

# **Transportation Characteristics of Wheat and Barley Shipments on Haul Roads To and From Elevators in Eastern Washington**

**EWITS Research Report Number 5  
March, 1995**

**by**

**Jonathon R. Newkirk  
Cooperative Extension  
Washington State University  
Spokane, Washington 99202**

**and**

**Ken A. Eriksen  
Department of Agricultural Economics  
Washington State University  
Pullman, WA 99164-6210**

**in cooperation with**

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

## **EWITS Research Reports: Background and Purpose**

This is the fifth 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. This particular study was partially funded by the Washington Wheat Commission.

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:

**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. EWITS Research Report Number 1. "Linking Transportation System Improvements to New Business Development in Eastern Washington." February 1994.
2. Gillis, William R. and Kenneth L. Casavant. EWITS Research Report Number 2. "Lessons from Eastern Washington: State Route Mainstreets, Bypass Routes and Economic Development in Small Towns." February 1994.
3. Gillis, William R. and Kenneth L. Casavant. EWITS Research Report Number 3. "Washington State Freight Truck Origin and Destination Study: Methods, Procedures and Data Dictionary." December 1994.
4. Gillis, William R. and Kenneth L. Casavant. EWITS Research Report Number 4. "Major Generators of Traffic on U.S. 395 North of Spokane: Including Freight Trucks and Passenger Vehicles Crossing the International Border." January 1995.

## **ACKNOWLEDGEMENTS**

This report was partially funded by a grant from the Washington State Wheat Commission.

<b><u>Table of Contents</u></b>	<b><u>Page</u></b>
<b>Introduction</b> .....	<b>1</b>
<b>Report Organization</b> .....	<b>3</b>
<b>Background</b> .....	<b>3</b>
<b>Section 1. Elevator Characteristics</b> .....	<b>8</b>
 <b>Section 2. Seasonality of Wheat and Barley Deliveries to Elevators</b> .....	<b>17</b>
<b>Section 3. Seasonality of Wheat and Barley Shipments From Elevators</b> .....	<b>25</b>
<b>Section 4. Destinations for Wheat and Barley Shipped From Elevators</b> .....	<b>32</b>
<b>Section 5. Modal Choice for Wheat and Barley Shipments</b> .....	<b>40</b>
<b>Section 6. Elevator Storage and Handling Rates</b> .....	<b>51</b>
<b>Section 7. Transportation Rates</b> .....	<b>54</b>
<b>Section 8. Summary and Conclusions</b> .....	<b>59</b>
<b>References</b> .....	<b>61</b>
<b>Appendix: Eastern Washington Road Needs Survey Mail Questionnaire</b> .....	<b>62</b>

<b>Tables</b>	<b>Page</b>
Table 1.1. Elevator Capacity by County. ....	9
Table 1.2. Size Distribution of Elevators by County. ....	10
Table 1.3. Average Turnover Rate for Elevators by Region. ....	12
Table 1.4. Average Annual Wheat, Barley and Other Grain Receipts at Elevators by County, Ranked by Volume. ....	14
Table 1.5. Farms Which Ship to the Reporting Elevator, by Distance. ....	16
Table 1.6. Farms Within the Distance Ranges Which Ship to the Reporting Elevator. ....	16
Table 2.1. Annual Wheat Receipts by Time Period. ....	18
Table 2.2. Annual Barley Receipts by Time Period. ....	20
Table 2.3. Wheat Receipts by County and Time Period. Total Grain Receipts, Largest to Smallest. ....	22
Table 2.4. Barley Receipts by County and Time Period. Total Grain Receipts, Largest to Smallest. ....	23
Table 2.5. Wheat Receipts by Time Period and Size of Elevator. ....	24
Table 3.1. Wheat Shipments by Time Period. ....	25
Table 3.2. Barley Shipments by Time Period. ....	27
Table 3.3. Wheat Shipments from Elevators by County and Time Period. Total Grain Receipts, Largest to Smallest. ....	29
Table 3.4. Barley Shipments from Elevators by County and Time Period. Total Grain Receipts, Largest to Smallest. ....	30
Table 3.5. Wheat Shipments by Time Period and Size of Elevators. ....	31
Table 4.1. Wheat Shipments by Destination. ....	33
Table 4.2. Barley Shipments by Destination. ....	35
Table 4.3. Wheat Shipments by Destination and County. Total Grain Receipts, Largest to Smallest. ....	38

**Tables (continued)****Page**

Table 4.4. Barley Shipments by Destination and County. Total Grain Receipts, Largest to Smallest. ....	39
Table 5.1. Modes Used to Ship Wheat. ....	41
Table 5.2. Modes Used to Ship Barley. ....	43
Table 5.3. Modes Used to Ship Wheat by County. Total Grain Receipts, Largest to Smallest. ....	46
Table 5.4. Modes Used to Ship Barley by County. Total Grain Receipts, Largest to Smallest. ....	47
Table 5.5. Wheat Shipments Via Truck-Barge at Differing Percentages of 25/26-Car Rail Shipments. ....	49
Table 5.6. Wheat Shipments Via 25/26-Car Rail at Differing Percentage of Truck-Barge Shipments. ....	49
Table 5.7. Modal Shipment Intensity for Wheat Shipped Using a Particular Mode. ....	50
Table 6.1. Wheat and Barley Storage Rates. ....	52
Table 6.2. Wheat and Barley Handling Rates. ....	53
Table 7.1. Wheat and Barley Rail Rates by County. ....	55
Table 7.2. Wheat and Barley Truck-Barge Rates by County. ....	56
Table 7.3. Wheat Truck-Barge and 25/26-Car Rail Rates by County. ....	57
Table 7.4. Relationship Between 25/26-Car Rail Rate Levels and Elevators Who Shipped Differing Percentages of Wheat Via Truck-Barge. ....	58

**Figures****Page**

<b>Figure 1.1. Annual Wheat, Barley and Other Grain Receipts for Eastern Washington County Elevators. ....</b>	<b>15</b>
<b>Figure 2.1. Annual Wheat Receipts by Time Period. ....</b>	<b>19</b>
<b>Figure 2.2. Annual Barley Receipts by Time Period. ....</b>	<b>21</b>
<b>Figure 3.1. Wheat Shipments by Time Period. ....</b>	<b>26</b>
<b>Figure 3.2. Barley Shipments by Time Period. ....</b>	<b>28</b>
<b>Figure 4.1. Wheat Shipments by Destination. ....</b>	<b>34</b>
<b>Figure 4.2. Barley Shipments by Destination. ....</b>	<b>36</b>
<b>Figure 5.1. Modes Used to Ship Wheat. ....</b>	<b>42</b>
<b>Figure 5.2. Modes Used to Ship Barley. ....</b>	<b>44</b>

## **Introduction**

**Wheat and barley production are prominent in Washington agriculture. Eastern Washington, one of the major grain producing areas of the United States, has a unique combination of soils, climate, and supporting industries suitable for dry-land grain production. Whitman County produces more wheat than any other county in the nation and areas of the Palouse region have the highest U.S. per acre yields for dryland wheat (Dooley). The production, storage, processing, transportation and marketing of these grains play an important role in the regional economy of the Pacific Northwest.**

**Transportation is the dynamic link between producers and consumers of agricultural products. The transportation of Eastern Washington grain to U.S. and global markets is made possible by a system of on-farm storage, upcountry elevators, rail and river grain sub-terminals and grain export terminals, all inter-connected by roads, rail lines, and the Snake and Columbia River System.**

**This study reports on the movement of wheat and barley to and from commercial elevators in the 16 counties of Eastern Washington. Although there is on-farm storage throughout the region, wheat stored in farmer owned on-farm storage will almost always move through one of the commercial elevators in the region on its way to market. There is a higher probability that barley may move directly from on-farm storage to a feed lot, brewery, or other destination; however, this report does not account for those movements.**

**This report provides information on the storage, handling, and transportation of wheat and barley produced in the 16 Eastern Washington counties for the three year time period ending July 1, 1992 - June 30, 1993. This study was undertaken to provide documentation for the evaluation**

of the multimodal transportation system serving Eastern Washington.

Data used in this analysis were compiled from 64 of the 71 Public Grain Warehouse owners licensed during 1993 in the State of Washington. A questionnaire, (see Appendix), was mailed to the warehouse companies in September of 1993. Information on 410 of the 470 licensed individual elevators has been used to develop the report that follows. This high response rate allows implications to be drawn for the entire grain industry.

Care was taken to remove the chance of double-counting grain shipments. For example, a shipment which originated at a elevator owned by one firm that was then transhipped by truck to a river elevator owned by a second firm for immediate loading on a rail car or barge would have been reported as having been shipped from each elevator. Such duplications were removed.

The data have been grouped several ways for comparison purposes. Information is reported and evaluated for all elevators, upcountry elevators, elevators which use bulk rail (25/26-car rail), those which do not use bulk rail, and by county. The data were also grouped according to elevator size and are reported as such where those comparisons provide additional clarity to the analysis.

Modal shipments identified as "Truck to Other Houses", with the exception of those in Garfield County, are assumed to continue on by rail and could be reasonably considered as moving by the 25/26-car modal designation. This shift increases the 25/26-car modal share appreciably in most cases. There is only one elevator company in Garfield County and all of their grain moves to the river. Therefore for Garfield County, "Truck to Other Houses" could be shifted to "Truck-Barge." This reporting anomaly in the data affects the region wide modal shares by less than one percent.

## **Report Organization**

The report begins with the background and history of the grain transportation system in Eastern Washington and uses eight sections as follows:

<b>Section 1</b>	<b>Elevator Characteristics,</b>
<b>Section 2</b>	<b>The Seasonality of Wheat and Barley Deliveries to Elevators,</b>
<b>Section 3</b>	<b>The Seasonality of Wheat and Barley Shipments from Elevators,</b>
<b>Section 4</b>	<b>The Destinations for Wheat and Barley Shipped from Elevators,</b>
<b>Section 5</b>	<b>Modal Choice for Wheat and Barley Shipments,</b>
<b>Section 6</b>	<b>Elevator Storage and Handling Rates,</b>
<b>Section 7</b>	<b>Transportation Rates and</b>
<b>Section 8</b>	<b>Summary and Conclusions.</b>

## **Background**

The initial demand for commercial grain production began in Eastern Washington in response to the influx of miners into the region during the 1850s. Grain was delivered by wagon from the farms to the mining camps (Penaranda). Over the next 125 years the transportation system was expanded into a complete multimodal system as rail lines were built, roads were paved and improved, and a 465 mile waterway was created by a series of locks and dams on the Snake and Columbia Rivers.

Multimodal shipments have been part of the Eastern Washington grain business since the 1850s. Grain was originally shipped from the Walla Walla region to the coastal regions using a combination of wagons and steamships. Portage railroads were built, at Celilo in 1859 and at Cascades in 1863, to move grain from steamboat to steamboat around the at those locations.

In the late 1870s and 1880s, railroads rushed to build lines into the rich Palouse region as they competed to transport the agricultural products from the area. Steamboat traffic on the river ended in 1880; by 1882, Walla Walla was connected to Portland by railroad. Over 1,500 miles of

rail line had been constructed in Washington by the end of the 1880s; interestingly, this is a little more than the 1,369 miles of rail lines abandoned in Washington between 1980 and 1991 (Penaranda).

Water transportation on the Salmon and Columbia River was reborn when the Bonneville Lock and Dam opened in 1937. Then by 1975 river traffic increased dramatically as the McNary, The Dalles, and John Day dams and locks were opened on the Columbia River and the Ice Harbor, Lower Monumental, Little Goose, and Lower Granite dams and locks were opened on the Snake River. The full 465 mile slack water system from Lewiston, Idaho to the Pacific Ocean became operational in 1975. By 1978, Columbia River ports received 87 percent of the total volume of grain shipped from Eastern Washington. Truck-barge moved 51 percent of the grain to the ocean ports in 1978, rail shipped 36 percent and 13 percent went to Puget Sound ports (Mehring).

Trucks originally were used as feeders for the rail system, bringing produce from production areas to the rail station. The miles of hard surfaced roads in Washington grew from 91 in 1910 to 4,200 in 1942 (Penaranda). The number of roads grew substantively after World War II as federal aid for highways was increased. Many of the roads serving rural Washington were laid out during the 1920s and 1930s and later paved and hard surfaced during the 1940s and 1950s.

During the 1950s, trucks became an effective long haul competitor to rail carriage of grain as railroads were discouraged from setting competitive rail rates by the Interstate Commerce Commission regulatory process. Rail deregulation legislation passed in 1980 provided railroads the opportunity to price their services competitively and eased the restrictions on abandoning

unprofitable lines.

Following rail deregulation in 1980, a rail rate structure was established which offered considerably lower rates for shipments shipped as bulk rail. Additionally, the railroads abandoned over 1,369 miles of branch lines over the next 11 years, leaving some country elevators without rail service (Dooley). As a result of abandonment, rail shipment of grain became concentrated at elevators which could take advantage of the 25/26-car rail rates. These elevators had rail sidings that could handle 25 or 26 car units and had the high volume load out equipment to load the rail car unit within 24 hours.

As of the early 1980s, trucks were no longer able to compete for the long haul movement of grain. Two competitive modes emerged and greatly influenced the decrease in utilization of trucks. Barge companies use the Snake and Columbia River System extensively since completion in 1975. Railroad companies experienced greater regulatory freedom which allowed them to adopt new pricing schemes to compete directly with trucks. The original feeder role of trucks was reborn and expanded as trucks moved grain from satellite elevators to multiple-rail car terminals, river terminals, and to local buyers such as cattle feeders, dairies, flour mills, and breweries (Dooley).

Grain is delivered at harvest time to an elevator within a relatively short distance of the field or to the farmer's own storage. Farmers wish to minimize the transport time from the field to initial storage so as to have the trucks available to empty the combines in the field and to keep the combines harvesting grain. Once the grain is ready to harvest, each additional day it is unharvested increases the risk the crop could be lost to rain, hail, fire or wind.

Grain warehouse firms commonly operate several elevators located at different locations

in their area of service. This pattern of elevator location developed because railroads came to grain producing areas before there were trucks. Grain storage needed to be located in production areas near farm fields at harvest time and on rail lines so that grain could be moved to market.

The number of grain storage houses decreased as operations were consolidated and trucks made it possible to move grain longer distances from farm to final destination. The shift away from "flat-houses", which were designed to handle bagged grains, to bulk grain elevators did not occur in Eastern Washington until the 1930s and early 1940s when many basic elevator units were built by farmer owned cooperatives.

With the exception of river terminals built after the completion of the Snake and Columbia River lock and dam system, only a few elevators were built in the 16 county area of Eastern Washington. A 1983 study by Dooley and Casavant reported that the average age of grain elevators in Eastern Washington was 33 1/3 years, with a life expectancy of 45 to 50 years.

Even though the shift from "flat-houses" to elevators brought further consolidation, the general distribution pattern of elevators located on rail lines was maintained throughout the grain production areas. Since the 1970s, many of the rail lines serving these country elevators have been abandoned. Elevators without rail or river service have in effect become satellite elevators for elevators with multiple-car rail service or for elevators located on the river system. These satellite elevators have become assembly points for grain at harvest time. Grain is moved from these satellites to other rail or river terminals by truck when needed or as dictated by weather and market conditions.

The complete (meaning access to truck, barge and rail) transportation system found in Eastern Washington has allowed producers to develop links with distant consumers as the region

expands its wheat, barley and other grain markets globally. The economic forces created by the competition between rail, truck and barge have provided one of the most competitive transportation rate structures of any grain producing area in the U.S., an important factor as global markets become increasingly competitive. It is against this backdrop of an elevator and grain storage system developed during the 1930s and early 1940s and a dramatically changed transportation system which continues to evolve as it responds to market shifts, changing public policy and a dynamic transportation environment, that this study is placed.

## **Section 1. Elevator Characteristics**

Elevators in the five counties of Whitman, Lincoln, Adams, Grant and Walla Walla, represent over 78 percent of the grain elevator capacity in the 16 Eastern Washington Counties covered by this study (Table 1.1). Whitman County, with almost 37 million bushels of grain storage capacity, or 26.3 percent, has nearly two times as much elevator capacity as the next largest county, Lincoln. Furthermore, their total elevator capacity exceeds the remaining eleven counties by more than 30 million bushels. Whitman and Walla Walla counties have direct river port access while Lincoln, Adams, and Grant counties do not.

The size distribution of elevators by county is presented in Table 1.2. For comparison purposes elevators have been placed in one of six size classes identified in Table 1.2. Although only elevators for which complete information was reported are reported, the distribution represented is characteristic of the actual distribution of elevators by size.

Elevator capacity ranges from 11,000 bushels to over 4 million bushels. Nearly 34 percent of the elevators in Eastern Washington are less than 200,000 bushels in size while over 12 percent exceed 1,000,000 bushels in size. Elevators exceeding 1,000,000 bushels in capacity represent over 47.4 percent of the total elevator capacity in the region. Of those over 1,000,000 bushels in capacity, 31 are less than 2 million bushels in capacity, four are between 2 million and 3 million bushels capacity, three are between 3 million and 4 million bushels capacity and one is over 4 million bushels capacity.

Whitman County has the largest number of elevators, 101 or 32.6 percent, followed by Adams and Grant Counties with 38 elevators or 12.3 percent each. Even though Lincoln County has the third largest number of elevators in the region (29), it has 14.8 percent of the region's

total elevator capacity, second to Whitman County reflecting the larger size of elevators in Lincoln County.

<b>Table 1.1. Elevator Capacity<sup>1</sup> by County.</b>			
<b>County</b>	<b>Total Reported Capacity (bushels)</b>	<b>Percent of 16 County Capacity</b>	<b>Average Elevator Capacity (bushels)</b>
Whitman	36,873,000	26.3	384,099
Lincoln	20,799,000	14.8	717,207
Adams	18,769,000	13.4	575,842
Grant	18,080,000	12.8	568,974
Walla Walla	15,311,000	10.9	452,086
Columbia	7,860,000	5.6	533,133
Douglas	5,797,000	4.1	828,143
Benton	4,406,000	3.1	1,107,000
Garfield	3,662,000	2.6	657,167
Franklin	3,619,000	2.6	379,818
Spokane	2,880,000	2.1	360,400
Yakima	927,000	0.7	309,000
Chelan	506,000	0.4	506,000
Okanogan	412,000	0.3	412,000
Stevens	343,000	0.2	85,750
Kittitas	90,000	0.1	90,000
<b>TOTAL</b>	<b>140,334,000</b>	<b>100.0</b>	

<sup>1</sup> Above figures based on survey returns. The figures disregard incomplete data, elevators with unknown capacities, and elevators which have been sold/closed.

**Table 1.2. Size Distribution of Elevators by County.**

County	Number of Elevators						Total
	bushels						
	<=200,000	200,001-400,000	400,001-600,000	600,001-800,000	800,001-1,000,000	>1,000,000	
<b>Adams</b>	8	10	9	4	2	5	38
<b>Benton</b>	2	1	0	0	0	1	4
<b>Chelan</b>	0	0	1	0	0	0	1
<b>Columbia</b>	5	6	1	1	0	2	15
<b>Douglas</b>	0	2	1	0	1	3	7
<b>Franklin</b>	3	4	2	1	1	0	11
<b>Garfield</b>	4	0	0	0	1	1	6
<b>Grant</b>	16	7	3	2	2	8	38
<b>Kittitas</b>	1	0	0	0	0	0	1
<b>Lincoln</b>	5	7	3	6	1	7	29
<b>Okanogan</b>	0	0	1	0	0	0	1
<b>Spokane</b>	4	4	6	0	1	0	15
<b>Stevens</b>	4	0	0	0	0	0	4
<b>Walla Walla</b>	12	10	10	0	0	3	35
<b>Whitman</b>	40	24	19	7	2	9	101
<b>Yakima</b>	1	2	0	0	0	0	3
<b>TOTAL NUMBER</b>	105	77	56	21	11	39	309

The turnover rate of an elevator is calculated by dividing the total volume shipped in a year by the capacity of the elevator. The turnover rate is one indication of elevator utilization. That is, the higher the turnover rate for a region, the more grain that is moving out and is not in long-term storage.

The average turnover rate for all elevators in the study region was 0.89 (Table 1.3). Different elevators had turnover rates that ranged 0.00 to 27.30. County turnover rates ranged from 0.33 in the SW region of Lincoln County to 4.33 in the SE region of Walla Walla County.

The average annual volume of wheat, barley and other grains received at Eastern Washington elevators over the three marketing years concluding with the marketing year July 1, 1992 to June 30, 1993 was 99,430,487 bushels of wheat, 17,994,134 bushels of barley, and 12,423,094 bushels of other grains (Table 1.4). Elevators in Whitman, Walla Walla, Lincoln, Adams and Grant counties received over 81 percent of the total grain received at elevators.

**Table 1.3. Average Turnover Rate for Elevators by Region<sup>1</sup>.**

County	Sub-Division	bushels		Turnover Rate
		Total Capacity	Total Shipments	
Adams	NE	2,891,000	2,598,557	0.90
Adams	NW	5,234,000	2,881,022	0.55
Adams	SE	3,213,000	2,149,792	0.67
Adams	SW	7,431,000	3,794,000	0.51
Benton	ALL	4,406,000	435,833	0.10
Chelan	ALL	506,000	524,813	1.04
Columbia	NORTH	4,912,000	2,618,500	0.53
Columbia	SOUTH	2,948,000	2,876,293	0.98
Douglas	ALL	5,797,000	3,010,546	0.52
Franklin	EAST	1,587,000	770,932	0.49
Franklin	WEST	2,022,000	1,165,000	0.58
Garfield	ALL	3,662,000	7,190,072	1.96
Grant	NE	7,646,000	3,657,225	0.48
Grant	NW	2,863,000	1,871,552	0.65
Grant	SE	6,159,000	4,180,000	0.68
Grant	SW	1,412,000	550,000	0.39
Kittitas	ALL	90,000	220,000	2.44
Lincoln	NE	7,630,000	4,987,217	0.65
Lincoln	NW	4,632,000	3,605,478	0.78
Lincoln	SE	5,534,000	6,120,955	1.11
Lincoln	SW	3,003,000	996,388	0.33
Okanogan	ALL	412,000	343,045	0.83

(TABLE 1.3. continued on next page)

**Table 1.3. (continued).**

County	Sub-Division	bushels		Turnover Rate
		Total Capacity	Total Shipments	
Spokane	ALL	2,880,000	2,911,667	1.01
Stevens	ALL	343,000	377,600	1.10
Walla Walla	CENTER	6,225,000	5,709,316	0.92
Walla Walla	NORTH	1,586,000	3,782,287	2.38
Walla Walla	SE	2,446,000	10,585,467	4.33
Walla Walla	SW	5,054,000	3,284,000	0.65
Whitman	NE	10,188,000	8,062,556	0.79
Whitman	NW	7,307,000	5,152,975	0.71
Whitman	SE	12,867,000	22,373,270	1.74
Whitman	SW	6,511,000	4,531,500	0.70
Yakima	ALL	927,000	2,081,600	2.25
<b>TOTAL</b>		<b>140,324,000</b>	<b>125,399,458</b>	<b>0.89</b>

<sup>1</sup>The figures disregard incomplete data, elevators with unknown capacities, elevators which have been sold/closed, and elevators with unknown grain volume.

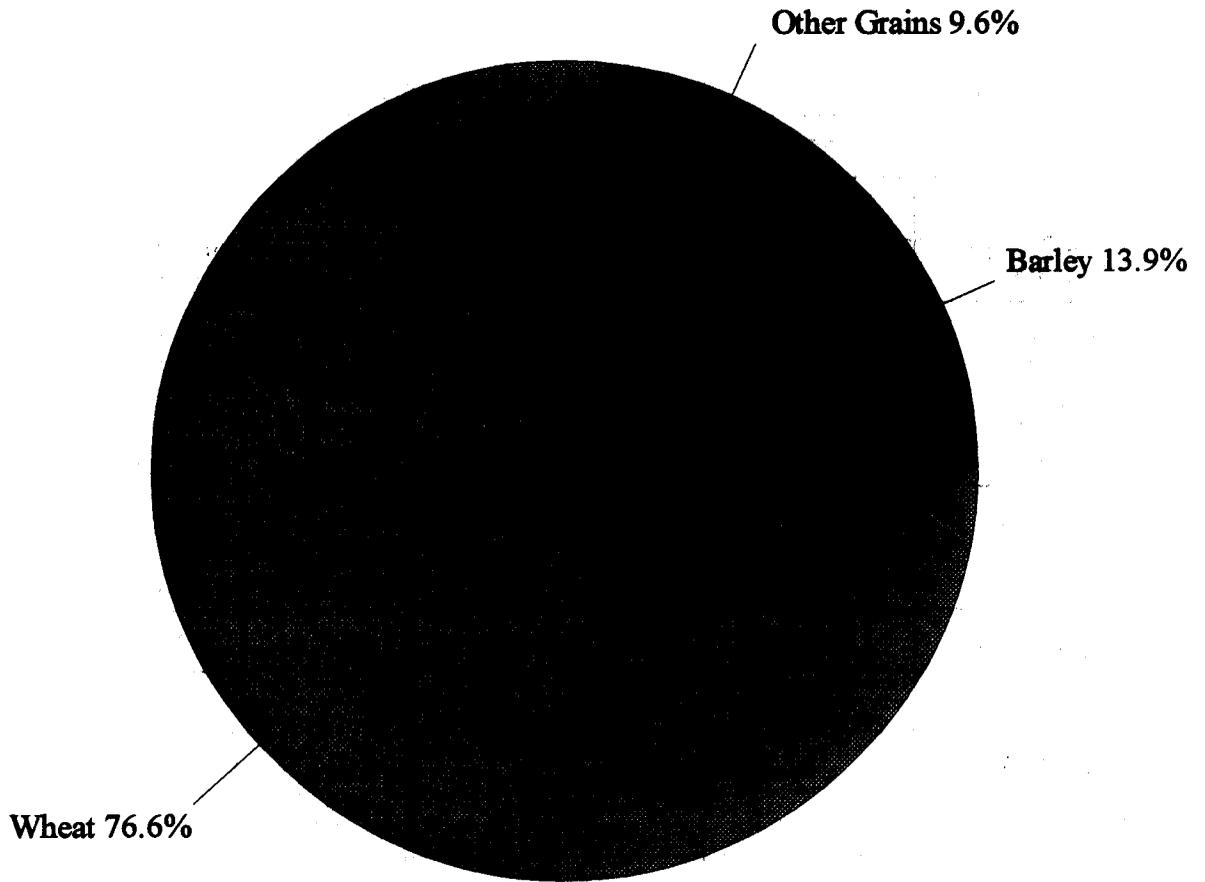
**Table 1.4. Average Annual Wheat, Barley and Other Grain Receipts at Elevators by County, Ranked by Volume.**

County	bushels (000)			Total All Grains	Percent of Total
	Wheat	Barley	Other Grains <sup>1</sup>		
Whitman	32,148	10,328	2,889	45,364	34.9
Walla Walla	17,756	511	5,095	23,362	18.0
Lincoln	13,101	2,651	52	15,804	12.2
Adams	10,634	228	570	11,432	8.8
Grant	8,822	189	1,250	10,261	7.9
Garfield	4,270	1,983	24	6,277	4.8
Columbia	4,789	445	262	5,495	4.2
Douglas	2,847	94	69	3,011	2.3
Spokane	1,359	1,211	345	2,915	2.2
Yakima	907	128	1,052	2,087	1.6
Franklin	1,021	115	800	1,936	1.5
Chelan	508	16	0.283	525	0.4
Benton	410	28	2	440	0.3
Stevens	325	41	11	378	0.3
Okanogan	334	7	3	343	0.3
Kittitas	200	20	0	220	0.2
<b>TOTALS</b>	<b>99,431</b>	<b>17,995</b>	<b>12,424</b>	<b>129,850</b>	

<sup>1</sup>Includes corn, dry edible beans, peas, lentils, oats, garbanzo

The average annual grain receipts for Eastern Washington elevators are reported in Figure 1.1. Wheat receipts account for more than 76 percent of all grain receipts while barley and other grains, respectively, account for 13.9 and 9.6 percent of all grain receipts.

**Figure 1.1. Annual Wheat, Barley and Other Grain Receipts for Eastern Washington County Elevators.**



Elevator operators were asked to identify the approximate percentage of farms that used their elevator, located by distances from their elevator. Elevator operators interpreted the question one of two ways, generating two different results. Some elevator operators provided the percentage of their client farmers which fell in the distance ranges found in Table 1.5. Other elevator operators interpreted the question to mean the percentage of farms in the distance ranges which ship to their elevator.

Almost 89 percent of an elevator's client farms are within 10 miles of the individual elevator. It is also evident that, on average, nearly 90 percent of the farms within a 10 mile radius of an elevator ship all or some of their grain to that elevator (Table 1.6). It is apparent that farmers want to ship to a close elevator at harvest time to minimize travel time for farm trucks during harvest.

<b>Table 1.5. Farms Which Ship to the Reporting Elevator, by Distance.</b>	
<b>Distance from Elevator (mi)</b>	<b>Percent of Farms</b>
<b>Less than 5</b>	<b>37.71</b>
<b>5 to 10</b>	<b>51.03</b>
<b>10 to 20</b>	<b>8.39</b>
<b>More than 20</b>	<b>2.79</b>

<b>Table 1.6. Farms Within the Distance Ranges Which Ship to the Reporting Elevator.</b>	
<b>Distance from Elevator (mi)</b>	<b>Percent of Client Farms</b>
<b>Less than 5</b>	<b>56.38</b>
<b>5 to 10</b>	<b>32.92</b>
<b>10 to 20</b>	<b>8.95</b>
<b>More than 20</b>	<b>0.81</b>

## **Section 2. Seasonality of Wheat and Barley Deliveries to Elevators**

Harvest time continues to be the time of year when most grain is delivered to elevators.

On the average, 72.3 percent of the wheat and 66.5 percent of the barley received at the elevators was delivered during July and August (Tables 2.1 and 2.2, and Figures 2.1 and 2.2). The percentage received at all elevators during September and October drops off considerably to 9.0 percent of the wheat and to 10.5 percent of the barley. Receipts of wheat during the rest of the year remains relatively constant, varying between 3.6 percent, March-April, to 5.8 percent, November-December.

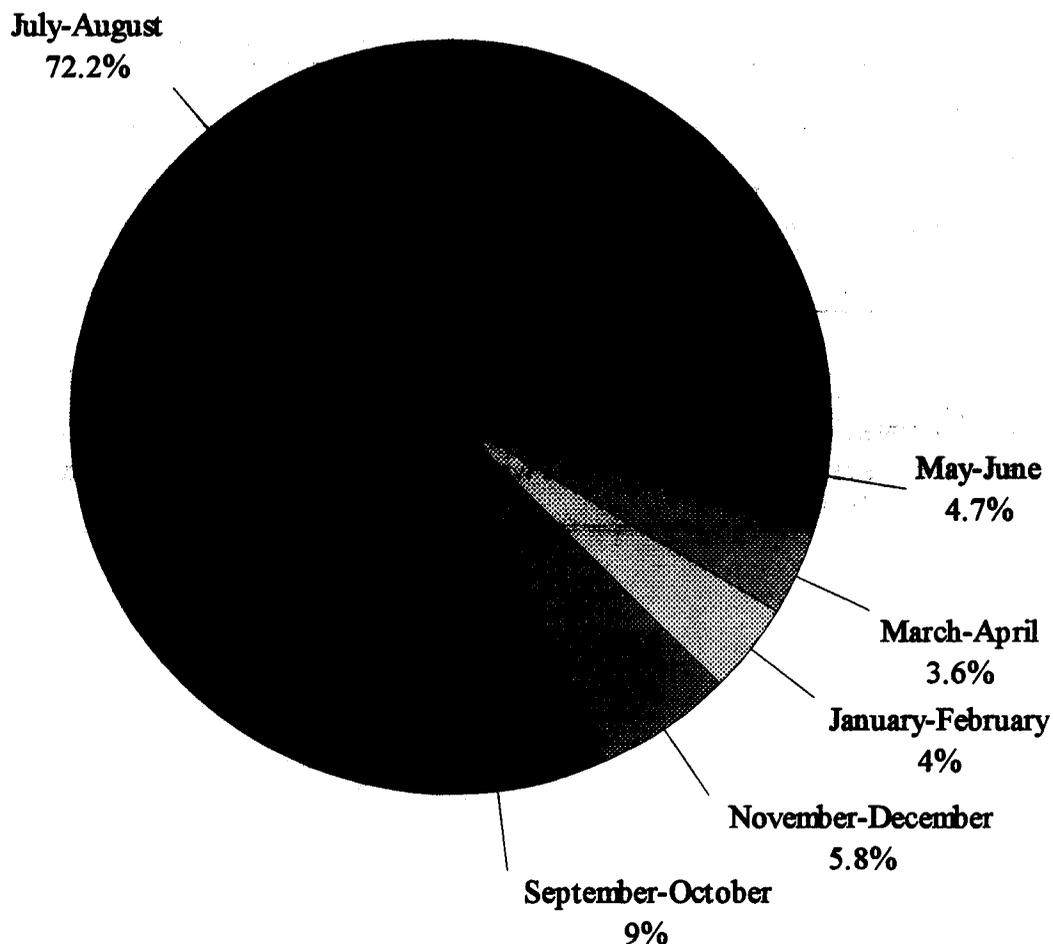
Specific attention can be paid to the upcountry elevators by removing the river elevator data from the analysis (Table 2.1). A higher percentage of wheat is delivered to the upcountry elevators during harvest time since most farmers want to deliver their grain at harvest time to elevators near their farms. Further defining the data set to elevators which use bulk rail, a smaller percentage of wheat is delivered to those elevators during harvest time than when all upcountry elevators are included in the analysis, reflecting transshipments that occur during the year to bulk rail users (Table 2.1). When the bulk rail elevators are excluded, the percentage received by elevators at harvest declines substantially from the bulk rail elevators. This is explained by the fact that grain delivered to river elevators, most of which do not use bulk rail, is more evenly distributed throughout the year and influences these deliveries.

**Table 2.1. Annual Wheat Receipts by Time Period.**

Time-Periods	Percent			
	All	Upcountry <sup>1</sup>	Bulk Rail User	Bulk Rail Non-User
July-August	72.2	87.1	81.9	70.2
September-October	9.0	6.4	9.2	9.1
November-December	5.8	1.6	3.0	6.3
January-February	4.0	1.7	2.1	4.0
March-April	3.6	1.0	2.5	3.9
May-June	4.7	1.3	1.2	5.7

<sup>1</sup> Data from the reporting river elevators was excluded to develop this column. All non-river elevators were included.

Figure 2.1. Annual Wheat Receipts by Time Period.



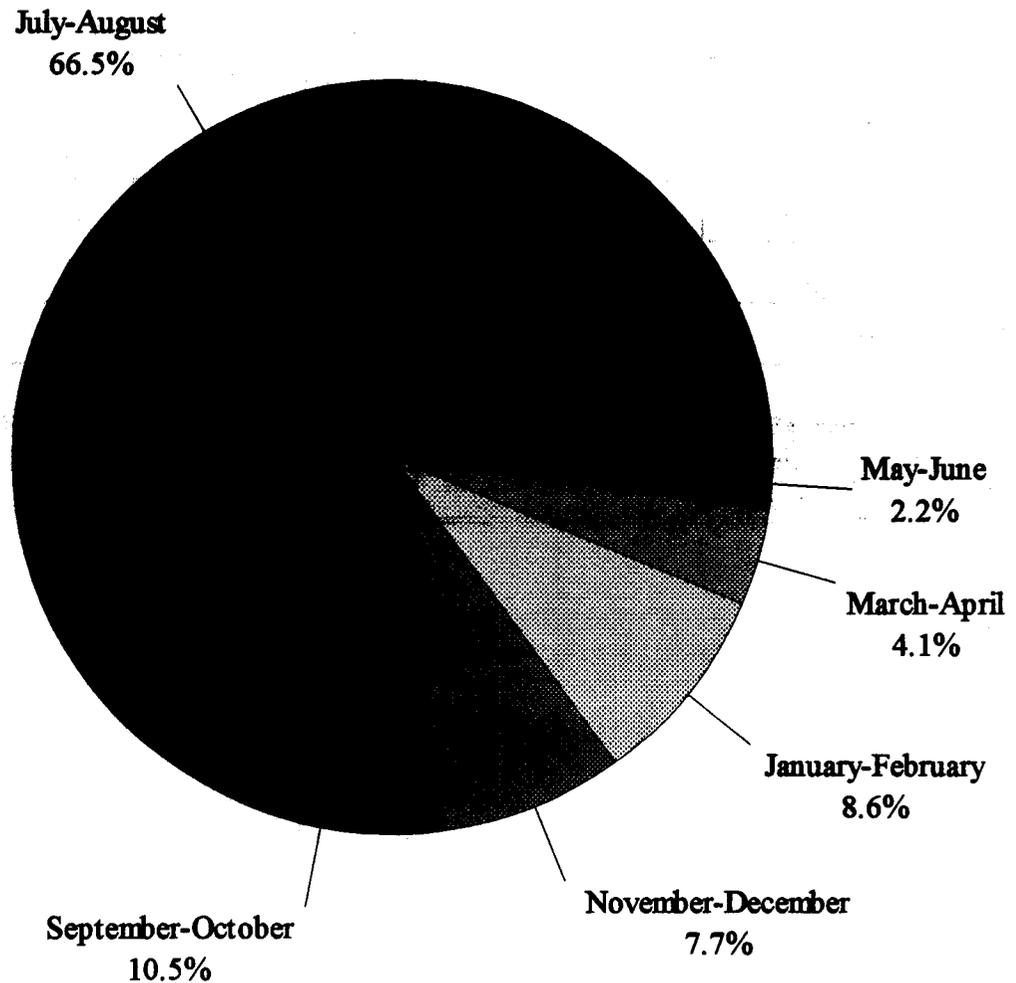
Barley receipts to elevators overtime varies somewhat more than wheat (Table 2.2 and Figure 2.2). The largest variation from the seasonal receipt pattern is found with elevators which do not use bulk rail. On the average, over 52 percent of barley delivered to non-bulk rail elevators was delivered from November through June, a distribution pattern very different from all other elevator groupings. This dynamic is repeated when deliveries to all elevators are compared to deliveries to upcountry elevators only. As expected, the deliveries to upcountry elevators are more heavily concentrated during the July and August harvest season.

**Table 2.2. Annual Barley Receipts by Time Period.**

Time-Periods	Percent			
	All	Upcountry <sup>1</sup>	Bulk Rail User	Bulk Rail Non-User
July-August	66.5	84.8	76.5	37.5
September-October	10.5	9.5	16.5	9.5
November-December	7.7	1.5	0.9	16.8
January-February	8.6	1.0	1.0	25.1
March-April	4.1	1.8	1.2	7.0
May-June	2.2	0.7	3.9	3.8

<sup>1</sup> Data from the reporting river elevators was excluded to develop this column. All non-river elevators were included.

**Figure 2.2. Annual Barley Receipts by Time Period.**



There is considerable variation among counties as to when elevators in those counties receive wheat (Table 2.3). On the average, elevators in eleven counties receive more than 90 percent of their wheat during July through October. The other five counties, Whitman, Lincoln, Adams, Garfield and Chelan, receive less than 90 percent of their wheat during July to October, reflecting on-farm storage and shipments to river elevators. Chelan and Whitman County elevators have the greatest distribution of receipts during non-harvest periods, with 39 percent

and 32.7 percent of wheat for each, respectively, from November through June.

Table 2.3. Wheat Receipts by County and Time Period. Total Grain Receipts, Largest to Smallest.						
County	Percent					
	July-Aug.	Sept-Oct.	Nov-Dec.	Jan-Feb.	Mar-Apr.	May-June
Whitman	51.4	15.9	11.3	7.1	7.5	6.9
Walla Walla	91.6	<sup>1</sup>	-	-	-	7.8
Lincoln	72.0	12.5	4.6	4.8	1.1	1.2
Adams	83.7	3.8	3.8	1.6	3.4	3.6
Grant	92.2	3.6	0.4	1.3	1.2	1.2
Garfield	65.4	5.4	12.5	8.4	4.2	4.2
Columbia	84.0	9.9	2.3	0.8	1.3	1.8
Douglas	97.4	1.1	0.8	0.3	-	0.4
Spokane	97.7	2.3	-	-	-	-
Yakima	76.5	15.5	0.1	7.8	-	0.1
Franklin	100.0	-	-	-	-	-
Chelan	41.0	20.0	6.0	14.0	8.0	11.0
Benton	86.3	7.6	-	6.1	-	-
Stevens	72.6	27.4	-	-	-	-
Okanogan	88.0	4.0	3.0	3.0	2.0	-
Kittitas	60.0	40.0	-	-	-	-

<sup>1</sup>An omission means that no grain receipts were reported during that time period.

Over 88 percent of the barley is received at elevators during July to October in 13 of the 16 counties (Table 2.4). Only Whitman, Garfield, and Chelan County elevators receive barley in noticeable amounts throughout the rest of the year.

**Table 2.4. Barley Receipts by County and Time Period. Total Grain Receipts, Largest to Smallest.**

County	Percent					
	July-Aug.	Sept-Oct.	Nov-Dec.	Jan-Feb.	Mar-Apr.	May-June
Whitman	56.8	12.4	10.1	12.6	5.3	2.5
Lincoln	84.3	13.0	0.7	0.3	1.7	0.1
Garfield	63.5	5.2	13.4	8.9	4.5	4.5
Spokane	91.7	2.5	- <sup>1</sup>	-	2.5	-
Walla Walla	97.9	-	-	-	-	1.1
Columbia	87.4	12.6	-	-	-	-
Adams	95.9	2.5	-	-	-	1.6
Grant	83.7	15.0	-	-	1.3	-
Yakima	68.9	19.3	2.9	2.9	2.9	2.9
Franklin	100.0	-	-	-	-	-
Douglas	92.5	7.5	-	-	-	-
Stevens	69.3	30.7	-	-	-	-
Benton	81.1	18.9	-	-	-	-
Kittitas	75.0	25.0	-	-	-	-
Chelan	17.0	-	-	-	-	83.0
Okanogan	-	100.0	-	-	-	-

<sup>1</sup>An omission means that no grain receipts were reported during that time period.

Over 90 percent of the wheat is received during the July-October time period in all elevator size classes except those elevators in size class 600,001-800,000 bushels, and size class >1,000,000 bushels (Table 2.5). Elevators whose size class >1,000,000 bushels, on average, have the greatest distribution of wheat receipts throughout the year, again reflecting the transshipments

received throughout the year.

<b>Table 2.5. Wheat Receipts by Time Period and Size of Elevator.</b>						
<b>Size Class (bu)</b>	<b>Percent</b>					
	<b>July- August</b>	<b>September -October</b>	<b>November -December</b>	<b>January- February</b>	<b>March- April</b>	<b>May- June</b>
<b>&lt;=200,000</b>	<b>83.7</b>	<b>8.0</b>	<b>-<sup>1</sup></b>	<b>-</b>	<b>0.2</b>	<b>-</b>
<b>200,001- 400,000</b>	<b>92.5</b>	<b>5.1</b>	<b>-</b>	<b>0.7</b>	<b>0.1</b>	<b>1.5</b>
<b>400,001- 600,000</b>	<b>91.2</b>	<b>3.4</b>	<b>0.7</b>	<b>0.7</b>	<b>0.4</b>	<b>3.7</b>
<b>600,001- 800,000</b>	<b>71.6</b>	<b>11.8</b>	<b>6.5</b>	<b>6.7</b>	<b>1.7</b>	<b>1.7</b>
<b>800,001- 1,000,000</b>	<b>91.4</b>	<b>8.5</b>	<b>-</b>	<b>0.1</b>	<b>-</b>	<b>-</b>
<b>&gt;1,000,000</b>	<b>62.4</b>	<b>10.2</b>	<b>9.3</b>	<b>5.0</b>	<b>5.8</b>	<b>7.3</b>

<sup>1</sup>An omission means that no grain receipts were reported during that time period.

### Section 3. Seasonality of Wheat and Barley Shipments From Elevators

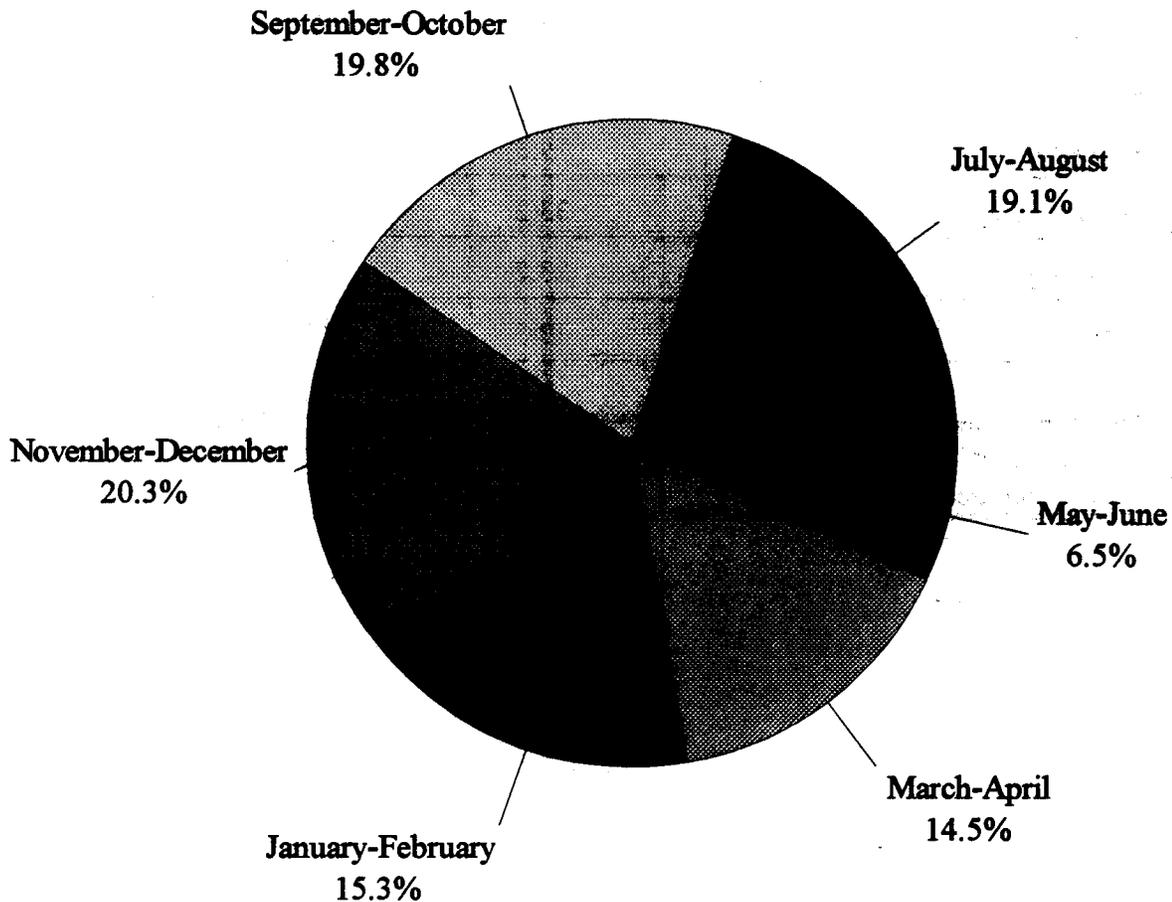
Grain is shipped from elevators throughout the year (Table 3.1). Wheat shipments, averaged across all elevators, remain relatively constant for five of the six two-month periods, varying only between 20.3 percent in November-December to 6.5 percent in May-June just prior to harvest (Figure 3.1).

Upcountry elevators ship less wheat during July-August than all elevators but the shipment pattern is relatively consistent and similar the remainder of the year. Bulk rail elevators ship much less wheat during July-August than any other elevator group, but overall, the distribution shows that wheat is shipped throughout the year from all groupings of elevators.

Table 3.1. Wheat Shipments by Time Period.				
Time-Periods	Percent			
	All	Upcountry <sup>1</sup>	Bulk Rail User	Bulk Rail Non-User
July-August	19.1	13.3	7.7	22.7
September-October	19.8	21.2	23.3	18.3
November-December	20.3	22.0	23.3	19.5
January-February	15.3	16.5	21.1	13.0
March-April	14.5	15.7	20.3	13.8
May-June	6.5	5.0	4.0	7.4

<sup>1</sup> Data from the reporting river elevators was excluded to develop this column. All non-river elevators were included.

**Figure 3.1. Wheat Shipments by Time Period.**



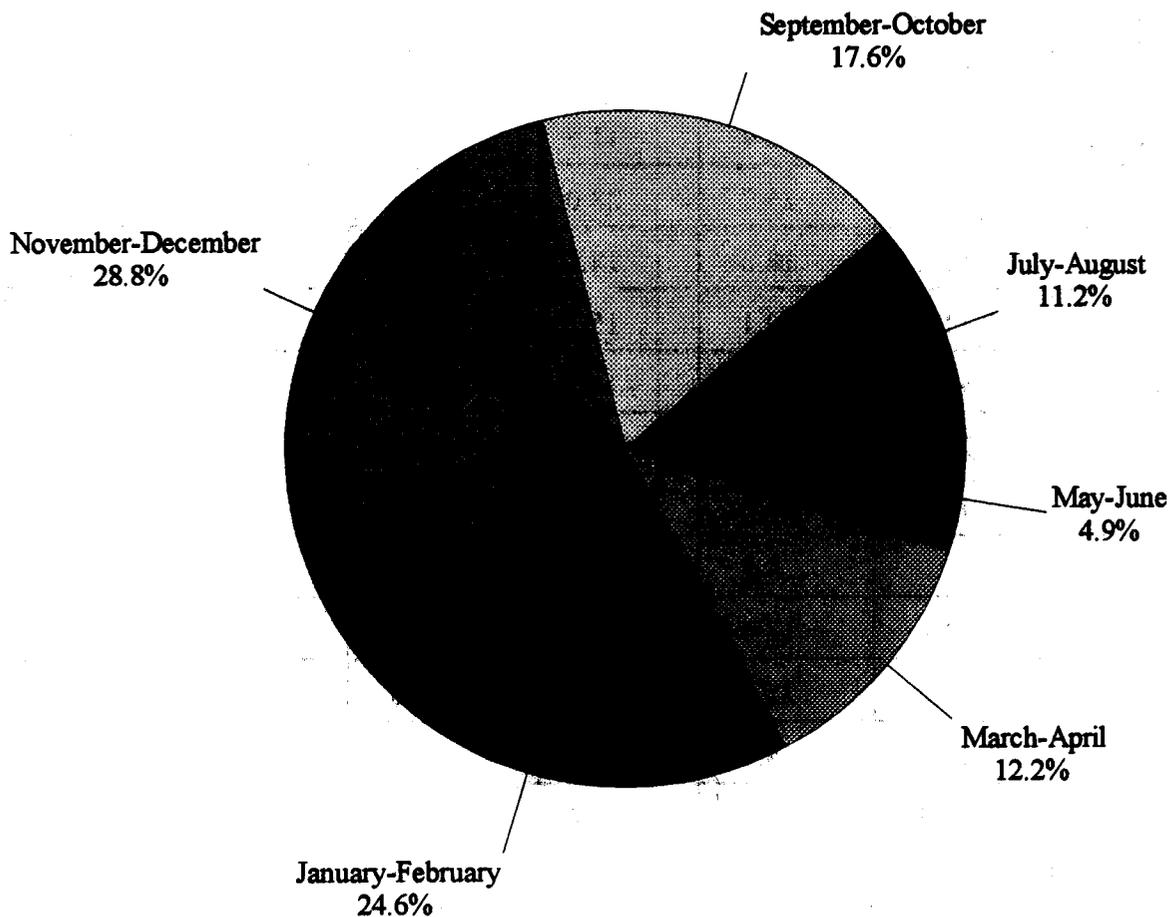
Barley shipments show more variation during the year than wheat for all elevator combinations (Table 3.2). Barley shipments vary between 28.8 percent in November-December to 4.9 percent in May-June, as revealed in Figure 3.2. Barley shipments from November to February are consistently over 50 percent of shipments in all comparisons.

**Table 3.2. Barley Shipments by Time Period.**

Time-Periods	Percent			
	All	Upcountry <sup>1</sup>	Bulk Rail User	Bulk Rail Non-User
July-August	11.2	6.0	7.8	15.1
September-October	17.6	19.3	16.5	12.3
November-December	28.8	33.2	25.0	25.5
January-February	24.6	23.2	30.0	31.4
March-April	12.2	13.3	14.7	10.4
May-June	4.9	4.1	6.0	5.0

<sup>1</sup>Data from the reporting river elevators was excluded to develop this column. All non-river elevators were included.

**Figure 3.2. Barley Shipments by Time Period.**



The seasonality of wheat shipments from elevators by county is presented in Table 3.3. There is considerable seasonal variation of shipments from elevators in the different counties. However, the pattern of shipment from Whitman County elevators, representing over 33 percent of the wheat shipped from elevators in Eastern Washington, is consistent with the regional averages.

**Table 3.3. Wheat Shipments from Elevators by County and Time Period. Total Grain Receipts, Largest to Smallest.**

County	Percent					
	July-Aug.	Sept.-Oct.	Nov.-Dec.	Jan.-Feb.	Mar.-April	May-June
Whitman	13.2	21.4	24.4	16.8	15.6	8.7
Walla Walla	38.8	10.9	11.5	6.3	14.4	3.5
Lincoln	7.3	25.7	28.0	20.7	12.6	2.5
Adams	12.1	18.8	18.1	14.8	18.4	12.2
Grant	11.7	20.1	15.2	17.1	22.0	1.5
Garfield	41.8	14.9	16.5	13.1	9.5	4.2
Columbia	21.4	37.7	23.0	3.6	3.0	11.3
Douglas	18.3	22.8	8.0	31.4	9.1	10.4
Spokane	- <sup>1</sup>	3.8	51.8	35.0	5.6	3.7
Yakima	71.8	13.4	0.1	14.5	0.1	0.1
Franklin	7.5	25.5	23.0	23.0	16.6	3.0
Chelan	17.0	4.0	14.0	14.0	32.0	19.0
Benton	42.4	22.7	7.6	25.9	1.5	-
Stevens	17.9	23.0	9.0	38.2	3.1	8.9
Okanogan	42.0	5.0	26.0	-	26.0	1.0
Kittitas	50.0	20.0	5.0	10.0	10.0	5.0

<sup>1</sup>An omission means that no grain receipts were reported for during that time period.

The seasonality of barley shipments from elevators by county is shown in Table 3.4. All counties have shipments in every period with the exception of Kittitas, Chelan, and Okanogan Counties which have relatively small barley production totals. Spokane County shipments are concentrated in the November to February time period, a pattern differing from all other counties. Seven of the 16 counties ship their highest volume of barley during November and December.

**Table 3.4. Barley Shipments from Elevators by County and Time Period. Total Grain Receipts, Largest to Smallest.**

County	Percent					
	July-Aug.	Sept.-Oct.	Nov.-Dec.	Jan.-Feb.	Mar.-April	May-June
Whitman	9.3	17.6	28.3	26.4	13.4	4.7
Lincoln	2.8	25.1	28.3	26.4	13.5	4.3
Garfield	35.7	18.1	11.9	15.3	10.1	8.9
Spokane	- <sup>1</sup>	4.1	54.5	36.4	5.0	-
Walla Walla	22.7	3.3	36.7	8.9	15.9	0.5
Columbia	2.4	31.2	54.9	9.3	1.8	0.4
Adams	8.7	23.4	21.3	10.4	13.8	12.5
Grant	7.4	8.9	30.4	29.2	11.5	7.3
Yakima	14.1	14.1	18.8	25.9	18.8	8.2
Franklin	14.3	14.3	34.8	14.3	14.3	13.0
Douglas	15.2	11.3	20.9	46.5	6.0	-
Stevens	8.2	40.4	14.5	22.2	7.2	7.3
Benton	-	10.0	7.5	37.9	44.6	-
Kittitas	-	-	-	25.0	50.0	25.0
Chelan	7.0	1.0	1.0	-	7.0	84.0
Okanogan	-	1.0	-	1.0	91.0	7.0

<sup>1</sup>An omission means that no grain receipts were reported during that time period.

Wheat is shipped from elevators throughout the year from all elevator size classes (Table 3.5). Although there are differences of shipment distribution between elevator size classes throughout the year, no clear pattern relative to elevator size is evident. The largest elevator size class, those over 1 million bushels capacity, has the smallest variation.

<b>Table 3.5. Wheat Shipments by Time Period and Size of Elevators.</b>						
<b>Size Class (bu)</b>	<b>Percent</b>					
	<b>July-Aug.</b>	<b>Sept.-Oct.</b>	<b>Nov.-Dec.</b>	<b>Jan.-Feb.</b>	<b>Mar.-Apr.</b>	<b>May-June</b>
<b>&lt;=200,000</b>	<b>25.8</b>	<b>26.9</b>	<b>22.1</b>	<b>10.5</b>	<b>10.5</b>	<b>2.9</b>
<b>200,001-400,000</b>	<b>20.6</b>	<b>17.0</b>	<b>17.1</b>	<b>11.5</b>	<b>13.2</b>	<b>3.2</b>
<b>400,001-600,000</b>	<b>21.9</b>	<b>17.4</b>	<b>21.7</b>	<b>14.0</b>	<b>16.2</b>	<b>6.4</b>
<b>600,001-800,000</b>	<b>8.6</b>	<b>21.1</b>	<b>25.9</b>	<b>18.3</b>	<b>15.2</b>	<b>2.8</b>
<b>800,001-1,000,000</b>	<b>8.1</b>	<b>16.5</b>	<b>22.1</b>	<b>29.3</b>	<b>20.1</b>	<b>3.9</b>
<b>&gt;1,000,000</b>	<b>20.0</b>	<b>20.7</b>	<b>19.0</b>	<b>15.7</b>	<b>14.3</b>	<b>9.0</b>

Conclusions similar to wheat can be drawn about barley shipment patterns by elevator class size. The noticeable difference in barley shipment patterns is that they were somewhat more heavily concentrated during the November-February time period.

## **Section 4. Destinations for Wheat and Barley Shipped From Elevators**

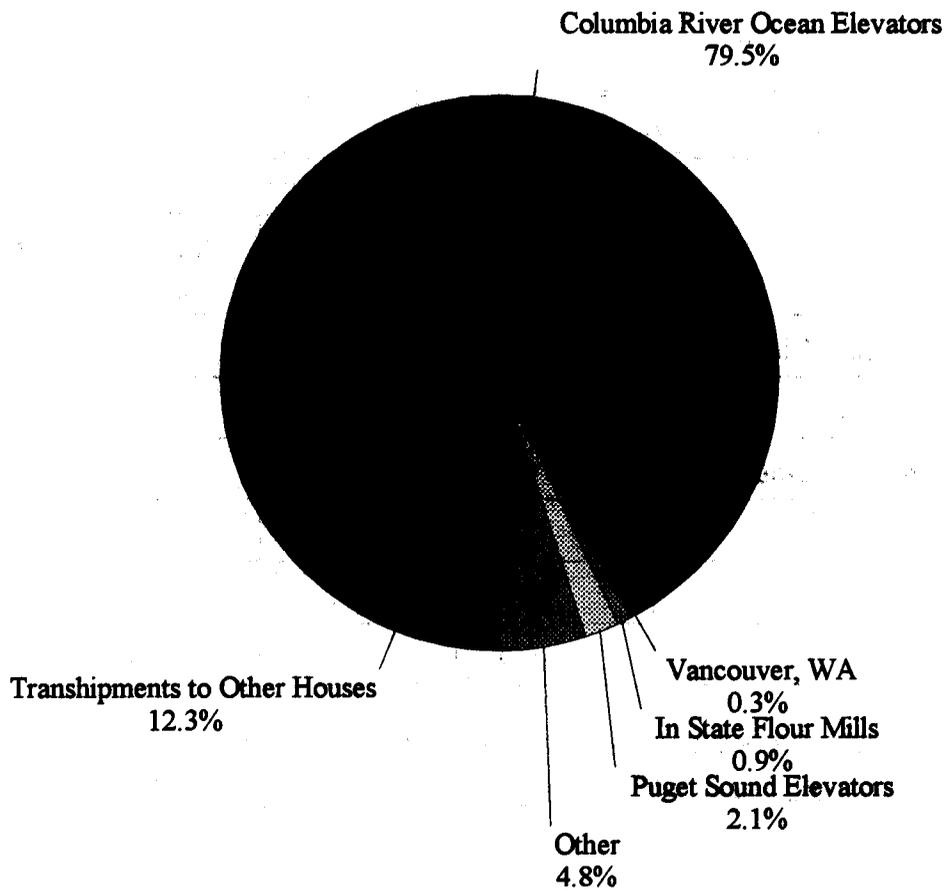
Although wheat is shipped from Eastern Washington elevators to a number of destinations (Table 4.1), it is predominantly shipped to Columbia River ocean elevators located between Portland, Oregon and Kalama, Washington. Of the wheat shipped from elevators in Eastern Washington, 79.5 percent goes to the Columbia River ocean elevators, 2.1 percent to Puget Sound elevators, and 12.3 percent is shipped to other grain houses as revealed in Figure 4.1. In-state flour mills receive 0.9 percent of the wheat. The differences indicated for wheat shipments from all elevators, and upcountry elevators only is most likely a reporting difference and not a difference in final destination. The percentage of wheat shipped "Transshipment to other Houses", is higher from upcountry elevators and lower to the Columbia River ocean elevators. Wheat "Transhipped to Other Houses" is movement either to a river elevator where it continues on to a Columbia River ocean elevator or to a 25/26-car rail facility where it continues on to a Columbia River ocean elevator as well.

**Table 4.1. Wheat Shipments by Destination.**

Destination	Percent			
	All	Upcountry	Bulk Rail User	Bulk Rail Non-User
Columbia River Ocean Elevators	79.5	73.2	88.4	78.6
Puget Sound Elevators	2.1	2.7	7.6	0.1
Transshipment to Other Houses	12.3	16.1	0.8	14.7
In-State Flour Mills	0.9	1.1	0.3	0.9
Vancouver, WA	0.3	0.4	0.9	0.1
Feedlots	- <sup>1</sup>	-	-	-
Other	4.8	6.3	2.0	5.3

<sup>1</sup>An omission means that no grain was shipped to that particular destination.

**Figure 4.1. Wheat Shipments by Destination.**

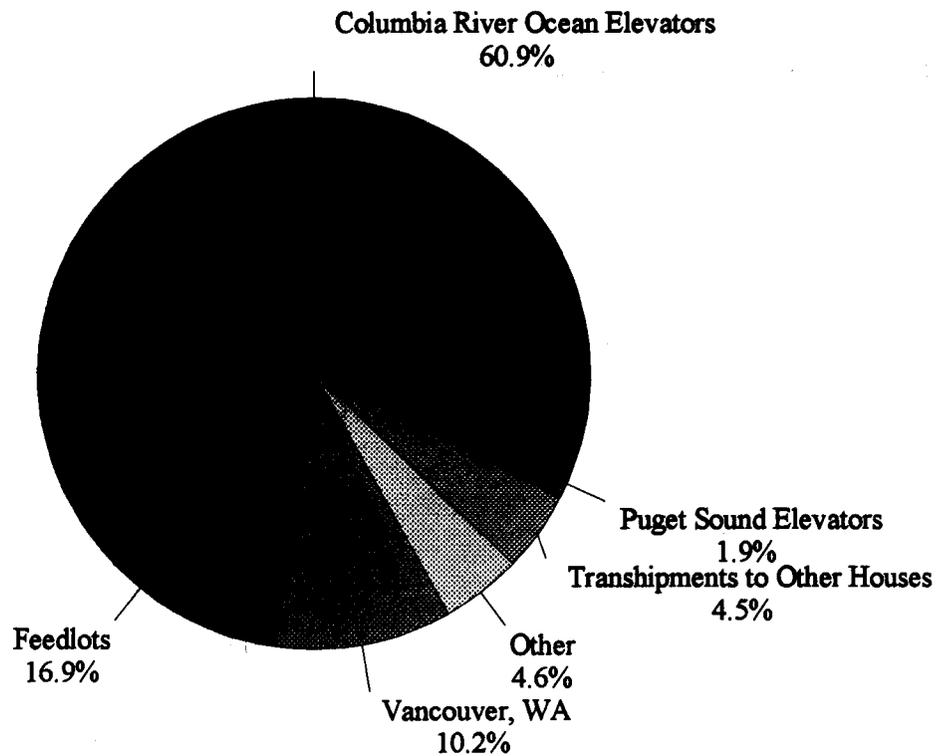


Columbia River ocean elevators are the destination for 60.9 percent of barley shipped from Eastern Washington (Table 4.2 and Figure 4.2). Feedlots are the next highest destination with 16.9 percent, followed by Vancouver locations at 10.2 percent. Puget Sound elevators receive 1.9 percent of the barley.

<b>Table 4.2. Barley Shipments by Destination.</b>				
<b>Destination</b>	<b>Percent</b>			
	<b>All</b>	<b>Upcountry</b>	<b>Bulk Rail User</b>	<b>Bulk Rail Non-User</b>
<b>Columbia River Ocean Elevators</b>	<b>60.9</b>	<b>51.7</b>	<b>36.4</b>	<b>86.9</b>
<b>Puget Sound Elevators</b>	<b>1.9</b>	<b>2.5</b>	<b>9.7</b>	<b>-<sup>1</sup></b>
<b>Transshipment to Other Houses</b>	<b>4.5</b>	<b>5.9</b>	<b>-</b>	<b>2.2</b>
<b>In-State Flour Mills</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Vancouver, WA</b>	<b>10.2</b>	<b>11.4</b>	<b>14.2</b>	<b>4.0</b>
<b>Feedlots</b>	<b>16.9</b>	<b>21.4</b>	<b>38.2</b>	<b>4.4</b>
<b>Other</b>	<b>4.6</b>	<b>6.0</b>	<b>1.4</b>	<b>2.1</b>

<sup>1</sup>An omission means that no grain was shipped to that particular destination.

**Figure 4.2. Barley Shipments by Destination.**



The average percentage of wheat shipped from each of the 16 counties to various destinations is reported in Table 4.3. Eleven of the 16 counties ship over 75 percent of their wheat to the Columbia River ocean elevators. Lincoln County probably ships over 85 percent of its wheat to ocean elevators because their transshipment to other houses is most likely to houses with 25/26-car rail facilities for movement to ocean elevators for export. Spokane County, the location of several flour mills, has the highest percentage of wheat moving to flour mills.

**Garfield, Franklin, Chelan, Okanogan, and Kittitas county elevators ship all of their wheat to the Columbia River ocean elevators.**

**Barley shipments to various destinations by county are more unevenly distributed to the various destinations than are wheat shipments (Table 4.4). As mentioned before, more barley is shipped to in-state feedlots than wheat.**

**Table 4.3. Wheat Shipments by Destination and County. Total Grain Receipts, Largest to Smallest.**

County	Percent						
	Columbia River Ocean Elevators	Puget Sound Elevators	Tranship to other Houses	Flour Mills	Vancouver, Washington	In-State Feedlots	Other
Whitman	90.7	0.4	1.8	0.3	1.0	-	5.8
Walla Walla	91.0	-	8.4	-	-	-	-
Lincoln	67.6	13.1	18.8	0.5	-	-	-
Adams	49.0	-	27.3	3.0	-	0.1	20.7
Grant	87.3	0.8	10.4	1.4	-	-	0.2
Garfield	100.0	-	-	-	-	-	-
Columbia	92.6	-	7.4	-	-	-	-
Douglas	-	-	81.4	-	-	-	18.6
Spokane	76.1	-	3.7	17.3	-	-	2.9
Yakima	22.1	-	77.2	-	-	-	0.7
Franklin	100.0	-	-	-	-	-	-
Chelan	100.0	-	-	-	-	-	-
Benton	79.3	-	14.6	-	-	-	6.1
Stevens	60.9	27.7	11.4	-	-	-	-
Okanogan	100.0	-	-	-	-	-	-
Kittitas	100.0	-	-	-	-	-	-

<sup>1</sup>An omission means that no grain was shipped to that particular destination.

**Table 4.4. Barley Shipments by Destination and County. Total Grain Receipts, Largest to Smallest.**

County	Percent						
	Columbia River Ocean Elevators	Puget Sound Elevators	Tranship to other Houses	Flour Mills	Vancouver, Washington	In-State Feedlots	Other
Whitman	75.7	-	2.7	- <sup>1</sup>	12.2	4.0	5.3
Lincoln	9.0	11.2	13.4	-	11.8	51.0	-
Garfield	98.1	-	-	-	-	1.9	-
Spokane	77.7	-	3.3	-	6.6	12.4	-
Walla Walla	73.6	-	3.8	-	3.1	18.5	-
Columbia	0.4	-	-	-	-	39.6	-
Adams	8.7	-	9.7	-	-	81.6	-
Grant	9.5	-	8.7	-	-	77.5	4.2
Yakima	-	-	-	-	-	41.4	58.6
Franklin	2.6	-	-	-	10.4	-	87.0
Douglas	-	-	-	-	-	100.0	-
Stevens	1.0	29.0	26.6	-	-	43.5	-
Benton	-	-	-	-	71.4	10.7	17.9
Kittitas	-	-	-	-	-	-	-
Chelan	-	-	-	-	-	100.0	-
Okanogan	-	-	-	-	-	100.0	-

<sup>1</sup>An omission means that no grain was shipped to that particular destination.

## **Section 5. Modal Choice for Wheat and Barley Shipments**

Grain is shipped from elevators to market destinations via rail, truck and the combination of truck and barge. Elevator operators were asked to identify how their grain was shipped, whether by rail, truck to other houses, truck to final market or truck-barge. Information on rail mode shipments was collected according to whether the grain moved as a single-car shipment, a 3-car shipment or a 25/26-car shipment. As discussed later in this report, effective rail rates are highest for single-car shipments and lowest for 25/26-car shipments.

Truck-barge moved 61.3 percent of the wheat produced in Eastern Washington (Table 5.1 and Figure 5.1). Although responses in the questionnaire identified 21.4 percent of the wheat moved via 25/26-car shipments, follow up with elevator operators found that most of the 12.5 percent identified as moving by truck to other houses is later shipped by rail in 25/26-car shipments. Therefore, 33.9 percent actually moves by the 25/26-car mode.

Upcountry elevators ship 49.5 percent of their wheat via truck-barge and 44.2 percent by bulk rail (Table 5.1). At elevators which do not ship wheat by bulk rail, over 80 percent of their wheat is shipped via truck-barge. Just over 19 percent of all elevators use bulk rail and 80.8 percent of reporting elevators do not use bulk rail for grain shipment. Elevators which have 25/26 car facilities ship 82.6 percent of their wheat via bulk rail and 15.5 of their wheat via truck-barge.

Single-car and 3-car rail shipments accounted for only 2.6 percent of the wheat shipped from elevators, 0.9 and 1.7 percent respectively. Truck to final market represents only two percent of wheat shipped from elevators.

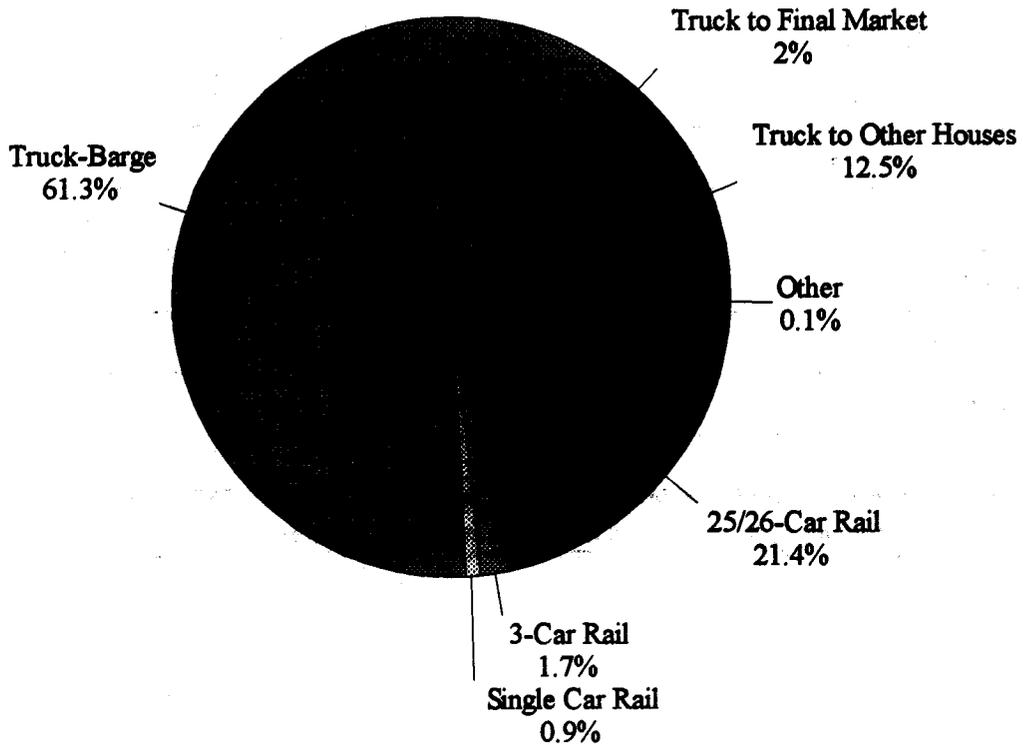
**Table 5.1. Modes Used to Ship Wheat.**

Transportation Mode	Percent			
	All	Upcountry	Bulk Rail User	Bulk Rail Non-User
Truck to Other Houses <sup>1</sup>	12.5	16.3	0.3	14.6
Truck to Final Market	2.0	2.6	0.8	2.2
Truck-Barge	61.3	49.5	15.5	80.1
Single-Car Rail	0.9	1.2	-. <sup>2</sup>	1.1
3-Car Rail	1.7	2.2	0.9	1.8
25/26-Car Rail	21.4	27.9	82.6	-
Other	0.1	0.2	-	0.1

<sup>1</sup>Most of this grain eventually moves as a 25/26-car rail shipment with the exception of grain in Garfield County which ends up as a truck-barge shipment.

<sup>2</sup>An omission means that mode was not utilized to ship wheat.

**Figure 5.1. Modes Used to Ship Wheat.**



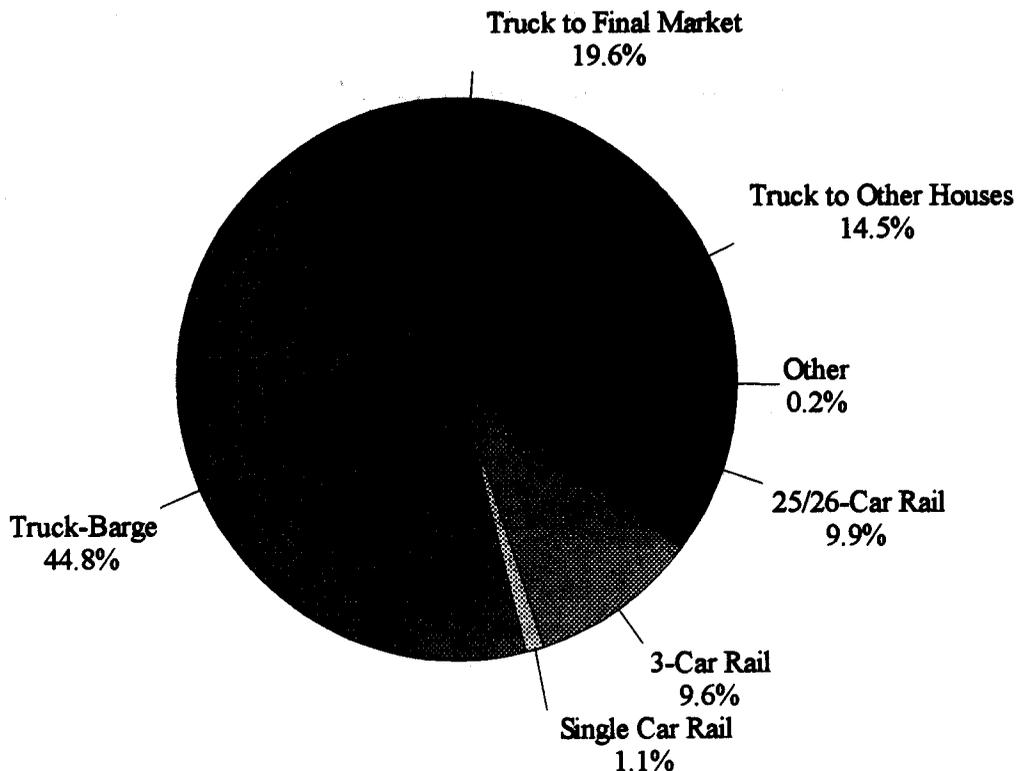
Feed and malting barley are produced in Eastern Washington. Local markets such as dairies, cattle feeders, and breweries play a much more important role in barley marketing than is true for wheat. As a result, the modal mix for barley shipments is very different from that of wheat shipments (Table 5.2 and Figure 5.2). Truck-barge is still the leading mode for barley shipments with 44.8 percent of the barley shipped from elevators being by that mode. Truck to final market represents 19.6 percent and truck to other houses 14.5 percent. Combined rail

shipments were 20.6 percent with nearly an even split between 25/26-car shipments and 3-car shipments at 9.9 and 9.3 percent respectively.

<b>Table 5.2. Modes Used to Ship Barley.</b>				
<b>Transportation Mode</b>	<b>Percent</b>			
	<b>All</b>	<b>Upcountry</b>	<b>Bulk Rail User</b>	<b>Bulk Rail Non-User</b>
Truck to Other Houses	14.5	19.1	4.3	5.6
Truck to Final Market	19.6	25.8	28.4	6.9
Truck-Barge	44.8	29.9	15.7	83.4
Single-Car Rail	1.1	1.4	1.4	0.4
3-Car Rail	9.6	10.2	15.1	3.4
25/26-Car Rail	9.9	13.0	35.0	- <sup>1</sup>
Other	0.2	0.3	-	0.1

<sup>1</sup>An omission means that mode was not utilized to ship barley.

Figure 5.2. Modes Used to Ship Barley.



Considerable variability in modal choice exists among counties (Table 5.3). As would be expected, truck-barge shipments dominate in counties closest to the river system. These counties include Whitman, Douglas, Franklin, Benton, Walla Walla, Garfield and Columbia. With the exception of Adams County, 25/26-car rail shipment dominates the modal choice in those counties without direct river access. In Adams County over 65 percent of their grain is shipped from elevators by truck-barge. An omission means that particular mode was not used for the

corresponding county.

Trucks are more likely to be part of the modal choice for shipment of barley than for wheat. In Whitman, Garfield, Columbia, and Walla Walla counties, over 50 percent of the barley is shipped via truck-barge (Table 5.4) in seven counties over 75 percent of the barley is trucked to final market. Elevators in eleven counties did not use rail at all for barley shipments.

**Table 5.3. Modes Used to Ship Wheat by County. Total Grain Receipts, Largest to Smallest.**

County	Percent						
	Truck to Other Houses <sup>1</sup>	Truck to Final Market	Truck-Barge	25/26 Car Rail	Single-Car Rail	3-Car Rail	Other
Whitman	5.5	3.4	78.9	9.7	-	2.2	0.2
Walla Walla	8.4	0.6	80.8	10.3	-	-	-
Lincoln	19.8	0.4	19.8	60.0	-	-	-
Adams	12.9	2.6	65.4	18.2	-	0.9	-
Grant	11.4	2.2	35.2	50.3	-	0.7	0.2
Garfield	16.5	-	83.5	-	-	-	-
Columbia	7.4	-	92.6	-	-	-	-
Douglas	81.4	-	18.6	-	-	-	-
Spokane	19.2	17.1	2.9	25.8	-	35.0	-
Yakima	-	0.7	22.1	-	77.2	-	-
Franklin	-	-	92.7	-	-	7.3	-
Chelan	-	-	-	100.0	-	-	-
Benton	14.6	-	69.5	-	-	9.8	6.1
Stevens	23.1	-	6.2	24.6	-	46.2	-
Okanogan	-	-	-	100.0	-	-	-
Kittitas	-	-	-	-	100.0	-	-

<sup>1</sup>For all counties except Garfield County, the “truck to other house” percentage can be shifted to “25/26-Car Rail”. Garfield County can be shifted to “Truck-Barge”.

**Table 5.4. Modes Used to Ship Barley by County. Total Grain Receipts, Largest to Smallest.**

County	Percent						
	Truck to Other Houses <sup>1</sup>	Truck to Final Market	Truck-Barge	25/26 Car Rail	Single-Car Rail	3-Car Rail	Other
Whitman	10.6	8.1	59.9	10.3	0.8	9.9	0.3
Lincoln	10.6	50.3	14.0	19.4	-	5.6	-
Garfield	10.6	0.2	89.2	-	-	-	-
Spokane	44.7	14.9	-	-	7.4	33.0	-
Walla Walla	25.5	-	73.6	-	-	-	-
Columbia	-	39.6	60.4	-	-	-	-
Adams	9.7	85.1	0.4	4.7	-	-	-
Grant	8.7	89.3	1.1	-	-	-	-
Yakima	-	100.0	-	-	-	-	-
Franklin	21.7	75.7	2.6	-	-	-	-
Douglas	-	100.0	-	-	-	-	-
Stevens	26.6	-	36.2	36.2	-	1.0	-
Benton	89.3	10.7	-	-	-	-	-
Kittitas	-	-	-	-	-	-	-
Chelan	-	100.0	-	-	-	-	-
Okanogan	-	100.0	-	-	-	-	-

<sup>1</sup>For all counties except Garfield County, the “truck to other house” percentage can be shifted to “25/26-Car Rail”. Garfield County can be shifted to “Truck-Barge”.

As would be expected, as the percentage of wheat shipped via bulk rail increases, the percentage of wheat shipped via truck-barge decreases, although a small amount of wheat is still shipped truck-barge even when the percentage of wheat moving bulk rail is over 80 percent, (Table 5.5). However a very different pattern exists when comparing the use of bulk rail by an elevator who heavily ships truck-barge. Elevators which ship over 60 percent of their wheat via truck-barge do not use bulk rail at all as a shipping mode (Table 5.6), probably reflecting the lack of rail sidings.

**Table 5.5. Wheat Shipments Via Truck-Barge at Differing Percentages of 25/26-Car Rail Shipments.**

<b>For Elevators Where Wheat Was Shipped Via 25/26-Car Rail</b>	<b>THEN</b>	<b>On the Average Wheat Was Shipped Via Truck-Barge</b>
<b>Percent</b>		<b>Percent</b>
0 - 20		76.8
21 - 40		60.0
41 - 60		49.3
61 - 80		17.6
81 - 100		1.2

**Table 5.6. Wheat Shipments Via 25/26-Car Rail at Differing Percentage of Truck-Barge Shipments.**

<b>For Elevators Where Wheat Was Shipped Via Truck-Barge</b>	<b>THEN</b>	<b>On the Average Wheat Was Shipped Via 25/26-Car Rail</b>
<b>Percent</b>		<b>Percent</b>
0 - 20		56.3
21 - 40		27.6
41 - 60		27.1
61 - 80		0.0
81 - 100		0.0

A much higher percentage of elevators used truck-barge as their predominate modal choice than those who chose bulk rail (Table 5.7). Only about 8 percent of elevators shipped over 80 percent of their wheat via bulk rail. Nearly 46.6 percent of elevators shipped over 80 percent of their wheat via truck-barge. It is interesting to note that each mode had a few elevators that used that mode almost exclusively.

**Table 5.7. Modal Shipment Intensity for Wheat Shipped Using a Particular Mode.<sup>1</sup>**

Percent of Elevators	Percent				
	Single-Car Rail	3-Car Rail	25/26-Car Rail	Truck-Barge	Truck Only
0-20	99.2	95.9	82.7	35.7	94.5
21-40	0.0	1.5	1.9	5.6	1.1
41-60	0.0	0.4	2.3	7.5	0.0
61-80	0.0	0.4	4.9	4.5	0.8
81-100	0.8	1.9	8.3	46.6	3.8
Total	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> Each column in this table stands alone as follows. For example: 35.7 percent of all elevators shipped between 0 and 20 percent of their wheat via truck-barge and 46.6 percent of all elevators shipped between 81 percent and 100 percent of their wheat via truck-barge.

## **Section 6. Elevator Storage and Handling Rates**

The average storage rate for wheat was 2.04 cents per bushel per month (c/bu/mo).

Storage rates for wheat ranged from a low of no charge (but with a substantial handling rate) to 4.5 c/bu/mo (Table 6.1). Over 85 percent of the elevators charged between 1.5 to 2.5 c/bu/mo for wheat storage. About 46 percent of the elevators charged in the 1.5 to 2.0 c/bu/mo range for wheat.

Barley storage rates followed a similar distribution to the storage rates for wheat except that the highest storage rate for barley was 20.4 c/bu/mo which is well above wheat's high of the 4.5 c/bu/mo. The weighted average storage rate for barley was 2.45 c/bu/mo. It can be expected that the 20.4 c/bu/mo was inclusive of many other services such as handling.

Weighted average storage rates for wheat and barley at upcountry elevators were 1.96 and 2.44 c/bu/mo respectively. By eliminating river elevator storage rates, the upcountry elevator storage rates are slightly lower, indicating that on average, storage rates at upcountry elevators are lower than river elevators.

<b>Table 6.1. Wheat and Barley Storage Rates.</b>		
<b>Rates (c/bu/mo)</b>	<b>Wheat Number of Sites</b>	<b>Barley Number of Sites</b>
[0]	3	2
(0, 0.5]	9	8
(0.5, 1]	0	0
(1, 1.5]	15	7
(1.5, 2]	120	82
(2, 2.5]	103	93
(2.5, 4.5] (wheat only)	10	-
(2.5, 20.4] (barley only)	-	25
<b>Total Sites Reporting</b>	<b>260</b>	<b>217</b>

Handling charges for wheat and barley ranged from a low of no charge to a high of 18 c/bu (Table 6.2). Over 90 percent of reporting elevators reported wheat handling rates in the 7 to 10 c/bu range with just over 41 percent of the elevators reporting wheat handling rates in the 7 to 8 c/bu range. About 74 percent of the reporting elevators reported barley handling rates in the 7 to 10 c/bu range.

<b>Table 6.2. Wheat and Barley Handling Rates.</b>		
<b>Rates (c/bu)</b>	<b>Wheat Number of Sites</b>	<b>Barley Number of Sites</b>
[0]	6	9
(0, 1]	0	0
(1, 2]	2	0
(2, 3]	0	0
(3, 4]	0	0
(4, 5]	2	0
(5, 6]	12	26
(6, 7]	11	4
(7, 8]	94	40
(8, 9]	34	53
(9, 10]	78	68
(10, 11]	4	2
(11, 12]	9	10
(12, 13]	0	0
(13, 14]	4	3
(14, 18]	4	2
<b>Total Sites Reporting</b>	<b>260</b>	<b>217</b>

The region's average wheat handling rate was 8.23 c/bu and the average barley rate was 8.24 c/bu/mo. Average handling rates at upcountry elevators for wheat and barley are 8.96 c/bu/mo and 8.60 c/bu/mo respectively. Since these averages are higher after eliminating river elevator handling rates, it can be concluded that wheat and barley handling rates at the river elevators are lower than handling rates at upcountry elevators.

## **Section 7. Transportation Rates**

The average truck, barge and rail rates to the Columbia River ocean elevators for the shipment of wheat and barley are presented in Tables 7.1 and 7.2. Rates to Columbia River ocean elevators are used for comparison since nearly 80 percent of the wheat and 61 percent of the barley from the 16 counties in the study area is shipped to those elevators.

In general, the closer a county is to the river system, the greater the differential between single car rail rates and 25/26-car rail rates (Table 7.1). This suggests that truck-barge rates create a downward pressure on bulk rail rates. In Whitman, Garfield, Walla Walla, and Columbia counties, single-car rail rates for wheat shipment ranged from 43.7 percent higher than the 25/26-car rates in Whitman County to 60.7 percent higher in Garfield County. Spokane County single-car rates were 38.6 percent higher than the bulk rail rates, Franklin County single-car rates were 30 percent higher and the difference in the remaining counties ranged from 21.2 percent in Okanogan County to 25.8 percent in Chelan County.

**Table 7.1. Wheat and Barley Rail Rates by County.**

County	Cents per Bushel					
	Wheat Rail Rates			Barley Rail Rates		
	1-Car	3-Car	25/26-Car	1-Car	3-Car	25/26-Car
Adams	36.52	33.32	28.21	31.38	28.48	25.90
Benton	31.73	27.87	- <sup>1</sup>	25.93	23.13	-
Chelan	40.50	37.20	32.20	34.90	32.00	27.50
Columbia	39.18	32.78	25.18	33.25	26.85	20.15
Douglas	42.17	39.36	34.41	36.90	34.07	29.50
Franklin	36.00	32.80	27.70	30.90	28.00	23.50
Garfield	41.30	33.30	25.70	33.40	27.30	20.60
Grant	40.84	37.64	32.51	35.18	32.37	27.78
Kittitas	31.50	28.30	-	26.90	24.10	-
Lincoln	42.10	38.75	33.83	36.44	33.64	29.06
Okanogan	47.50	44.30	39.20	41.10	38.30	33.70
Spokane	39.31	34.20	28.36	33.89	28.94	24.14
Stevens	45.80	42.40	-	46.20	43.40	38.80
Walla Walla	36.95	30.78	24.36	31.28	25.35	19.47
Whitman	37.15	32.31	25.85	32.66	27.65	21.62
Yakima	31.50	28.30	25.70	26.90	24.10	20.60
Average	38.75	34.60	29.48	33.58	29.86	26.59

<sup>1</sup>An omission of a rate means that mode was not offered in the corresponding county.

**Table 7.2. Wheat and Barley Truck-Barge Rates by County.**

County	Cents per Bushel				
	Wheat		Put-Thru Charge	Barley	
	Barge	Truck		Barge	Truck
Adams	15.06	13.41	5.0	13.87	13.13
Benton	14.10	10.83	5.0	12.98	8.45
Chelan	14.10	28.00	5.0	12.98	28.00
Columbia	16.38	7.26	5.0	15.07	6.83
Douglas	14.10	28.00	5.0	12.98	28.00
Franklin	14.35	10.55	5.0	13.21	13.33
Garfield	17.31	6.50	5.0	15.94	5.53
Grant	14.42	20.81	5.0	13.27	21.43
Kittitas	- <sup>1</sup>	22.00	5.0	-	-
Lincoln	15.01	21.50	5.0	13.82	19.18
Okanogan	14.10	28.00	5.0	12.98	28.00
Spokane	16.87	20.31	5.0	15.53	16.52
Stevens	15.36	26.00	5.0	14.14	21.00
Walla Walla	14.29	9.30	5.0	13.15	8.28
Whitman	17.45	11.29	5.0	16.06	9.75
Yakima	14.10	16.50	5.0	12.98	9.60
Average	15.13	17.52	5.0	13.93	15.80

<sup>1</sup>An omission of a rate means that mode was not offered in the corresponding county.

The county average truck-barge and 25/26-car rail rates, as presented in Table 7.3, are the primary competitors for grain movement to ocean elevators. Bulk rail rates are lower than truck-barge rates for all counties except for those counties who did not use bulk rail (Table 7.3).

<b>Table 7.3. Wheat Truck-Barge and 25/26-Car Rail Rates by County.</b>		
<b>County</b>	<b>Cents per Bushel</b>	
	<b>Truck-Barge<sup>1</sup></b>	<b>25/26-Car Rail</b>
Adams	33.47	28.21
Benton	29.93	- <sup>2</sup>
Chelan	47.10	32.20
Columbia	28.64	25.18
Douglas	47.10	34.41
Franklin	29.90	27.70
Garfield	28.81	25.70
Grant	40.23	32.51
Kittitas	-	-
Lincoln	41.51	33.83
Okanogan	47.10	39.20
Spokane	42.18	28.36
Stevens	46.36	-
Walla Walla	28.59	24.36
Whitman	33.74	25.85
Yakima	35.60	25.70

<sup>1</sup>Includes handling  
<sup>2</sup>The omission of a rate means elevators in that county did not use the corresponding transportation mode.

Elevators are grouped in Table 7.4 according to the percentage of wheat the elevator ships via truck-barge. In elevators that ship less than 20 percent of their wheat truck-barge, the 25/26-car rail rate for those elevators on the average is higher than if the elevator shipped more than 20 percent via truck-barge. The bulk rail rates seems to continue to decline as the percentage of

wheat shipped via truck-barge increases, suggesting rail is attempting to react to the competitive environment between the two modes. It is difficult to make the inverse comparison between bulk rail and truck-barge because truck-barge rates are heavily influenced by the truck portion of the shipment and truck cost is heavily influenced by the distance trucks haul grain to the river elevators.

**Table 7.4. Relationship Between 25/26-Car Rail Rate Levels and Elevators Who Shipped Differing Percentages of Wheat Via Truck-Barge.**

<b>For Elevators Where This Percent Wheat Was Shipped Via Truck-Barge</b>	<b>THEN</b>	<b>On the Average The 25/26-Car Rail Rate Was</b>
<b>Percent</b>		<b>Cents/Bu.</b>
0 - 20		30.0
21 - 40		29.8
41 - 60		28.7
61 - 80		28.0
81 - 100		26.9

## **Section 8. Summary and Conclusions**

The wheat and barley industry in Eastern Washington has been found to be a heavy user of truck-barge, a heavy shipper to the Columbia River ocean elevators, and, except for May-June, a consistent shipper throughout the year. Grain receipts at elevators are concentrated in six of the 16 county study area. Elevators in those six counties, receiving over 86.6 percent of grain receipts through their regional elevators, were in Whitman, Walla Walla, Lincoln, Adams, Grant, and Garfield Counties.

Elevators in the region vary widely in capacity from 11,000 bushels to over 4 million bushels in size. Over 87 percent of the regions elevators are less than 1 million bushels in capacity. The elevators of less than 1 million bushels in size make up slightly over 53 percent of the total elevator capacity in the region. Elevators over 1 million bushels in capacity, (12.6 percent of the elevators) make up over 47 percent of elevator capacity in the region. On the average, area elevators have a turnover rate of 0.89.

The modal combination of truck and barge is responsible for 61.3 percent of the wheat and 44.8 percent of the barley shipped to and from Eastern Washington elevators. Bulk rail or 25/26-car rail shipments, the main competitor to truck-barge, moves 33.9 percent of the wheat. Total rail shipments of barley were 20.6 percent.

Trucks play a more vital role in the shipment of barley from elevators than in the shipment of wheat. In addition to the barley upcountry elevators moving via truck-barge, truck to final market is responsible for 16.6 percent of barley shipments and truck to other houses 14.5 percent.

Wheat and barley are shipped from elevators year around. The percentage of wheat shipped is distributed more evenly throughout the year, where a high of 20.3 percent is shipped

between November and December and a low of 6.5 percent between May and June. Grain is shipped from all size elevators throughout the year and from elevators scattered throughout the study area.

Barley shipments occur more often November through February than during any other time period. The percentage of barley shipped November through February is higher than the percentage of wheat shipped during the same time frame.

Trucks, as collectors for barges, are involved in moving sizeable amounts of grain during all times of the year. Over 80 percent of the wheat from the non-bulk rail elevators and 83.4 percent of the barley is shipped via truck-barge. Nearly 81 percent of Eastern Washington elevators do not use bulk rail.

While most wheat and barley is received at elevators during harvest season, elevators with over 1 million bushels in capacity receive grain on a constant basis throughout the year. It is likely that most of these elevators are either rail sub-terminals or river terminal elevators. Thus, it is the transshipment of grain that occurs throughout the rest of the year.

Elevator operators report that over 89 percent of all the farmers within a 10 mile radius of their elevators ship all or some of their grain to their elevator. Elevator operators also report that of their clients who use their elevator, over 88 percent are within 10 miles of their elevator. Both of these statistics confirm that most grain does not move very far at harvest time to an elevator.

The primary destination for wheat and barley shipped from elevators in Eastern Washington is the Columbia River ocean elevators. Almost 80 percent of all wheat and 61 percent of all barley is shipped to ocean elevators in the Portland, Oregon - Kalama, Washington area. In addition to the large amount of barley shipped to ocean elevators, 10.2 percent is shipped to breweries in Vancouver, Washington, and 16.9 percent to feedlots.

## **References**

- Casavant, Kenneth L., and Frank J. Dooley. Transportation Needs of Washington Agriculture Phase II: Present and Future Needs. Washington Department of Agriculture, Olympia, 1983.**
- Dooley, Frank J. "The Theory and Economics of Multiplant Firms Applied to Washington Grain Elevators." Ph.D. dissertation, Department of Agricultural Economics, Washington State University, Pullman, 1986.**
- Mehring, Jeanne C. "Impacts of Waterway Fees on the Movement of Pacific Northwest Wheat." Masters Thesis, Department of Agricultural Economics, Washington State University, Pullman, 1986.**
- Penaranda, Walter F. "Multimodal Choice Analysis for Grain Transportation in Eastern Washington." Ph.D. dissertation, Department of Agricultural Economics, Washington State University, Pullman, 1992.**

# EASTERN WASHINGTON ROAD NEEDS SURVEY

## EASTERN WASHINGTON GRAIN MOVEMENT PROJECT ELEVATOR QUESTIONNAIRE

NAME OF THE FIRM: \_\_\_\_\_

LOCATION OR HOUSE: \_\_\_\_\_

NAME OF PERSON RESPONDING: \_\_\_\_\_

We are interested in the type of transportation services available (truck, rail and truck-barge); the flow of WHEAT and BARLEY in and out of each location; and current charges for various modes of transportation. We have included a questionnaire for each location. Please feel free to make address corrections or include other locations.

Q.1 Do you have RAIL ACCESS at this location?  Yes  No

If you do not have local access to rail, please indicate the NAME of the rail facility employed and the general route used to reach that facility.

NAME: \_\_\_\_\_

GENERAL ROUTE USED (indicate state and county roads used):  
\_\_\_\_\_  
\_\_\_\_\_

Q.2 Please indicate the NAME of the RIVER PORT FACILITY that you use (or would use if you go to the river):

NAME: \_\_\_\_\_

GENERAL ROUTE USED (indicate state and county roads used):  
\_\_\_\_\_  
\_\_\_\_\_

Please indicate the prevailing shipping rate for truck shipment of grain from this elevator to the River Port Facility named above.

	WHEAT	BARLEY
Shipping Charge:	_____ \$/bu	_____ \$/bu

Q.3 Please estimate the average annual volume (past three years) of WHEAT and BARLEY received at this location.

WHEAT	BARLEY	OTHER CROPS
_____ bu.	_____ bu.	_____ bu.

Washington State University  
Department of Agricultural Economics  
Pullman, Washington 99164-6210

62

and

Washington State Department of Transportation  
(D.O.T.)

1993