

Grain Receipts at Columbia River Grain Terminals 1980-81 to 1997-98

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by

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EWITS Research Reports: Background and Purpose

This is the eleventh in a series of Working Papers (topical and current analysis of topics related to the mission of EWITS) to accompany the series of Reports prepared as a part of this study to provide information to help shape the multimodal network necessary for the efficient movement of both freight and people into the next century.

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

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

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

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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.
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9. Gillis, William R., Eric L. Jessup, and Kenneth L. Casavant. "Movement of Freight on Washington's Highways: A Statewide Origin and Destination Study." EWITS Report Number 9, November 1995.
10. Chase, Robert A. and Kenneth L. Casavant. "Eastern Washington Transport-Oriented Input-Output Study: Technical Report." EWITS Research Report Number 10. March 1996.
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Introduction

International markets have become the focus of the grain production in Washington and the United States. In many years the international markets account for over 90 % of Washington's grain sales. Access to these markets is accomplished by the availability of an efficient and balanced transportation system. Washington's transportation system is fortunate in that all three major modes (truck, barge, and rail) are available. An important contributor to the access to international markets is the efficiency and performance of that multimodal system. Such efficiencies arise because of both the competitive and complementary roles played by the modes in our system. Competition serves to make rates more closely reflect costs of operation while encouraging innovation. Complementary roles allow each mode to perform that function for which it is economically suited, while the overall efficiency of the system serving producers and foreign consumers is enhanced.

This efficient system, irrespective of which mode is used, is dependent on the terminals and export facilities available to move the grain from barge, rail, or truck onto the ocean segment of the transportation overseas. These Northwest ports, and the physical facilities within them serve both Washington and national grain movements. Investment in and upgrading of these facilities should reflect the distribution of land side barge, train, or rail arrivals if overall system efficiencies are to be maintained and increased.

It is, therefore, useful to evaluate the volume of grain moving into and through these facilities and to examine in detail the modal split in the arrivals. Trends over time reflect the competitive outcome of the modes as well as changing sources of shipments through Columbia River terminals.

Approach and Objectives

This report is based on unpublished data on volume and arrivals by mode. The data were developed by a comprehensive survey of all exporting firms merchandising grain through those terminal elevators for the crop years 1980-81 to 1997-98. The survey was done in Fall of 1998 by examination of actual firm records by R.C. Grumary and Associates. All exporters were initially sent a letter of inquiry. A follow-up personal contact was made as needed. Individual and aggregate data were reviewed and compared to prior years and respective totals. Verification and correction was requested, if necessary.

The objectives of this working paper were to evaluate volume of wheat and barley moving through the Tidewater elevators, to determine the modal split in the arrivals of these movements, to determine any discernable changes over time and to draw implications on the relationship between volume and modal splits.

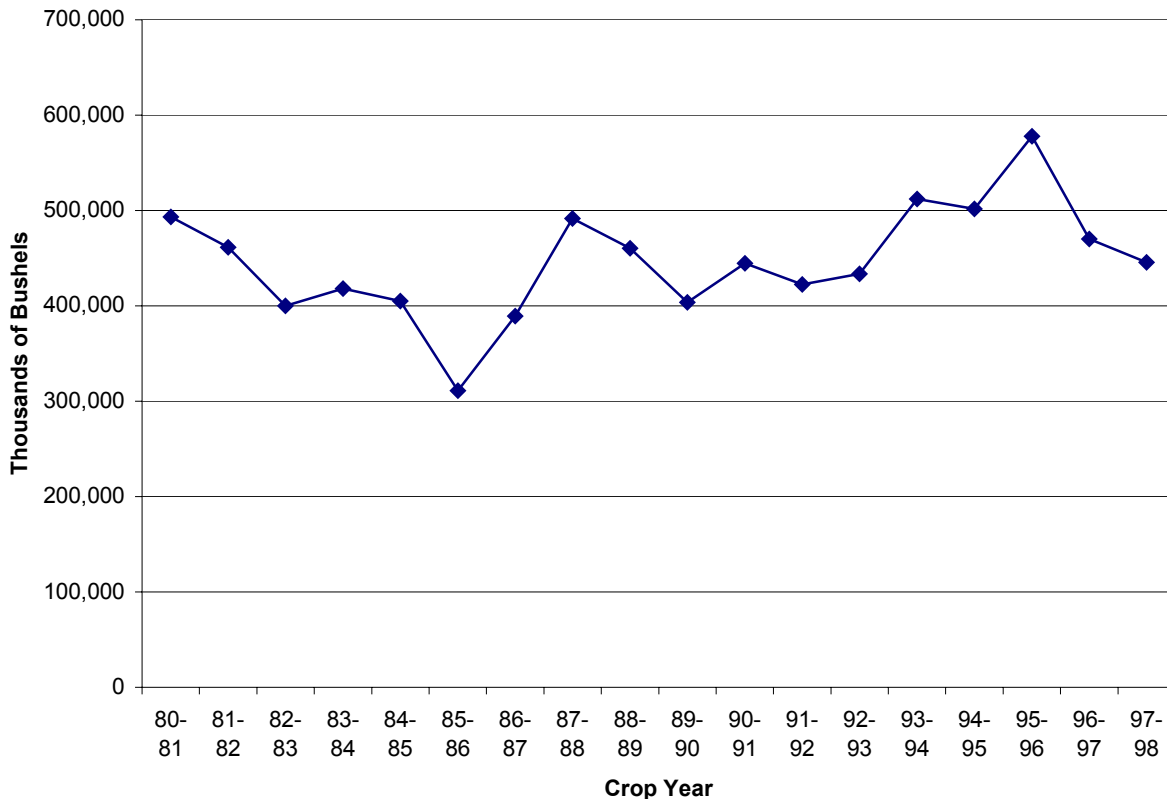
Volume of Shipments

The total grain receipts from the last 18 years at the Columbia River elevators are shown in Table 1 and Figure 1. The fairly noticeable decrease and then recovery in total volumes of exports is evident, starting from 493 million bushels in 1980-81, decreasing to a low of 311 million bushels in 1985-86 to a record high of 578 million bushels in 1995-96, a 15% increase over the previous year. This was followed by a 19% decrease to 470 million bushels in 1996-97 and a continued decrease to almost 446 million bushels in 1997-98. The general changes in the grain volume over the 18-year are apparent with an average of 415 million over the first six years, 435 million over the next six years, and 490 million for the most recent six years. Within the last six years, exports ranged from a low of 434 million bushels to a high of 578 million bushels, with the two most recent years showing a decrease in each year. Unpublished data (due to confidentiality) shows that in the 1997-98 crop year, 206,021,939 (46.2%) bushels of grain were received by Columbia River exporters and 239,724,510 (53.8%) bushels were received by Willamette River exporters. In 1995-96, the split was 41% and 59%, respectively, and in 1996-97 the split was 45% and 55%, respectively, indicating increased activity occurring in the Columbia River locations.

Table 1--Receipts of Grain Transported by Mode in Bushels, 1980-81 to 1997-98

| Crop Year | Rail | Barge | Truck | Total |
|------------------|-------------|--------------|--------------|--------------|
| 80-81 | 247,686 | 217,687 | 28,024 | 493,397 |
| 81-82 | 227,475 | 205,089 | 28,681 | 461,245 |
| 82-83 | 203,748 | 170,254 | 26,054 | 400,056 |
| 83-84 | 229,029 | 171,542 | 17,234 | 417,985 |
| 84-85 | 215,575 | 169,235 | 20,123 | 404,933 |
| 85-86 | 178,411 | 116,722 | 15,819 | 310,952 |
| 86-87 | 233,612 | 140,075 | 15,720 | 389,407 |
| 87-88 | 274,825 | 199,855 | 17,032 | 491,712 |
| 88-89 | 247,441 | 198,185 | 14,707 | 460,333 |
| 89-90 | 226,714 | 165,197 | 11,798 | 403,709 |
| 90-91 | 254,514 | 179,528 | 10,505 | 444,547 |
| 91-92 | 251,942 | 162,067 | 8,406 | 422,415 |
| 92-93 | 267,143 | 155,888 | 10,456 | 433,487 |
| 93-94 | 317,299 | 185,589 | 9,353 | 512,241 |
| 94-95 | 315,989 | 176,540 | 9,282 | 501,811 |
| 95-96 | 343,136 | 227,163 | 7,564 | 577,863 |
| 96-97 | 258,778 | 203,353 | 8,055 | 470,186 |
| 97-98 | 243,499 | 196,252 | 5,995 | 445,746 |

Figure 1: Total Receipts of Grain at Columbia River Export Terminals, 1980-81 to 1997-98



The volumes by each mode over this time period are also shown in Table 1 and Figures 2-5. Rail moved 248 million bushels in 1980-81, increasing to 343 million bushels in 1995-96. Rail movements reflect the same decrease in the 85-86 crop year as total movements, but the strength in movements by rail is clear in the last half of the study period. An average of 226 million bushels in the first eight years and nearly 281 million bushels in the last eight years were transported by rail with a noticeable 10% increase in the 95-96 crop year, followed by a sharp 24% drop in 1996-97 and an additional 6% drop in 1997-98. Barge shipments reflect a general overall steadiness in volume, with a noticeable decrease in 85-86 and 86-87. The overall decrease in the number of bushels barged went from 218 million bushels in 1980-81 to 177 million in 1994-95, but may be exhibiting a turnaround. The number of bushels barged in 1995-96, 1996-97, and 1997-98 averaged 209 million representing a 20% increase in the past three years.

Receipts by truck showed a pronounced and steady decline over the 18 year study period, decreasing from 28 million in 1980-81 to a lowest ever 6 million in 1997-98, with a small increase noted in 1996-97. Even the record year of 1995-96, truck shipments showed a decrease in total volume. The relative shipments by mode, depicted in Figure 5, reflect the trends in volume identified above.

Figure 2: Receipts of Grain by Rail at Columbia River Export Terminals, 1980-81 to 1997-98

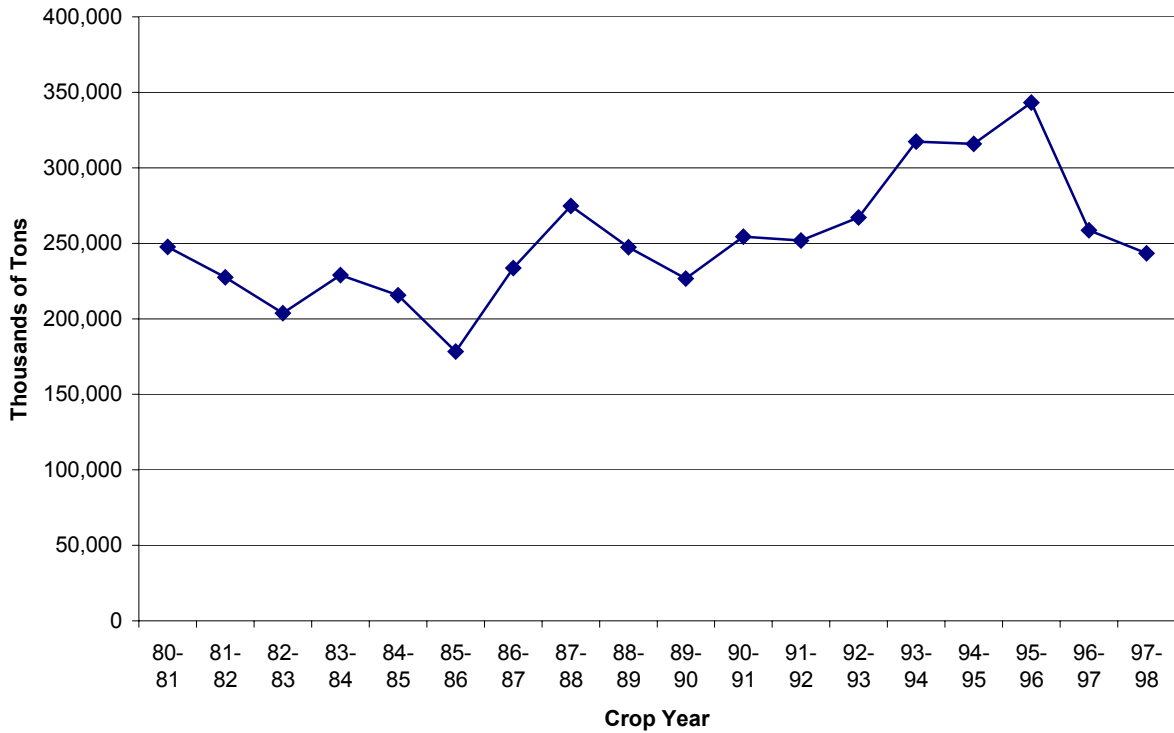


Figure 3: Receipts of Grain by Barge at Columbia River Export Terminals, 1980-81 to 1997-98

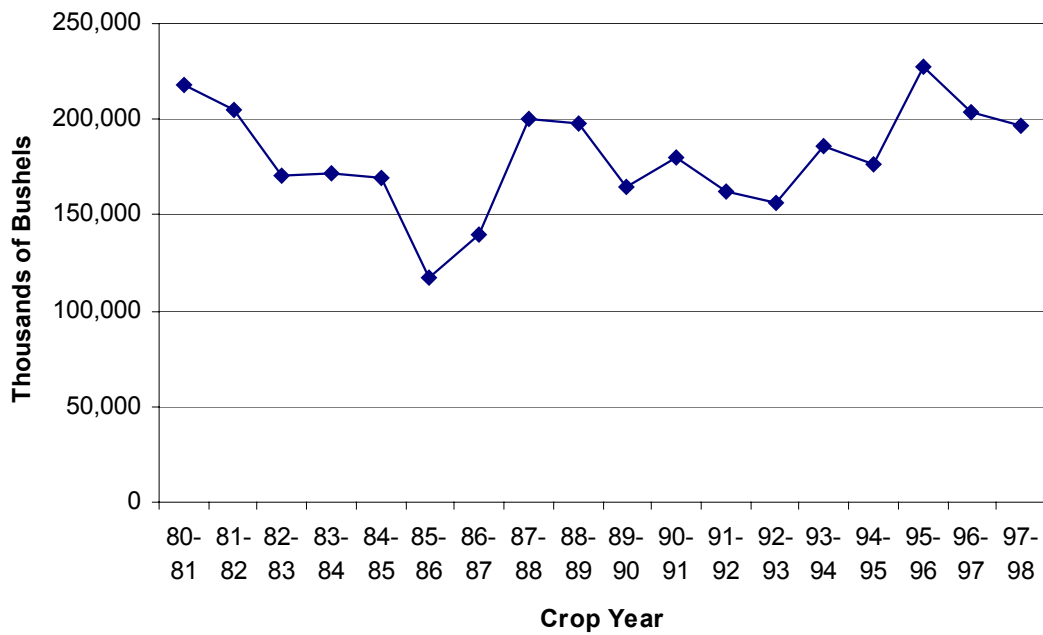


Figure 4: Receipts of Grain by Truck at Columbia River Export Terminals, 1980-81 to 1997-98

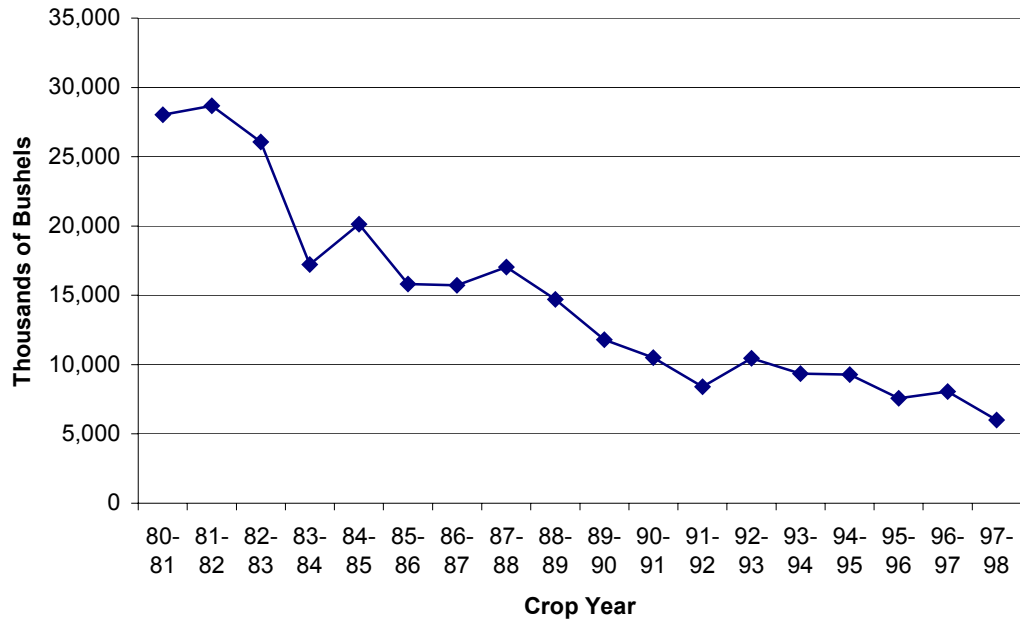
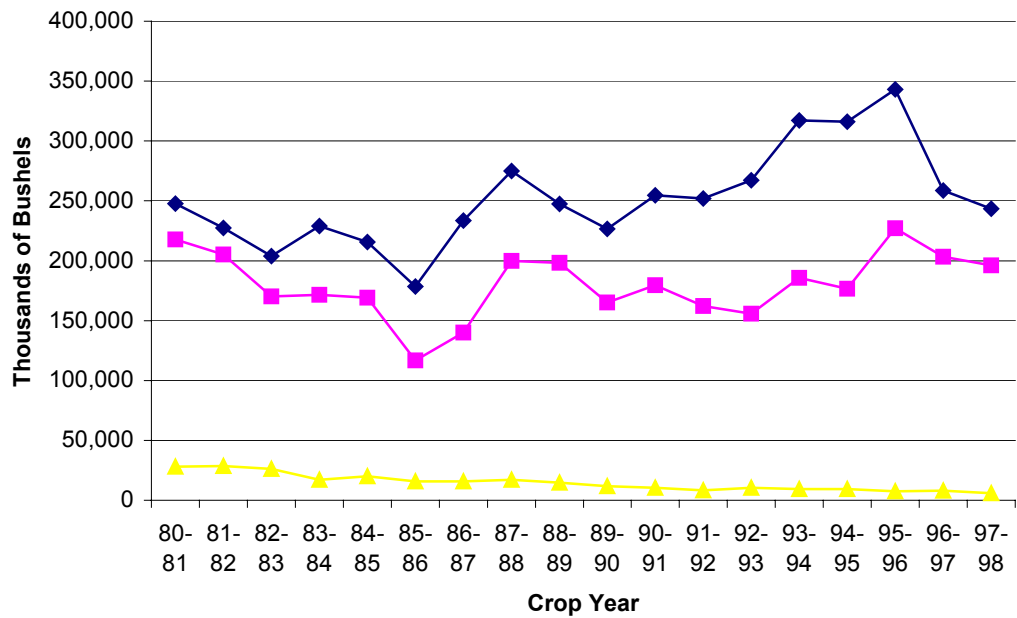


Figure 5: Receipts of Grain by Rail, Barge, and Truck at Columbia River Export Terminals, 1980-81 to 1997-98



Grain Receipts by Modal Split

The arrival pattern, by mode, of grain receipts is indicated in Table 2 and Figures 6-9. The dominance of rail since 1988-89 is quite evident, increasing from a low of 54% to a record high of 63% in the 1994-95 crop year. However, there was a slight and continuing decrease in rail share over the last three years, falling to 55.7% in 1997-98 (Figure 6). However, rail did increase about 10% in total volume overall. Rail had consistently increased its share over the past eight years, until the 8% loss in share over the past three crop years.

Barge receipts have experienced a fairly steady decrease in modal share, with a slight resurgence in the late 1980s (Figure 7) and another three year resurgence beginning in 1995-96. Barge share had decreased from 44% in 1980-81 to a record low of 35% in 1994-95. However, in 1995-96, the percent of grain shipped by barge was 39, an increase of 28% in volume over the previous year. In 1996-97, the barge share had increased to 43% and in 1997-98 it increased to 44%. Receipts by truck have never been above 7% of total receipts and have dropped to about 2% from 1990-91 to 1994-95. In 1995-96 and 1997-98, the share was even lower at 1.3% with an interesting jump to 1.7% in 1996-97 (Figure 8). As evidenced in Figure 9, the modal strength of rail in 1996-97 is apparent, with rail, barge, and truck having about 55%, 44% and 1% of total receipts, respectively.

Table 2--Percent of Grain Transported by Mode, 1980-81 to 1997-98

| Crop Year | Rail | Barge | Truck |
|-----------|------|-------|-------|
| 80-81 | 50.2 | 44.1 | 5.7 |
| 81-82 | 49.3 | 44.5 | 6.2 |
| 82-83 | 50.9 | 42.6 | 6.5 |
| 83-84 | 54.9 | 41.1 | 4.0 |
| 84-85 | 53.2 | 41.8 | 5.0 |
| 85-86 | 57.4 | 37.5 | 5.1 |
| 86-87 | 60.0 | 36.0 | 4.0 |
| 87-88 | 55.9 | 40.6 | 3.5 |
| 88-89 | 53.8 | 43.0 | 3.2 |
| 89-90 | 56.2 | 40.9 | 2.9 |
| 90-91 | 57.2 | 40.4 | 2.4 |
| 91-92 | 59.6 | 38.4 | 2.0 |
| 92-93 | 61.6 | 36.0 | 2.4 |
| 93-94 | 61.9 | 36.0 | 2.4 |
| 94-95 | 62.9 | 35.2 | 1.9 |
| 95-96 | 59.4 | 39.3 | 1.3 |
| 96-97 | 55.0 | 43.3 | 1.7 |
| 97-98 | 54.7 | 44.0 | 1.3 |

Figure 6: Percent of Grain by Rail to Columbia River Export Terminals, 1980-81 to 1997-98

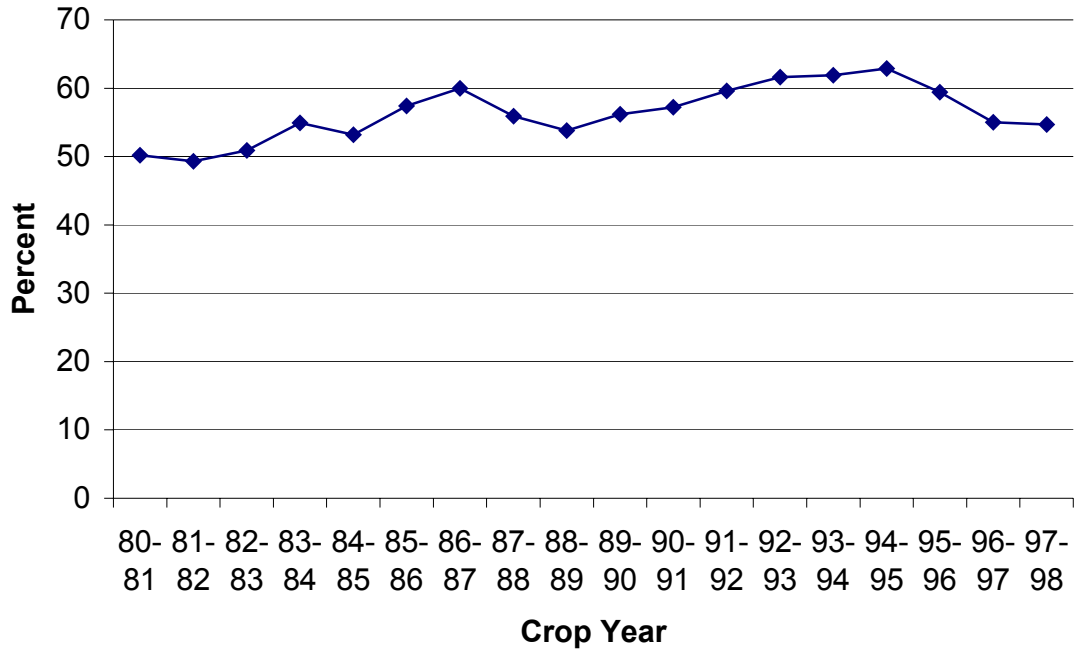


Figure 7: Percent of Grain by Barge to Columbia River Export Terminals, 1980-81 to 1997-98

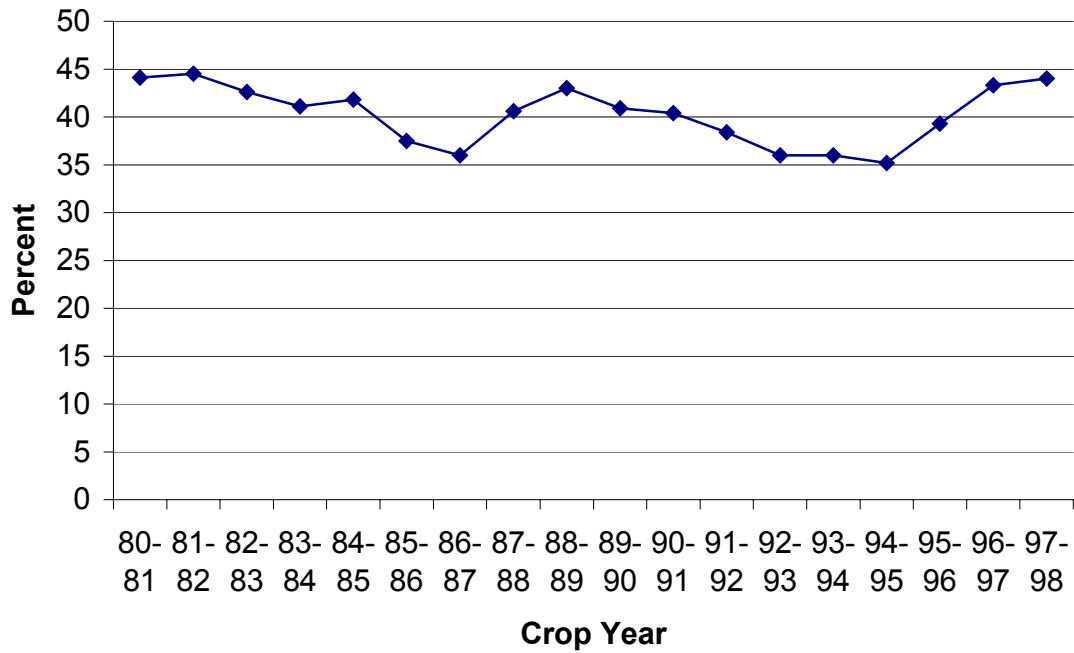


Figure 8: Percent of Grain by Truck to Columbia River Export Terminals, 1980-81 to 1997-98

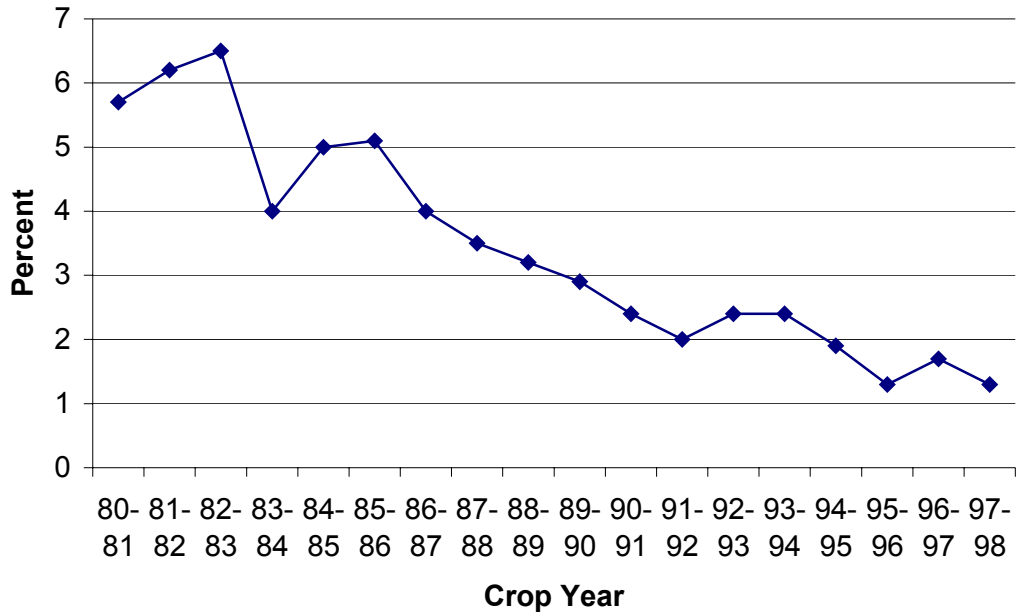
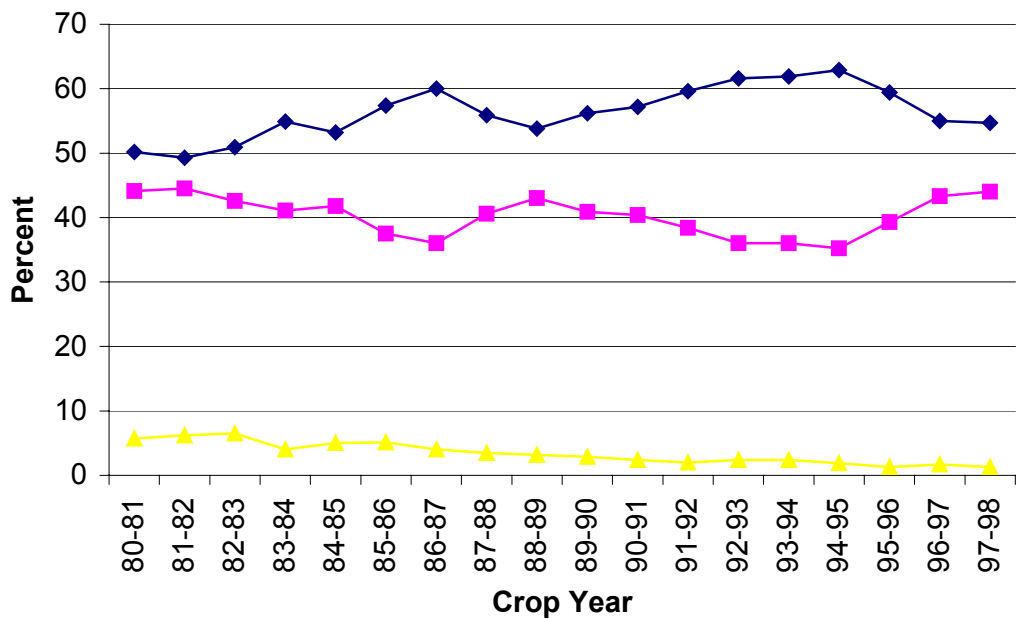


Figure 9: Percent of Grain by Rail, Barge, and Truck to Columbia River Export Terminals, 1980-81 to 1997-98



General Relationships

A better understanding of receipts by mode can be generated by considering source and volume of grain receipts, providing further insight into the overall shipping pattern. Truck is obviously used mainly for local gathering near the export elevators. Most of the barge movements come from the Pacific Northwest states of Idaho, Washington, and Oregon. Shipments in the early 1980s, when barge share was larger, also originated from Montana and the Dakotas. The advent of multiple car rates, occasioned by the Staggers Rail Act of 1980, has decreased those movements. It is also noticeable that, usually, when decreases in total volume occur, an increase in rail share occurs. This, however, did not occur in 1997-98 when total volume decreased 5.2%, but rail decreased 5.9% and barge decreased only 3.5%. This suggests that rail volume is usually more stable than truck-barge; thus, truck-barge movements could be considered to be a mover of traffic that is residual after rail capacity is utilized. This is also related to some long haul movements by rail from the Midwest production areas. However, this relationship did not hold in 1996-97 and 1997-98 when rail problems may have softened rail service.

Rail car shortages have been identified by numerous shippers and commodity organizations. Even in such periods of shortage, the ability of rail to provide service is evident, possibly reflecting the railroads' willingness to provide cars on those long haul, higher revenue moves from the Midwest. Such car shortages are obviously not as important in low volume years. It is possible that, if railroads or shippers increase rail car numbers or relieve the current congestion, barge share of total receipts will continue to decrease relative to rail. The reader is reminded that modal shares of receipts at export elevators do not indicate the relative modal importance from each production area; such analysis is beyond the scope of this report.