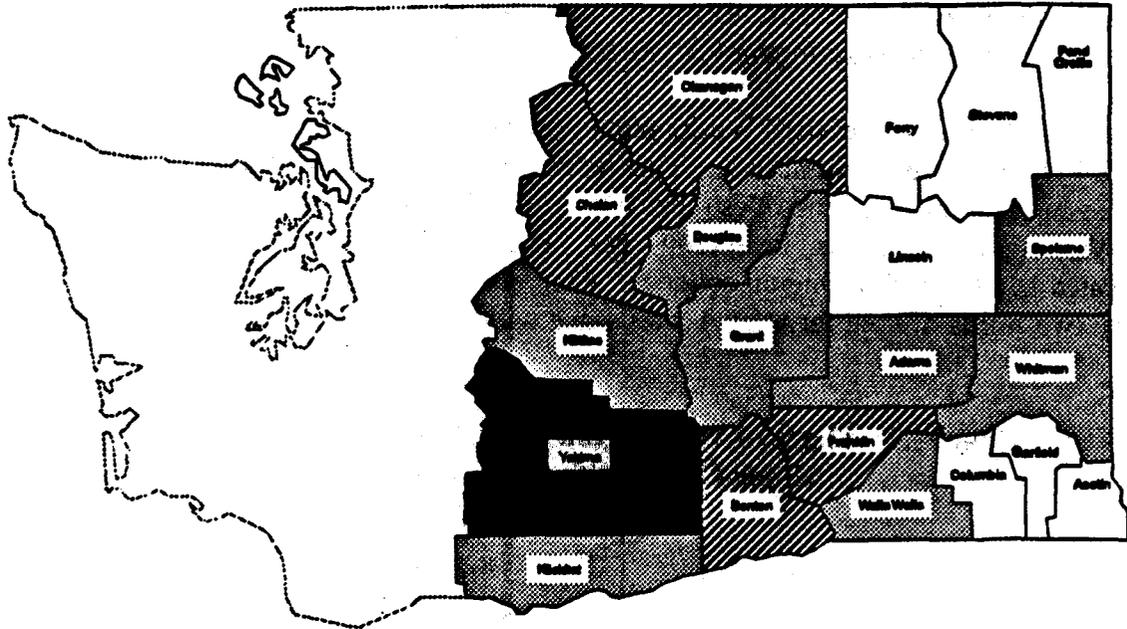
Chart 1.1: Share of Washington Farm Level Crop Sales for Major Commodity Groups, 1993



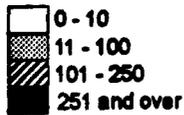
Source: Washington Agricultural Statistics Service, Washington Agricultural Statistics 1993-1994

Note: The vegetable group is broadly defined to include potatoes, dry peas and lentils.

Map 1.1: Geographic Centers of Fruit, Vegetable and Hay Production



**Market Value of Fruit, Vegetables & Hay Sold
Million Dollars**



Source: U.S. Census of Agriculture, 1992

Notes: Value of potatoes calculated at \$5/cwt.

The vegetable group is broadly defined to include potatoes, dry peas and lentils.

The geographic centers of fruit, vegetable and hay production within eastern Washington are depicted in Map 1.1 above. Actual farm level 1992 sales in each county for key commodity groups appear in Table 1.3 on page 5. Thirteen out of the 20 eastern Washington counties had farm level fruit, vegetable or hay sales in excess of \$10 million in 1992. Recent years are not expected to be significantly different.

Yakima County farmers report the highest level of annual nongrain farm sales in the region. The relatively high level of farm sales in Yakima County is largely attributed to a successful high value fruit industry. Nongrain farm sales in Chelan, Okanogan and Douglas Counties also are closely linked to the fruit industry. In contrast, Grant, Franklin, Benton, Chelan, Adams and Walla Walla Counties each have highly diversified agricultural economies. However, potato growers play a major role in each of these counties. Whitman and Spokane Counties, typically recognized as major centers of dry land wheat production, also benefit

from a significant dry bean and lentil industry. Every eastern Washington county reports some level of hay production.

In summary, the fruit, vegetable and hay industries are a key component of the local economy for most eastern Washington counties. Recognizing the economic importance of these industries, the study team was directed to conduct an evaluation of their essential transportation needs.

Table 1.3: County Profile of Fruit, Vegetable and Hay Sales, 1992

	<u>Fruits</u>	<u>Potatoes</u>	<u>Other Vegetables</u>	<u>Hay</u>	<u>All Nongrain Crops</u>
Yakima	314.6	2.1	25.3	9.9	351.9
Grant	103.0	84.0	42.2	49.6	278.8
Franklin	30.4	70.1	35.0	34.4	169.9
Benton	70.1	72.7	5.9	4.6	153.3
Chelan	150.7	0.0	D	.1	150.8
Okanogan	117.4	0.0	D	1.5	118.9
Douglas	81.8	0.0	D	0.3	82.1
Adams	5.6	41.0	7.6	10.8	65.0
Walla Walla	15.5	23.2	11.5	12.9	63.1
Kittitas	12.5	1.1	2.5	14.0	30.1
Whitman	D	0.1	16.6	1.4	18.1
Spokane	1.0	0.0	7.2	7.7	15.9
Klickitat	4.3	0.0	4.5	2.4	11.2
Stevens	0.3	D	0.0	1.9	2.2
Lincoln	D	D	0.0	1.7	1.7
Pend Oreille	D	0.0	D	0.4	0.4
Ferry	D	0.0	D	0.4	0.4
Columbia	D	0.0	D	0.4	0.4
Asotin	D	0.0	0.1	0.2	0.3

Source: US Census of Agriculture, 1992
D=Unable to disclose due to confidentiality

PROFILE OF PROCESSING, WAREHOUSING AND DISTRIBUTION COMPANIES SURVEYED

The research methodology chosen was to conduct a mail/telephone survey of major nongrain processing, warehousing and distribution companies. Three commodities--apples, potatoes and hay--represent 80% of the volume of agriculture crops other than grain produced in eastern Washington. Consequently, a decision was made to focus the survey on these three major commodities.

The survey focused on warehouses, packers, processors, and brokers in the apple, potato and hay industries. The majority of apple, potato and hay harvests will move through the facilities included in the survey. Limiting the survey to warehouses, packers, processors and brokers also required considerably fewer financial resources compared to a survey of all apple, potato and hay growers. In addition, including both growers and processors could lead to double-counting of local truck shipments, so that situation was avoided in this study.

The first challenge of the survey was assembling an up-to-date address and telephone list for the region's processing, warehousing and distribution companies in each of the three selected industries. No comprehensive up-to-date address list of this type was available for eastern Washington at the time of the study. Consequently, it was necessary for the research team to develop an appropriate address and contact file from a variety of sources, including the Washington Department of Agriculture, commodity trade associations, the Washington State University Extension Service and past studies. The list of firms identified through this process is provided in Appendix A.

The research team developed a customized mail questionnaire for each of the three industries. An example of the questionnaire utilized for the apple industry is provided in Appendix B. The questionnaire addressed key transportation issues including typical local transportation flows for both the raw commodity and processed products, modes of transport utilized and perceived barriers to efficient transportation.

Three copies of the questionnaire were mailed to the transportation manager or President of each firm during the first week of October in 1994. A letter signed by the EWITS Project Director requested transportation managers to fill out a questionnaire for each of their three largest facilities located in eastern Washington. A follow-up reminder letter was sent to firms not responding within two weeks. Personal phone calls were made to all firms who did not respond within one month. In these cases, the research team offered to help complete the questionnaire over the phone.

The processing, warehousing and brokerage facilities for the apple, potato, and hay industries are concentrated in a few counties. For example, approximately 80% of the surveys mailed and received from apple industry headquarters were located in Yakima and Chelan Counties.

Approximately 60% of the surveys mailed and received from the potato industry headquarters were located in Grant and Franklin Counties. Similarly, 50% of the hay industry surveys were mailed and received from Grant and Kittitas Counties. Maps identifying the geographic location of participating firms are included in later sections of this report.

Approximately two-thirds of the firms surveyed agreed to participate, a strong response that allows inferences to be drawn about the entire industry. Table 2.1 summarizes the number contacted and responded by county. Most headquarters surveyed operate only one facility. Several headquarters submitted information on two facilities. One manager provided survey information for three facilities.

Table 2.1: County Summary of Number of Firms Surveyed and Number of Responses

<u>County</u>	<u>Total Number of Surveys Mailed to Headquarters</u>	<u>Number of Headquarters Represented in Survey</u>	<u>Number of Facilities Represented in Survey</u>
Apple Surveys			
Yakima	35	19	24
Chelan	21	15	15
Okanogan	4	4	4
Benton	3	2	2
Douglas	1	1	1
Franklin	2	1	1
Walla Walla	1	1	1
Grant	0	0	1
Spokane	1	0	0
Subtotal APPLES	68	43	49
Potato Surveys			
Grant	15	12	15
Benton	3	3	5
Franklin	8	4	5
Adams	5	3	3
Stevens	1	1	2
Lincoln	1	1	1
Spokane	1	1	1
Walla Walla	1	1	1
Yakima	1	1	1
Subtotal POTATO	38	27	34
Hay Surveys			
Grant	10	7	7
Kittitas	10	6	6
Franklin	6	5	5
Benton	6	3	3
Adams	3	3	3
Yakima	6	1	2
Spokane	1	1	1
Stevens	1	0	0
Subtotal HAY	43	26	27

Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Apple Respondents: Services

Typically, the respondents from the apple industry indicated that more than one service is provided at each facility. The most commonly reported were warehousing/distribution services and packing fresh fruit. Twenty-six apple respondents reported that brokerage or sales services are provided at their facility. Four processors of apple juice, apple sauce or other processed apple product responded to the survey. The services provided by the respondents in the survey are identified in Table 2.2 below.

Table 2.2
Apple Respondents: Services

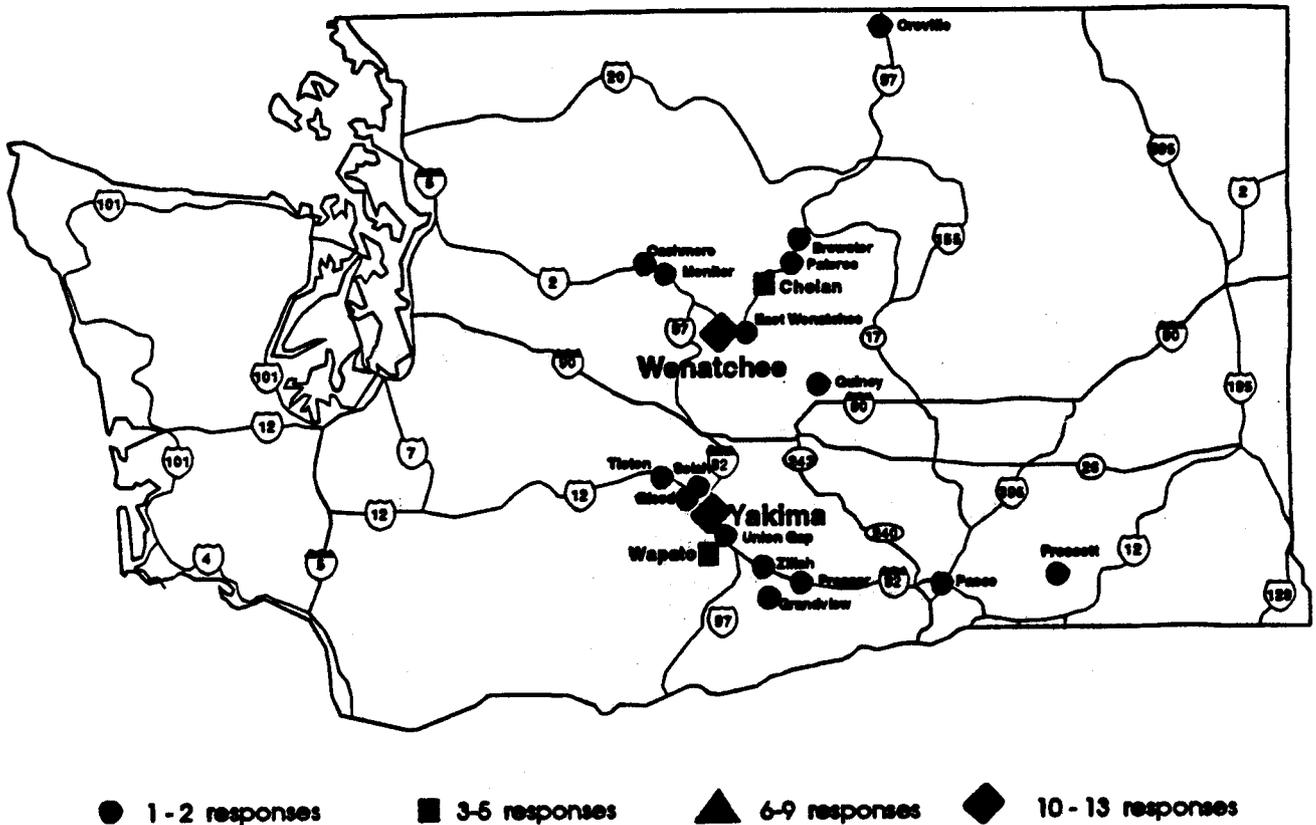
<u>Service</u>	<u>Number of Apple Respondents</u>
Warehousing/Distribution	42
Packing	39
Brokering/Sales	26
Processing	4

Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Apple Respondents: Geographic Location

The respondents among apple processors, packers, distributors and brokers were concentrated in the Yakima and Wenatchee areas. Map 2.1 on page 9 highlights the location of apple facilities that participated in the study.

Map 2.1
Apple Respondents: Geographic Location by City



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Apple Respondents: Volume of Shipments/Receipts

Survey respondents reported shipping a total of over two million tons of apple product in a typical year. The volume of product shipped varied widely between apple respondents. At the lowest end of the range, one small packer reported annual shipments of only 7 tons. At the opposite end of the scale, a large warehouse reported 300,000 tons of product shipments in a typical year. The county-level averages for typical respondents ranged from 36,588 to 45,190 tons. Table 2.3 on page 10 provides information on average product volumes.

Table 2.3
Apple Respondents: Average Volume of Product Shipped
by Typical Facilities

<u>Respondent Location</u>	<u>Average Tons Shipped Annually by a Typical Facility</u>
Yakima County	45,190
Chelan County	56,575
Okanogan County	36,588
Other Apple Respondents	46,735
All Apple Respondents	47,667

Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Apple respondents generally indicated that the amount shipped into the facility was equal to the amount shipped out of the facility. Packers and processors did not necessarily include the culls (apples that do not make the grade for fresh packing) in their tonnage shipments. Packers typically send the culls to eastern Washington processors by truck throughout the year. One manager reported that culls represented over 30% of the raw commodity, although the levels were more typically just a few percentage points. In a few cases, the product shipments from the facility were larger than the tonnage of raw product received by the facility. Follow-up interviews indicated that the differences in volume were explained by apples grown on-site.

Apple respondents reported a total of 2,226,035 tons of raw commodity receipts a year. Raw commodity receipts were as low as zero for one packer who only packed what was grown on-site to a high of 300,000 tons. County-level averages of estimated raw commodity receipts ranged from 45,088 to 58,200. Table 2.4 reports the average volume of raw commodity received by apple respondents.

Table 2.4
Apple Respondents: Average Volume of Raw Commodity Received
By Typical Facilities

<u>Respondent Location</u>	<u>Average Tons/Year Received By a Typical Facility</u>
Yakima County	46,604
Chelan County	58,200
Okanogan County	45,088
Other Apple Respondents	52,567
All Apple Respondents	50,356

Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Potato Respondents: Services

Respondents from the potato industry typically provide more than one service. Fresh storage and warehousing/distribution services were most frequently provided by participating potato facilities. Six facilities responding to the survey provide frozen processing services and two process dried potatoes.

Table 2.5
Potato Respondents: Services

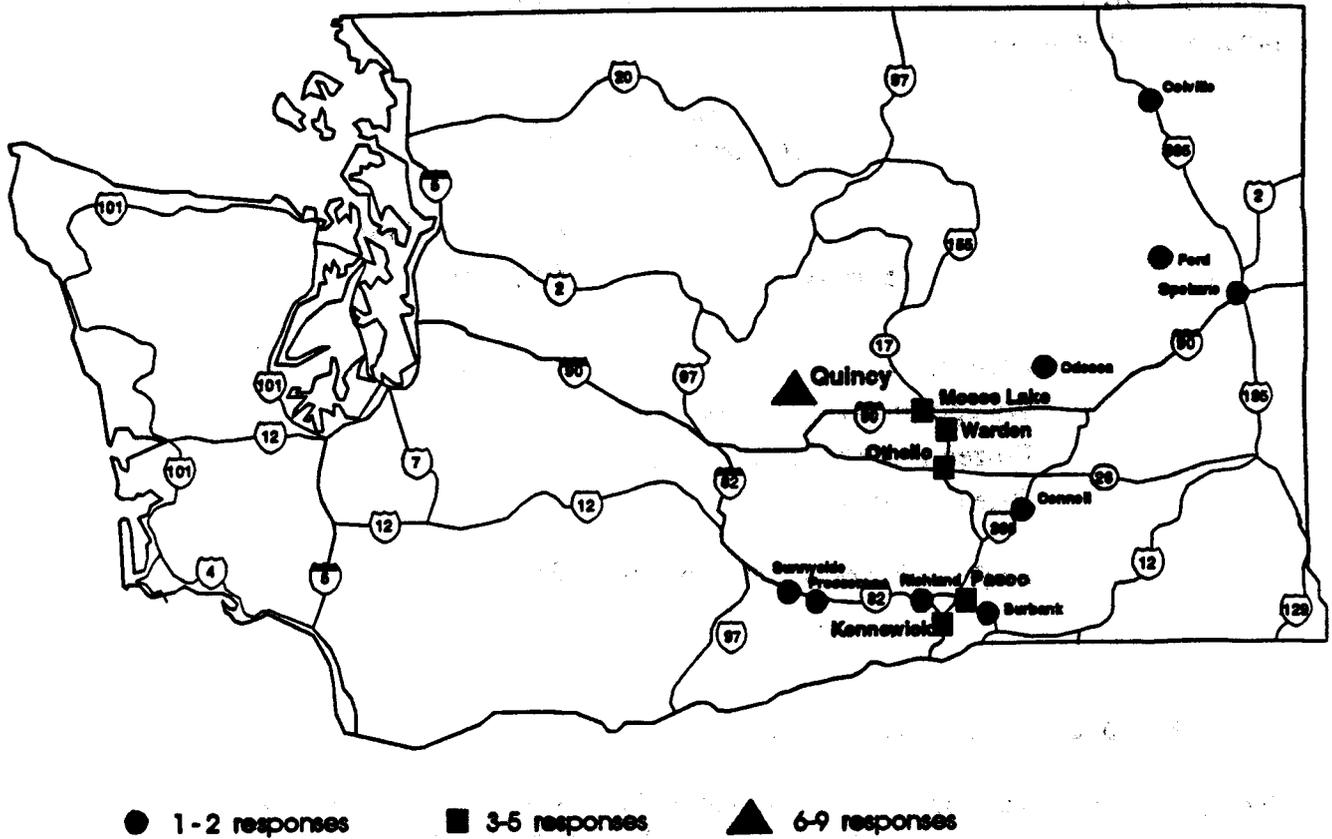
<u>Service</u>	<u>Number of Potato Respondents</u>
Fresh Storage	29
Warehousing/Distribution	23
Frozen Processing	6
Dried Processing	2

Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Potato Respondents: Geographic Location

The bulk of the potato facilities represented in the survey are located in the Moses Lake, Othello, and Tri-Cities areas. Map 2.1 highlights the location of potato facilities that participated in the study.

Map 2.2
Potato Respondents: Geographic Location by City



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Potato Respondents: Volumes of Shipments/Receipts

Survey respondents estimated typical annual shipments of potato product at a total of over two million tons (2,301,734 tons). One large processor reported shipping 350,000 tons in a typical year. Small packers shipping only a few hundred tons also participated in the survey. Table 2.7 provides information on average product volumes for participating facilities by county.

Table 2.7
Potato Respondents: Average Volume of Product Shipped By Typical Facilities

<u>Respondent Location</u>	<u>Average Tons/Year Shipped by a Typical Facility</u>
Grant County	67,128
Benton County	74,400
Franklin County	115,000
Adams County	150,795
Other Potato Respondents	12,925
All POTATO Respondents	71,929

Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Potato respondents reported receiving almost 850,000 tons more raw potatoes than total shipments. This disparity is primarily due to the potato processors. About one-half of the weight of raw potatoes is reduced into water during french fry processing. Table 2.8 reports the average volume of raw commodity received by potato respondents.

Table 2.8
Potato Respondents: Average Volume of Raw Commodity Received By Typical Facilities

<u>Respondent Location</u>	<u>Average Tons/Year Received by a Typical Facility</u>
Grant County	89,343
Benton County	116,600
Franklin County	196,250
Adams County	150,795
Other Potato Respondents	13,033
All POTATO Respondents	98,418

Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Hay Respondents: Services

Similar to the apple and potato respondents, typical hay respondents provide warehousing/distribution or brokering/sales services. Nine facilities participating in the survey provide cubing services, 6 compress bales, and 8 provide other bale processing services. A few respondents process hay pellets into feed. Three also provide hay chop as a service.

Table 2.9
Hay Respondents: Services

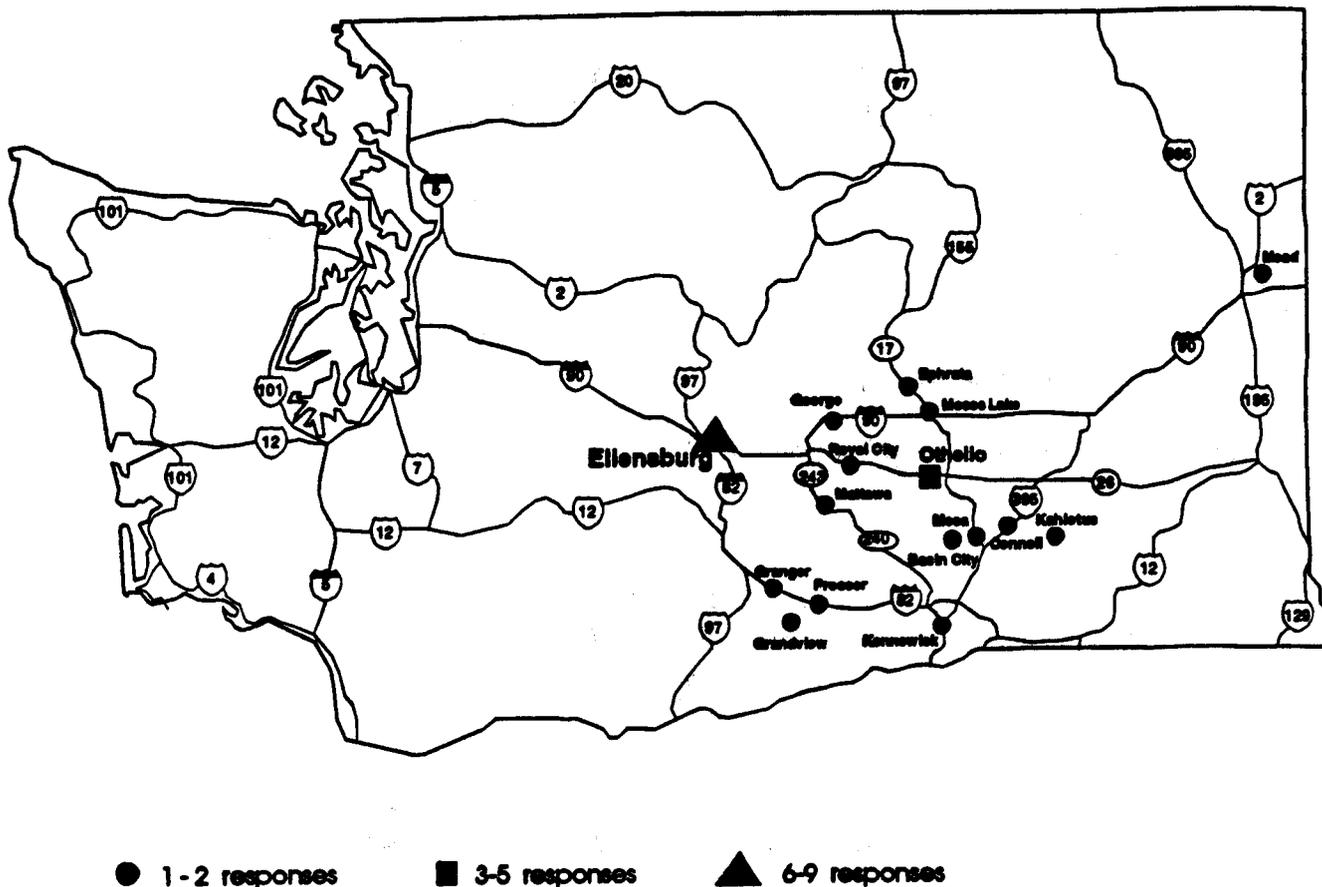
<u>Service</u>	<u>Number of Hay Respondents</u>
Warehousing/Distribution	18
Brokering/Sales	14
Cubing	9
Compressed Bales	6
Other Bale Processing	8
Pellets	4
Hay Chop	3

Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Hay Respondents: Geographic Location

Ellensburg is the most frequent location of the hay processor/warehouse/broker facilities participating in the study. However, hay survey responses were received from a number of communities throughout central portion of eastern Washington. Map 2.3 highlights the location of hay facilities that participated in the study.

Map 2.3
Hay Respondents: Geographic Location by City



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Hay Respondents: Volume of Shipments/Receipts

The volume of product shipped from facilities compared to the volume of raw commodity received was more similar in the hay industry than in the potato and apple industries. Hay respondents reported product shipments of 478,100 tons and receipts of 498,000. A few respondents reported growing hay on site. One hay respondent indicated that hay products are held at their facility and farmers transport the product themselves. More information is provided in Tables 2.10 and 2.11.

Table 2.10
Hay Respondents: Average Volume of Product Shipped By Typical Facilities

<u>Respondent Location</u>	<u>Average Tons/Year Shipped By a Typical Facility</u>
Grant County	35,000
Kittitas County	29,500
Franklin County	7,367
Other Hay Respondents	15,500
All HAY Respondents	23,905

Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Table 2.11
***Hay Respondents: Average Volume of Raw Commodity Received
By Typical Facilities***

<u>Respondent Location</u>	<u>Average Tons/Year Received By a Typical Facility</u>
Grant County	39,357
Kittitas County	26,625
Franklin County	7,000
Other Hay Respondents	13,833
All HAY Respondents	24,900

Source: EWITS Fruit, Vegetable and Hay Survey, 1994

PRODUCT AND RAW COMMODITY FLOWS

Product Destinations

Respondents in this study were asked to estimate the percentage of product shipped from each facility to different geographic regions in a typical year. In the apple industry, the final products are primarily packed fresh apples, apple juice or apple sauce. Final products in the potato industry are fresh packed potatoes, frozen french fries, or dehydrated potatoes. Hay final products include baled hay, compressed bales, cubed hay and other hay forms. Charts 3.1 through 3.3 show the destination of product for each commodity participating in the study.

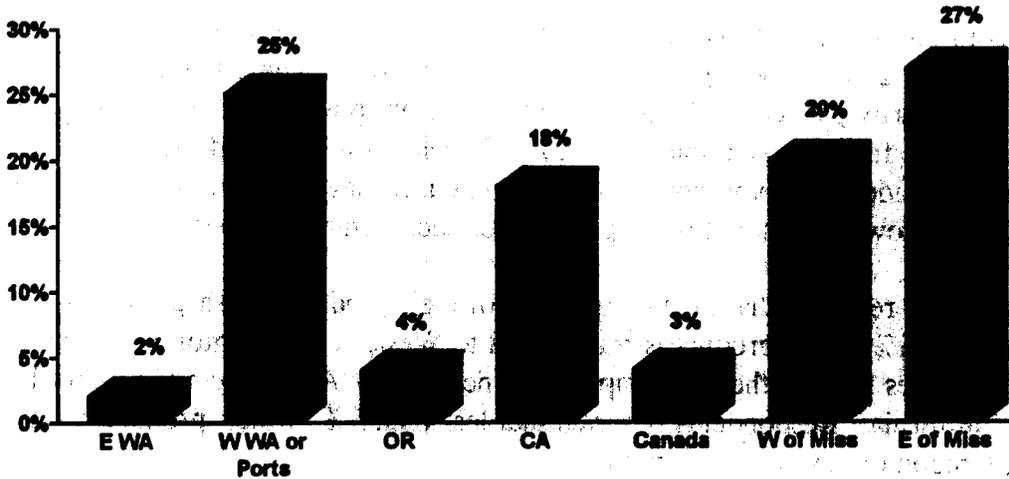
Apple respondents reported that on average 27% of their product is transported to states east of the Mississippi, 25% of the product is transported to Western Washington including the ocean ports, 20% to states west of the Mississippi (not including WA, OR, and CA), and 18% is shipped to California. Respondents reported that less than 5% of their product is transported to Canada, Oregon or eastern Washington.

Potato respondents reported a higher concentration of product moving to states east of the Mississippi. Almost 40% of potato product moves to states east of the Mississippi. 17% of potato product is shipped to states west of the Mississippi (not including WA, CA, and OR), 15% is shipped to western Washington or the ports and 14% is shipped to Canada. Potato respondents reported 8% of product shipments to eastern Washington, but this includes the shipments between packers and processors throughout the year. The potato industry tends to have more inter-facility movements than the apple and hay industries. Less than 5% of the potato product is shipped to either Oregon or Canada.

The movements of the hay industry are sharply different from the apple and potato industry. Almost all of the hay product shipped by hay processors, warehouses, and brokers (95%) moves to western Washington or the ports. Survey respondents report that 4% of the product shipped by hay processors, warehouses, and brokers moves to eastern Washington and 1% to Canada.

Chart 3.1
Apple Industry: Major Destinations of Product

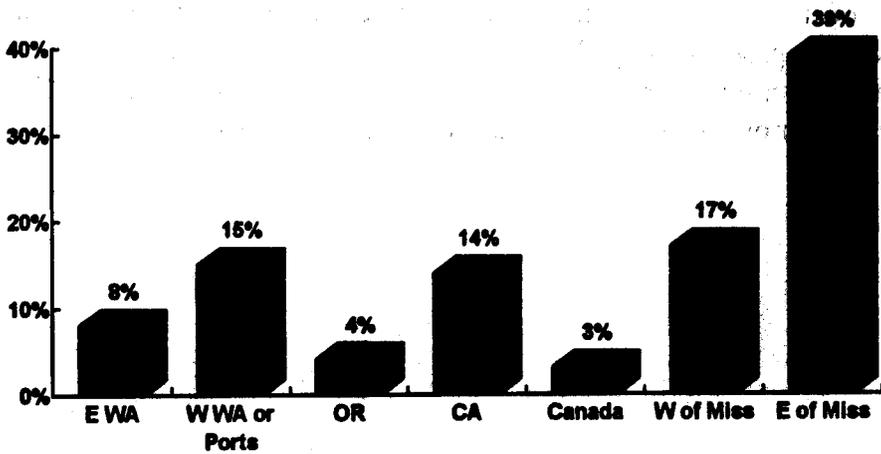
Averages Weighted by Tonnage for Apple Respondents



Note: W of Miss=states west of Mississippi River except CA, OR, WA
Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Chart 3.2
Potato Industry: Major Destinations of Product

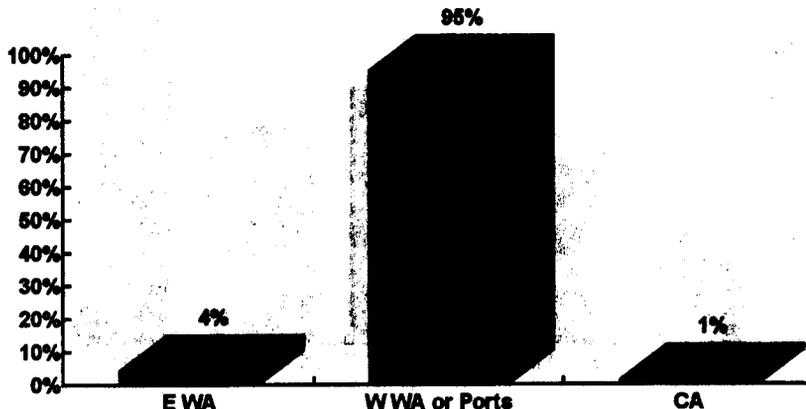
Averages Weighted by Tonnage for Potato Respondents



Note: W of Miss=states west of Mississippi River except CA, OR, WA
Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Chart 3.3
Hay Industry: Major Destinations of Product

Averages Weighted by Tonnage for Hay Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Source of Raw Commodity

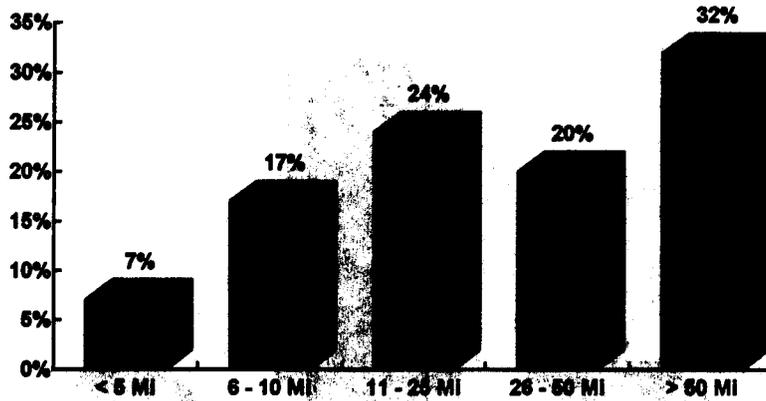
Charts 3.4 through 3.6 illustrate the typical percentage of raw commodity received by mileage range. In both the apple and hay industries, about one-third of the raw commodity travels more than 50 miles. In the apple industry, 32% of the raw commodity travels more than 50 miles to the respondent's facilities, 20% travels between 26 and 50 miles, 24% travels 11 to 25 miles, 17% travels 6 to 10 miles and 7% travels less than 5 miles.

The source of commodity is more concentrated in the 26 to 50 mile radius for the potato industry than the other two industries surveyed. For the potato industry, 19% of the raw commodity travels more than 50 miles, 35% travels 26 to 50 miles, 28% travels 11 to 25 miles, 13% travels 6 to 10 miles, and 6% travels less than 5 miles to reach respondent facilities.

In the hay industry, 33% of the raw commodity is transported more than 50 miles, 9% moves from 26 to 50 miles, 15% moves 11 to 25 miles, 28% moves 6 to 10 miles, and 15% moves less than 5 miles.

Chart 3.4:
Apple Industry: Source of Raw Commodity

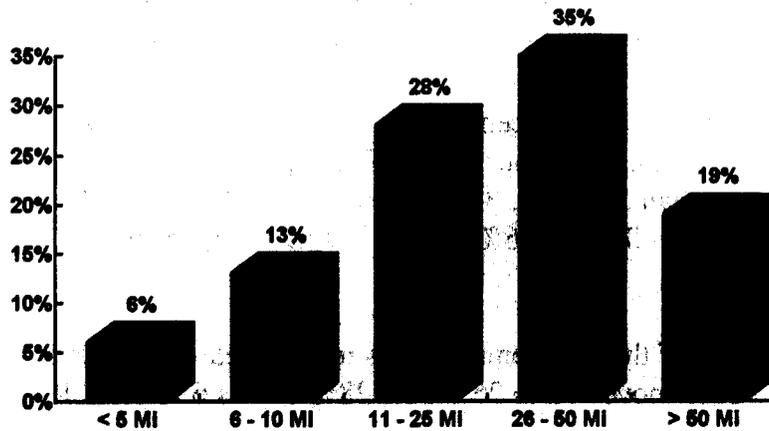
Averages Weighted by Tonnage for Apple Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Chart 3.5
Potato Industry: Source of Raw Commodity

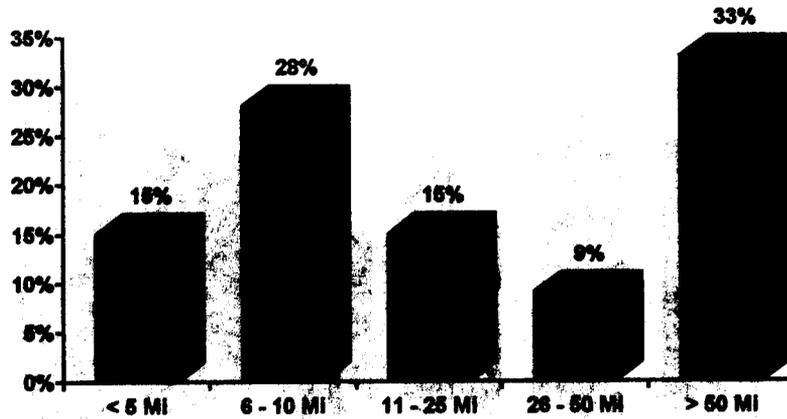
Averages Weighted by Tonnage for Potato Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Chart 3.6
Hay Industry: Source of Raw Commodity

Averages Weighted by Tonnage for Hay Respondents



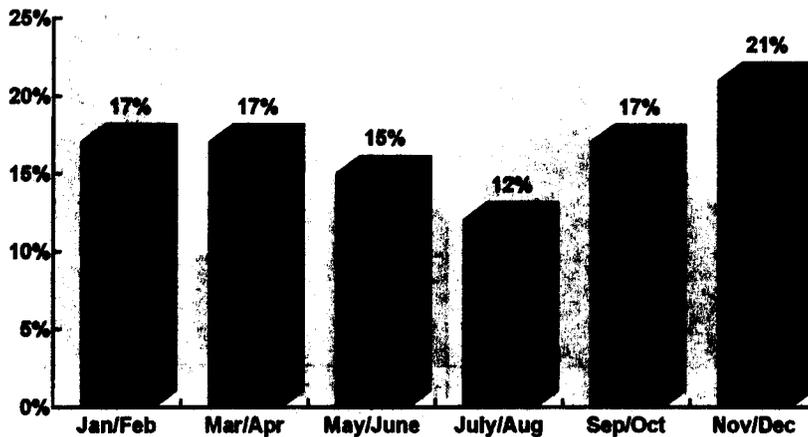
Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Timing of Product Shipments

Charts 3.7 through 3.9 illustrate that the flows of product shipments occur steadily throughout the year for all three commodity groups. No less than 12% and no more than 23% of the product is shipped in any two month period for all three of the commodity groups. Compared to earlier charts, the timing of product shipments is strikingly similar in the three commodity groups.

Chart 3.7
Apple Industry: Timing of Product Shipments

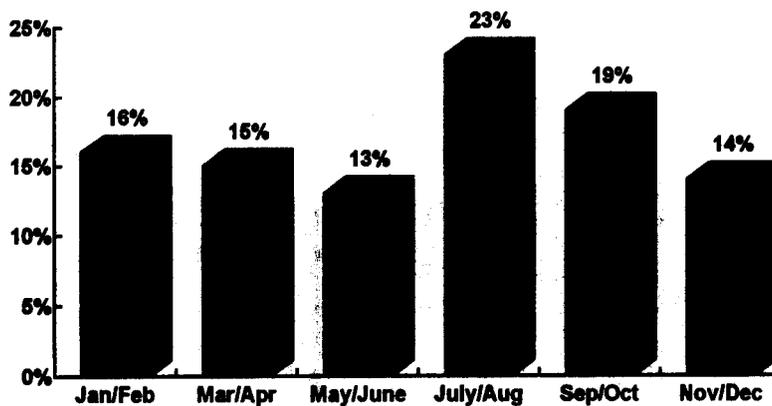
Averages Weighted by Tonnage for Apple Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Chart 3.8
Potato Industry: Timing of Product Shipments

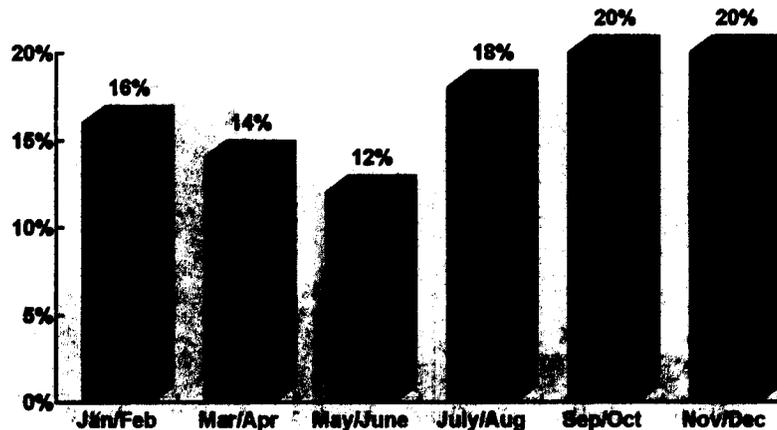
Averages Weighted by Tonnage for Potato Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Chart 3.9
Hay Industry: Timing of Product Shipments

Averages Weighted by Tonnage for Hay Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Timing of Raw Commodity Receipts

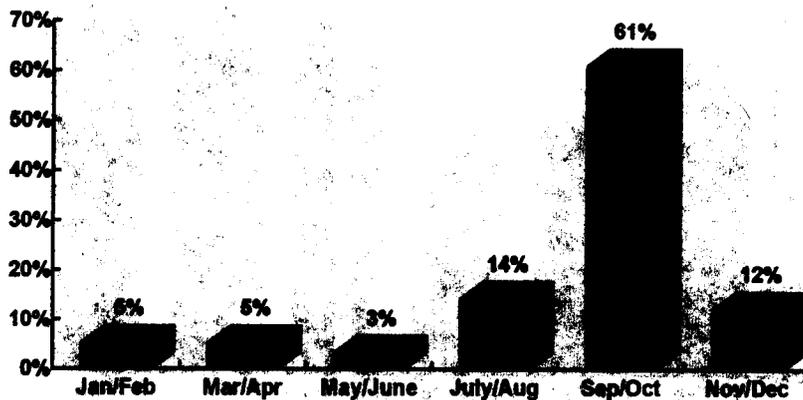
Raw commodity receipts are much more concentrated than product flows for the three commodity groups. Raw commodity receipts are generated by crop harvests as well as movements from packers to processors. Of the three industries examined, the raw commodity receipts of the apple industry are the most concentrated. The facilities participating in the study typically receive 60% of their raw apple commodity in September/October. Between 12% and 14% is received by the apple facilities in the shoulder months of July/August and November/December. 5% or less of the raw product is received January/February, March/April or May/June. The shipments in the first six months of the year are primarily between warehouse facilities and processors.

Respondents from potato facilities reported receiving 33% of their raw commodity in September/October and another 21% in July/August. The raw commodity receipts are higher in the first six months of the year than in the apple industry because there are more year-round movements between packers and processors in the potato industry than in the apple industry.

The longer harvest season for hay crops explains the flatter chart for the hay industry as compared to the apple and potato industries. Hay respondents reported typically receiving 25% of the raw hay in July/August, 23% in September/October, 18% in May/June, 13% in November/December, 11% in January/February and 10% in March/April.

Chart 3.10
Apple Industry: Timing of Raw Commodity Receipts

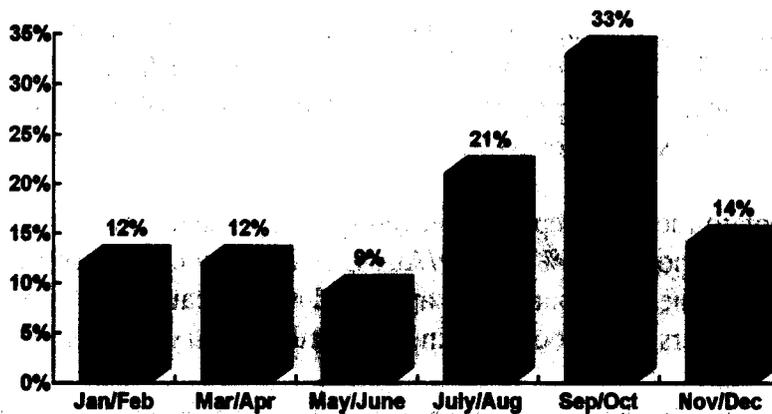
Averages Weighted by Tonnage for Apple Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Chart 3.11
Potato Industry: Timing of Raw Commodity Receipts

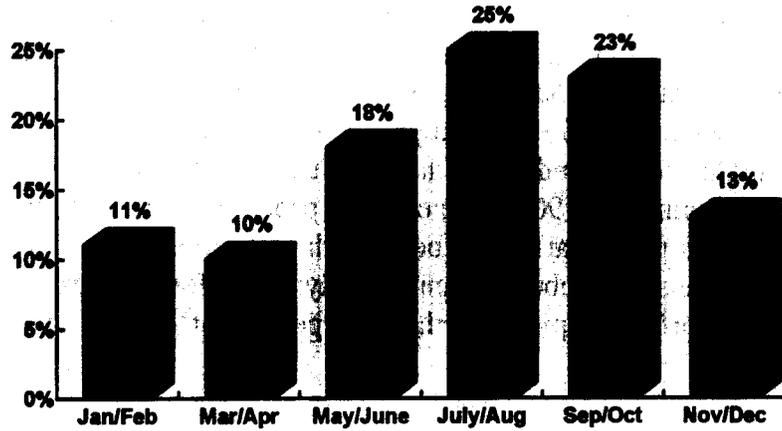
Averages Weighted by Tonnage for Potato Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Chart 3.12
Hay Industry: Timing of Raw Commodity Receipts

Averages Weighted by Tonnage for Hay Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

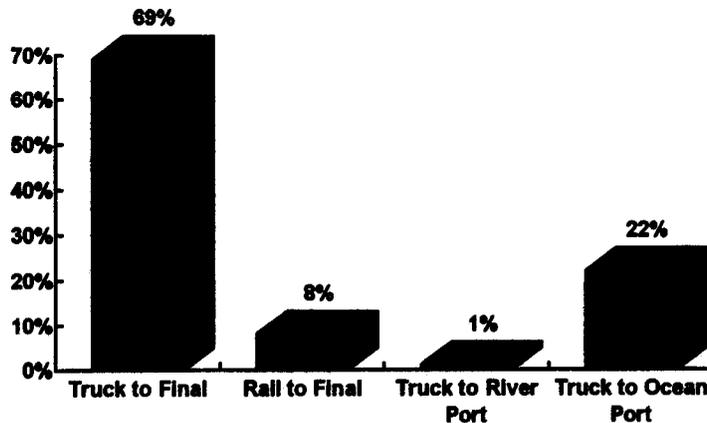
MODES OF TRANSPORT AND MAJOR ROUTES

Transportation Modes for Products

The importance of trucking to ship products for all three surveyed industries is illustrated in Charts 4.1 through 4.3. Approximately 70% of the product shipped by participating apple and potato facilities moves to final destination via truck. Rail plays the most significant role in the movement of potato products. 22% of potato products moves by rail to final destination compared to 8% of apple product and 2% of hay products represented in the survey. Hay respondents reported shipping over 90% of their final product via truck to an ocean port. Hay shipments to ocean ports is particularly high because the responses are weighted by tonnage. The large processors in the study cube or compress hay solely for the purpose of exports. The participating facilities reported shipping less than one percent of product by truck to river ports.

Chart 4.1
Apple Industry: Modes Utilized to Ship Products

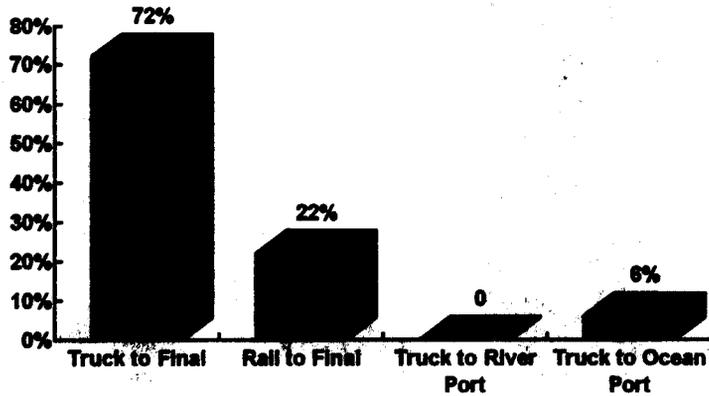
Averages Weighted by Tonnage for Apple Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Chart 4.2
Potato Industry: Modes Utilized to Ship Products

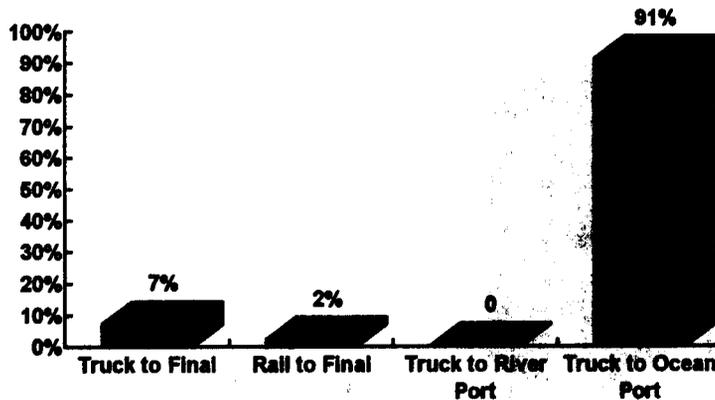
Averages Weighted by Tonnage for Potato Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Chart 4.3
Hay Industry: Modes Utilized to Ship Products

Averages Weighted by Tonnage for Hay Respondents



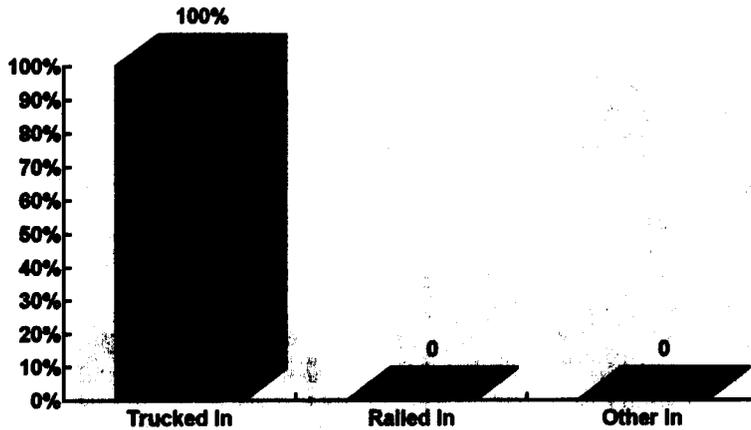
Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Transportation Modes Used to Receive Commodities

As is illustrated in Charts 4.4 through 4.6, the three industries participating in the survey rely almost exclusively on truck shipments to receive commodities. Survey respondents reported from 99% to 100% of raw commodities are transported to their facilities by truck. Potato respondents reported that typically about 1% of raw potatoes arrive at their facilities via rail.

Chart 4.4
Apple Industry: Modes Utilized to Receive Commodities

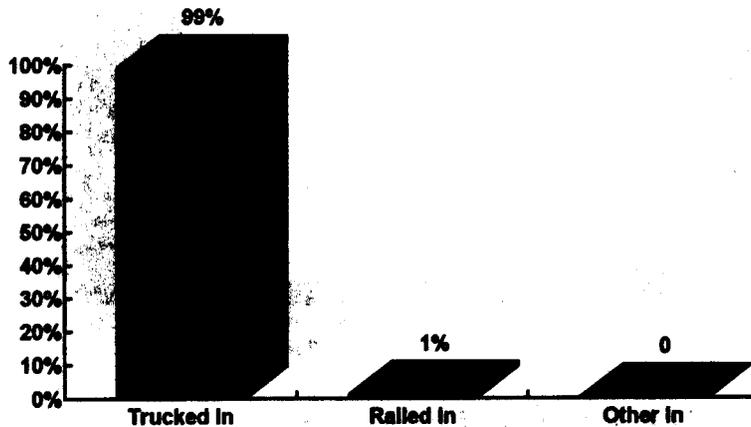
Averages Weighted by Tonnage for Apple Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Chart 4.5
Potato Industry: Modes Utilized to Receive Commodities

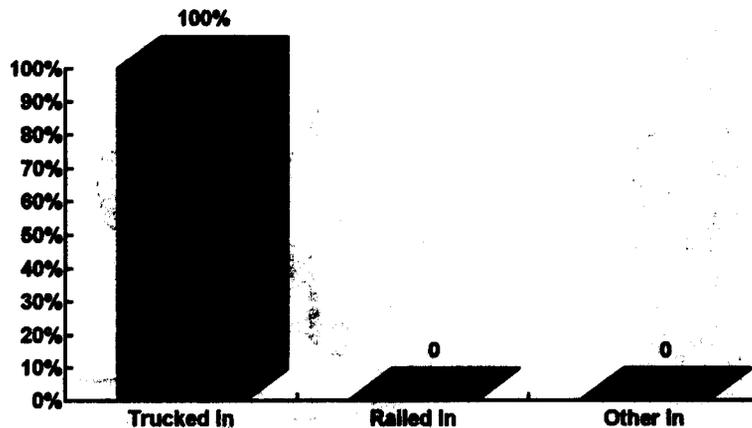
Averages Weighted by Tonnage for Potato Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

Chart 4.6 *Hay Industry: Modes Utilized to Receive Commodities*

Averages Weighted by Tonnage for Hay Respondents



Source: EWITS Fruit, Vegetable and Hay Survey, 1994

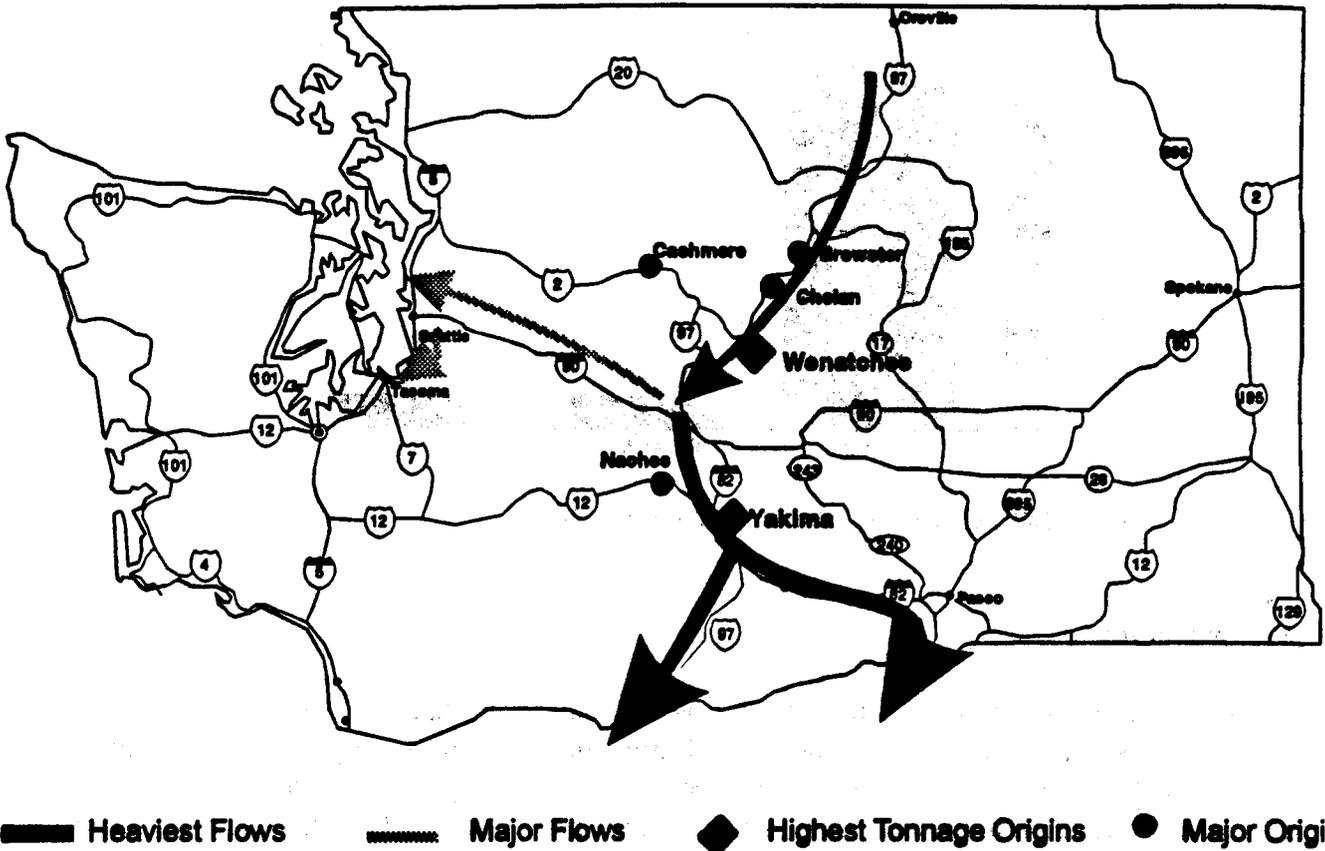
Major Routes

The data presented in Maps 4.1 through 4.3 were collected through the EWITS Origin and Destination Study. The EWITS Origin and Destination Study involved personal interviews of over 28,000 truck drivers to collect information on origin, destination and routes of freight cargo on Washington highways. The data were collected during each of the four seasons over the course of one year beginning Summer of 1993 and ending Spring of 1994.

Map 4.1 illustrates patterns of fruit movements on eastern Washington highways, including apple as well as other fruit cargoes. According to the truck driver interviews, the major origins are Wenatchee and Yakima with significant tonnage originating from the small communities in the Wenatchee and Yakima areas. On average throughout the year, nearly 3,000 tons of apples per day originate from communities located in Yakima County. An additional 2,100 tons of apples per day originate from communities located in Chelan, Okanogan and Douglas Counties.

Routes most widely utilized by apple shippers are southbound on US97 and I-82 to reach produce markets in other states. Approximately 4,000 tons of apples per day are shipped south from eastern Washington locations via these routes. An additional 1,000 tons per day are transported to western Washington retail outlets, distribution centers and ocean ports each day. A combination of I-82, US 97 and I-90 are the primary routes utilized in reaching western Washington.

**Map 4.1
Major Fruit Movements on E.WA Highways**



Source: EWITS Origin and Destination Study, 1994

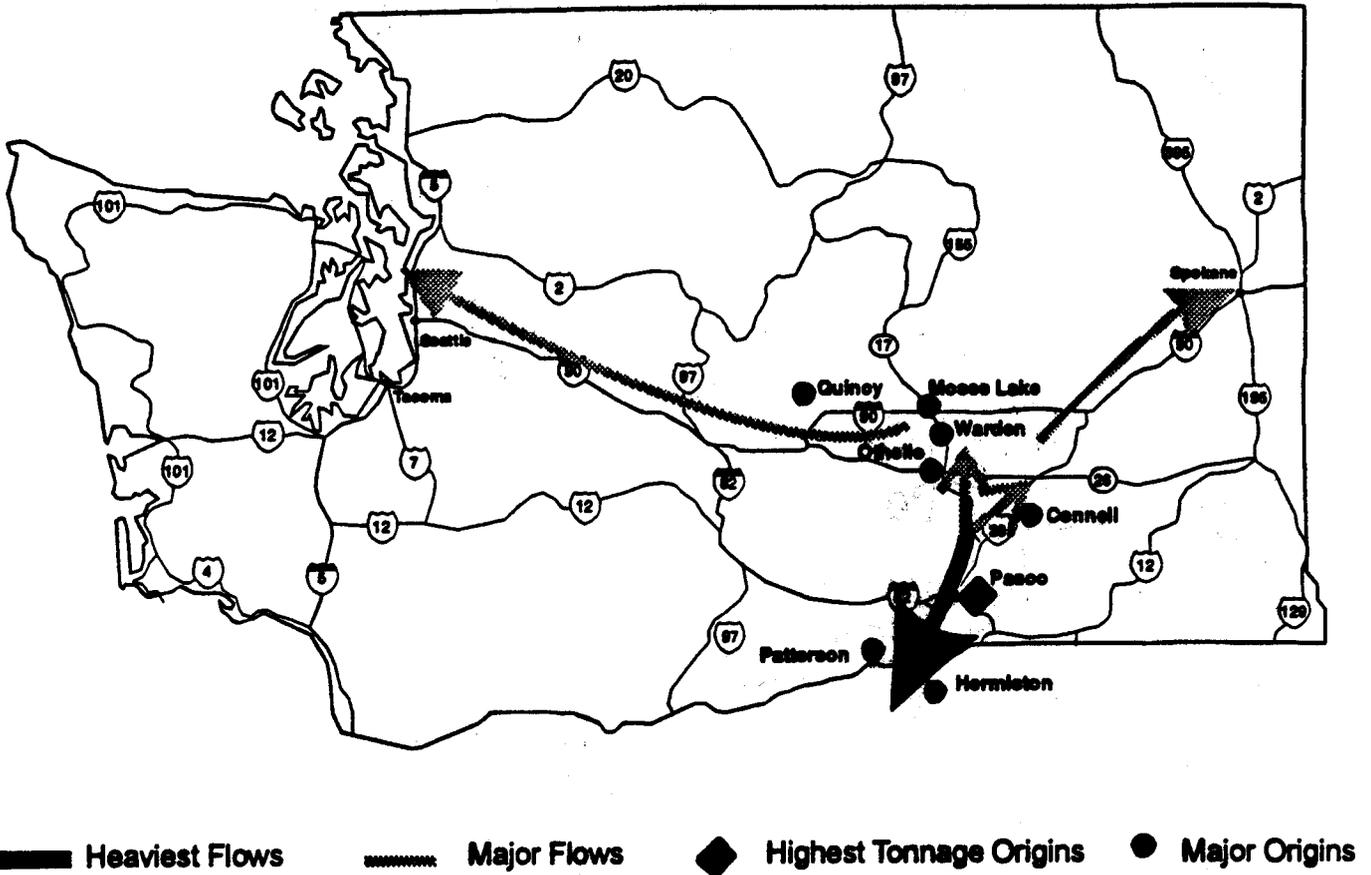
The thousands of truck drivers interviewed as part of the EWITS Origin and Destination Study also provide information on major potato movements on eastern Washington highways. As illustrated in Map 4.2, the highest tonnage origins of potato cargoes are in the central portion of eastern Washington.

Approximately 1,000 tons per day of frozen and fresh potato products are transported from the Pasco area. This represents the single largest tonnage origin of potato shipments from eastern Washington. Other major eastern Washington origins of potato products include Paterson, Moses Lake, Othello, Quincy, Warden and Connell. Each of these locations account for between 200 and 400 tons of potato product shipments per day.

As indicated by Map 4.2, the heaviest volumes of potato product shipments move from central-eastern Washington down I-82 for export into other states. The arrows moving in both directions along US395 and SR17 depict the inter-facility shipments between warehousing and

processing facilities that occur frequently in the potato industry. A major flow of potato movements utilizes I-90 from central-eastern Washington to Seattle, Washington ocean ports or distribution sites in Spokane.

Map 4.2
Major Potato Movements on E. WA Highways



Source: EWITS Origin and Destination Study, 1994

Data collected through the Origin and Destination Study indicate that Ellensburg is the highest tonnage origin for hay movements. Over 1,000 tons per day of hay are shipped from Ellensburg. Approximately 550 tons of hay are shipped per day from Mattawa, 500 tons per day from Moses Lake and 400 tons per day from Othello.

The largest quantity of hay shipments is to western Washington dairies and ocean ports. The second largest movement flows south via I-82 or US 395. Relatively smaller portions of hay

Barriers To Efficient Transport

Participants in the EWITS Fruit, Vegetable and Hay Study were asked if they had faced any of the problems identified in Table 5.1 over the past year. Over 60% of the apple and potato industry representatives reported facing problems with availability of trucks. In the comment section, survey respondents noted that the availability problems were seasonal, particularly during harvest seasons, harvests of competing commodities and the Christmas season. A number of participants noted that they perceive the problems with availability of trucks will become more acute over time due to increasing size of harvest as well as the new regulatory environment.

Between 45% and 50% of apple and potato representatives reported problems with availability of rail cars. The comments made it clear that these industry representatives would like to access more rail than they currently use. Problems with lack of refrigerated cars and poor service from the rail industry are barriers to increased rail usage.

Table 5.1
Transportation Problems by Respondent Commodity

	Apples	Potatoes	Hay	Average
Problems w/ Availability of Trucks	65%	62%	30%	55%
Problems w/ Availability of Drivers	37%	41%	33%	37%
Problems w/ Availability of Rail Cars	45%	50%	7%	37%
Problems w/ Rail Service Quality	31%	37%	4%	26%
Problems w/ Truck Service Quality	29%	26%	4%	22%

Seasonal Closures and Weight Restrictions

Participants in the Fruit, Vegetable and Hay Study were asked to identify roads and bridges used by the facility affected by seasonal closures or weight restrictions. Respondents tended not to fill this section out completely. For example, a number of respondents simply indicated "county roads are a problem". Table 5.2 does not represent a comprehensive list of closure and weight restricted roads important to the apple, potato, and hay industry, but does identify specific roads important to the respondents of this survey.

**Table 5.2
Road Closures and Weight Restriction
Affecting Participating Facilities**

<u>Respondent County Location</u>	<u>Road Name</u>	<u>Seasonal Closures</u>	<u>Weight Restrictions</u>
Adams County	SR17	X	
	SR24	X	
	SR26	X	
	Adams Road	X	X
	Booker Road	X	X
	Bruce Road	X	X
	Cunningham Road	X	X
	Dobson Road	X	X
	Glade Road	X	X
	Lee Road	X	X
	Mount Vista	X	X
	"gravel roads"	X	
Benton County	I-82	X	
	Coffin Road	X	X
	Glade	X	
	Hinzerling	X	
	Johnson	X	
	Tailor Flats	X	
	"county roads"		X
Chelan County	US2	X	
	US97	X	
	I-82	X	
	I-90	X	
	SR93	X	
	McNeil Canyon Road		X
	Mission Creek Road	X	X
	Stevens Road	X	X
Franklin County	"county roads"		X
	Hollingsworth	X	X
	Sage Hill Road	X	X
	Vineyard Road	X	X
	"county roads"	X	X

Table 5.2, Continued

Grant County	SR17	X	X
	SR26	X	X
	Frontage Road, N.W.	X	X
	Hiawatha Road		X
	U Road	X	X
	Larson AF Base roads		X
	"Adams county roads"	X	
	"Columbia Basin roads"		X
	"county roads"	X	X
	"Franklin county roads"	X	X
	"Grant county roads"	X	X

<u>Respondent County Location</u>	<u>Road Name</u>	<u>Seasonal Closures</u>	<u>Weight Restrictions</u>
Kittitas County	I-90	X	X
	Snoqualmie Pass	X	
Lincoln County	Ruff Road	X	X
	Wheeler Road	X	X
Okanogan County	US2	X	
	US97	X	
	I-90	X	
	North Cascades Pass	X	
	E. Osoyoos Lake Road	X	X
	"county roads to orchards"	X	X
Spokane County	"county roads in the Columbia Basin"	X	X
Stevens County	Devils Gap Road	X	X
	Williams Lake Road	X	X
Walla Walla County	SR125	X	X
	Fish Hook Park Road	X	X
	"county roads"	X	X
Yakima	I-82	X	
	I-84	X	
	I-90	X	
	SR410	X	

IMPLICATIONS FOR EFFICIENT COMMODITY TRANSPORTATION

Information provided by eastern Washington processors, packers and brokers has implications for both programs and policies needed to ensure the efficient transportation of agricultural commodities critical to the region's economy. Several of the important implications are highlighted in this final section of the report.

Maintaining an efficient highway freight transportation system is essential to the economic success of eastern Washington's fruit, vegetable and hay industries.

Truck transportation is the dominant mode of transportation utilized by processors and packers both to receive raw commodities from fields and warehouses as well as to ship products to final markets. Overall, industry representatives surveyed in this study were relatively satisfied with the available highway freight transportation system. However, several specific weaknesses in the current system were identified. First seasonal road closures and weight restrictions were identified as an issue by many processors and packers (see Table 5.2 on page 34). Some road closures due to heavy snow conditions or blowing dust are not preventable. However, road closures or weight restrictions due to freeze/thaw cycles could potentially be addressed through programs to upgrade eastern Washington agricultural haul roads.

Approximately two-thirds of apple and potato industry representatives and one-third of the hay industry representatives identified the availability of trucks as a problem. Many also cited the availability of drivers as a problem. Truck and driver shortages are a particular problem during peak harvest seasons and during early winter when the fruit and vegetable shippers must compete with Christmas tree growers for available trucks. The implications of the recent economic deregulation of intrastate trucking for the availability of trucks in eastern Washington is unknown and deserves research attention. However, the availability of trucks to transport eastern Washington agriculture products is an issue that should be carefully monitored as the industry adjusts to the new deregulated intrastate trucking environment.

The availability of quality rail service is an important transportation concern for many fruit and potato shippers.

Twenty-two percent of eastern Washington potatoes and 8% of apples are shipped to their final destination by rail. Rail is most frequently utilized for shipments east of the Mississippi. Responses obtained in this study suggest that rail might be more widely utilized if rail cars were readily available and rail service could be provided on a more timely basis. Overall, 50% of potato shippers and 45% of apple shippers returning surveys indicated that the current availability of rail cars is a transportation problem. Rail service quality was cited as an issue by approximately one-third of potato and apple shippers. Even shippers that do not presently utilize rail may view the availability of rail favorably as it offers a transportation alternative to keep rates charged by freight trucks cost competitive.

Results from this study suggest that maintaining quality rail service in eastern Washington is important to the region's fruit and potato industries. Continued development of the region's

short-line rail system and exploration of the feasibility of reopening Stampede Pass are examples of actions that can be taken to improve rail service for eastern Washington shippers. Continued discussions between commodity shippers and private rail service providers should be encouraged.

Efficient truck connections to western Washington ocean ports is key to the success of eastern Washington fruit, vegetable and hay industries.

Efficient truck connections to western Washington ocean ports is a particularly important issue for eastern Washington apple and hay shippers. Survey respondents reported shipping approximately one-fifth of apples or apple products and 91% of hay products to final markets through western Washington ports. I-82 and I-90 are the key highways utilized to reach ocean ports. A number of issues already discussed, including the availability of trucks and road conditions, play a role in the efficient connection to western Washington ocean ports. In addition, eastern Washington industries have an important interest in the continued development of efficient port facilities in both Seattle and Tacoma. Capacity constraints or access problems at these facilities would be a significant hindrance for eastern Washington fruit and hay shippers in reaching their key export markets.

Agricultural transportation needs are greatest during the peak summer and fall harvest seasons, but significant shipments occur all year.

The heaviest transportation needs for eastern Washington fruit, vegetable and hay industries occur during the peak summer and fall harvest seasons. It is during these periods that county roads receive particular use as crops are transported from fields or orchards to warehouses and processing facilities. Many commodities are transported a significant distance to reach warehousing or processing facilities. Approximately one-third of apples and hay commodities are transported from orchards or fields located more than 50 miles from the warehouse or processor. Potatoes tend to be transported slightly shorter distances. These commodity movements rely heavily on eastern Washington's county road system. Overall, shippers identified only scattered problems with this county "haul-road" network. Problems that were identified focused primarily on seasonal road closures (primarily for dust or snow) and a desire to haul heavier weights than is allowed on some key roads. While shippers were asked specifically to identify bridge restrictions, none were identified.

While peak transportation needs occur during the harvest season, fruit, vegetable and hay commodities are transported on Washington highways year-around. Potatoes in particular are transported between warehouses and processing facilities as needed throughout the year. Storage technologies enable fresh products to be sold to consumer markets during all seasons of the year. Eastern Washington's extensive frozen potato industry requires year-around transportation support. Poor road winter road conditions appear to be a particular concern for eastern Washington fruit, vegetable and hay product shippers selling to markets in western Washington and outside the state.

Eastern Washington agriculture is dependent on an efficient national and international transportation system

Fruit, vegetable and hay products produced in eastern Washington are sold primarily to markets outside the states borders. Consequently, ensuring an efficient transportation network within the state of Washington is only a part of the equation. Transportation needs of eastern Washington agriculture must also be met through cooperation with other states in the development of the National Transportation System and efficient customs procedures at the Canadian and Mexican border.

Appendix A.1: Mailing List & Respondents for Apple Warehouse, Distributors, & Processors Survey

Note: * = Responded to Survey

<u>Company (Apple)</u>	<u>City</u>	<u>County</u>
Agri-Export	Richland	Benton
Apple Corps, Inc.	Yakima	Yakima
Apple Wood Farms, Ltd.	Mead	Spokane
Appleseed Sales Company	Wenatchee	Chelan
Beebe Orchard Company*	Chelan	Chelan
Borton and Sons, Inc.*	Yakima	Yakima
Brewster Heights Packing*	Brewster	Okanogan
Broetje Orchards*	Prescott	Walla Walla
CM Holtzinger Fruit Company, Inc.*	Yakima, Prosser	Yakima, Benton
CRO Fruit Company, Inc.*	Wenatchee	Chelan
Carlson Orchards, Inc.*	Wapato	Yakima
Cascade Fruit Products	Yakima	Yakima
Cascade Marketing Company	Yakima	Yakima
Cascadian Fruit Shippers, Inc.*	Wenatchee	Chelan
Central Washington Sales, Inc.*	Yakima	Yakima
Chelan Valley Farms*	Chelan	Chelan
Chief Wenatchee*	Wenatchee	Chelan
Cowin and Sons	Wapato	Yakima
Crisp 'N Spicy Growers, Inc.*	Pateros	Okanogan
Custom Fruit Sales, Inc.	Wenatchee	Chelan
Domex Marketing, Inc.*	Yakima	Yakima
Douglas Fruit Company*	Pasco	Franklin
Dovex Fruit Company*	Wenatchee	Chelan
Eakin Fruit Company*	Union Gap	Yakima
Gilbert Orchards	Yakima	Yakima
Gold Digger Apples, Inc.*	Oroville	Okanogan
Haas Fruit Company, Inc.*	Yakima	Yakima
Hansen Fruit Export	Yakima	Yakima
Highland Fruit Growers, Inc.*	Yakima	Yakima
Im Ex Trading Company	Yakima	Yakima
Inland Fruit and Produce Co., Inc.*	Wapato	Yakima
Jack Frost Fruit Company*	Yakima	Yakima
Jack's Fruit Sales, Inc.	Yakima	Yakima
Lake Chelan Shippers	Chelan	Chelan
Lloyd Garretson Company, Inc.*	Yakima	Yakima
M & J Fruit Sales, Inc.*	Tieton	Yakima
Mercer Ranch Vineyards	Prosser	Benton
Northern Fruit Company*	Wenatchee	Chelan

Apple Warehouse, Distributor & Processor Mailing List (Continued)

Note: * = Responded to Survey

<u>Company (Apple)</u>	<u>City</u>	<u>County</u>
Northwest Fresh, Inc.*	Monitor	Chelan
Nuchief Sales, Inc.	Wenatchee	Chelan
Oneonta Trading Company*	Brewster, Quincy	Chelan, Grant
Price Cold Storage & Packing Co., Inc.*	Gleed	Yakima
Pride Packing Company	Yakima	Yakima
Pyramid Orchards, Inc.*	Yakima	Yakima
RE Redman & Sons, Inc.	Wapato	Yakima
Ridgecrest Fruit Corporation*	Wenatchee	Chelan
Roche Fruit Company, Inc.*	Yakima	Yakima
Rosemary's Kitchen, Ltd.	Cashmere	Chelan
Seneca Foods Corporation*	Prosser	Benton
Silver Sage Industries	Okanogan	Okanogan
Skone & Connors Produce, Inc.*	Wapato	Yakima
Skookum, Inc.*	Wenatchee	Chelan
Snokist Growers Co-op*	Yakima, Grandview	Yakima
Stadelman Fruit, Inc.*	Zillah	Yakima
Stemilt Growers, Inc.*	Wenatchee	Chelan
Strickland Orchard's Gift Packs	Grandview	Yakima
Sun Fruit/Severn Enterprises	Yakima	Yakima
Thompsons Farm	Naches	Yakima
Tontz Orchards*	East Wenatchee	Douglas
Tree Fruit Marketing, Inc.	Wenatchee	Chelan
Tree Top, Inc.*	Selah, Wenatchee	Yakima, Chelan
Trout, Inc.*	Chelan	Chelan
Washington Fruit & Produce, Inc.*	Yakima	Yakima
Wenoka Sales*	Wenatchee	Chelan
Wilbur-Ellis Company	Pasco	Franklin
Windy Point Packing Co., Inc.*	Wapato	Yakima
Woodring Orchards*	Cashmere	Chelan
Yakima Fruit & Cold Storage Company*	Yakima, Wapato	Yakima

**Appendix A.2: Mailing List & Respondents for Potato
Warehouse, Distributors, & Processors Survey**

Note: * = Responded to Survey

<u>Company (Potato)</u>	<u>City</u>	<u>County</u>
"3" Rivers Potato Service, Inc.*	Pasco	Franklin
A&K Growers Inc.*	Spokane	Spokane
Agri-Pack, Inc.	Pasco	Franklin
Andrus & Roberts Produce Co.*	Sunnyside	Yakima
Baker Produce Co., Inc.*	Kennewick	Benton
Balcom & Moe, Inc.*	Pasco	Franklin
Basic American Foods*	Moses Lake	Grant
Basin Frozen Foods	Warden	Grant
Blakal Packing Inc.*	Quincy	Grant
Blue Ribbon Sales, Inc.*	Quincy	Grant
Bouchey Potatoes	Wapato	Yakima
Century 21 Products, Inc.*	Pasco	Franklin
Charlie Cox Farms*	Kennewick	Benton
Columbia Potato, Inc.*	Moses Lake	Grant
Dee's Fruit & Produce	Benton City	Benton
Echo Valley Farms*	Colville	Stevens
Fresh Pak, Inc.	Pasco	Franklin
Harvest Fresh Produce, Inc.	Othello	Adams
Jones Produce, Inc.*	Quincy	Grant
Kiska Farms*	Burbank	Walla Walla
Lamb-Weston, Inc.*	Connel, Quincy, Richland	Franklin, Grant, Benton
McCain Foods, Inc.*	Othello	Adams
Nestle Brands Potato Division	Moses Lake	Grant
Odessa Farming Service, Inc.*	Odessa	Lincoln
Olympic Potato Inc.	Pasco	Franklin
Pacific Produce Inc.*	Othello	Adams
Quality Growers Company*	Quincy	Grant
Quincy Produce Co.*	Quincy	Grant
Simplot Soilbuilders	Othello	Adams
Skone & Connors Produce, Inc.*	Warden	Grant
Stetner Brothers*	Quincy	Grant
Sunfresh, Inc.	Royal City	Grant
Sunspiced, Inc.*	Moses Lake	Grant
Twin City Foods, Inc.	Prosser, Kennewick	Benton
Warden Produce Co., Inc.*	Warden	Grant
Washington Potato Company*	Warden	Grant
Weber Farms	Quincy	Grant
Western Cold Storage*	Othello	Adams
Willow Wind Farms, Inc.*	Ford	Stevens

**Appendix A.3: Mailing List & Respondents for Hay
Warehouse, Distributors, & Processors Survey**

Note: * = Responded to Survey

<u>Company (Hay)</u>	<u>City</u>	<u>County</u>
ACX Trading, Inc.*	Ellensburg	Kittitas
AgRex, Inc.*	Ephrata	Grant
Agri Pac*	Royal City	Grant
Amtrade Commodities*	Ellensburg	Kittitas
Anderson Hay	Ellensburg	Kittitas
B&B Hay & Cattle Company	Sunnyside	Yakima
Bleyhl Farm Service*	Grandview, Granger	Yakima
C.J. Cubers*	Othello	Adams
Calaway Pacific, Inc.*	Ellensburg	Kittitas
Columbia Agri Commodities	Othello	Adams
Columbia Basin Hay*	Mesa	Franklin
Devine Hay Cube Company*	Ephrata	Grant
Eckenberg Farms*	Mattawa	Grant
Harder & Harder*	Kahlotus	Franklin
Hay Dealer: John Clark	Selah	Yakima
Hay Dealer: Albert Willis	Moses Lake	Grant
Hay Dealer: Gene Cook	Ellensburg	Kittitas
Hay Dealer: Robert Leitz	Selah	Yakima
Hay Dealer: Tony Mount	Grandview	Yakima
Hay Dealer: George Hastings	Colville	Stevens
Hay Dealer: Danny Marshall	Prosser	Benton
Hay Dealer: James Prchal	Royal City	Grant
Hay Dealer: George Rominger	Ellensburg	Kittitas
Johnson Brothers Hay Co., Inc.*	Ellensburg	Kittitas
L&R Farms*	Connell	Franklin
L&R Ranches	Ellensburg	Kittitas
Lazy J Ranch*	Othello	Adams
Lemmon Trucking	Prosser	Benton
Lyle Ver Mulm Trucking	Grandview	Yakima
Mackner's Scales*	Ellensburg	Kittitas
Mid Valley Milling*	Prosser	Benton
Midwest Agri Commodities*	Moses Lake	Grant
Northwest Hay Growers	Kennewick	Benton
Pacific Rim Hay Co.	Ellensburg	Kittitas
Rugh, Ward, Inc.*	Ellensburg	Kittitas
Rainbow Springs*	Othello	Adams
S&W Hay Company*	Kennewick	Benton

Hay Warehouse, Distributor & Processor Mailing List (Continued)

Note: * = Responded to Survey

<u>Company (Hay)</u>	<u>City</u>	<u>County</u>
Sage Hill Northwest, Inc. *	Mesa	Franklin
Steve Koelzer Farms	Basin City	Franklin
Suncure Pellet*	Quincy	Grant
Swanson Hay Company*	Mead	Spokane
Unruh Hay Co.	Quincy	Grant
Vance Alfalfa*	Kennewick	Benton
Wahluke Hay Co. *	Mattawa	Grant
Winebarger Farms*	Mesa	Franklin

Transportation of Product:

- 6) For a typical year, please estimate the annual volume of fresh & processed apples (apple product) shipped from this facility.
_____ Tons per year
- 7) Please estimate the typical percentage of total apple product shipped from this facility for the following months in a typical year:
- | | |
|----------------------|---------|
| a) January-February | _____ % |
| b) March-April | _____ % |
| c) May-June | _____ % |
| d) July-August | _____ % |
| e) September-October | _____ % |
| f) November-December | _____ % |
| Total | 100 % |
- 8) Approximately what percentage of apple product is shipped from this location by the following transportation modes?
- | | |
|-------------------------------|---------|
| a) Truck to final destination | _____ % |
| b) Rail to final destination | _____ % |
| c) Truck to river port | _____ % |
| d) Truck to ocean port | _____ % |
| e) Other _____ | _____ % |
| Total | 100 % |
- 9) Approximately what percentage of apple product is shipped from this location to the following destinations in a typical year?
- | | |
|--|---------|
| Eastern Washington | _____ % |
| Western Washington (includes WA ocean ports) | _____ % |
| Oregon (includes Oregon ocean ports) | _____ % |
| California | _____ % |
| Other states west of Mississippi | _____ % |
| States east of the Mississippi | _____ % |
| Canada | _____ % |
| Total | 100 % |
- 10) What local and Washington state roads are utilized most frequently to transport apple product from this facility (For example: I-82, US 395, and Wheeler Road) _____

Transportation of Apples into this Facility:

- 11) For a typical year, please estimate the average annual volume of apples shipped into this facility. _____ Tons per year
- 12) We are interested in the seasonality of shipping into this location. Please estimate the typical percentage of total apples shipped into this facility for the following months:
- | | |
|----------------------|---------|
| a) January-February | _____ % |
| b) March-April | _____ % |
| c) May-June | _____ % |
| d) July-August | _____ % |
| e) September-October | _____ % |
| f) November-December | _____ % |
| Total | 100 % |
- 13) Approximately what percentage of apples utilized by this facility is shipped into this location by the following transportation modes?
- | | |
|----------------|---------|
| a) Truck | _____ % |
| b) Rail | _____ % |
| e) Other _____ | _____ % |
| Total | 100 % |
- 14) Approximately what percentage of apples utilized at this facility is received from the following areas in a typical year?
- | | |
|----------------------------------|---------|
| a) Less than 5 mile radius | _____ % |
| b) 6 to 10 mile radius | _____ % |
| c) 11 to 25 mile radius | _____ % |
| d) 26 to 50 mile radius | _____ % |
| e) Greater than a 50 mile radius | _____ % |
| Total | 100 % |
- 15) What local and Washington state roads are utilized most frequently to transport apples into this facility (For example: I-82, US 395 and Wheeler Road) _____