

Grain Receipts at Columbia River Grain Terminals 1980-1981 to 2004-2005

SFTA Working Paper # 1

By

Ken Casavant
Marcia Gossard
Eric Jessup

Washington State University
School of Economic Sciences
101 Hulbert Hall
Pullman, WA 99164-6210

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SFTA Research Reports: Background and Purpose

This is the first in a series of working papers prepared from the Strategic Freight Transportation Analysis (SFTA) study. SFTA is a six year comprehensive research and implementation analysis that will provide information (data and direction) for local, state, and national investments and decisions designed to achieve the goal of seamless transportation.

The overall SFTA scope includes the following goals and objectives:

- Improving knowledge about freight corridors.
- Assessing the operations of roadways, rail systems, ports and barges — freight choke points.
- Analyze modal cost structures and competitive mode shares.
- Assess potential economic development opportunities.
- Conduct case studies of public/private transportation costs.
- Evaluate the opportunity for public/private partnerships.

The five specific work tasks identified for SFTA are:

- Work Task 1 – Scoping of Full Project
- Work Task 2 – Statewide Origin and Destination Truck Survey
- Work Task 3 – Shortline Railroad Economic Analysis
- Work Task 4 – Strategic Resources Access Road Network (Critical State and Local Integrated Network)
- Work Task 5 – Adaptive Research Management

For additional information about the SFTA or this report, please contact Eric Jessup or Ken Casavant at the following address:

Washington State University
School of Economic Sciences
101 Hulbert Hall
Pullman, Washington 99164-6210

Or go to the following Web Address:

www.sfta.wsu.edu

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PREVIOUS SFTA REPORTS NOW AVAILABLE

1. Casavant, Kenneth L. and Eric L. Jessup. "SFTA Full Scope of Work." SFTA Research Report Number 1. December 2002.
2. Clark, Michael L., Eric L. Jessup and Kenneth L. Casavant. "Freight Truck Origin and Destination Study: Methods, Procedures and Data Dictionary." SFTA Research Report Number 2. December 2002.
3. Casavant, Kenneth L. and Eric L. Jessup. "Value of Modal Competition for Transportation of Washington Fresh Fruits and Vegetables." SFTA Research Report Number 3. December 2002.
4. Ripplinger, Toby, Kenneth L. Casavant and Eric L. Jessup. "Transportation Usage of the Washington Wine Industry." SFTA Research Report Number 4. May 2003.
5. Clark, Michael L., Eric L. Jessup and Kenneth L. Casavant. "Dynamics of Wheat and Barley Shipments on Haul Roads to and from Grain Warehouses in Washington State." SFTA Research Report Number 5. September 2003.
6. Casavant, Kenneth L., Eric L. Jessup, and Joe Poire. "An Assessment of the Current Situation of the Palouse River and Coulee City Railroad and the Future Role of the Port of Whitman County." SFTA Research Report Number 6. September 2003.
7. Tolliver, Denver, Eric L. Jessup, and Kenneth L. Casavant. "New Techniques for Estimating Impacts of Rail Line Abandonment on Highways in Washington." SFTA Research Report Number 7. September 2003.
8. Tolliver, Denver, Eric L. Jessup, and Kenneth L. Casavant. "Implications of Rail Line Abandonment on Shipper costs in Eastern Washington." SFTA Research Report Number 8. September 2003.
9. Jessup, Eric L. and Kenneth L. Casavant. "Rail Line Investment Alternatives Resulting from Abandonment: A Case Study of Moses Lake, Washington." SFTA Research Report Number 9. July 2003.

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Introduction

International markets have become the dominant focus of grain production in Washington and the United States. In many years, the international markets have accounted for up to 90% of Washington's grain sales. In large part, the efficient and balanced transportation system in the state has helped access to these markets. Washington State benefits from a transportation system that has all three major modes available to it (truck, barge, and rail). Such efficiencies arise due to 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.

Irrespective of which mode is used, this efficient system 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. If overall system efficiencies are to be maintained and increased, investment in and upgrading of these facilities should reflect the distribution of land-side barge, train, or rail arrivals.

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 transportation mode. The data were developed by a comprehensive, confidential survey of all exporting firms merchandising grain through Washington and Oregon terminal elevators for the crop years 1980-81 to 2004-05. The survey was done in fall of 2005 through examination of actual firm records by R. C. Grumary and Associates. All exporters were initially sent a letter of inquiry and questionnaire. 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, where necessary.

The objectives of this working paper are 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.

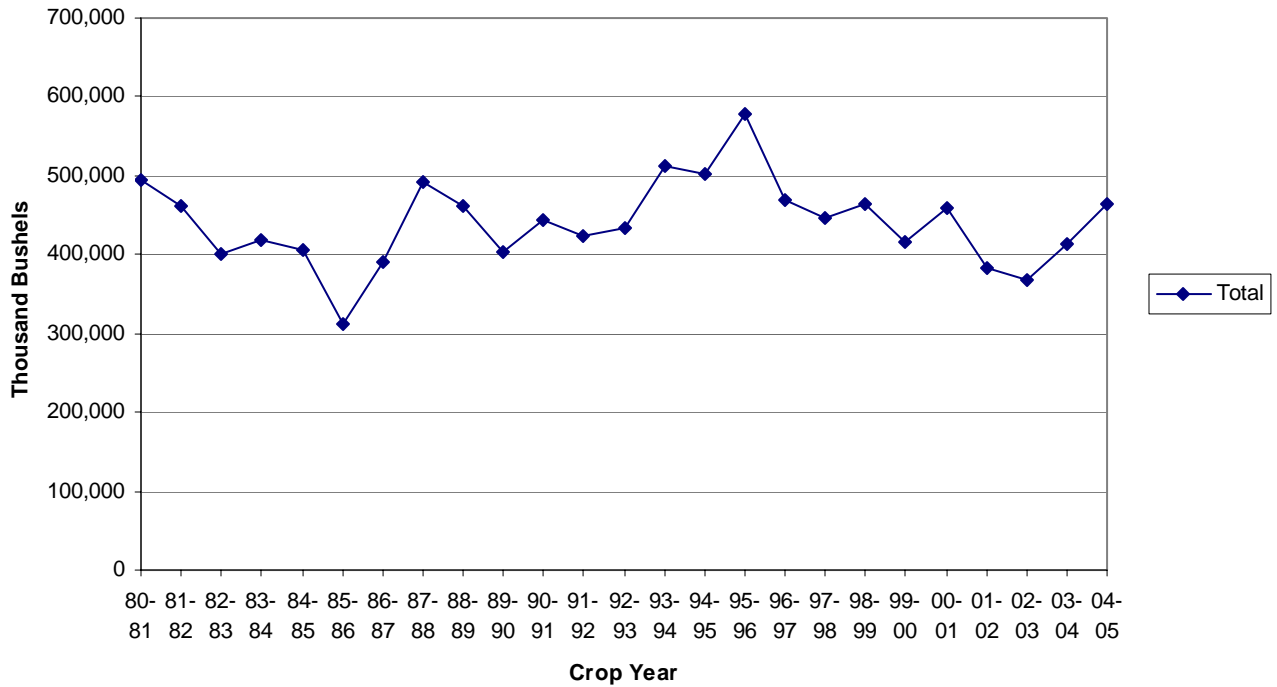
Volume of Shipments

The total grain receipts from the last 25 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 nearly 578 million bushels in 1995-96, a 15% increase over the previous year. This was followed by a decrease of 19% to 470 million bushels in 1996-97 and 5% to 446 million bushels in 1997-98. Total receipts increased by 4.2%, to 464 million bushels in 1998-99 and then decreased to 417 million bushels in the 1999-2000 season. Grain receipts increased to 460 million in 2000-01, but in 2001-02 there was a decrease of 16.5% to 384 million bushels and 2002-03 dropped a further 4% to 367 million bushels — the lowest since 1985-86. By 2003-04 total receipts increased by 13%, to 414 million bushels from the previous year and in 2004-05 there was an additional 12% increase to 463 million bushels.

Table 1: Receipts of Grain, Transported by Mode, in Thousand Bushels, 1980-81 to 2003-2004

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
98-99	228,684	232,478	3,477	464,639
99-00	242,299	171,475	2,791	416,565
00-01	242,187	214,392	3,392	459,971
01-02	223,861	156,085	4,151	384,097
02-03	224,578	137,767	5,484	367,829
03-04	238,492	167,157	8,815	414,464
04-05	274,341	184,014	4,995	463,350

Figure 1: Total Receipts of Grain at Columbia River Export Terminals, Thousands of Bushels, 1980-81 to 2004-05



The general changes in the grain volume over the period from 1980-81 to 2004-05 are apparent with an average of 415 million over the first six years, 435 million over the next six years, 490 over the following six years, and 424 million for the most recent seven years. Within the last ten years, exports ranged from a low of 368 million bushels to a high of 578 million bushels. The volume for the 2002-03 season is the smallest received during the past decade.

During the 2004-05 crop season 231.6 (49.9%) million bushels of grain were received by Columbia River exporters and 231.7 (50.1%) million bushels were received by Willamette River exporters. The total volumes and share of grain received at the two general locations are shown in Table 2. The sources for these data are confidential due to concerns of proprietary information by the terminal operators.

Table 2: Total Volumes and Percentage Share for Grain Received at Columbia and Willamette River Exporters for the Period 1995-2005

Crop Year	Columbia River Exporters		Willamette River Exporters	
	Volume (Bu.)	%	Volume (Bu.)	%
95-96	240,434,000	41.6	337,434,000	58.4
96-97	213,060,522	45.3	257,125,620	54.6
97-98	206,021,939	46.2	239,724,510	53.8
98-99	217,825,918	46.9	246,813,179	53.1
99-00	203,817,993	48.9	212,750,755	51.1
00-01	244,299,774	53.1	215,671,116	46.9
01-02	220,889,370	57.5	163,207,759	42.5
02-03	200,893,866	54.6	166,935,012	45.4
03-04	204,849,558	49.4	209,614,022	50.6
04-05	231,657,107	49.9	231,693,142	50.1

It is apparent from Table 2 that until the 2001-02 season the share of grain delivered to Columbia River exporters increased, while the share for Willamette River exporters declined, reflecting activity and capacity of the exporting grain terminals. Since the 2001-02 crop year, the share of grain delivered to Columbia River exporters has been slightly declining, while the share for Willamette River exporters has been increasing; for the past two seasons nearly equal shares of grain have been delivered to the two regions.

The volumes of grain transported by each mode over the period 1980-2005 are also shown in Table 1 and Figures 2-5. Rail moved 248 million bushels in 1980-81, increasing to a high of 343 million bushels in 1995-96. In 1996-97, however, rail volume declined to 260 million bushels and there was a downward trend until 2004-05, when rail increased to 274 million bushels. The higher share of rail relative to the alternative transport modes is evident in the last half of the study period. An average of 233 million bushels in the first twelve years and 263 million bushels in the last thirteen years were transported by rail, with a 8.6% increase in the 95-96 crop year, followed by a sharp 24% drop in 1996-97 and additional 6% reductions in both the 1997-98 and 1998-99 crop years. In the last two years, the share of rail relative to other transport modes decreased by 3.4% during the 2003-04 crop year but increased slightly by 1.6% in 2004-05.

Barge shipments reflect a general increase in volume since the 85-86 and 86-87 years. The number of bushels barged had decreased from 218 million bushels in 1980-81 to 117 million bushels in 1985-86. Barge transport increased by 99% during the past 13 seasons and peaked at a record 232 million bushels during the 1998-99 season. In contrast to this trend, barge shipments were reduced by 26% to 171 million bushels during the period 1999-2000. In 2000-01 barge transportation increased to 214 million bushels, but decreased in 2002-03 to 138 million bushels, the lowest volume in 17

years. In 2003-04 barge traffic shares were up 2.8% (an increase of 21% in tonnage), However, in 2004-05 there was a very small 0.6% decrease.

Receipts by truck showed a pronounced and steady decline over the 25-year study period, decreasing from 28 million in 1980-81 to a low of 2.8 million bushels in 1999-00. Truck shipments showed a decrease in total volume of 18% even during the record crop year of 1995-96. Beginning in 2000-01, however, truck receipts show an increase in total volume that peaked in 2003-04 at 8.8 million bushels, the highest in 7 years. This was only a 0.6% share increase, but a 60% increase in bushels hauled. This was followed by a significant drop in 2004-05, a 43% traffic share decrease from the previous year. 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, Thousands of Bushels, 1980-81 to 2004-05

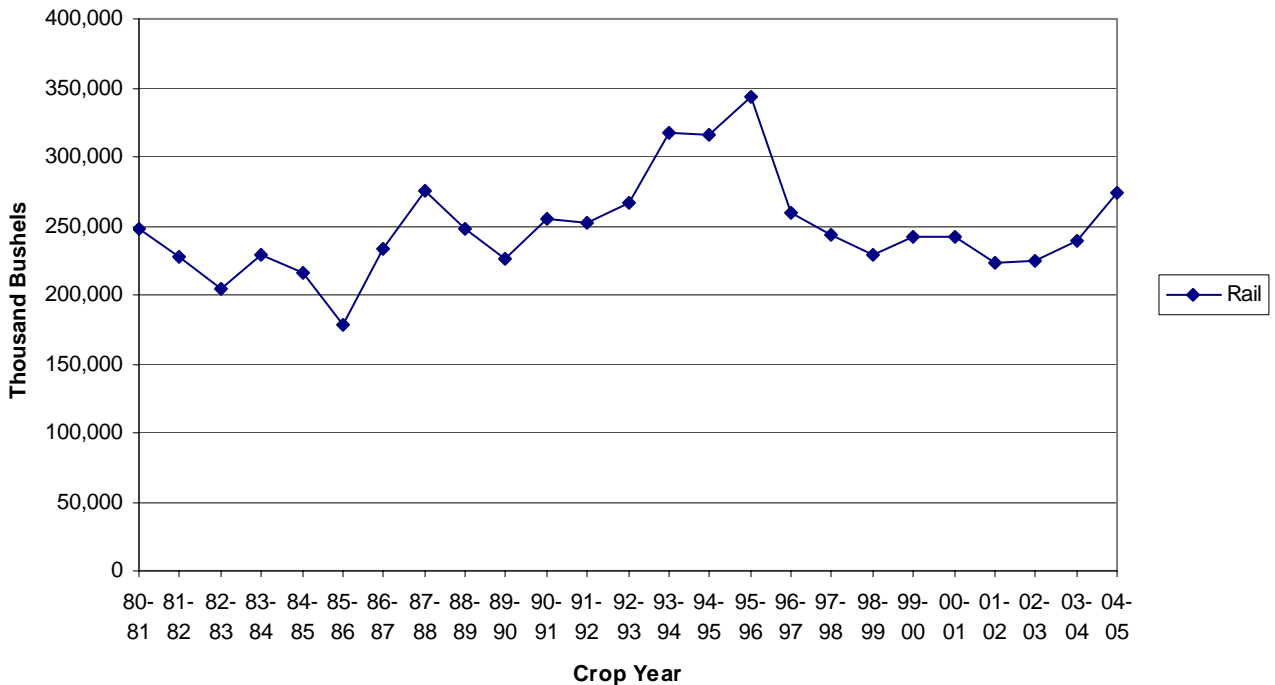


Figure 3: Receipts of Grain by Barge at Columbia River Export Terminals, Thousands of Bushels, 1980-81 to 2004-05

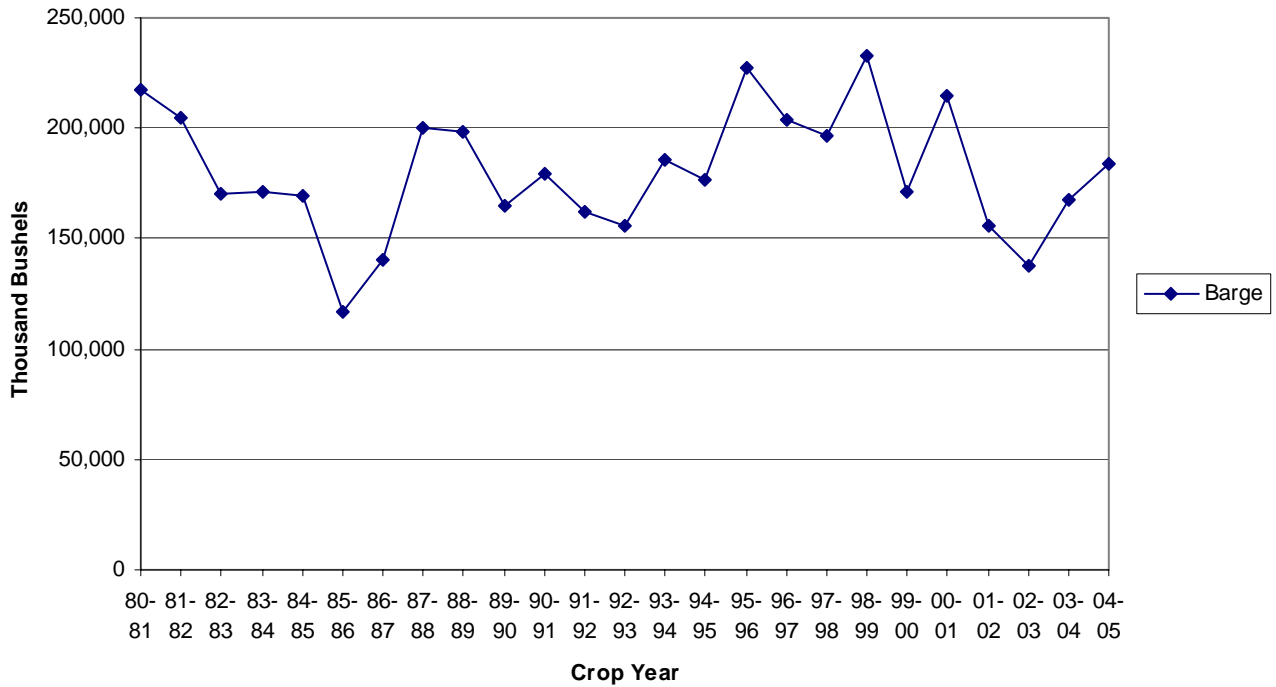


Figure 4: Receipts of Grain by Truck at Columbia River Export Terminals, Thousands of Bushels, 1980-81 to 2004-05

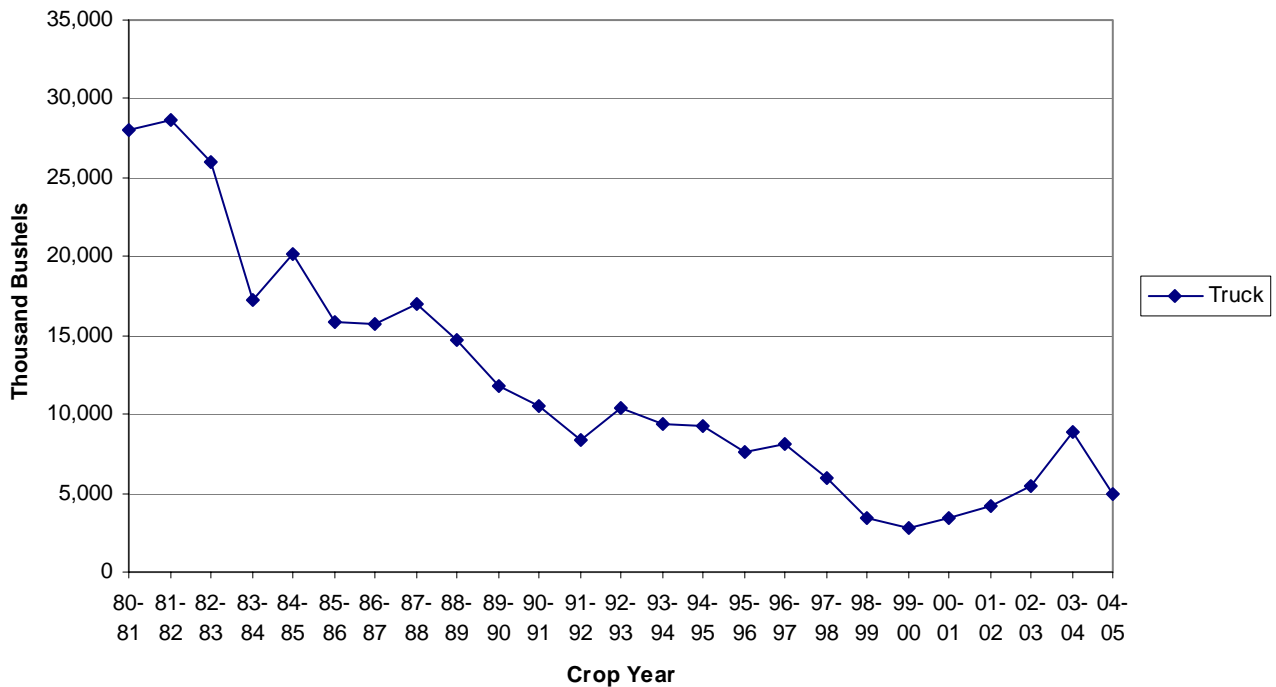
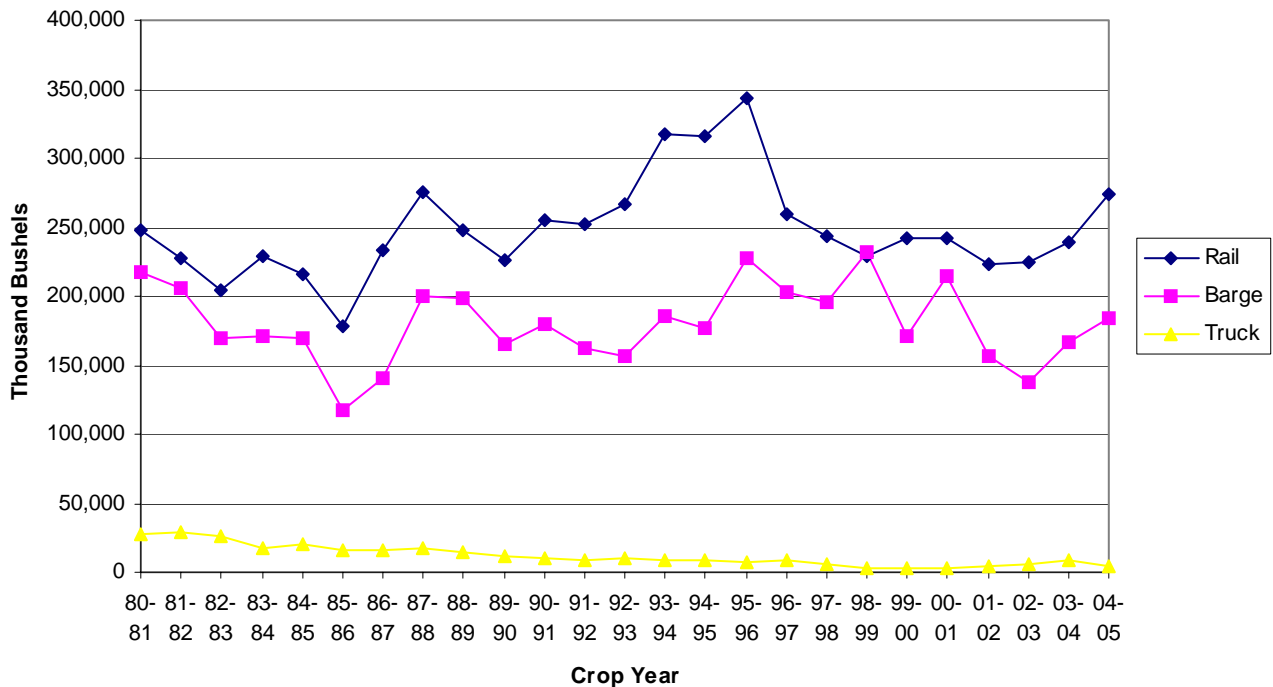


Figure 5: Receipts of Grain by Rail, Barge and Truck at Columbia River Export Terminals, Thousands of Bushels, 1980-81 to 2004-05



Grain Receipts by Modal Split

The arrival pattern, by mode, of grain receipts is indicated in Table 3 and Figures 6-9. The general 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 decrease in rail share over the 1996-99 crop years, falling to 49.2 % in 1998-99 (Figure 6). Rail reversed this trend in the 1999-2000 season by delivering 58.2% of the shipments, in 2000-01 there was a slight decrease, followed by increases over the next two years reaching a total of 61% of the shipments in 2002-03. After a small decrease in 2003-04, there was a modest increase to 59.2% this past season.

Table 3: Percent of Grain Transported by Mode, 1980-81 to 2004-05

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
98-99	49.2	50.0	0.8
99-00	58.2	41.1	0.7
00-01	52.7	46.6	0.7
01-02	58.3	40.6	1.1
02-03	61.0	37.5	1.5
03-04	57.6	40.3	2.1
04-05	59.2	39.7	1.1

Barge receipts have experienced a fairly steady increase in modal share, with a more pronounced resurgence during the 1996-99 seasons (Figure 7). Barge share had decreased from 44% in 1980-81 to a record low of 35% in 1994-95. However, in 1995-96 crop years 39% of grain delivered was shipped by barge, an increase of 28% in volume over the previous year. In the following seasons, the barge share increased to 43.3%, 44% and 50% of total receipts respectively. Barge shipments were reduced to 41.1% of the total delivered grain during the 1999-2000 crop year, rose to 46.6% in 2000-01, followed by a decreasing trend over the next four years to 39.7% in the 2004-05 crop year.

Receipts by truck fell below 1% during the 1998-99 season. In the period 1980-86 the share of grain transported by truck ranged between 4 to 5 percent. However, the volume transported by this mode has continued to decline since 1985-86. As evidenced in Figure 9, the modal strength of rail during the past two decades is apparent. However, in the 1998-99 season, the volume transported by barge had grown to the point where it was greater than rail volume reflecting a modal split of 49.2% rail, 50% barge and 0.8% truck. During the 2004-05 crop year rail has dominated receipts thus reducing the shares of barge and trucking. Total grain deliveries for the past season were split 59.2% rail, 39.7% barge and 1.1% truck.

Figure 6: Percent of Grain Deliveries by Rail to Columbia River Export Terminals, 1980-81 to 2004-05

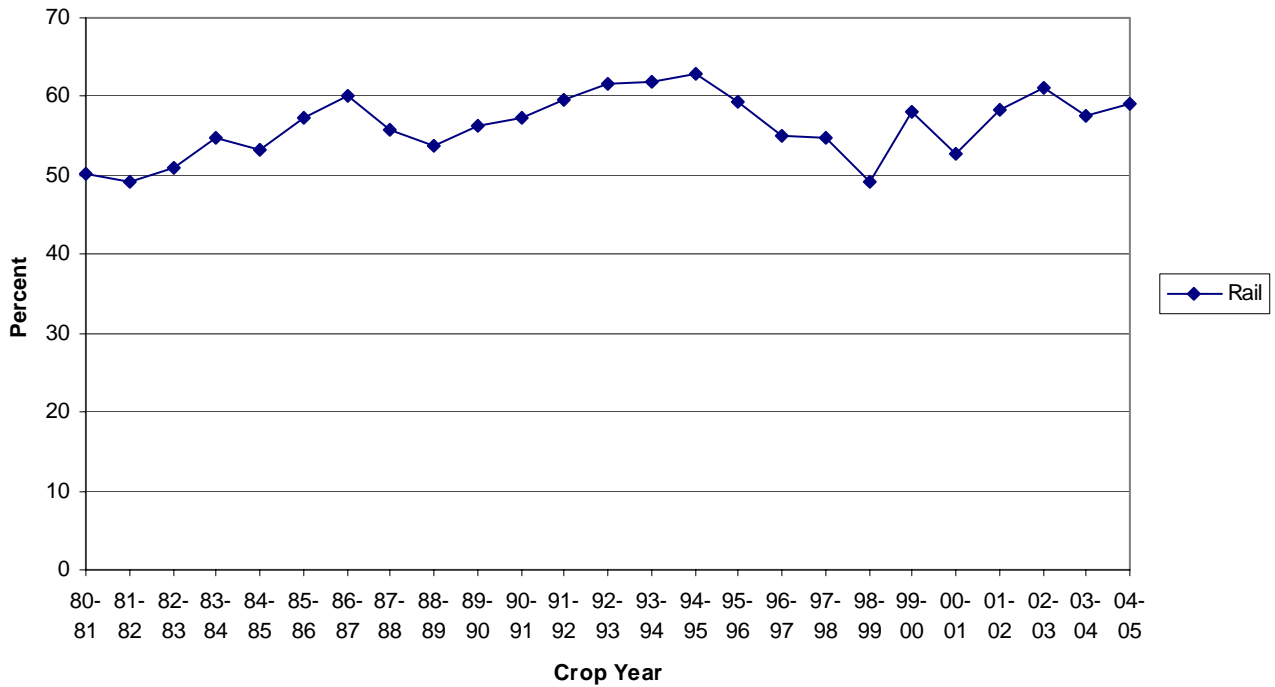


Figure 7: Percent of Grain Deliveries by Barge at Columbia River Export Terminals, 1980-81 to 2004-05

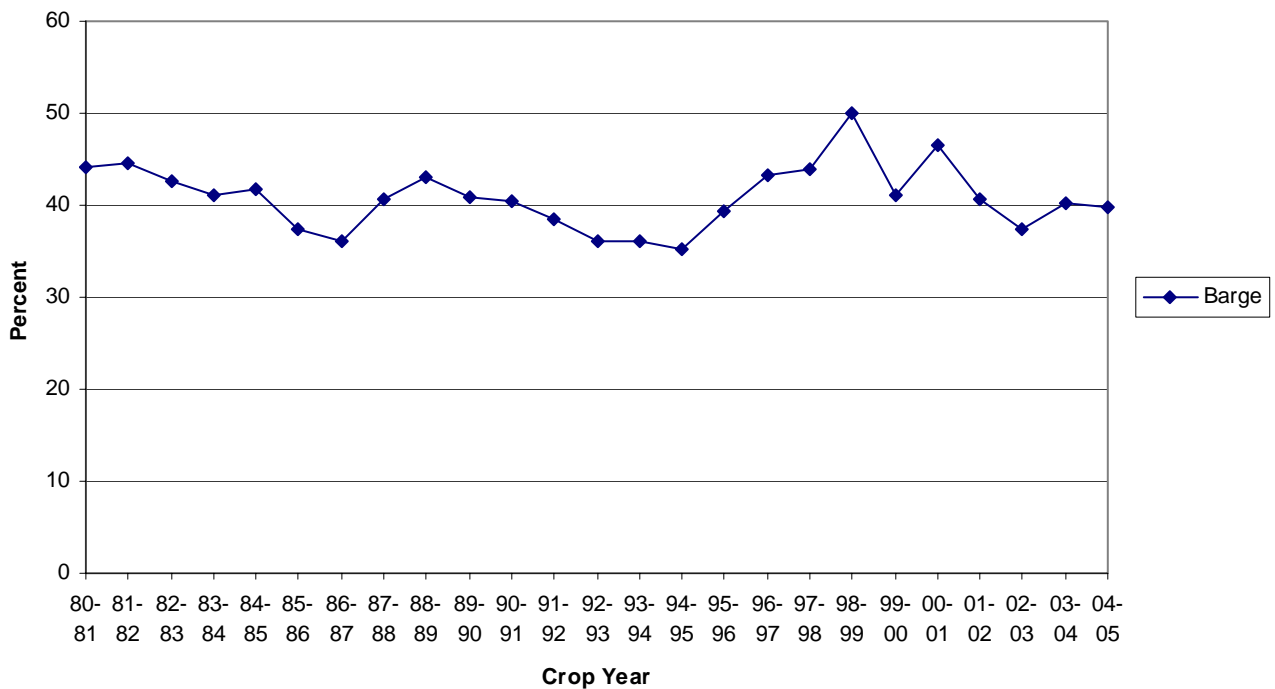


Figure 8: Percent of Grain Deliveries by Truck at Columbia River Export Terminals, 1980-81 to 2004-05

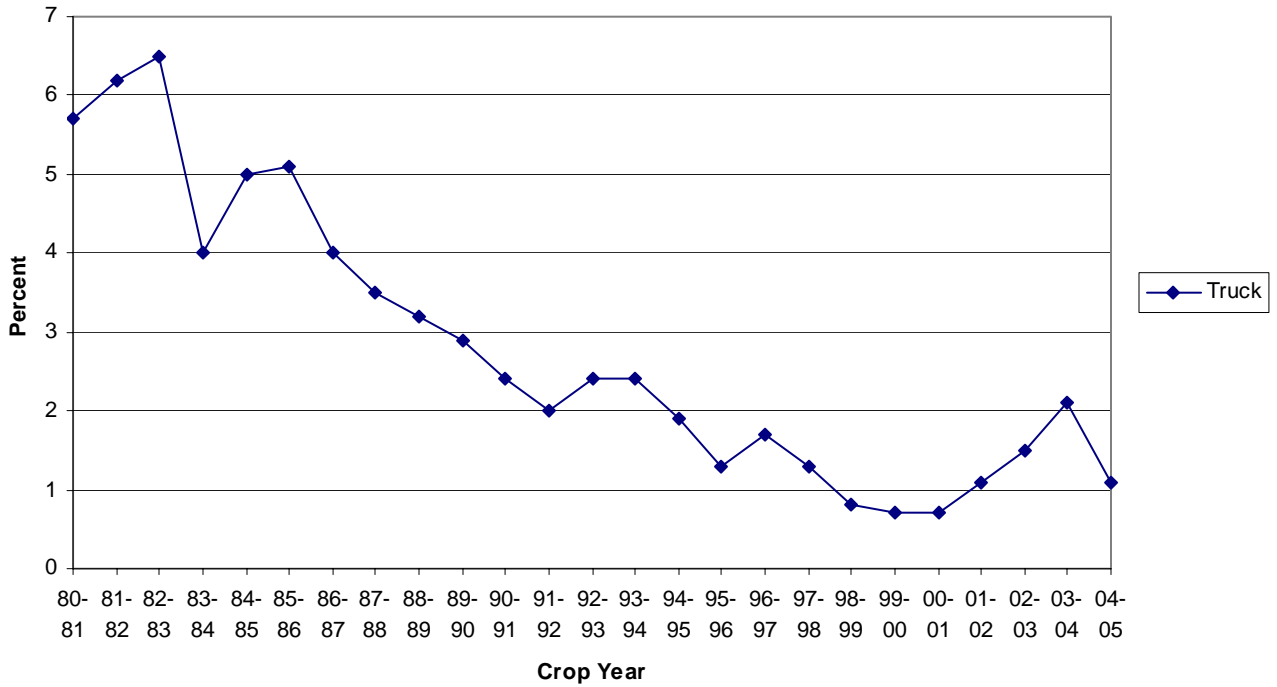
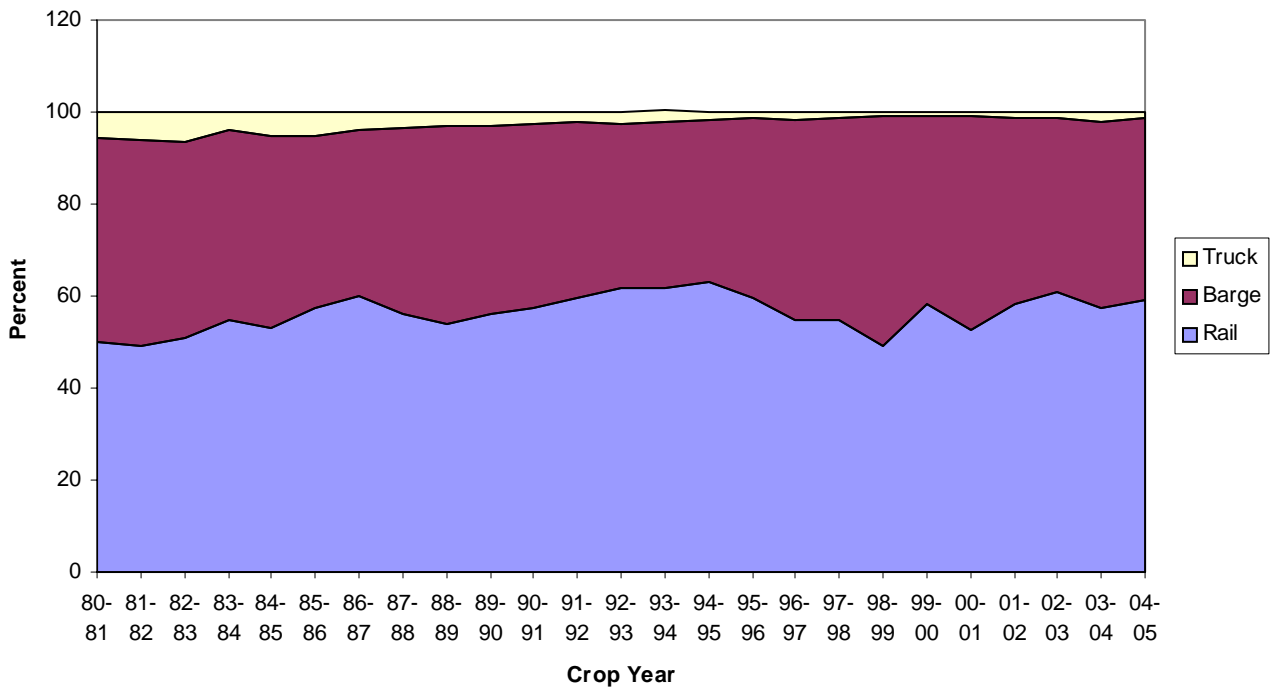


Figure 9: Percent of Grain Deliveries by Rail, Barge and Truck at Columbia River Export Terminals, 1980-81 to 2004-05

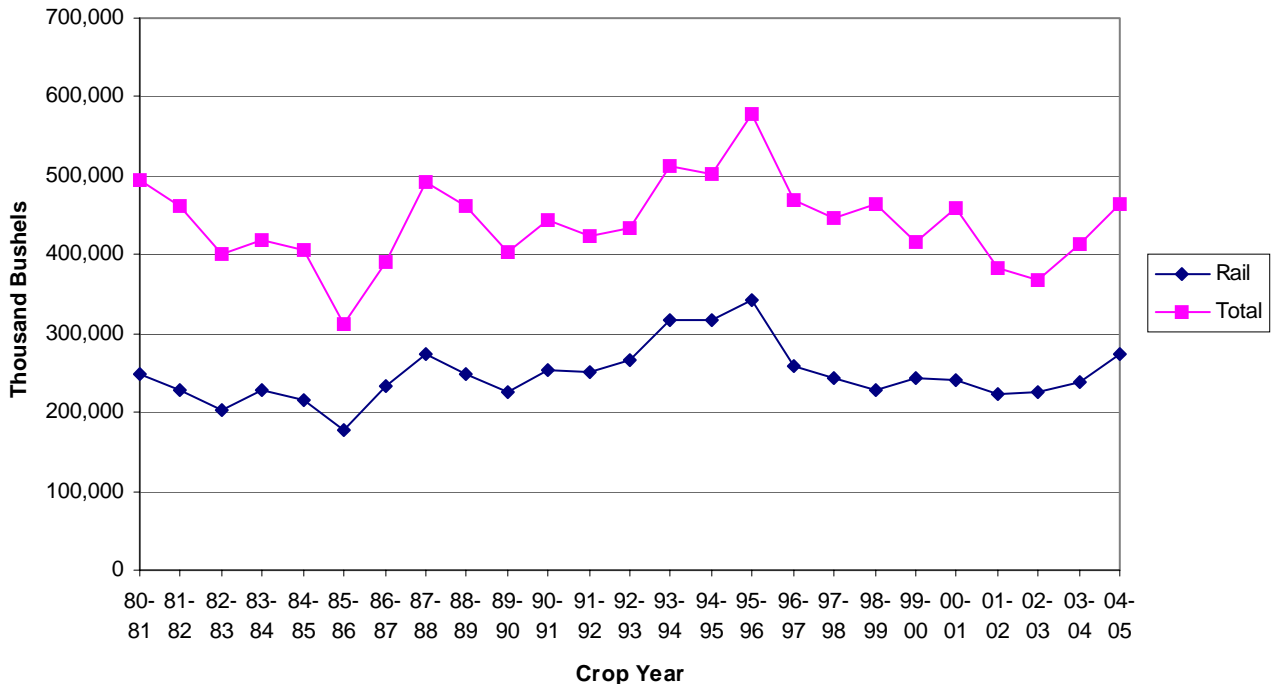


General Relationships

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 and the relative amount of this volume is decreasing. Most of the barge movements come from the Pacific Northwest states of Idaho, Washington, and Oregon. Substantial truck-barge shipments in the early 1980's originated from Montana and the Dakotas. The advent of unit trains (100 cars), occasioned by the Staggers Rail Act of 1980, decreased those movements in the early 90's.

It is also noticeable from Figure 10 that rail volumes closely follow total volume. 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, 1997-98 and 1998-99 when rail problems may have softened rail service in favor of barge service.

Figure 10: Total Receipts of Grain Relative to Total Receipts by Rail at Colombia Export Terminals 1980-81 to 2004-05



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 congestion, then the barge share of total receipts may decrease relative to rail. In times of high grain volumes, however, the critical role played by barge transportation is evident. 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.