The Navigation Economic Technologies Program

May 1, 2005

NETS

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COLUMBIA/ SNAKE RIVER TRANSPORTATION STUDY

US Army Corps
of Engineers®

IWR Report 05-NETS-R-04

Navigation Economic Technologies

The purpose of the Navigation Economic Technologies (NETS) research program is to develop a standardized and defensible suite of economic tools for navigation improvement evaluation. NETS addresses specific navigation economic evaluation and modeling issues that have been raised inside and outside the Corps and is responsive to our commitment to develop and use peer-reviewed tools, techniques and procedures as expressed in the Civil Works strategic plan. The new tools and techniques developed by the NETS research program are to be based on 1) reviews of economic theory, 2) current practices across the Corps (and elsewhere), 3) data needs and availability, and 4) peer recommendations.

The NETS research program has two focus points: expansion of the body of knowledge about the economics underlying uses of the waterways; and creation of a toolbox of practical planning models, methods and techniques that can be applied to a variety of situations.

Expanding the Body of Knowledge

NETS will strive to expand the available body of knowledge about core concepts underlying navigation economic models through the development of scientific papers and reports. For example, NETS will explore how the economic benefits of building new navigation projects are affected by market conditions and/or changes in shipper behaviors, particularly decisions to switch to non-water modes of transportation. The results of such studies will help Corps planners determine whether their economic models are based on realistic premises.

Creating a Planning Toolbox

The NETS research program will develop a series of practical tools and techniques that can be used by Corps navigation planners. The centerpiece of these efforts will be a suite of simulation models. The suite will include models for forecasting international and domestic traffic flows and how they may change with project improvements. It will also include a regional traffic routing model that identifies the annual quantities from each origin and the routes used to satisfy the forecasted demand at each destination. Finally, the suite will include a microscopic event model that generates and routes individual shipments through a system from commodity origin to destination to evaluate non-structural and reliability based measures.

This suite of economic models will enable Corps planners across the country to develop consistent, accurate, useful and comparable analyses regarding the likely impact of changes to navigation infrastructure or systems.

NETS research has been accomplished by a team of academicians, contractors and Corps employees in consultation with other Federal agencies, including the US DOT and USDA; and the Corps Planning Centers of Expertise for Inland and Deep Draft Navigation.

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COLUMBIA/ SNAKE RIVER TRANSPORTATION STUDY

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Columbia/Snake River Transportation Study

Final Report

Columbia/Snake River Transportation Study

Final Report

Prepared for the

Navigation Economic Technologies Program
Institute for Water Resources
U.S. Army Corps of Engineers
Alexandria, Virginia

By

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Introduction

This report examines the demand for transportation along the Columbia Snake River system in the Pacific Northwest. The story of the competition between and among modes of transportation is good background for the current competitive situation affecting the demand for waterborne transportation on the river system.

Development of the Transportation Systems

The initial demand from transportation arose because of the demand for commercial grain production in response to the influx of miners into the region during the 1850"s. Over the next 125 years the transportation system was expanded onto 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 falls at those locations.

In the late 1870's 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, after the staggers Rail Act was implemented.

Water transportation on the Snake and Columbia Rivers was reborn when the Bonneville Lock and Dam opened in 1937. 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, Oregon and Idaho. 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.

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. 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 raill 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. As a result of abandonment, rail shipment of grain became concentrated at elevators which could handle 25 or 26 car units and had the high volume load out equipment to load the rail car unit with 24 hours.

As of the early 1970s and 1980s, trucks were no longer able to compete for the long haul movement of grain. Two competitive modes emerged, survived 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 and barges. 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 buyer such as cattle feeders, dairies, flour mills and breweries.

The grain marketing system has evolved into a traditional pattern. 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.

In the Pacific Northwest, 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 the grain could be moved to market.

The number of grain storage houses decreases 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 of the existing basic elevators 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 through9ut the grain production areas. Since the 1970’s, 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. Grain is moved from these satellites to other rail or river terminals by truck when needed or as dictated by weather and market conditions. Recent changes have seen some rail-barge movement from eastern Washington.

The complete (meaning access to truck, barge and rail) transportation system found in the area has allowed producers to develop links with distant customers 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 region in the U.S., an important factor as global markets become increasingly competitive.

Study Focus

The critical element in the above evolution of the transportation system in the region is the availability of slack water navigation into Idaho. It has been determined by Casavant that as late as 2000, grain was being moved by rail on the equivalent of 1946 rail rates. This did not occur because of the benevolence of the railroads in the region; rather it occurred because of the availability of competitive barge rates.

This waterborne navigation was made available through the work of the Army Corps of Engineers (ACE) who has the mandate of managing the nation's waterways. These waterways have alternative uses, power generation, fish protection/sustainability, environmental support, navigation, recreation, etc. The delicate balance among these goals puts pressure on the ACE to understand the benefits and costs of alternative improvements or maintenance of the navigation use.

Understanding the demand for the navigation services is a critical component of determining those benefits, and ACE undertakes studies to determine those benefits, and associated costs, of maintaining the navigation capabilities of the river system. Survey work, in numerous studies, is used to provide information that allows theoretically justified models of demand to be estimated and used in the ACE's planning and implementation responsibilities. ACE seeks to determine the competitive structure underlying the demand for lock services in this study. Understanding the complexities, elasticities and capacities of alternative modes is the underlying need for the evaluations.

ACE relies on three or four primary models to assess the benefits and costs, models that are very sensitive to the structure of the demand curve: The Tow Cost Model (TCM), the Essence Model (EM), the Ohio River Navigation Investment Model (ORNIM), among others. Construction and estimation of the demand curve for river transportation requires in depth understanding of the shipper decision framework as well as the structure of the industry and the modes in the area. Specific knowledge about shipper response to changes in transportation costs and times is desired to rigorously estimate the shape of the demand curve.

Study Assignment

The authors of this report were retained to design and implement a survey of shippers, both grain and non grain, on the Columbia-Snake River waterway. The research was to provide a descriptive review of demand and potential demand for Columbia-Snake waterway services and to develop a database to be used econometrically to examine demand decisions.

Specific work tasks were:

1. Work with the Institute for Water Resources to develop a survey instrument (and/or modify an existing survey instrument) that has the capacity to provide estimates of poll level demands and allow specific criticisms of previous models used by the ACE to be assessed;

2. Develop a contact list of existing and potential shippers for use in a survey;

3. Develop a survey methodology;

4. Coordinate the survey and survey design with a survey agency;

5. Oversee the implementation of the survey;

6. Organize and clean the data;

7. Write a descriptive report that summarizes the major issues of demand and provides a review of the survey.

Deliverables of the contract were to be the survey instrument, the survey design methodology, the contact list, the survey data and a final descriptive report. This report comprises the final deliverable.

Survey Design

The Social and Economic Sciences Research Center (SESRC) at Washington State University was retained by the authors to conduct the survey of the grain and non grain shippers on the waterway. The SESRC has a national reputation in conducting surveys of this type, via telephone, questionnaire, etc. and has done hundreds of such surveys.

The population in this survey consisted of two parts. The first part was composed of grain elevator businesses in the state of Washington, licensed with the State of Washington Department of Agriculture and listed in its Public Grain Warehouses and grain Dealers Publication. These 78 businesses totaled 414 individual warehouses and differing locations. The second part of the population consisted of 89 non grain businesses located at the ten different ports located on the Snake and Columbia Rivers. The inclusive list was obtained from the individual port tenant lists via telephone and email contact.

The questionnaire itself was modified by the Institute of Water Resources and the SESRC from questionnaires that had been used over the years in over seven surveys by the authors. Up to five versions of the questionnaire were reviewed and modified so as to achieve the purpose of the demand estimation. The final questionnaire was eight pages in length and contained 19 questions and 84 variables. The questionnaire was slightly modified from the grain shipper version to accommodate minor wording changes (the word "elevator" was changed to the word, "business") for the non grain shipper.

Each grain questionnaire, when printed, was personalized with the warehouse location and state warehouse number and the port questionnaires were personalized with the business name printed on the questionnaire. Each questionnaire was further tailored and personalized at the question level for a response variable reflecting the percentage change necessary to cause a change in the respondent's shipping methods. A random number between 10% and 60% (with 10% incremental steps) was assigned to each questionnaire to test if that percentage increase in transportation cost or transit time or that percentage decrease in reliability would lead to a change in shipping methods.

Survey Implementation

SESRC submitted the project design and questionnaire to the Institutional Review Board at Washington State University (WSU-IRB) for review of human subjects procedures and compliance with federal regulations for human subject research. Approval was received on September 9, 2004.

Pretest

SESRC and the authors conducted an in-house pretest prior to mailing the questionnaire. The questionnaire was also reviewed by a grain elevator owner for clarity and accuracy. The pretest was conducted to ensure that the questionnaire was understandable for the respondents and to answer several questions to make sure the survey would progress smoothly. After reviewing the pretest comments, the questionnaire was finalized and prepared for the mailings.

Data Collection

The key element of this TDM (Total Design Method) survey procedure was to implement carefully designed and timed mailings to the survey sample respondents. The goal of data collection was to have a completed questionnaire for each individual elevator warehouse owned by a business. All questionnaires mailed included a respondent ID number to track whether it had been completed and returned. The letters were personalized with the business' name, contact name (when available) and address and printed on SESRC letterhead. All letters were hand signed with a blue ball-point pen by both the SESRC study director and one of the authors.

The first contact sent to grain elevators was mailed on October 19, 2004. It included a cover letter with an 8-page questionnaire booklet for each warehouse and a business reply return envelope. The cover letter introduced the survey and asked to respondents to complete the questionnaire sent for each warehouse. This mailing was sent by USPS Priority mail. Elevator businesses with more than one warehouse had all the questionnaires for the individual warehouses packaged together into a single priority envelope. For the four largest elevator companies, a priority mailing box (available at the post office) was used to send the questionnaires. The business reply envelope was a 9” x 12” or 10” x 13” envelope to accommodate the number of questionnaires to be returned.

The first mailing to Port businesses was sent on November 5, 2004. It was also sent by Priority mail and included a cover letter, 8-page questionnaire booklet and business reply return envelope.

The second contact was a postcard follow-up sent one week after the initial mailing. It was sent October 27, 2004 to Grain businesses and November 12, to Port businesses. The postcard reminder first thanked the respondents for their help with the study and asked them to complete the questionnaire as soon as possible if they had not already done so.

A second questionnaire, cover letter and return envelope was sent to all Grain business non-responders on November 12, 2004 and to Port business non-responders on November 30, 2004. This reminder was sent Priority mail from SESRC and again asked the respondent to complete the paper questionnaire.

The authors also called non-responders from the grain elevator sample to encourage them to return the questionnaires since they had worked with most of the respondents at one time and had personal rapport with them.

Data Entry and Data Management

Data entry of the paper questionnaires began on December 9, 2004 and ended on January 26, 2005. Data entry consists of three steps: (1) coding, (2) initial input and (3) verification. In addition, there is a final data validation step that occurs after all questionnaires have been data entered. These procedures are described below.

The first step of data entry is the process of coding each questionnaire. Coding consists of trained SESRC staff reviewing each questionnaire to make sure each answer is eligible and conforms to a set of specifications. These specifications are outlined in a coding manual, which can be found at the end of this report. Once coded, questionnaires are ready for computer entry.

For computer-assisted data entry work, the SESRC relies on a computer-assisted telephone interviewing (CATI) software installed on networked computer workstations. This CATI system is produced and maintained by the Voxco company. This CATI system creates survey databases that are readable not only by its own statistics program, STATXP, but also by SAS, Lotus, SPSS, Excel, Access, and most other microcomputer and mainframe software.

The second data entry step occurs during initial entry of data and is handled by the CATI system. The system prompts interviewers for valid responses to every question in the survey. For example, on numeric questions, when a response is entered into the computer the CATI system can determine the validity of a response by limiting the acceptable numeric values. When an invalid response is entered, the computer warns the interviewer that the value is out of range and prompts the interviewer for a valid response. Initial entry of data simply means an interviewer enters the answers the respondent wrote on the questionnaire.

The third data entry step is verification of initial entry. Verification is when a different interviewer enters the same questionnaire and its responses a second time into the CATI system. The CATI system then compares the entries, and informs the interviewer if a different response has been entered. If there is a discrepancy between the two entries, the CATI program then prompts the interviewer to make a correction to either the initial entry, or to the verification entry. The SESRC performs verification on every questionnaire received, and on every question within the questionnaire (100% verification). These steps comprise data entry at the SESRC.

A final data validation step occurs at the data management level and consists primarily of accounting for all cases in the project, ensuring that a data record exists for every completed questionnaire received, and reviewing individual cases for discrepancies between initial input and verification. All discrepancies were checked against the questionnaire to ensure accuracy in the data. Data records are passed through a SAS program to ensure that all data fields are readable, and that all responses are read in the format specified for that variable.

Response Rate

Table 1 displays the response rate achieved for the grain businesses, the individual warehouses, and the port businesses. The first response rate is the ratio of number of completed questionnaires to the total number in the sample. This questionnaire was mailed to 78 grain elevator companies (representing 414 individual elevator warehouses) in the state of Washington and 89 businesses headquartered in the Ports along the two rivers. For the grain elevator companies as individuals, 49 completed and returned their questionnaires for a completion rate of 70%. For the individual elevators, 181 questionnaires were completed and returned for a completion rate of 52%. For the Port Shippers, 31 questionnaires were completed and returned for a completion rate of 51%.

Table 1. Final Sample Disposition Report

	Grain businesses	Warehouses	Port businesses
Completed Questionnaires	49	181	31
Refusals	2	55	0
Ineligible	7	23	21
Return to Sender	1	0	7
Other	0	45	0
Non-Response	19	110	30
Total	78	414	89
Response Rate *(Completes/Sample Size)*	62.8%	43.7%	34.8%
Completion Rate *(Completes/Completes + Refusals + No Response)*	70%	52.3%	50.8%

Research Findings

For consistency purposes the descriptive findings of the survey are presented below following the question sequence of the survey questionnaire. The questionnaire was broken down into six sections and these provide the outline of the following brief discussion.

Shipping Characteristics

It was desired to determine what each firm or facility specialized in or moved the most of. Survey respondents by primary commodity shipped from the elevator/business are indicated in Table 2. Responding to the numbers on the grain and non-grain survey lists 86% of the respondents shipped grain, which includes wheat, barley, dry beans, lentils and garbanzo beans. There are 27 non grain firms who moved many varied products, including reinforcing steel, propane, fertilizers, chemicals, fuel and differing wood products. Wood products and construction materials are 50% of the non grain shipments and 7% of the total firms. The varied movements on the river reflect the overall attractiveness of waterborne transportation, especially for bulk or containerized products.

Shipment size affects the ability to shift among modes and identifies to a general degree the actual mode used. Table 3 reveals a large range in shipment size and is in the varying units from the differing facilities. It includes gallons, tons, hundredweight, bushels and several other units of shipment, as indicated in Table 4. Most of the responses were in bushels, reflecting the survey lists but tons and hundredweight were also common. In Table 5 we converted the different units into a common estimate of tons, which we later use to compare rates and other operating characteristics. The many differing responses seem to show that the respondents looked specifically at their last bill of lading to get a precise number for the size of last shipment. Noticeable is the large groupings around the average shipment size for truck, rail and barge (probably in a tow) in Table 5, 30-35 tons, 3,000 tons and 60,000 tons, respectively.

Question three of the questionnaire sought to investigate the loading and unloading capabilities at each location. Tables 6-11 provide detailed responses. Between 97% and 98% of the facilities have the ability to load and unload trucks. Only 12% can load barges and even less, 4% can unload barges. Those capable of unloading barges were all of the non-grain facilities and reflected the fertilizer, chemicals and empty container movements. Interestingly, only 43% of the facilities were capable of loading rail while slightly over 20% had the ability to unload rail cars at that location. These responses indicate the orientation of these facilities is to ship out, rather than to ship in, which makes economic sense given the production of bulk products in the region and the low consumer density.

Respondents were also asked to identify, if they did not have barge or rail loading capability, how far it was to the nearest facility that provided that service. Tables 12-16 provide the array of responses and the statistical characteristics of those responses. It is apparent that some facilities are very close, if not on, the nearest facility that has barge loading capabilities, with 13 respondents indicating that they were

Table 2: The primary commodity shipped from this elevator

```
                                                       Cumulative    Cumulative
Q1                                Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
CONSTRUCTION MATERIALS                    7        3.30             7         3.30
FERTILIZER                                2        0.94             9         4.25
FRESH FRUIT                               1        0.47            10         4.72
FUEL                                      2        0.94            12         5.66
GRAINS                                  183       86.32           195        91.98
HEAVY EQUIPMENT                           1        0.47           196        92.45
HOUSEHOLD PRODUCTS                        1        0.47           197        92.92
MANUFACTURED FOOD                         4        1.89           201        94.81
MANUFACTURED MATERIALS                    3        1.42           204        96.23
WOOD PRODUCTS                             8        3.77           212       100.00
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Table 3: How large was your last single outbound shipment

```
                                             Cumulative    Cumulative
           Q2_1    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Skipped                4          .               .            .
              1            1        0.48             1         0.48
              8            1        0.48             2         0.96
             20            1        0.48             3         1.44
             24            1        0.48             4         1.92
             25            1        0.48             5         2.40
             26            1        0.48             6         2.88
             28            1        0.48             7         3.37
             29            2        0.96             9         4.33
             30            3        1.44            12         5.77
             32            3        1.44            15         7.21
             33            1        0.48            16         7.69
             35            2        0.96            18         8.65
             36            2        0.96            20         9.62
             40            1        0.48            21        10.10
             80            1        0.48            22        10.58
            100            1        0.48            23        11.06
            160            1        0.48            24        11.54
         247.26            1        0.48            25        12.02
            250            1        0.48            26        12.50
            440            4        1.92            30        14.42
            470            1        0.48            31        14.90
            480            2        0.96            33        15.87
            490            1        0.48            34        16.35
            700            2        0.96            36        17.31
            900            1        0.48            37        17.79
           1000           17        8.17            54        25.96
           1100           23       11.06            77        37.02
           1125           10        4.81            87        41.83
           1150            4        1.92            91        43.75
           1160            1        0.48            92        44.23
           1200           25       12.02           117        56.25
           1400            2        0.96           119        57.21
           1500            1        0.48           120        57.69
           2900            1        0.48           121        58.17
           3000            1        0.48           122        58.65
           3300            3        1.44           125        60.10
```

Table 3 (continued): How large was your last single outbound shipment

```
                                             Cumulative    Cumulative
           Q2_1    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
           3400            1        0.48           126        60.58
           3600            3        1.44           129        62.02
           3665            1        0.48           130        62.50
           3800            1        0.48           131        62.98
           4000            2        0.96           133        63.94
           8000            1        0.48           134        64.42
          10000            2        0.96           136        65.38
          10200            1        0.48           137        65.87
          11000            1        0.48           138        66.35
          12320            1        0.48           139        66.83
          14000            1        0.48           140        67.31
          15000            1        0.48           141        67.79
          17000            1        0.48           142        68.27
          20000            3        1.44           145        69.71
          20500            1        0.48           146        70.19
          33000            1        0.48           147        70.67
          40000            1        0.48           148        71.15
          42000            1        0.48           149        71.63
          44000            2        0.96           151        72.60
          48000            1        0.48           152        73.08
```

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         50000           2        0.96           154        74.04
         55000           1        0.48           155        74.52
         60000           2        0.96           157        75.48
         60500           1        0.48           158        75.96
         63000           1        0.48           159        76.44
         64000           1        0.48           160        76.92
         71600           1        0.48           161        77.40
         72340           1        0.48           162        77.88
         80000           1        0.48           163        78.37
         82500           1        0.48           164        78.85
         87100           1        0.48           165        79.33
         88000           2        0.96           167        80.29
         90000          15        7.21           182        87.50
        100000           2        0.96           184        88.46
        105000           1        0.48           185        88.94
        120000          10        4.81           195        93.75
        140000           1        0.48           196        94.23
        154322           2        0.96           198        95.19
        180000           1        0.48           199        95.67
        190000           1        0.48           200        96.15
        198000           4        1.92           204        98.08
        210000           1        0.48           205        98.56
        480000           2        0.96           207        99.52
       1680000           1        0.48           208       100.00
```

Table 4: Type of unit for last single outbound shipment

```
                                           Cumulative    Cumulative
           Q2A    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                  3         .               .          .
Tons                    34       16.27            34        16.27
Bushels                129       61.72           163        77.99
Cwt.                    13        6.22           176        84.21
Gallons                  1        0.48           177        84.69
Other                   32       15.31           209       100.00
```

Table 5: Tons of Last Shipment

```
                                   Cumulative    Cumulative
  Q2_A    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
     .           4         .               .          .
0.0005           1        0.48             1         0.48
  0.02           1        0.48             2         0.96
  0.35           1        0.48             3         1.44
   1.5           1        0.48             4         1.92
     5           2        0.96             6         2.88
   5.5           1        0.48             7         3.37
     8           2        0.96             9         4.33
    10           2        0.96            11         5.29
    20           2        0.96            13         6.25
    21           1        0.48            14         6.73
    22           6        2.88            20         9.62
  23.5           1        0.48            21        10.10
    24           5        2.40            26        12.50
  24.5           1        0.48            27        12.98
    25           2        0.96            29        13.94
    26           1        0.48            30        14.42
  27.5           1        0.48            31        14.90
    28           1        0.48            32        15.38
    29           2        0.96            34        16.35
    30          20        9.62            54        25.96
  31.5           1        0.48            55        26.44
    32           4        1.92            59        28.37
    33          24       11.54            83        39.90
  33.6           2        0.96            85        40.87
 33.75          10        4.81            95        45.67
  34.5           4        1.92            99        47.60
  34.8           1        0.48           100        48.08
    35           3        1.44           103        49.52
  35.8           1        0.48           104        50.00
    36          27       12.98           131        62.98
 36.17           1        0.48           132        63.46
    45           1        0.48           133        63.94
  52.5           1        0.48           134        64.42
77.161           2        0.96           136        65.38
    80           1        0.48           137        65.87
    90           1        0.48           138        66.35
    95           1        0.48           139        66.83
    96           1        0.48           140        67.31
    99           7        3.37           147        70.67
   100           1        0.48           148        71.15
   102           1        0.48           149        71.63
   105           1        0.48           150        72.12
```

```
         120           1        0.48           151        72.60
         240           3        1.44           154        74.04
      247.26           1        0.48           155        74.52
         250           1        0.48           156        75.00
         306           1        0.48           157        75.48
         450           1        0.48           158        75.96
         510           1        0.48           159        76.44
         600           1        0.48           160        76.92
         615           1        0.48           161        77.40
         700           1        0.48           162        77.88
         990           1        0.48           163        78.
```

Table 5 (continued): Tons of Last Shipment

```
                                         Cumulative    Cumulative
        Q2_A    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
        1500           2        0.96           165        79.33
        2400           1        0.48           166        79.81
        2475           1        0.48           167        80.29
        2520           1        0.48           168        80.77
        2613           1        0.48           169        81.25
        2640           2        0.96           171        82.21
        2700          14        6.73           185        88.94
        2900           1        0.48           186        89.42
        3000           3        1.44           189        90.87
        3600          13        6.25           202        97.12
        3665           1        0.48           203        97.60
        3800           1        0.48           204        98.08
        4200           1        0.48           205        98.56
        6300           1        0.48           206        99.04
       12320           1        0.48           207        99.52
       60500           1        0.48           208       100.00
```

Table 6: Loading capabilities: Truck

```
                                              Cumulative    Cumulative
         Q3A_L    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                  1         .             .            .
Yes                    205       97.16           205        97.16
No                       6        2.84           211       100.00
```

Table 7: Unloading capabilities: Truck

```
                                              Cumulative    Cumulative
         Q3A_U    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Yes                    209       98.58           209        98.58
No                       3        1.42           212       100.00
```

Table 8: Loading capabilities: Barges

```
                                              Cumulative    Cumulative
         Q3B_L    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                  1         .             .            .
Yes                     25       11.85            25        11.85
No                     186       88.15           211       100.00
```

Table 9: Unloading capabilities: Barges

```
                                           Cumulative    Cumulative
         Q3B_U    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Yes                      9        4.25             9         4.25
No                     203       95.75           212       100.00
```

Table 10: Loading capabilities: Rail Cars

```
                                           Cumulative    Cumulative
         Q3C_L    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                  1         .               .          .
Yes                     91       43.13            91        43.13
No                     120       56.87           211       100.00
```

Table 11: Unloading capabilities: Rail Cars

```
                                           Cumulative    Cumulative
         Q3C_U    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Yes                     44       20.75            44        20.75
No                     168       79.25           212       100.00
```

Table 12: How close is the nearest barge loading facility

```
                                           Cumulative    Cumulative
           Q3B    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know               3         .               .          .
Missing                  3         .               .          .
Skipped                 25         .               .          .
             1          13        7.18            13         7.18
             2           2        1.10            15         8.29
             3           1        0.55            16         8.84
             4           1        0.55            17         9.39
             5           1        0.55            18         9.94
             6           1        0.55            19        10.50
             8           1        0.55            20        11.05
            10           1        0.55            21        11.60
            11           1        0.55            22        12.15
            12           1        0.55            23        12.71
            13           1        0.55            24        13.26
            15           3        1.66            27        14.92
            16           1        0.55            28        15.47
            18           1        0.55            29        16.02
            19           1        0.55            30        16.57
            20           1        0.55            31        17.13
            21           3        1.66            34        18.78
            22           2        1.10            36        19.89
            24           1        0.55            37        20.44
            25           6        3.31            43        23.76
```

Table 12 (continued): How close is the nearest barge loading facility

```
                                           Cumulative    Cumulative
           Q3B    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
            26           1        0.55            44        24.31
            28           3        1.66            47        25.97
            29           1        0.55            48        26.52
            30           3        1.66            51        28.18
            31           3        1.66            54        29.83
            32           1        0.55            55        30.39
            33           1        0.55            56        30.94
            34           3        1.66            59        32.60
            35           1        0.55            60        33.15
            36           4        2.21            64        35.36
            37           1        0.55            65        35.91
            39           2        1.10            67        37.02
            40           5        2.76            72        39.78
            41           3        1.66            75        41.44
            42           1        0.55            76        41.99
            45           7        3.87            83        45.86
            50          13        7.18            96        53.04
            52           1        0.55            97        53.59
            54           2        1.10            99        54.70
```

```
            55           3        1.66           102        56.35
            57           1        0.55           103        56.91
            58           1        0.55           104        57.46
            60           3        1.66           107        59.12
            63           1        0.55           108        59.67
            65           1        0.55           109        60.22
            69           2        1.10           111        61.33
            70           3        1.66           114        62.98
            72           1        0.55           115        63.54
            75           3        1.66           118        65.19
            78           1        0.55           119        65.75
            80           1        0.55           120        66.30
            82           1        0.55           121        66.85
            84           1        0.55           122        67.40
            90           1        0.55           123        67.96
            92           3        1.66           126        69.61
            96           1        0.55           127        70.17
           100          12        6.63           139        76.80
           101           1        0.55           140        77.35
           107           1        0.55           141        77.90
           109           1        0.55           142        78.45
           110           4        2.21           146        80.66
           114           2        1.10           148        81.77
           115           1        0.55           149        82.32
           116           1        0.55           150        82.87
           118           1        0.55           151        83.43
           120           7        3.87           158        87.29
           121           1        0.55           159        87.85
           125           1        0.55           160        88.40
           126           1        0.55           161        88.95
           130           2        1.10           163        90.06
           137           1        0.55           164        90.61
           140           3        1.66           167        92.27
           142           1        0.55           168        92.82
           145           2        1.10           170        93.92
           147           1        0.55           171        94.48
```

Table 12 (continued): How close is the nearest barge loading facility

```
                                           Cumulative    Cumulative
           Q3B    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

           150           1        0.55           172        95.03
           151           1        0.55           173        95.58
           161           2        1.10           175        96.69
           166           2        1.10           177        97.79
           178           1        0.55           178        98.34
           200           2        1.10           180        99.45
           250           1        0.55           181       100.00
```

Table 13: Variable: Q3B (How close is the nearest barge loading facility)

```
                            Moments

N                         181    Sum Weights                181
Mean               64.6685083    Sum Observations         11705
Std Deviation      49.1765589    Variance            2418.33395
Skewness            0.8376725    Kurtosis            0.34781047
Uncorrected SS        1192245    Corrected SS         435300.11
Coeff Variation    76.0440595    Std Error Mean      3.65526484
```

Table 14: Basic Statistical Measures

```
    Location                    Variability

Mean     64.66851     Std Deviation           49.17656
Median   50.00000     Variance                    2418
Mode      1.00000     Range                  249.00000
                      Interquartile Range     72.00000
```

Table 15: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max           250
99%                200
95%                150
90%                130
75% Q3             100
50% Median          50
25% Q1              28
10%                  6
```

```
5%                   1
1%                   1
0% Min               1
```

Table 16: Variable: Q3B (How close is the nearest barge loading facility)

```
               Missing Values

                       -----Percent Of-----
Missing                             Missing
  Value       Count     All Obs         Obs

      .          25       11.79       80.65
      D           3        1.42        9.68
      M           3        1.42        9.68
  Total          31       14.62      100.00
```

Table 17: Frequency Counts

```
                         Percents                                 Percents
Percents
 Value Count  Cell   Cum                  Value Count  Cell   Cum                  Value Count  Cell   Cum

 1    13   7.2   7.2                     35     1   0.6  33.1                     96     1   0.6  70.2
 2     2   1.1   8.3                     36     4   2.2  35.4                    100    12   6.6  76.8
 3     1   0.6   8.8                     37     1   0.6  35.9                    101     1   0.6  77.3
 4     1   0.6   9.4                     39     2   1.1  37.0                    107     1   0.6  77.9
 5     1   0.6   9.9                     40     5   2.8  39.8                    109     1   0.6  78.5
 6     1   0.6  10.5                     41     3   1.7  41.4                    110     4   2.2  80.7
 8     1   0.6  11.0                     42     1   0.6  42.0                    114     2   1.1  81.8
10     1   0.6  11.6                     45     7   3.9  45.9                    115     1   0.6  82.3
11     1   0.6  12.2                     50    13   7.2  53.0                    116     1   0.6  82.9
12     1   0.6  12.7                     52     1   0.6  53.6                    118     1   0.6  83.4
13     1   0.6  13.3                     54     2   1.1  54.7                    120     7   3.9  87.3
15     3   1.7  14.9                     55     3   1.7  56.4                    121     1   0.6  87.8
16     1   0.6  15.5                     57     1   0.6  56.9                    125     1   0.6  88.4
18     1   0.6  16.0                     58     1   0.6  57.5                    126     1   0.6  89.0
19     1   0.6  16.6                     60     3   1.7  59.1                    130     2   1.1  90.1
20     1   0.6  17.1                     63     1   0.6  59.7                    137     1   0.6  90.6
21     3   1.7  18.8                     65     1   0.6  60.2                    140     3   1.7  92.3
22     2   1.1  19.9                     69     2   1.1  61.3                    142     1   0.6  92.8
24     1   0.6  20.4                     70     3   1.7  63.0                    145     2   1.1  93.9
25     6   3.3  23.8                     72     1   0.6  63.5                    147     1   0.6  94.5
26     1   0.6  24.3                     75     3   1.7  65.2                    150     1   0.6  95.0
28     3   1.7  26.0                     78     1   0.6  65.7                    151     1   0.6  95.6
29     1   0.6  26.5                     80     1   0.6  66.3                    161     2   1.1  96.7
30     3   1.7  28.2                     82     1   0.6  66.9                    166     2   1.1  97.8
31     3   1.7  29.8                     84     1   0.6  67.4                    178     1   0.6  98.3
32     1   0.6  30.4                     90     1   0.6  68.0                    200     2   1.1  99.4
33     1   0.6  30.9                     92     3   1.7  69.6                    250     1   0.6 100.0
34     3   1.7  32.6
```

only one mile away. The most common responses were 50 and 100 miles, combined to be about 14% of the total. The responses over 150 miles appear to be based on moving the product all the way to the tidewater terminals in Portland or Seattle. The average distance was about 65 miles with a range from 1 to 200 miles (Table 14). Fifty percent of the firms were within 50 miles of the nearest facility offering barge loading capability and 75% were within 100 miles (Table 15). The data in Table 16 indicate those that gave no response (.), but based on the previous response this was a correct answer, e.g. they did have barge loading capabilities and therefore shouldn't answer this question. The (m) stands for missing, meaning no answer at all was given and the (d) means some sort of clarifying, but not answering the question, discussion was given. The frequency counts of responses, in Table 17, indicate how often a response, distance in miles, was given.

Similar information was sought about the nearest rail loading capable facility, if the responding facility did not have rail loading capability, and is reported in Tables 18-23. The nearest facility is considerable closer for rail than for barge, as should be expected. The average distance was slightly over 19 miles (barge was 65 miles) with a standard deviation of 18 miles which means 67% of the facilities are within 1-37 miles. Fifty percent of the facilities have rail loading alternatives within 13 miles, as compared to the barge where it was 50 miles, and 75% were within 27 miles as compared to barge which was 100 miles away (Table 21).

The final question under shipping characteristics dealt with the mode of transportation used most often for freight shipments from the location in question. Truck was by far the most common mode used, slightly over 78%, and it was split fairly evenly between private truck (40%) and for-hire truck (38%), as indicated in Table 24. Barge was used by 18, 8.5%, of the facilities and rail was the principal mode for 12.3% of the locations. For the non truck shipments, barge comprised 25% and rail was 63% (Table 25).

Shipment Decisions

The focus of this analysis and much of the Corps demand models is the individual shipper choice. The questionnaire was structured to investigate the shipment decisions and patterns. Accordingly, a series of questions were directed to the very last freight shipment of the respondent.

The commodity shipped in the very last freight shipment is identified in Table 26. The preponderance of grains is apparent, with 183 locations moving grains on their last shipment. It is interesting that the respondents were very consistent with this distribution of last shipments exactly mirroring the responses to "what was the primary commodity shipped from this facility?", described earlier in Table 2.

Table 18: How close is the nearest rail loading facility

```
                                           Cumulative    Cumulative
           Q3C    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Don't Know               1         .               .          .
Missing                  5         .               .          .
Skipped                 91         .               .          .
             1          14       12.17            14        12.17
             2           5        4.35            19        16.52
             3           3        2.61            22        19.13
             4           1        0.87            23        20.00
             5           4        3.48            27        23.48
             6           2        1.74            29        25.22
             7           1        0.87            30        26.09
             8           6        5.22            36        31.30
             9           6        5.22            42        36.52
            10          11        9.57            53        46.09
            11           1        0.87            54        46.96
            12           3        2.61            57        49.57
            13           2        1.74            59        51.30
            14           1        0.87            60        52.17
            15           5        4.35            65        56.52
            16           1        0.87            66        57.39
            17           2        1.74            68        59.13
            18           5        4.35            73        63.48
            20           5        4.35            78        67.83
            21           1        0.87            79        68.70
            22           1        0.87            80        69.57
            23           1        0.87            81        70.43
            24           1        0.87            82        71.30
            25           4        3.48            86        74.78
            27           1        0.87            87        75.65
            28           2        1.74            89        77.39
            30           4        3.48            93        80.87
            31           1        0.87            94        81.74
            33           1        0.87            95        82.61
            35           1        0.87            96        83.48
            40           6        5.22           102        88.70
            43           1        0.87           103        89.57
            45           2        1.74           105        91.30
            50           1        0.87           106        92.17
            57           1        0.87           107        93.04
            61           1        0.87           108        93.91
            63           2        1.74           110        95.65
            66           1        0.87           111        96.52
            69           1        0.87           112        97.39
            70           2        1.74           114        99.13
            80           1        0.87           115       100.00
```

Table 19: Variable: Q3B (How close is the nearest barge loading facility)

```
                              Moments

N                          181    Sum Weights              181
Mean                64.6685083    Sum Observations       11705
Std Deviation       49.1765589    Variance          2418.33395
Skewness             0.8376725    Kurtosis          0.34781047
Uncorrected SS         1192245    Corrected SS       435300.11
Coeff Variation     76.0440595    Std Error Mean    3.65526484
```

Table 20: Basic Statistical Measures

```
        Location                    Variability

    Mean     64.66851     Std Deviation           49.17656
    Median   50.00000     Variance                    2418
    Mode      1.00000     Range                  249.00000
                          Interquartile Range     72.00000
```

Table 21: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max           250
99%                200
95%                150
90%                130
75% Q3             100
50% Median          50
25% Q1              28
10%                  6
5%                   1
```

```
                                                 1%                    1
                                                 0% Min                1
```

Table 22: Variable: Q3B (How close is the nearest barge loading facility)

```
                          Missing Values

                                       -----Percent Of-----
                    Missing                         Missing
                      Value       Count     All Obs     Obs

                          .          25       11.79   80.65
                          D           3        1.42    9.68
                          M           3        1.42    9.68
                      Total          31       14.62  100.00
```

Table 23: Frequency Counts

```
                       Percents                                 Percents
Percents
Value Count  Cell   Cum           Value Count  Cell   Cum            Value Count  Cell   Cum

 1    13   7.2   7.2              35     1   0.6  33.1              96     1   0.6  70.2
 2     2   1.1   8.3              36     4   2.2  35.4             100    12   6.6  76.8
 3     1   0.6   8.8              37     1   0.6  35.9             101     1   0.6  77.3
 4     1   0.6   9.4              39     2   1.1  37.0             107     1   0.6  77.9
 5     1   0.6   9.9              40     5   2.8  39.8             109     1   0.6  78.5
 6     1   0.6  10.5              41     3   1.7  41.4             110     4   2.2  80.7
 8     1   0.6  11.0              42     1   0.6  42.0             114     2   1.1  81.8
10     1   0.6  11.6              45     7   3.9  45.9             115     1   0.6  82.3
11     1   0.6  12.2              50    13   7.2  53.0             116     1   0.6  82.9
12     1   0.6  12.7              52     1   0.6  53.6             118     1   0.6  83.4
13     1   0.6  13.3              54     2   1.1  54.7             120     7   3.9  87.3
15     3   1.7  14.9              55     3   1.7  56.4             121     1   0.6  87.8
16     1   0.6  15.5              57     1   0.6  56.9             125     1   0.6  88.4
18     1   0.6  16.0              58     1   0.6  57.5             126     1   0.6  89.0
```

Table 23 (continued): Frequency Counts

```
                       Percents                                 Percents
Percents
Value Count  Cell   Cum           Value Count  Cell   Cum            Value Count  Cell   Cum

19     1   0.6  16.6              60     3   1.7  59.1             130     2   1.1  90.1
20     1   0.6  17.1              63     1   0.6  59.7             137     1   0.6  90.6
21     3   1.7  18.8              65     1   0.6  60.2             140     3   1.7  92.3
22     2   1.1  19.9              69     2   1.1  61.3             142     1   0.6  92.8
24     1   0.6  20.4              70     3   1.7  63.0             145     2   1.1  93.9
25     6   3.3  23.8              72     1   0.6  63.5             147     1   0.6  94.5
26     1   0.6  24.3              75     3   1.7  65.2             150     1   0.6  95.0
28     3   1.7  26.0              78     1   0.6  65.7             151     1   0.6  95.6
29     1   0.6  26.5              80     1   0.6  66.3             161     2   1.1  96.7
30     3   1.7  28.2              82     1   0.6  66.9             166     2   1.1  97.8
31     3   1.7  29.8              84     1   0.6  67.4             178     1   0.6  98.3
32     1   0.6  30.4              90     1   0.6  68.0             200     2   1.1  99.4
33     1   0.6  30.9              92     3   1.7  69.6             250     1   0.6 100.0
34     3   1.7  32.6
```

Table 24: Type of transportation do you use most often

```
                                                 Cumulative    Cumulative
          Q4M1    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Private Truck           85       40.09            85        40.09
For-Hire Truck          81       38.21           166        78.30
Barge                   18        8.49           184        86.79
Rail                    26       12.26           210        99.06
Other                    2        0.94           212       100.00
```

Table 25: Type of transportation do you use most often

```
                                                 Cumulative    Cumulative
          Q4M3    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Skipped                204           .             .            .
Barge                    2       25.00             2        25.00
Rail                     5       62.50             7        87.50
Other                    1       12.50             8       100.00
```

Table 26: Commodity was shipped in your very last freight shipment

```
                                                           Cumulative    Cumulative
Q5                                Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
CONSTRUCTION MATERIALS                   7        3.30             7         3.30
FERTILIZER                               2        0.94             9         4.25
FRESH FRUIT                              1        0.47            10         4.72
FUEL                                     2        0.94            12         5.66
GRAINS                                 183       86.32           195        91.98
HEAVY EQUIPMENT                          1        0.47           196        92.45
HOUSEHOLD PRODUCTS                       1        0.47           197        92.92
MANUFACTURED FOOD                        4        1.89           201        94.81
MANUFACTURED MATERIALS                   3        1.42           204        96.23
WOOD PRODUCTS                            8        3.77           212       100.00
```

Considerable information was sought, in question 6 and its subparts of the questionnaire, as to what modes were physically available at each location, its rate, average time of shipment, variability of on-time shipments, and actual and potential alternative mode usage. This information is critical to estimating the price and quality of service responsiveness of the shipper to mode characteristics. The principal modal combination alternatives in the area, known to the authors from earlier work and knowledge of the industries, were outlined and investigated.

The descriptive statistics and responses are indicated in Tables 28-33 for the truck rate component of the "truck to Pasco and then barge to Portland" modal combination. The average rate was $9.78 per ton with a standard deviation of $3.62, meaning 67% of the rates were in the range of $6.16 to $13.40 per ton (Tables 29 and 30). Fifty percent of the rates were $10.00 or less and 75% fell at or below $12.33 (Table 31). The values in Table 32, especially (.) indicate that 80 locations did not feel truck to Pasco was economically available to their location. The most common rates quoted were around $7, $8 and $11 (Table 33).

The barge component of the truck to Pasco, barge to Portland is described in Tables 34-39. All responses have been converted into dollars per ton. Almost 70% of the rates were from slightly below $7 to around $8, revealing the consistent barge rate from the Pasco pool locations (Table 34). The average rate was $7.60 per ton with a small standard deviation of $1.17 (Tables 35 and 36), meaning 67% of the rates were between $6.43 to $8.77, again showing the small range in the rates to Portland from the Pasco location. The same finding is evident when examining the results in Table 37, where 25% of the responses are at or below $7.33 and 75% are at or below $8.

Speed of service, a quality variable that affects the demand for a mode, was investigated in this survey, using average shipment time for truck to Pasco, barge to Portland (Tables 40-45). The average time of shipment for the total combined movement was slightly over 11 days but with some significant variation since the standard deviation was over 9 days (Table 42). The median was 7 days but 75% were within 15 days, suggesting again significant variation. The most common estimates were 5,7,15, and 30 days (Table 45).

The reliability of the alternative modal combinations was also investigated by inquiring as to the percent of the time shipments arrive on time at the final destination. Tables 26-51 report the results and the descriptive statistics. The average on time experience was 77% with a standard deviation of about 19 percent, meaning that 67% of the shipments arrived on time from 58% to 96% of the time, in the experiences of the respondents. The reliability of this combination is indicated by the fact that up to 50%

Table 27: Available : Truck to Pasco then Barge to Portland

```
                                           Cumulative    Cumulative
          Q6A1    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                  2         .               .          .
Yes                    130       61.90           130        61.90
No                      80       38.10           210       100.00
```

Table 28: Transportation rate: Truck to Pasco

```
                                           Cumulative    Cumulative
         Q6B1T    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know               5         .               .          .
Missing                  4         .               .          .
Skipped                 80         .               .          .
              2           1        0.81             1         0.81
           2.56           1        0.81             2         1.63
           2.78           1        0.81             3         2.44
           2.79           1        0.81             4         3.25
           3.99           4        3.25             8         6.50
              4           3        2.44            11         8.94
           4.99           1        0.81            12         9.76
           5.33           2        1.63            14        11.38
              6           4        3.25            18        14.63
           6.66          11        8.94            29        23.58
              7           1        0.81            30        24.39
            7.6           1        0.81            31        25.20
           7.66           5        4.07            36        29.27
              8           2        1.63            38        30.89
           8.33          12        9.76            50        40.65
            8.5           1        0.81            51        41.46
           8.66           5        4.07            56        45.53
           9.33           3        2.44            59        47.97
           9.66           1        0.81            60        48.78
             10           5        4.07            65        52.85
          10.33           1        0.81            66        53.66
          10.66          14       11.38            80        65.04
          11.33           1        0.81            81        65.85
          11.66           5        4.07            86        69.92
          11.99           5        4.07            91        73.98
          12.33           9        7.32           100        81.30
          12.66           3        2.44           103        83.74
          12.91           1        0.81           104        84.55
          13.33           6        4.88           110        89.43
          13.66           1        0.81           111        90.24
             14           1        0.81           112        91.06
          14.66           2        1.63           114        92.68
          14.99           1        0.81           115        93.50
          15.33           1        0.81           116        94.31
          15.99           2        1.63           118        95.93
          16.66           2        1.63           120        97.56
             20           3        2.44           123       100.00
```

Table 29: Variable: Q6B1T (Transportation rate: Truck to Pasco)

```
                            Moments

N                         123    Sum Weights                123
Mean                9.7796748    Sum Observations        1202.9
Std Deviation      3.61571092    Variance            13.0733655
Skewness           0.31247802    Kurtosis              0.341895
Uncorrected SS     13358.9214    Corrected SS        1594.95059
Coeff Variation    36.9716887    Std Error Mean      0.32601767
```

Table 30: Basic Statistical Measures

```
         Location                    Variability

     Mean      9.77967     Std Deviation            3.61571
```

```
Median   10.00000     Variance              13.07337
Mode     10.66000     Range                 18.00000
                      Interquartile Range    4.73000
```

Table 31: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max         20.00
99%              20.00
95%              15.99
90%              13.66
75% Q3           12.33
50% Median       10.00
25% Q1            7.60
10%               5.33
5%                3.99
1%                2.56
0% Min            2.00
```

Table 32: Variable: Q6B1T (Transportation rate: Truck to Pasco)

```
                        Missing Values

                                -----Percent Of-----
 Missing                                     Missing
   Value       Count     All Obs                 Obs

       .          80       37.74               89.89
       D           5        2.36                5.62
       M           4        1.89                4.49
   Total          89       41.98              100.00
```

Table 33: Frequency Counts

```
                         Percents                                    Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

 2     1   0.8   0.8                     8     2   1.6  30.9                    12     9   7.3  81.3
 3     1   0.8   1.6                     8    12   9.8  40.7                    13     3   2.4  83.7
 3     1   0.8   2.4                     9     1   0.8  41.5                    13     1   0.8  84.6
 3     1   0.8   3.3                     9     5   4.1  45.5                    13     6   4.9  89.4
 4     4   3.3   6.5                     9     3   2.4  48.0                    14     1   0.8  90.2
 4     3   2.4   8.9                    10     1   0.8  48.8                    14     1   0.8  91.1
 5     1   0.8   9.8                    10     5   4.1  52.8                    15     2   1.6  92.7
 5     2   1.6  11.4                    10     1   0.8  53.7                    15     1   0.8  93.
 6     4   3.3  14.6                    11    14  11.4  65.0                    15     1   0.8  94.3
 7    11   8.9  23.6                    11     1   0.8  65.9                    16     2   1.6  95.9
 7     1   0.8  24.4                    12     5   4.1  69.9                    17     2   1.6  97.6
 8     1   0.8  25.2                    12     5   4.1  74.0                    20     3   2.4 100.0
 8     5   4.1  29.3
```

Table 34: Transportation rate: Barge from Pasco

```
                                                Cumulative    Cumulative
          Q6B1B    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know               6          .             .            .
Missing                  6          .             .            .
Skipped                 80          .             .            .
            0            1        0.83            1         0.83
         4.08            1        0.83            2         1.67
            6            2        1.67            4         3.33
         6.05            1        0.83            5         4.17
          6.6            1        0.83            6         5.00
         6.66           11        9.17           17        14.17
          6.8            3        2.50           20        16.67
            7            8        6.67           28        23.33
         7.33           18       15.00           46        38.33
          7.4            1        0.83           47        39.17
         7.66           22       18.33           69        57.50
         7.99           21       17.50           90        75.00
            8           22       18.33          112        93.33
         9.33            2        1.67          114        95.00
         9.66            1        0.83          115        95.83
         9.99            1        0.83          116        96.67
           10            1        0.83          117        97.50
           11            2        1.67          119        99.17
           12            1        0.83          120       100.00
```

Table 35: Variable: Q6B1B (Transportation rate: Barge from Pasco)

```
                               Moments

N                          120    Sum Weights              120
Mean                7.60291667    Sum Observations      912.35
Std Deviation       1.17936915    Variance          1.39091159
Skewness            -1.5456494    Kurtosis          16.4242892
Uncorrected SS       7102.0395    Corrected SS      165.518479
Coeff Variation      15.512062    Std Error Mean    0.10766118
```

Table 36: Basic Statistical Measures

```
        Location                    Variability

    Mean     7.602917     Std Deviation           1.17937
    Median   7.660000     Variance                1.39091
    Mode     7.660000     Range                  12.00000
                          Interquartile Range     0.66500
```

Table 37: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max        12.000
99%             11.000
95%              9.495
90%              8.000
75% Q3           7.995
50% Median       7.660
25% Q1           7.330
10%              6.660
```

```
                                5%              6.630
                                1%              4.080
                                0% Min          0.000
```

Table 38: Variable: Q6B1B (Transportation rate: Barge from Pasco)

```
                                   Missing Values

                                         -----Percent Of-----
                    Missing                             Missing
                      Value       Count     All Obs         Obs

                          .          80       37.74       86.96
                          D           6        2.83        6.52
                          M           6        2.83        6.52
                      Total          92       43.40      100.00
```

Table 39:   Frequency Counts

```
                  Percents                                Percents
Percents
Value Count  Cell   Cum              Value Count  Cell   Cum              Value Count  Cell   Cum

 0     1   0.8   0.8                  7     8   6.7  23.3                  9     2   1.7  95.0
 4     1   0.8   1.7                  7    18  15.0  38.3                 10     1   0.8  95.8
 6     2   1.7   3.3                  7     1   0.8  39.2                 10     1   0.8  96.7
 6     1   0.8   4.2                  8    22  18.3  57.5                 10     1   0.8  97.5
 7     1   0.8   5.0                  8    21  17.5  75.0                 11     2   1.7  99.2
 7    11   9.2  14.2                  8    22  18.3  93.3                 12     1   0.8 100.0
 7     3   2.5  16.7
```

Table 40:   Average shipment time: Truck to Pasco then Barge to Portland

```
                                                 Cumulative    Cumulative
          Q6C1    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know            3           .             .            .
Missing               6           .             .            .
Skipped              80           .             .            .
             1        6        4.88             6         4.88
             2        3        2.44             9         7.32
             3        5        4.07            14        11.38
             4        4        3.25            18        14.63
             5       19       15.45            37        30.08
             6        3        2.44            40        32.52
             7       35       28.46            75        60.98
             9        1        0.81            76        61.79
            10        7        5.69            83        67.48
            15       20       16.26           103        83.74
            30       20       16.26           123       100.00
```

Table 41: Variable: Q6C1 (Average shipment time: Truck to Pasco then Barge to Portland)

```
                              Moments

N                         123    Sum Weights               123
Mean               11.2195122    Sum Observations         1380
Std Deviation      9.15399813    Variance           83.7956817
Skewness           1.22608105    Kurtosis           0.17998505
Uncorrected SS          25706    Corrected SS       10223.0732
Coeff Variation    81.5899833    Std Error Mean     0.82538821
```

Table 42:   Basic Statistical Measures

```
              Location                    Variability

    Mean     11.21951     Std Deviation            9.15400
    Median    7.00000     Variance                83.79568
```

```
Mode      7.00000     Range                   29.00000
                      Interquartile Range     10.00000
```

Table 43: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max            30
99%                 30
95%                 30
90%                 30
75% Q3              15
50% Median           7
25% Q1               5
10%                  3
5%                   2
1%                   1
0% Min               1
```

Table 44: Variable: Q6C1 (Average shipment time: Truck to Pasco then Barge to Portland)

```
                     Missing Values

                                -----Percent Of-----
    Missing                                  Missing
      Value       Count     All Obs             Obs

          .          80       37.74           89.89
          D           3        1.42            3.37
          M           6        2.83            6.74
      Total          89       41.98          100.00
```

Table 45: Frequency Counts

```
                         Percents                                 Percents
Percents
Value Count  Cell   Cum               Value Count  Cell   Cum               Value Count  Cell   Cum

 1     6   4.9   4.9                   5    19  15.4  30.1                  10     7   5.7  67.5
 2     3   2.4   7.3                   6     3   2.4  32.5                  15    20  16.3  83.7
 3     5   4.1  11.4                   7    35  28.5  61.0                  30    20  16.3 100.0
 4     4   3.3  14.6                   9     1   0.8  61.8
```

Table 46: Percent of on time arrive : Truck to Pasco then Barge to Portland

```
                                                   Cumulative    Cumulative
           Q6D1    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know              17          .              .            .
Missing                 13          .              .            .
Skipped                 80          .              .            .
              0          3        2.94             3         2.94
             50          6        5.88             9         8.82
             60         10        9.80            19        18.63
             75         34       33.33            53        51.96
             80          5        4.90            58        56.86
             85          2        1.96            60        58.82
             90         33       32.35            93        91.18
             98          1        0.98            94        92.16
             99          4        3.92            98        96.08
            100          4        3.92           102       100.00
```

Table 47: Variable: Q6D1 (Percent of on time arrive : Truck to Pasco then Barge to Portland)

```
                             Moments

N                        102    Sum Weights              102
Mean              77.2941176    Sum Observations        7884
Std Deviation     18.7271118    Variance          350.704718
Skewness          -2.1437964    Kurtosis          6.67377472
Uncorrected SS        644808    Corrected SS      35421.1765
Coeff Variation   24.2283791    Std Error Mean    1.85426038
```

```
Table 48:             Basic Statistical Measures

                                     Location                Variability

                                 Mean     77.29412     Std Deviation           18.72711
                                 Median   75.00000     Variance               350.70472
                                 Mode     75.00000     Range                  100.00000
                                                       Interquartile Range     15.00000
```

```
Table 49:                Quantiles (Definition 5)

                                                 Quantile      Estimate

                                                 100% Max          100
                                                 99%               100
                                                 95%                99
                                                 90%                90
                                                 75% Q3             90
                                                 50% Median         75
                                                 25% Q1             75
                                                 10%                60
                                                 5%                 50
                                                 1%                  0
                                                 0% Min              0
```

```
Table 50:  Variable:  Q6D1  (Percent of on time arrive : Truck to Pasco then Barge to Portland)

                                                     Missing Values

                                                             -----Percent Of-----
                                      Missing                             Missing
                                        Value       Count     All Obs         Obs

                                            .          80       37.74       72.73
                                            D          17        8.02       15.45
                                            M          13        6.13       11.82
                                        Total         110       51.89      100.00
```

```
 Table 51:                     Frequency Counts

                         Percents                                Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

  0     3   2.9   2.9                    80     5   4.9  56.9                    98     1   1.0  92.2
 50     6   5.9   8.8                    85     2   2.0  58.8                    99     4   3.9  96.1
 60    10   9.8  18.6                    90    33  32.4  91.2                   100     4   3.9 100.0
 75    34  33.3  52.0
```

```
 Table 52:      Available : Truck to river port then Barge

                                                                     Cumulative    Cumulative
                                    Q6A2    Frequency     Percent     Frequency      Percent
                          fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
                          Missing                  9           .             .            .
                          Yes                    116       57.14           116        57.14
                          No                      87       42.86           203       100.00
```

of the respondents felt 75% was their experience and 75% felt that 90% or less of the shipments were on time (Table 49).

Similar analysis was undertaken for ports other than Pasco, as reported in Tables 52 and 53. Over 57% of the locations had this combination available to them. The ports identified as being used were 13 in number. Windust, Central Ferry and Almota were the most common with 25%, 19% and 15%, respectively. The truck transportation rate to the identified river port averaged $5.63 per ton, with a fairly wide standard deviation of $3.27, meaning that to include 67% of the responses would require a range of

$2.36 to $8.90. Fifty percent of the responses were at or below $4.66 (Table 57). It is evident how distance affects the rates since the average truck rate to Pasco was $9.78 as contrasted to the $5.63 for ports closer to the locations of the respondents.

The barge rate from ports other than Pasco, also identified in the survey and described in Tables 60-65, averaged $8.09 per ton with a fairly small standard deviation of $1.88, meaning that 67% of the responses were between $6.21 and $9.97 per ton. Half of the locations had rates of $7.33 or less for the barge segment of this combination (Table 63). Again, distance is a powerful variable because these ports, farther up stream than Pasco, have an average per ton rate that is higher than the $7.60 per ton for the Pasco movements.

The quality of service for non Pasco shipments, measured by average shipment time from shipping location to Portland, was on average 4.14 days, as reported by the respondents (Tables 67 and 68). There was significant variation as evidenced by a standard deviation of 2.83 days and a median of only 3 days, meaning 50% of the responses were at or below 3 days (Table 69). Again, as indicated in Table 70, 87 of the respondents did not consider this a viable alternative for their location.

This alternative was also examined for variability in transit time (Table72). Reliability was judged extremely high with an average of over 90% on time delivery, with a reasonable standard deviation of 12%. Fifty percent felt the combination was on time up to 90% of the time and 75% felt that 100% or less of the shipments were usually on time (Table 75). Interestingly, the most common estimates were 90% and 100% on time delivery, with 30 and 38 respondents, respectively (Table 77).

Another alternative mode combination was rail to Portland. Seventy one, 35% of the respondents had this combination available to them at their identified location (Table 78). The other locations served as a collector role, using either truck to rail or truck to barge as their overall movement. The rail to Portland rate was also identified (Table79) and put on a dollar per ton basis. The average rate to Portland by rail

Table 53: Truck to river port other than Pasco

Q6POT	Frequency	Percent	Cumulative Frequency	Cumulative Percent
	98	.	.	.
ALMOTA	15	13.16	15	13.16
BIGGS, OR	3	2.63	18	15.79
BOARDMAN	2	1.75	20	17.54
BOARDMAN, OR	1	0.88	21	18.42
BURBANK	1	0.88	22	19.30
CARGILL	1	0.88	23	20.18
CENTRAL FERRY	22	19.30	45	39.47
LEWISTON	11	9.65	56	49.12
LONGVIEW	1	0.88	57	50.00
M	3	2.63	60	52.63
MCNARY	1	0.88	61	53.51
POMEROY GRAIN GROWERS	1	0.88	62	54.39
PORT ALMOTA	2	1.75	64	56.14
ROOSEVELT	1	0.88	65	57.02
S-17-A	1	0.88	66	57.89
SHEFFLER	10	8.77	76	66.67
UMATILLA	1	0.88	77	67.54
WALLULA	8	7.02	85	74.56
WILMA	1	0.88	86	75.44
WINDUST	28	24.56	114	100.00

Table 54: Transportation rate: Truck to river port

Q6B2T	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Don't Know	2	.	.	.
Missing	11	.	.	.
Skipped	87	.	.	.
0	1	0.89	1	0.89
1	2	1.79	3	2.68
1.05	4	3.57	7	6.25
1.11	1	0.89	8	7.14
1.66	1	0.89	9	8.04
2.33	1	0.89	10	8.93
2.66	3	2.68	13	11.61
2.85	2	1.79	15	13.39
3	5	4.46	20	17.86
3.16	1	0.89	21	18.75
3.24	1	0.89	22	19.64
3.33	2	1.79	24	21.43
3.5	1	0.89	25	22.32
3.66	11	9.82	36	32.14
3.99	8	7.14	44	39.29
4	5	4.46	49	43.75
4.17	1	0.89	50	44.64
4.33	3	2.68	53	47.32
4.58	1	0.89	54	48.21
4.66	4	3.57	58	51.79
4.99	1	0.89	59	52.68
5	5	4.46	64	57.14
5.2	1	0.89	65	58.04
5.33	3	2.68	68	60.71
5.66	2	1.79	70	62.50
6	5	4.46	75	66.9

Table 54 (continued): Transportation rate: Truck to river port

Q6B2T	Frequency	Percent	Cumulative Frequency	Cumulative Percent
6.24	1	0.89	76	67.86
6.33	6	5.36	82	73.21
6.66	1	0.89	83	74.11
7.33	3	2.68	86	76.79
7.6	1	0.89	87	77.68
8	4	3.57	91	81.25
8.13	1	0.89	92	82.14
8.66	2	1.79	94	83.93
9	1	0.89	95	84.82
10	3	2.68	98	87.50
10.66	4	3.57	102	91.07
11.66	5	4.46	107	95.54
12.6	1	0.89	108	96.43
12.66	1	0.89	109	97.32
15	2	1.79	111	99.11
15.33	1	0.89	112	100.00

Table 55: Variable: Q6B2T (Transportation rate: Truck to river port)

```
                                                    Moments

                          N                          112    Sum Weights              112
                          Mean                5.62544643    Sum Observations      630.05
                          Std Deviation       3.26795522    Variance          10.6795313
                          Skewness            1.03033013    Kurtosis          0.70241736
                          Uncorrected SS       4729.7405    Corrected SS      1185.42798
                          Coeff Variation     58.0923712    Std Error Mean    0.30879274
```

Table 56: Basic Statistical Measures

```
                                   Location                    Variability

                               Mean     5.625446     Std Deviation            3.26796
                               Median   4.660000     Variance                10.67953
                               Mode     3.660000     Range                   15.33000
                                                     Interquartile Range      3.67000
```

Table 57: Quantiles (Definition 5)

```
                                              Quantile      Estimate

                                              100% Max         15.33
                                              99%              15.00
                                              95%              11.66
                                              90%              10.66
                                              75% Q3            7.33
                                              50% Median        4.66
                                              25% Q1            3.66
                                              10%               2.66
                                              5%                1.05
                                              1%                1.00
                                              0% Min            0.00
```

Table 58: Variable: Q6B2T (Transportation rate: Truck to river port)

```
                                                 Missing Values

                                                        -----Percent Of-----
                                 Missing                               Missing
                                   Value       Count     All Obs           Obs

                                       .          87       41.04         87.00
                                       D           2        0.94          2.00
                                       M          11        5.19         11.00
                                   Total         100       47.17        100.00
```

Table 59: Frequency Counts

```
                         Percents                                    Percents
Percents
Value Count  Cell   Cum                Value Count  Cell   Cum                Value Count  Cell   Cum

 0     1   0.9   0.9                    4     8   7.1  39.3                    7     1   0.9  74.1
 1     2   1.8   2.7                    4     5   4.5  43.8                    7     3   2.7  76.8
 1     4   3.6   6.3                    4     1   0.9  44.6                    8     1   0.9  77.7
 1     1   0.9   7.1                    4     3   2.7  47.3                    8     4   3.6  81.3
 2     1   0.9   8.0                    5     1   0.9  48.2                    8     1   0.9  82.1
 2     1   0.9   8.9                    5     4   3.6  51.8                    9     2   1.8  83.9
 3     3   2.7  11.6                    5     1   0.9  52.7                    9     1   0.9  84.8
 3     2   1.8  13.4                    5     5   4.5  57.1                   10     3   2.7  87.5
 3     5   4.5  17.9                    5     1   0.9  58.0                   11     4   3.6  91.1
 3     1   0.9  18.8                    5     3   2.7  60.7                   12     5   4.5  95.5
 3     1   0.9  19.6                    6     2   1.8  62.5                   13     1   0.9  96.4
 3     2   1.8  21.4                    6     5   4.5  67.0                   13     1   0.9  97.3
 4     1   0.9  22.3                    6     1   0.9  67.9                   15     2   1.8  99.1
 4    11   9.8  32.1                    6     6   5.4  73.2                   15     1   0.9 100.0
```

Table 60: Transportation rate: Barge from other port

```
                                                         Cumulative    Cumulative
                     Q6B2B    Frequency     Percent     Frequency      Percent
                 ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
                 Don't Know          5           .              .            .
                 Missing            12           .              .            .
                 Skipped            87           .              .            .
                         0           1        0.93              1         0.93
                      3.22           1        0.93              2         1.85
                      4.53           1        0.93              3         2.78
```

```
             4.66           1        0.93            4         3.70
                6           1        0.93            5         4.63
             6.23           1        0.93            6         5.56
             6.33           2        1.85            8         7.41
             6.66           9        8.33           17        15.74
             7.33          45       41.67           62        57.41
              7.4           1        0.93           63        58.33
             7.41           3        2.78           66        61.11
             7.75           1        0.93           67        62.04
             7.99           2        1.85           69        63.89
             8.33           6        5.56           75        69.44
             8.39           1        0.93           76        70.37
              8.4           2        1.85           78        72.22
             9.66           1        0.93           79        73.15
               10           2        1.85           81        75.00
```

Table 60 (continued): Transportation rate: Barge from other port

```
                                              Cumulative    Cumulative
            Q6B2B    Frequency     Percent     Frequency      Percent
     ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

            10.33          20       18.52          101        93.52
            10.66           3        2.78          104        96.30
             11.6           1        0.93          105        97.22
             11.8           1        0.93          106        98.15
               13           2        1.85          108       100.00
```

Table 61: Variable: Q6B2B (Transportation rate: Barge from other port)

```
                                 Moments

 N                         108    Sum Weights                108
 Mean               8.08574074    Sum Observations        873.26
 Std Deviation       1.8817258    Variance            3.54089197
 Skewness           -0.2496969    Kurtosis             2.7611797
 Uncorrected SS      7439.8294    Corrected SS        378.875441
 Coeff Variation     23.272151    Std Error Mean      0.18106915
```

Table 62: Basic Statistical Measures

```
            Location                    Variability

     Mean     8.085741     Std Deviation            1.88173
     Median   7.330000     Variance                 3.54089
     Mode     7.330000     Range                   13.00000
                           Interquartile Range      2.83500
```

Table 63: Quantiles (Definition 5)

```
        Quantile      Estimate

        100% Max        13.000
        99%             13.000
        95%             10.660
        90%             10.330
        75% Q3          10.165
        50% Median       7.330
        25% Q1           7.330
        10%              6.660
        5%               6.230
        1%               3.220
        0% Min           0.000
```

Table 64: Variable: Q6B2B (Transportation rate: Barge from other port)

```
                      Missing Values
                              -----Percent Of-----
       Missing                             Missing
         Value       Count     All Obs         Obs

             .          87       41.04       83.65
             D           5        2.36        4.81
             M          12        5.66       11.54
         Total         104       49.06      100.00
```

Table 65: Frequency Counts

```
                        Percents                                        Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

0     1   0.9   0.9                     7    45  41.7  57.4                    10     1   0.9  73.1
```

```
3     1   0.9   1.9                     7     1   0.9  58.3                     10     2   1.9  75.0
5     1   0.9   2.8                     7     3   2.8  61.1                     10    20  18.5  93.5
5     1   0.9   3.7                     8     1   0.9  62.0                     11     3   2.8  96.3
6     1   0.9   4.6                     8     2   1.9  63.9                     12     1   0.9  97.2
6     1   0.9   5.6                     8     6   5.6  69.4                     12     1   0.9  98.1
6     2   1.9   7.4                     8     1   0.9  70.4                     13     2   1.9 100.0
7     9   8.3  15.7                     8     2   1.9  72.2
```

Table 66: Average shipment time: Truck to river port then Barge

```
                                                  Cumulative    Cumulative
          Q6C2    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know              1           .              .            .
Missing                13           .              .            .
Skipped                87           .              .            .
             1         26       23.42             26        23.42
             2          6        5.41             32        28.83
             3         31       27.93             63        56.76
             4          5        4.50             68        61.26
             5         11        9.91             79        71.17
             6          1        0.90             80        72.07
             7         16       14.41             96        86.49
             8         11        9.91            107        96.40
            10          2        1.80            109        98.20
            12          1        0.90            110        99.10
            15          1        0.90            111       100.00
```

Table 67: Variable: Q6C2 (Average shipment time: Truck to river port then Barge)

```
                              Moments

N                         111    Sum Weights                111
Mean               4.13513514    Sum Observations           459
Std Deviation      2.82677615    Variance            7.99066339
Skewness           0.93954423    Kurtosis            0.88073319
Uncorrected SS           2777    Corrected SS        878.972973
Coeff Variation    68.3599461    Std Error Mean      0.26830572
```

Table 68: Basic Statistical Measures

```
         Location                    Variability

     Mean     4.135135     Std Deviation            2.82678
     Median   3.000000     Variance                 7.99066
     Mode     3.000000     Range                   14.00000
                           Interquartile Range      5.00000
```

Table 69: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max            15
99%                 12
95%                  8
90%                  8
75% Q3               7
50% Median           3
25% Q1               2
10%                  1
5%                   1
1%                   1
0% Min               1
```

Table 70: Variable: Q6C2 (Average shipment time: Truck to river port then Barge)

```
                   Missing Values

                          -----Percent Of-----
 Missing                                Missing
   Value       Count     All Obs          Obs

       .          87       41.04        86.14
       D           1        0.47         0.99
       M          13        6.13        12.87
   Total         101       47.64       100.00
```

Table 71: Frequency Counts

```
                         Percents                                 Percents
Percents
Value Count  Cell   Cum                  Value Count  Cell   Cum                  Value Count  Cell   Cum

1    26  23.4  23.4                      5    11   9.9  71.2                     10     2   1.8  98.2
2     6   5.4  28.8                      6     1   0.9  72.1                     12     1   0.9  99.1
3    31  27.9  56.8                      7    16  14.4  86.5                     15     1   0.9 100.0
4     5   4.5  61.3                      8    11   9.9  96.4
```

Table 72: Percent of on time arrive: Truck to river port then Barge

```
                                           Cumulative    Cumulative
          Q6D2    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know            5          .            .          .
Missing              31          .            .          .
Skipped              87          .            .          .
            60       10       11.24            10        11.24
            75        4        4.49            14        15.73
            80        2        2.25            16        17.98
            90       30       33.71            46        51.69
            97        1        1.12            47        52.81
            98        1        1.12            48        53.93
            99        3        3.37            51        57.30
           100       38       42.70            89       100.00
```

Table 73: Variable: Q6D2 (Percent of on time arrive: Truck to river port then Barge)

```
                             Moments

N                          89    Sum Weights                89
Mean               90.4719101    Sum Observations         8052
Std Deviation      12.7190711    Variance            161.77477
Skewness           -1.4950226    Kurtosis           1.17580547
Uncorrected SS         742716    Corrected SS       14236.1798
Coeff Variation    14.0585858    Std Error Mean     1.34821884
```

Table 74: Basic Statistical Measures

```
       Location                    Variability

Mean      90.4719     Std Deviation           12.71907
Median    90.0000     Variance               161.77477
Mode     100.0000     Range                   40.00000
                      Interquartile Range     10.00000
```

Table 75: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max           100
99%                100
95%                100
90%                100
75% Q3             100
50% Median          90
25% Q1              90
10%                 60
5%                  60
1%                  60
0% Min              60
```

Table 76: Variable: Q6D2 (Percent of on time arrive: Truck to river port then Barge)

```
                   Missing Values

                       -----Percent Of-----
Missing                             Missing
  Value       Count     All Obs         Obs

      .          87       41.04       70.73
      D           5        2.36        4.07
      M          31       14.62       25.20
  Total         123       58.02      100.00
```

Table 77: Frequency Counts

```
                         Percents                                        Percents
Percents
Value Count  Cell   Cum                Value Count  Cell   Cum                Value Count  Cell   Cum

60    10  11.2  11.2                   90    30  33.7  51.7                    99     3   3.4  57.3
75     4   4.5  15.7                   97     1   1.1  52.8                   100    38  42.7 100.0
80     2   2.2  18.0                   98     1   1.1  53.9
```

Table 78: Available :Rail to Portland

```
                                                 Cumulative    Cumulative
          Q6A3    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Missing                 8          .             .            .
Yes                    71       34.80           71        34.80
No                    133       65.20          204       100.00
```

Table 79: Transportation rate: Rail to Portland

```
                                                 Cumulative    Cumulative
         Q6B3R    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Don't Know              3          .             .            .
Missing                11          .             .            .
Skipped               133          .             .            .
           1.6          1        1.54            1         1.54
           9.5          1        1.54            2         3.08
          9.68          1        1.54            3         4.62
          9.99          1        1.54            4         6.15
          10.5          3        4.62            7        10.77
         10.99          5        7.69           12        18.46
            11          1        1.54           13        20.00
         11.33          1        1.54           14        21.54
          11.5          1        1.54           15        23.08
         11.99          1        1.54           16        24.62
            12          1        1.54           17        26.15
         12.66          2        3.08           19        29.23
         12.99          2        3.08           21        32.31
            13          1        1.54           22        33.85
         13.23          1        1.54           23        35.38
         13.29          1        1.54           24        36.92
         13.33          5        7.69           29        44.6
         13.35          1        1.54           30        46.15
         13.66          6        9.23           36        55.38
         13.87          1        1.54           37        56.92
         13.99          7       10.77           44        67.69
         14.33          3        4.62           47        72.31
         14.66          3        4.62           50        76.92
         14.99          5        7.69           55        84.62
         15.23          2        3.08           57        87.69
          16.5          2        3.08           59        90.77
            17          1        1.54           60        92.31
         18.48          1        1.54           61        93.85
          22.5          1        1.54           62        95.38
         22.99          1        1.54           63        96.92
         26.66          1        1.54           64        98.46
         36.29          1        1.54           65       100.00
```

Table 80: Variable: Q6B3R (Transportation rate: Rail to Portland)

```
                                   Moments

  N                          65    Sum Weights                 65
  Mean               13.9833846    Sum Observations        908.92
  Std Deviation      4.31862003    Variance             18.650479
  Skewness           2.43490426    Kurtosis            12.2176894
  Uncorrected SS     13903.4086    Corrected SS        1193.63066
  Coeff Variation    30.8839394    Std Error Mean      0.5356
```

Table 81: Basic Statistical Measures

```
    Location                    Variability

Mean     13.98338     Std Deviation           4.31862
Median   13.66000     Variance               18.65048
Mode     13.99000     Range                  34.69000
                      Interquartile Range     2.66000
```

Table 82:

```
Quantiles (Definition 5)

                Quantile      Estimate

                100% Max         36.29
                99%              36.29
                95%              22.50
                90%              16.50
                75% Q3           14.66
                50% Median       13.66
                25% Q1           12.00
                10%              10.50
                5%                9.99
                1%                1.60
                0% Min            1.60
```

was almost $14, with a standard deviation of $4.32 cents, meaning that 67% of the rates were between $9.68 and $18.32 (Tables 80 and 81). The median rate was $13.66, meaning there were as many rates above this number as there was below (Table 82). The maximum rate, $36.29 reflects a commodity that is light loaded and odd size, leading to a significantly higher per ton rate. The most common rate quote was $14 per ton, followed by $13, $11 and $15 (Table 84).

The average shipment time for rail to Portland was an average of 10.4 days but with a rather large standard deviation of 9.65 days, suggesting that respondents experienced significantly different service from the railroads (Tables 86 and 87). The median experience was only 7 days, significantly less than the average, reflecting those outlier estimates of 45 and 60 days, and numerous 20 and 21 day estimates (Table 88). By far the most common experiences were either 5, 7 or 12 days (Table 90).

The reliability of rail is reflected in its on time arrivals (Table 91), and it also shows a great deal of differing experiences. The average on time experience was 63% with a standard deviation of about 18 percent. The median estimate was 65 % suggesting a fairly normal distribution in this variable. The most common estimate was 75%, followed by 65% and 50% (Table 96). It is interesting that the rail reliability and speed of delivery were notably less than the combinations that utilize barge movements.

A common movement is for a small elevator to truck product to a railroad siding/elevator where lower cost multiple car rates are available and then to send the grain by rail to Portland (Table 97). This alternative was identified as available by108 of the survey respondents, slightly less than 53%. Attention in the questionnaire was paid to the separate truck and rail rates. The frequency of the rate quotes for the truck leg of the movement, in dollars per ton, is indicated in Table 98 with Tables 99-103 providing more descriptive statistics. The average truck rate to the railroad was $4.36 but with significant variation (Tables 99 and 100). The median estimate was $3, significantly less than the average revealing the existence of high estimates for some movements, again probably due to some of the non grain commodities being of high value and carrying a high truck rate. By far the most common estimates were $3 and $2 (Table 103).

The rail rate in the truck to rail and then rail to Portland combination was also collected in the survey and is presented in dollars per ton in Table 104. The average rate was $10.66 with a standard deviation of $3.22 (Tables 105 and 106). The median rate was estimated at $10.99, again suggesting a fairly normal distribution (Table 107). It should be noted that this combination identified a rail rate that was significantly lower than direct rail to Portland, discussed above with an average rate of $14. This indicates that this combination is accessing the lower cost 25 car rail rates and even some of the 110-car rail rates.

Table 83: Variable: Q6B3R (Transportation rate: Rail to Portland)

```
                                       Missing Values

                                                -----Percent Of-----
                   Missing                                   Missing
                     Value       Count     All Obs              Obs

                         .         133       62.74            90.48
                         D           3        1.42             2.04
                         M          11        5.19             7.48
                     Total         147       69.34           100.00
```

Table 84: Frequency Counts

```
                        Percents                                  Percents
Percents
Value Count  Cell   Cum                Value Count  Cell   Cum                Value Count  Cell   Cum

  2     1   1.5   1.5                   13     2   3.1  29.2                   15     3   4.6  76.9
 10     1   1.5   3.1                   13     2   3.1  32.3                   15     5   7.7  84.6
 10     1   1.5   4.6                   13     1   1.5  33.8                   15     2   3.1  87.7
 10     1   1.5   6.2                   13     1   1.5  35.4                   17     2   3.1  90.8
 11     3   4.6  10.8                   13     1   1.5  36.9                   17     1   1.5  92.3
 11     5   7.7  18.5                   13     5   7.7  44.6                   18     1   1.5  93.8
 11     1   1.5  20.0                   13     1   1.5  46.2                   23     1   1.5  95.4
 11     1   1.5  21.5                   14     6   9.2  55.4                   23     1   1.5  96.9
 12     1   1.5  23.1                   14     1   1.5  56.9                   27     1   1.5  98.5
 12     1   1.5  24.6                   14     7  10.8  67.7                   36     1   1.5 100.0
 12     1   1.5  26.2                   14     3   4.6  72.3
```

Table 85: Average shipment time: Rail to Portland

```
                                                 Cumulative    Cumulative
           Q6C3    Frequency     Percent     Frequency       Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Missing                  13           .             .             .
Skipped                 133           .             .             .
              2           1        1.52             1          1.52
              3           3        4.55             4          6.06
              5          13       19.70            17         25.76
              6          11       16.67            28         42.42
              7          12       18.18            40         60.61
              8           4        6.06            44         66.67
             10           9       13.64            53         80.30
             20           5        7.58            58         87.88
             21           5        7.58            63         95.45
             30           1        1.52            64         96.97
             45           1        1.52            65         98.48
             60           1        1.52            66        100.00
```

Table 86: Variable: Q6C3 (Average shipment time: Rail to Portland)

```
                            Moments

N                             66    Sum Weights                 66
Mean                  10.4242424    Sum Observations           688
Std Deviation          9.6509236    Variance            93.1403263
Skewness              3.09922381    Kurtosis             11.934828
Uncorrected SS             13226    Corrected SS        6054.12121
Coeff Variation       92.5815345    Std Error Mean      1.18794658
```

Table 87: Basic Statistical Measures

```
    Location                     Variability

Mean     10.42424     Std Deviation            9.65092
Median    7.00000     Variance                93.14033
Mode      5.00000     Range                   58.00000
                      Interquartile Range      5.00000
```

Table 88: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max            60
99%                 60
95%                 21
90%                 21
75% Q3              10
50% Median           7
25% Q1               5
10%                  5
5%                   3
1%                   2
0% Min               2
```

Table 89: Variable: Q6C3 (Average shipment time: Rail to Portland)

```
               Missing Values

                       -----Percent Of-----
Missing                             Missing
  Value       Count     All Obs         Obs

      .         133       62.74       91.10
      M          13        6.13        8.90
  Total         146       68.87      100.00
```

Table 90: Frequency Counts

```
                         Percents                                  Percents
Percents
Value Count  Cell   Cum                  Value Count  Cell   Cum                  Value Count  Cell   Cum

 2     1   1.5   1.5                      7    12  18.2  60.6                     21     5   7.6  95.5
 3     3   4.5   6.1                      8     4   6.1  66.7                     30     1   1.5  97.0
 5    13  19.7  25.8                     10     9  13.6  80.3                     45     1   1.5  98.5
 6    11  16.7  42.4                     20     5   7.6  87.9                     60     1   1.5 100.0
```

Table 91: Percent of on time arrive: Rail to Portland

```
                                           Cumulative    Cumulative
          Q6D3    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know               3         .               .          .
Missing                 12         .               .          .
Skipped                133         .               .          .
            10           3        4.69             3         4.69
            20           1        1.56             4         6.25
            40           1        1.56             5         7.81
            50          10       15.63            15        23.44
            55           3        4.69            18        28.13
            60           7       10.94            25        39.06
            65          11       17.19            36        56.25
            70           6        9.38            42        65.63
            75          15       23.44            57        89.06
            80           3        4.69            60        93.75
            85           2        3.13            62        96.88
           100           2        3.13            64       100.00
```

Table 92: Variable: Q6D3 (Percent of on time arrive: Rail to Portland)

```
                                Moments

N                          64    Sum Weights                64
Mean                63.203125    Sum Observations         4045
Std Deviation      17.7363224    Variance           314.577133
Skewness           -1.2001351    Kurtosis           2.63663767
Uncorrected SS         275475    Corrected SS       19818.3594
Coeff Variation    28.0624137    Std Error Mean      2.2170403
```

Table 93: Basic Statistical Measures

```
          Location                    Variability

      Mean     63.20313     Std Deviation            17.73632
      Median   65.00000     Variance                314.57713
      Mode     75.00000     Range                    90.00000
                            Interquartile Range      20.00000
```

Table 94: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max           100
99%                100
95%                 85
90%                 80
75% Q3              75
50% Median          65
25% Q1              55
10%                 50
5%                  20
1%                  10
0% Min              10
```

Table 95: Variable: Q6D3 (Percent of on time arrive: Rail to Portland)

```
                         Missing Values

                                    -----Percent Of-----
         Missing                                 Missing
           Value       Count     All Obs             Obs

               .         133       62.74           89.86
               D           3        1.42            2.03
               M          12        5.66            8.11
           Total         148       69.81          100.00
```

Table 96: Frequency Counts

```
                      Percents                                  Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

10     3   4.7   4.7                    55     3   4.7  28.1                     75    15  23.4  89.1
20     1   1.6   6.3                    60     7  10.9  39.1                     80     3   4.7  93.8
40     1   1.6   7.8                    65    11  17.2  56.3                     85     2   3.1  96.9
50    10  15.6  23.4                    70     6   9.4  65.6                    100     2   3.1 100.0
```

Table 97: Available : Truck to Railroad then Rail to Portland

```
                                             Cumulative    Cumulative
          Q6A4    Frequency     Percent     Frequency       Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                  8           .             .             .
Yes                    108       52.94           108         52.94
No                      96       47.06           204        100.00
```

Table 98: Transportation rate: Truck to Railroad

```
                                             Cumulative    Cumulative
         Q6B4T    Frequency     Percent     Frequency       Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know               8           .             .             .
Missing                 11           .             .             .
Skipped                 97           .             .             .
             1           2        2.08             2          2.08
```

```
        1.33           7        7.29            9         9.38
         1.6           3        3.13           12        12.50
        1.66          11       11.46           23        23.96
        1.99           2        2.08           25        26.04
           2           5        5.21           30        31.25
        2.33           4        4.17           34        35.42
        2.66           3        3.13           37        38.54
        2.99           1        1.04           38        39.58
           3          14       14.58           52        54.17
         3.2           2        2.08           54        56.25
        3.33           4        4.17           58        60.42
        3.35           1        1.04           59        61.46
        3.66           5        5.21           64        66.67
           4           3        3.13           67        69.79
        4.35           1        1.04           68        70.83
```

Table 98 (continued): Transportation rate: Truck to Railroad

```
                                               Cumulative    Cumulative
       Q6B4T    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

        4.58           1        1.04           69        71.88
        4.99           1        1.04           70        72.92
         5.2           1        1.04           71        73.96
        5.33           2        2.08           73        76.04
        5.66           2        2.08           75        78.13
           6           2        2.08           77        80.21
        6.66           2        2.08           79        82.29
         7.6           1        1.04           80        83.33
           8           3        3.13           83        86.46
         8.5           1        1.04           84        87.50
        8.66           1        1.04           85        88.54
       10.66           3        3.13           88        91.67
       11.66           6        6.25           94        97.92
       12.33           1        1.04           95        98.96
          25           1        1.04           96       100.00
```

Table 99: Variable: Q6B4T (Transportation rate: Truck to Railroad)

```
                              Moments

N                          96    Sum Weights                 96
Mean               4.35895833    Sum Observations        418.46
Std Deviation      3.74064038    Variance            13.9923905
Skewness           2.46839113    Kurtosis            8.96740877
Uncorrected SS      3153.3268    Corrected SS         1329.2771
Coeff Variation    85.8150067    Std Error Mean      0.38177751
```

Table 100: Basic Statistical Measures

```
        Location                    Variability

    Mean     4.358958     Std Deviation            3.74064
    Median   3.000000     Variance                13.99239
    Mode     3.000000     Range                   24.00000
                          Interquartile Range      3.34000
```

Table 101: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max         25.00
99%              25.00
95%              11.66
90%              10.66
75% Q3            5.33
50% Median        3.00
25% Q1            1.99
10%               1.60
5%                1.33
1%                1.00
0% Min            1.00
```

Table 102: Variable: Q6B4T (Transportation rate: Truck to Railroad)

```
                                        Missing Values

                                                -----Percent Of-----
                       Missing                                 Missing
                         Value       Count     All Obs             Obs

                             .          97       45.75           83.62
                             D           8        3.77            6.90
                             M          11        5.19            9.48
                         Total         116       54.72          100.00
```

Table 103: Frequency Counts

```
                         Percents                                        Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

 1     2   2.1   2.1                     3     4   4.2  60.4                     6     2   2.1  80.2
 1     7   7.3   9.4                     3     1   1.0  61.5                     7     2   2.1  82.3
 2     3   3.1  12.5                     4     5   5.2  66.7                     8     1   1.0  83.3
 2    11  11.5  24.0                     4     3   3.1  69.8                     8     3   3.1  86.5
 2     2   2.1  26.0                     4     1   1.0  70.8                     9     1   1.0  87.5
 2     5   5.2  31.3                     5     1   1.0  71.9                     9     1   1.0  88.5
 2     4   4.2  35.4                     5     1   1.0  72.9                    11     3   3.1  91.7
 3     3   3.1  38.5                     5     1   1.0  74.0                    12     6   6.3  97.9
 3     1   1.0  39.6                     5     2   2.1  76.0                    12     1   1.0  99.0
 3    14  14.6  54.2                     6     2   2.1  78.1                    25     1   1.0 100.0
 3     2   2.1  56.3
```

Table 104: Transportation rate: Truck to Rail then Rail

```
                                            Cumulative    Cumulative
         Q6B4R    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know               8         .              .           .
Missing                 13         .              .           .
Skipped                 96         .              .           .
           1.6           1        1.05            1         1.05
          6.33           2        2.11            3         3.16
          7.33          11       11.58           14        14.74
           7.5           2        2.11           16        16.84
          7.85           1        1.05           17        17.89
          7.99           1        1.05           18        18.95
             8           7        7.37           25        26.32
           8.5           1        1.05           26        27.37
          9.66           2        2.11           28        29.47
          9.99           2        2.11           30        31.58
            10           2        2.11           32        33.68
         10.33           4        4.21           36        37.89
         10.66          11       11.58           47        49.47
         10.99          13       13.68           60        63.16
            11           1        1.05           61        64.21
         11.33           8        8.42           69        72.63
         11.66           1        1.05           70        73.68
            12           1        1.05           71        74.74
         12.33           4        4.21           75        78.95
```

Table 104 (continued): Transportation rate: Truck to Rail then Rail

```
                                            Cumulative    Cumulative
         Q6B4R    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

         12.66           2        2.11           77        81.05
            13           2        2.11           79        83.16
         13.33           7        7.37           86        90.53
         13.66           5        5.26           91        95.79
         13.99           3        3.16           94        98.95
         32.45           1        1.05           95       100.00
```

Table 105: Variable: Q6B4R (Transportation rate: Truck to Rail then Rail)

```
                             Moments

N                         95    Sum Weights                 95
Mean              10.6626316    Sum Observations       1012.95
Std Deviation     3.22218414    Variance            10.3824707
Skewness           2.9956735    Kurtosis            21.7364027
Uncorrected SS    11776.6649    Corrected SS        975.952242
Coeff Variation    30.219408    Std Error Mean      0.33058912
```

Table 106: Basic Statistical Measures

```
        Location                    Variability

Mean     10.66263     Std Deviation            3.22218
Median   10.99000     Variance                10.38247
Mode     10.99000     Range                   30.85000
                      Interquartile Range      4.33000
```

Table 107: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max         32.45
99%              32.45
95%              13.66
90%              13.33
75% Q3           12.33
50% Median       10.99
25% Q1            8.00
10%               7.33
5%                7.33
1%                1.60
0% Min            1.60
```

Table 108: Variable: Q6B4R (Transportation rate: Truck to Rail then Rail)

```
                    Missing Values

                             -----Percent Of-----
   Missing                                Missing
     Value       Count     All Obs            Obs

         .          96       45.28          82.05
         D           8        3.77           6.84
         M          13        6.13          11.11
     Total         117       55.19         100.00
```

Table 109: Frequency Counts

```
                       Percents                                  Percents
Percents
Value Count  Cell   Cum                Value Count  Cell   Cum                Value Count  Cell   Cum

 2     1   1.1   1.1                   10     2   2.1  31.6                   12     1   1.1  74.7
 6     2   2.1   3.2                   10     2   2.1  33.7                   12     4   4.2  78.9
 7    11  11.6  14.7                   10     4   4.2  37.9                   13     2   2.1  81.1
 8     2   2.1  16.8                   11    11  11.6  49.5                   13     2   2.1  83.2
 8     1   1.1  17.9                   11    13  13.7  63.2                   13     7   7.4  90.5
 8     1   1.1  18.9                   11     1   1.1  64.2                   14     5   5.3  95.8
 8     7   7.4  26.3                   11     8   8.4  72.6                   14     3   3.2  98.9
 9     1   1.1  27.4                   12     1   1.1  73.7                   32     1   1.1 100.0
10     2   2.1  29.5
```

Table 110: Average shipment time: Truck to Railroad then Rail to Portland

```
                                                 Cumulative    Cumulative
          Q6C4    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know              4          .             .            .
Missing                14          .             .            .
Skipped                96          .             .            .
             1          3        3.06            3          3.06
             2          3        3.06            6          6.12
             3          2        2.04            8          8.16
             4         10       10.20           18         18.37
             5         13       13.27           31         31.63
             7         27       27.55           58         59.18
             8          3        3.06           61         62.24
            10          4        4.08           65         66.33
            12          1        1.02           66         67.35
            15          2        2.04           68         69.39
            20         17       17.35           85         86.73
```

```
                                21           7        7.14            92         93.88
                                23           1        1.02            93         94.90
                                30           4        4.08            97         98.98
                                60           1        1.02            98        100.00
```

The average shipment time for the truck to railroad and then rail to Portland also had a substantial range, indicating that some of the locations had had bad experiences (Table 110). Over one fourth of the locations responding indicated that one week would be the average but 17 also felt 20 days was more typical in their experience. The average estimate was slightly over 11 days but with quite a large range, as indicated by the standard deviation of over nine days. This means 67% of the estimates fell into the broad range of 2.1 days to 20.4 days. The median and the most common was the seven day estimate (Table 113), though 20, 4 and 5 day estimates were also common.

Question 6 of the questionnaire also looked at reliability of this modal combination (Table 116). The most common estimate was 75% and 80% on time arrivals but the range was from zero to 100%. The average was 73% with a standard deviation of 23% and a median of 80% (Tables 118 and 119).

The last specific modal combination examined was barge direct to Portland (Table 123). Only 26 of the locations had this option which was dependent on being directly on the river. The rate for the barge to Portland ranged from $3.22 to $10.33 per ton. This is directly caused by the differing pools on the river and the different commodity or product being moved. The average rate was $6.84 per ton with a fairly narrow standard deviation of $1.49 per ton (Tables 124 and 125). The median rate was $6.66 and even 75% were at or below $7.75 (Table 126). Eleven of the twenty six locations offered rates around $7 (Table 128).

The timeliness and reliability of straight barge to Portland was also investigated in the survey. By far the most common estimate for shipment time was 3 days to Portland, with 48% identifying this time, followed by two days, probably from locations further down the river, by 35% of the locations (Table 129). The average was 3 days, the median was also 3 and the standard deviation was only slightly over one day (Tables 130, 131 and 132). There were very few observations at the upper end of the estimates (Table 134).

A similar tight distribution, and very positive experience, was found when looking at the reliability as indicated by the percent on time arrival (Table 135). The lowest estimate was 75% and the highest was 100%. The most common estimate was 90% and the average was a similar 88% (Tables 136 and 137. Shippers were given the option of finding another unique combination that they had used at some time.

This option was used by 25 of the locations (Table 141) and just what the alternatives were are indicated in Table 142.The descriptive statistics are given in Tables 143 to 160. Due to the noticeable differences among the options chosen as "other", the transportation rate has a substantial variation, and a wide

Table 111: Variable: Q6C4 (Average shipment time: Truck to Railroad then Rail to Portland)

```
                                        Moments

                N                           98    Sum Weights                 98
                Mean                11.2755102    Sum Observations          1105
                Std Deviation       9.18512986    Variance            84.3666106
                Skewness            1.97339354    Kurtosis             6.8138315
                Uncorrected SS           20643    Corrected SS        8183.56122
                Coeff Variation     81.4608802    Std Error Mean      0.92783823
```

Table 112:   Basic Statistical Measures

```
                    Location                    Variability

                 Mean     11.27551     Std Deviation           9.18513
                 Median    7.00000     Variance               84.36661
                 Mode      7.00000     Range                  59.00000
                                       Interquartile Range    15.00000
```

Table 113:   Quantiles (Definition 5)

```
                         Quantile      Estimate

                         100% Max           60
                         99%                60
                         95%                30
                         90%                21
                         75% Q3             20
                         50% Median          7
                         25% Q1              5
                         10%                 4
                         5%                  2
                         1%                  1
                         0% Min              1
```

Table 114:   Variable: Q6C4 (Average shipment time: Truck to Railroad then Rail to Portland)

```
                                          Missing Values

                                              -----Percent Of-----
                        Missing                              Missing
                          Value       Count     All Obs          Obs

                              .          96       45.28        84.21
                              D           4        1.89         3.51
                              M          14        6.60        12.28
                          Total         114       53.77       100.00
```

Table 115:   Frequency Counts

```
                       Percents                                    Percents
Percents
Value Count  Cell   Cum                    Value Count  Cell   Cum                   Value Count  Cell   Cum

  1     3   3.1   3.1                         7    27  27.6  59.2                       20    17  17.3  86.7
  2     3   3.1   6.1                         8     3   3.1  62.2                       21     7   7.1  93.9
  3     2   2.0   8.2                        10     4   4.1  66.3                       23     1   1.0  94.9
  4    10  10.2  18.4                        12     1   1.0  67.3                       30     4   4.1  99.0
  5    13  13.3  31.6                        15     2   2.0  69.4                       60     1   1.0 100.0
```

Table 116:   Percent of on time arrive: Truck to Rail then Rail to Portland

```
                                                  Cumulative    Cumulative
             Q6D4    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know              5          .              .           .
Missing                12          .              .           .
Skipped                96          .              .           .
                0        3        3.03             3        3.03
               10        2        2.02             5        5.05
               20        3        3.03             8        8.08
               50        3        3.03            11       11.11
               60       18       18.18            29       29.29
               70        1        1.01            30       30.30
```

```
                                         75          18       18.18           48        48.48
                                         80          23       23.23           71        71.72
                                         85           2        2.02           73        73.74
                                         90          11       11.11           84        84.85
                                        100          15       15.15           99       100.00
```

Table 117: Variable: Q6D4 (Percent of on time arrive: Truck to Rail then Rail to Portland)

```
                                                  Moments

                            N                          99    Sum Weights                 99
                            Mean                73.030303    Sum Observations          7230
                            Std Deviation      23.1655332    Variance            536.641929
                            Skewness           -1.5362972    Kurtosis            2.59167097
                            Uncorrected SS         580600    Corrected SS        52590.9091
                            Coeff Variation    31.7204397    Std Error Mean      2.32822369
```

Table 118:

```
                                       Basic Statistical Measures

                                    Location                    Variability

                                Mean     73.03030     Std Deviation           23.16553
                                Median   80.00000     Variance               536.64193
                                Mode     80.00000     Range                  100.00000
                                                      Interquartile Range     30.00000
```

Table 119:

```
                                 Quantiles (Definition 5)

                                                  Quantile      Estimate

                                                  100% Max           100
                                                  99%                100
                                                  95%                100
                                                  90%                100
                                                  75% Q3              90
                                                  50% Median          80
                                                  25% Q1              60
                                                  10%                 50
                                                  5%                  10
                                                  1%                   0
                                                  0% Min               0
```

Table 120: Variable: Q6D4 (Percent of on time arrive: Truck to Rail then Rail to Portland)

```
                                                Missing Values

                                                        -----Percent Of-----
                                    Missing                                Missing
                                      Value       Count     All Obs            Obs

                                          .          96       45.28          84.96
                                          D           5        2.36           4.42
                                          M          12        5.66          10.62
                                      Total         113       53.30         100.00
```

Table 121:

```
                                          Frequency Counts

                         Percents                                Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

 0     3   3.0   3.0                    60    18  18.2  29.3                    85     2   2.0  73.7
10     2   2.0   5.1                    70     1   1.0  30.3                    90    11  11.1  84.8
20     3   3.0   8.1                    75    18  18.2  48.5                   100    15  15.2 100.0
50     3   3.0  11.1                    80    23  23.2  71.7
```

Table 122:

```
                      Available : Barge to Portland

                                                            Cumulative    Cumulative
                                Q6A5    Frequency     Percent     Frequency      Percent
                        ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
                        Missing               1          .              .          .
```

```
Yes                     26       12.32            26       12.32
No                     185       87.68           211       100.00
```

Table 123: Transportation rate: Barge to Portland

```
                                           Cumulative    Cumulative
         Q6B5B    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know               2         .               .          .
Missing                  2         .               .          .
Skipped                185         .               .          .
          3.22           1        4.35             1        4.35
          4.66           1        4.35             2        8.70
          4.75           2        8.70             4       17.39
             6           1        4.35             5       21.74
          6.54           2        8.70             7       30.43
          6.66           5       21.74            12       52.17
          7.33           2        8.70            14       60.87
          7.41           2        8.70            16       69.57
          7.55           1        4.35            17       73.91
          7.75           1        4.35            18       78.26
          7.99           3       13.04            21       91.30
           8.4           1        4.35            22       95.65
         10.33           1        4.35            23      100.00
```

Table 124: Variable: Q6B5B (Transportation rate: Barge to Portland)

```
                                 Moments

N                          23    Sum Weights                 23
Mean               6.83652174    Sum Observations        157.24
Std Deviation      1.48758073    Variance            2.21289644
Skewness           -0.3575117    Kurtosis            1.34276568
Uncorrected SS      1123.6584    Corrected SS        48.6837217
Coeff Variation    21.7593214    Std Error Mean      0.31018203
```

Table 125: Basic Statistical Measures

```
        Location                    Variability

    Mean     6.836522     Std Deviation            1.48758
    Median   6.660000     Variance                 2.21290
    Mode     6.660000     Range                    7.11000
                          Interquartile Range      1.21000
```

Table 126: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max         10.33
99%              10.33
95%               8.40
90%               7.99
75% Q3            7.75
50% Median        6.66
25% Q1            6.54
10%               4.75
5%                4.66
1%                3.22
0% Min            3.22
```

Table 127: Variable: Q6B5B (Transportation rate: Barge to Portland)

```
                  Missing Values

                              -----Percent Of-----
 Missing                                   Missing
   Value       Count     All Obs               Obs

       .         185       87.26             97.88
       D           2        0.94              1.06
       M           2        0.94              1.06
   Total         189       89.15            100.00
```

Table 128: Frequency Counts

```
                        Percents                                  Percents
Percents
Value Count  Cell   Cum                Value Count  Cell   Cum                Value Count  Cell   Cum

3     1   4.3   4.3                    7     5  21.7  52.2                    8     1   4.3  78.3
5     1   4.3   8.7                    7     2   8.7  60.9                    8     3  13.0  91.3
5     2   8.7  17.4                    7     2   8.7  69.6                    8     1   4.3  95.7
6     1   4.3  21.7                    8     1   4.3  73.9                   10     1   4.3 100.0
7     2   8.7  30.4
```

Table 129: Average shipment time: Barge to Portland

```
                                                Cumulative    Cumulative
          Q6C5    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Don't Know               1           .             .            .
Missing                  3           .             .            .
Skipped                185           .             .            .
             2           8       34.78             8        34.78
             3          11       47.83            19        82.61
             4           1        4.35            20        86.96
             5           2        8.70            22        95.65
             6           1        4.35            23       100.00
```

Table 130: Variable: Q6C5 (Average shipment time: Barge to Portland)

```
                                 Moments

N                          23    Sum Weights                 23
Mean                        3    Sum Observations            69
Std Deviation      1.08711461    Variance            1.18181818
```

```
Skewness           1.39496195    Kurtosis           1.76111581
Uncorrected SS            233    Corrected SS               26
Coeff Variation    36.2371538    Std Error Mean     0.22667907
```

Table 131: Basic Statistical Measures

```
        Location                    Variability

    Mean     3.000000     Std Deviation           1.08711
    Median   3.000000     Variance                1.18182
    Mode     3.000000     Range                   4.00000
                          Interquartile Range     1.00000
```

Table 132: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max             6
99%                  6
95%                  5
90%                  5
75% Q3               3
50% Median           3
25% Q1               2
10%                  2
5%                   2
1%                   2
0% Min               2
```

Table 133: Variable: Q6C5 (Average shipment time: Barge to Portland)

```
                      Missing Values

                                    -----Percent Of-----
       Missing                                   Missing
         Value       Count     All Obs               Obs

             .         185       87.26             97.88
             D           1        0.47              0.53
             M           3        1.42              1.59
         Total         189       89.15            100.00
```

Table 134: Frequency Counts

```
                        Percents                                    Percents
Percents
 Value Count  Cell   Cum                Value Count  Cell   Cum                Value Count  Cell   Cum

 2     8  34.8  34.8                    4     1   4.3  87.0                    6     1   4.3 100.0
 3    11  47.8  82.6                    5     2   8.7  95.7
```

Table 135: Percent of on time arrive: Barge to Portland

```
                                                 Cumulative    Cumulative
          Q6D5    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know              1          .              .            .
Missing                 2          .              .            .
Skipped               185          .              .            .
            75          6      25.00              6        25.00
            80          2       8.33              8        33.33
            90          9      37.50             17        70.83
            95          1       4.17             18        75.00
            99          1       4.17             19        79.17
           100          5      20.83             24       100.00
```

Table 136: Variable: Q6D5 (Percent of on time arrive: Barge to Portland)

```
                              Moments

N                          24    Sum Weights                 24
Mean               88.0833333    Sum Observations          2114
Std Deviation      9.48186675    Variance            89.9057971
Skewness           -0.2413047    Kurtosis            -1.3269148
Uncorrected SS         188276    Corrected SS        2067.83333
Coeff Variation    10.7646548    Std Error Mean      1.93547795
```

Table 137: Basic Statistical Measures

```
         Location                    Variability

     Mean     88.08333     Std Deviation            9.48187
     Median   90.00000     Variance                89.90580
     Mode     90.00000     Range                   25.00000
                           Interquartile Range     19.50000
```

Table 138: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max         100.0
99%              100.0
95%              100.0
90%              100.0
75% Q3            97.0
50% Median        90.0
25% Q1            77.5
10%               75.0
5%                75.0
1%                75.0
0% Min            75.0
```

Table 139: Variable: Q6D5 (Percent of on time arrive: Barge to Portland)

```
                         Missing Values

                                 -----Percent Of-----
     Missing                                  Missing
       Value       Count     All Obs             Obs

           .         185       87.26           98.40
           D           1        0.47            0.53
           M           2        0.94            1.06
       Total         188       88.68          100.00
```

Table 140: Frequency Counts

```
                         Percents                                    Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

75     6  25.0  25.0                    90     9  37.5  70.8                     99     1   4.2  79.2
80     2   8.3  33.3                    95     1   4.2  75.0                    100     5  20.8 100.0
```

Table 141: Available :Other

```
                                              Cumulative    Cumulative
          Q6A6    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                   2           .             .            .
Yes                      25       11.90            25        11.90
No                      185       88.10           210       100.00
```

Table 142: What other transpotation

```
                                                                 Cumulative    Cumulative
Q6OT                                  Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
                                           185          .              .            .
BARGE TO PASCO                               1       3.70              1         3.70
DIRECT SHIP TO BRANCH LOCATION               1       3.70              2         7.41
DOMESTIC                                     1       3.70              3        11.11
FACILITY IN UPRAIL YARD -                    1       3.70              4        14.81
M                                            2       7.41              6        22.22
NOTHING SPECIFIED                            1       3.70              7        25.93
RAIL TO GULF                                 1       3.70              8        29.63
RAIL TO WALLULA                              2       7.41             10        37.04
TRUCK                                        6      22.22             16        59.26
TRUCK TO DESTINATION                         2       7.41             18        66.67
TRUCK TO FARMINGTON PLANT                    1       3.70             19        70.37
TRUCK TO NYSSA, OR                           1       3.70             20        74.07
TRUCK TO PORTLAND                            4      14.81             24        88.89
TRUCK TO RITZVILLE                           1       3.70             25        92.59
TRUCK TO SPOKANE                             1       3.70             26        96.30
UPS                                          1       3.70             27       100.00
```

Table 143: Transportation rate:Other

```
                                         Cumulative    Cumulative
         Q6B6    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know              1          .              .            .
Missing                14          .              .            .
Skipped               185          .              .            .
            2           1       8.33              1         8.33
          2.5           1       8.33              2        16.67
         3.75           1       8.33              3        25.00
         6.38           1       8.33              4        33.33
         6.66           1       8.33              5        41.67
         8.33           1       8.33              6        50.00
           10           1       8.33              7        58.33
        14.66           1       8.33              8        66.67
           15           1       8.33              9        75.00
           24           1       8.33             10        83.33
           26           1       8.33             11        91.67
           31           1       8.33             12       100.00
```

Table 144: Variable: Q6B6 (Transportation rate:Other)

```
                              Moments

N                          12    Sum Weights                 12
Mean               12.5233333    Sum Observations        150.28
Std Deviation      9.76855096    Variance            95.4245879
Skewness           0.80996861    Kurtosis            -0.6039202
Uncorrected SS       2931.677    Corrected SS        1049.67047
Coeff Variation    78.0028025    Std Error Mean      2.81993776
```

Table 145: Basic Statistical Measures

```
        Location                    Variability

    Mean     12.52333     Std Deviation           9.76855
    Median    9.16500     Variance               95.42459
    Mode       .          Range                  29.00000
                          Interquartile Range    14.43500
```

Table 146: Quantiles (Definition 5)

```
                           Quantile      Estimate

                           100% Max        31.000
                           99%             31.000
                           95%             31.000
                           90%             26.000
                           75% Q3          19.500
                           50% Median       9.165
                           25% Q1           5.065
                           10%              2.500
                           5%               2.000
                           1%               2.000
                           0% Min           2.000
```

Table 147: Variable: Q6B6 (Transportation rate:Other)

```
                                   Missing Values

                                               -----Percent Of-----
                  Missing                                   Missing
                    Value       Count     All Obs              Obs

                        .         185       87.26            92.50
                        D           1        0.47             0.50
                        M          14        6.60             7.00
                    Total         200       94.34           100.00
```

Table 148: Frequency Counts

```
                         Percents                                  Percents
Percents
Value Count  Cell   Cum                Value Count  Cell   Cum                Value Count  Cell   Cum

2     1   8.3   8.3                     7     1   8.3  41.7                  15     1   8.3  75.0
3     1   8.3  16.7                     8     1   8.3  50.0                  24     1   8.3  83.3
4     1   8.3  25.0                    10     1   8.3  58.3                  26     1   8.3  91.7
6     1   8.3  33.3                    15     1   8.3  66.7                  31     1   8.3 100.0
```

Table 149: Average shipment time: Other

```
                                                     Cumulative    Cumulative
                     Q6C6    Frequency     Percent     Frequency      Percent
         ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
         Missing                    8          .             .            .
         Skipped                  185          .             .            .
                        1           6       31.58            6        31.58
                        2           3       15.79            9        47.37
                        3           3       15.79           12        63.16
                        4           2       10.53           14        73.68
                        6           1        5.26           15        78.95
                        7           1        5.26           16        84.21
                       10           1        5.26           17        89.47
                       11           1        5.26           18        94.74
                       20           1        5.26           19       100.00
```

Table 150: Variable: Q6C6 (Average shipment time: Other)

```
                                 Moments

         N                        19    Sum Weights             19
         Mean             4.36842105    Sum Observations        83
         Std Deviation    4.83287959    Variance        23.3567251
         Skewness         2.21971919    Kurtosis        5.47172912
         Uncorrected SS          783    Corrected SS    420.421053
         Coeff Variation  110.632183    Std Error Mean  1.10873862
```

Table 151: Basic Statistical Measures

```
                Location                    Variability

            Mean     4.368421     Std Deviation           4.83288
            Median   3.000000     Variance               23.35673
            Mode     1.000000     Range                  19.00000
                                  Interquartile Range     5.00000
```

Table 152: Quantiles (Definition 5)

```
                Quantile      Estimate

                100% Max            20
                99%                 20
                95%                 20
                90%                 11
                75% Q3               6
                50% Median           3
                25% Q1               1
                10%                  1
                5%                   1
                1%                   1
                0% Min               1
```

Table 153: Variable: Q6C6 (Average shipment time: Other)

```
                           Missing Values

                                     -----Percent Of-----
      Missing                                     Missing
        Value       Count     All Obs                 Obs

            .         185       87.26               95.85
            M           8        3.77                4.15
        Total         193       91.04              100.00
```

Table 154: Frequency Counts

```
                     Percents                                 Percents
Percents
Value Count  Cell   Cum                Value Count  Cell   Cum                Value Count  Cell   Cum

 1     6  31.6  31.6                    4     2  10.5  73.7                   10     1   5.3  89.5
 2     3  15.8  47.4                    6     1   5.3  78.9                   11     1   5.3  94.7
 3     3  15.8  63.2                    7     1   5.3  84.2                   20     1   5.3 100.0
```

Table 155: Percent of on time arrive: Other

```
                                                Cumulative    Cumulative
          Q6D6    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Don't Know             1          .             .           .
Missing                8          .             .           .
Skipped              185          .             .           .
            50         1        5.56            1        5.56
            75         2       11.11            3       16.67
            80         1        5.56            4       22.22
            90         4       22.22            8       44.44
            95         3       16.67           11       61.11
            98         1        5.56           12       66.67
            99         1        5.56           13       72.22
           100         5       27.78           18      100.00
```

Table 156: Variable: Q6D6 (Percent of on time arrive: Other)

```
                              Moments

N                          18    Sum Weights                18
Mean               90.1111111    Sum Observations         1622
Std Deviation      12.9927079    Variance           168.810458
Skewness           -1.9940883    Kurtosis           4.51466691
```

```
Uncorrected SS        149030    Corrected SS       2869.77778
Coeff Variation   14.4185414    Std Error Mean     3.06241061
```

Table 157:

```
     Basic Statistical Measures

   Location                  Variability

Mean      90.1111     Std Deviation          12.99271
Median    95.0000     Variance              168.81046
Mode     100.0000     Range                  50.00000
                      Interquartile Range    10.00000
```

Table 158:

```
Quantiles (Definition 5)

                 Quantile      Estimate

                 100% Max          100
                 99%               100
                 95%               100
                 90%               100
                 75% Q3            100
                 50% Median         95
                 25% Q1             90
                 10%                75
                 5%                 50
                 1%                 50
                 0% Min             50
```

Table 159:

```
Variable:  Q6D6  (Percent of on time arrive: Other)

                    Missing Values

                             -----Percent Of-----
     Missing                             Missing
       Value       Count     All Obs         Obs

           .         185       87.26       95.36
           D           1        0.47        0.52
           M           8        3.77        4.12
       Total         194       91.51      100.00
```

Table 160:

```
                           Frequency Counts

                         Percents                                    Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

50     1   5.6   5.6                    90     4  22.2  44.4                     99     1   5.6  72.2
75     2  11.1  16.7                    95     3  16.7  61.1                    100     5  27.8 100.0
80     1   5.6  22.2                    98     1   5.6  66.7
```

standard deviation. This also holds for the quality variables, on time delivery and average shipment times.

Specific attention was paid to the original mode used for the last shipment, with the information requested in question 7 in the survey (Table 161). The most common choice was truck to another location than Pasco and then barge to Portland, 33%. Pasco was the location for barge movements for only 7% of the locations. Barge, under any option, comprised 48% of the movements, slightly less than other grain movement estimates by the authors in other previous studies but probably reflecting the use of alternatives to barge by the non grain shippers. Rail to Portland, either feed by truck or already at the location, was used by 30% of the movements. Other, which included the alternatives specified in Table 142, was 22% of the movements.

When asked to specify the alternative that would be used if the first choice was not available for six months, 25% of the respondents felt that there were no alternatives available (Table 162). As would be for consistency, other alternatives were required about the same amount of the time. The truck and barge combination were the identified alternative for 32% of the locations, with rail being used about 18 percent of the time. It is noticeable that truck to Pasco and barge to Portland doubled in usage if the first alternative was not available. Truck to an alternative river port than Pasco decreased about 50% showing that this alternative, as indicated above, was the first desired alternative. Similarly, rail movements decreased about 50% as well.

Transportation Rate

Individual shippers were asked if the transportation rate increased X percent (with the percentage varying across shippers in the sample), would they switch to the alternative at this location or continue with the original mode and destination. Shippers, over the array of percentage increases in each location's questionnaire, indicated a willingness to shift, since over two thirds of them replied they would shift to an alternative mode and destination. About 30% said that they would continue to use the original mode. Further evaluation of the average rate increase for the switchers versus those that stayed with the original option would be interesting. Shippers were then given the option, if they decided not to switch, to identify what percentage increase in the transportation rate would be necessary to cause them to switch to the alternative transportation mode (Table 164). There were only 27 locations in this category and the average was 54% (Tables 165 and 166). Forty percent of the locations required less than 50% to switch, with the median, meaning fifty percent above and fifty percent below, being 40% (Table 167). Again, further analysis could connect the willingness to shift to the percentages in each of

Table 161: Use for your very last freight shipment

```
                                                               Cumulative    Cumulative
                                     Q7    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                                         7          .              .            .
Truck to Pasco then Barge to Portland          15       7.32             15         7.32
Truck to xx then Barge to Portland             67      32.68             82        40.00
Rail to Portland                               33      16.10            115        56.10
Truck to Railroad then Rail to Portland        28      13.66            143        69.76
Barge to Portland                              17       8.29            160        78.05
Other (Specify mode and destination):          45      21.95            205       100.00
```

Table 162: Alternative transpotation mode/destination

```
                                                               Cumulative    Cumulative
                                     Q8    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                                        11          .              .            .
Truck to Pasco then Barge to Portland          32      15.92             32        15.92
Truck to xx then Barge to Portland             33      16.42             65        32.34
Rail to Portland                               14       6.97             79        39.30
Truck to Railroad then Rail to Portland        22      10.95            101        50.25
Other (Specify mode and destination):          49      24.38            150        74.63
No alternatives available                      51      25.37            201       100.00
```

Table 163: If transportation rate increased XX%, would you switch to alternative

```
                                                          Cumulative    Cumulative
                                Q9    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                                   14          .              .            .
Skipped                                   51          .              .            .
Switch to Alternative mode               104      70.75            104        70.75
Continue to use Original mode             43      29.25            147       100.00
```

Table 164: Percentage increase in the transportation rate needed to switch

```
                                           Cumulative    Cumulative
              Q9A    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know                4          .              .            .
Missing                  26          .              .            .
Skipped                 155          .              .            .
               15         6      22.22              6        22.22
               20         4      14.81             10        37.04
               25         2       7.41             12        44.44
               35         1       3.70             13        48.15
               40         1       3.70             14        51.85
               50         3      11.11             17        62.96
               75         4      14.81             21        77.78
              100         5      18.52             26        96.30
              225         1       3.70             27       100.00
```

Table 165: Variable: Q9A (Percentage increase in the transportation rate needed to switch)

```
                                 Moments

N                          27    Sum Weights                 27
Mean               54.4444444    Sum Observations          1470
Std Deviation      47.0746815    Variance            2216.02564
Skewness           1.94132903    Kurtosis            5.40561437
Uncorrected SS         137650    Corrected SS        57616.6667
Coeff Variation    86.4637008    Std Error Mean      9.05952668
```

Table 166: Basic Statistical Measures

```
            Location                    Variability

    Mean     54.44444     Std Deviation           47.07468
    Median   40.00000     Variance                    2216
    Mode     15.00000     Range                  210.00000
```

```
                                             Interquartile Range     55.00000
```

Table 167: Quantiles (Definition 5)

```
                                       Quantile      Estimate

                                       100% Max           225
                                       99%                225
                                       95%                100
                                       90%                100
                                       75% Q3              75
                                       50% Median          40
                                       25% Q1              20
                                       10%                 15
                                       5%                  15
                                       1%                  15
                                       0% Min              15
```

Table 168: Variable: Q9A (Percentage increase in the transportation rate needed to switch)

```
                                           Missing Values

                                                 -----Percent Of-----
                              Missing                             Missing
                                Value       Count     All Obs         Obs

                                    .         155       73.11       83.78
                                    D           4        1.89        2.16
                                    M          26       12.26       14.05
```

Table 169: Frequency Counts

```
                         Percents                                Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

15     6  22.2  22.2                    35     1   3.7  48.1                     75     4  14.8  77.8
20     4  14.8  37.0                    40     1   3.7  51.9                    100     5  18.5  96.3
25     2   7.4  44.4                    50     3  11.1  63.0                    225     1   3.7 100.0
```

the individual location's questionnaires. The two most common responses were 20% and 100% with an outlier of 225% from someone that was obviously reluctant to switch (Table 169).

Transit Time

The effect of increased transit time, as an indicator of the importance of timeliness, was also examined. Shippers were asked if the transit time, defined here as including scheduling and waiting for equipment, for the original mode and destination were to increase X percent (again, varying the percentage over the questionnaires), would a switch to another alternative occur? Sixty five percent of the respondents indicated a sensitivity to transit time by indicating they would switch to another mode and destination (Table 170). Thirty five said they would continue to use the original mode. Further analysis about the average percentage change offered to the locations in the questionnaires, relative to switching or not, would be useful in the future.

For those that indicated that they would continue to use the original mode they were then asked what percentage decrease in the reliability would be necessary for them to switch to the alternative. The responses for the 51 locations ranged from 15% to 440% (Table 171). The average percentage increase was 91% (Tables 172 and 173), but it is obvious that this was affected by the outlier 440% response. The median was 50% and 75% were at or less than 15)% (Table 174). The two most common responses were 15% and 200% (Table 176), again indicating the wide range in willingness to switch in response to a decrease in transit time.

Reliability

Similar analysis was done on the importance of reliability of the modes to the shippers who were asked if the percentage of time shipments arrived on-time of the original option decreased X percent (varied over the locations as usual), would the shipper switch to the alternative or stay with the original mode and destination. The same sensitivity was found as with transit time, about 62% of the shippers would switch and 38% would stay with the original mode (Table 177). For those that chose not to switch, they were asked what percentage decrease in reliability would be necessary to cause them to switch to the alternative. The range and distribution of responses are indicated in Table 178 and the descriptive statistics are presented in Tables 179 to 183. The most common response was 50%, the median was also 50 percent and the average was 65%, suggesting that a substantial change in reliability would have to occur for the shippers to change modes.

Table 170: If transit time increase xx%, would you switch to alternative

```
                                                 Cumulative    Cumulative
                           Q10    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Missing                                15          .              .           .
Skipped                                51          .              .           .
Switch to Alternative mode             95       65.07            95        65.07
Continue to use Original mode          51       34.93           146       100.00
```

Table 171: Percentage increase in the transit time needed to switch

```
                                          Cumulative    Cumulative
          Q10A    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Don't Know              3          .              .            .
Missing                32          .              .            .
Skipped               146          .              .            .
            15          6       19.35             6        19.35
            20          2        6.45             8        25.81
            25          1        3.23             9        29.03
            30          1        3.23            10        32.26
            50          7       22.58            17        54.84
            60          1        3.23            18        58.06
            75          2        6.45            20        64.52
            80          1        3.23            21        67.74
           100          1        3.23            22        70.97
           110          1        3.23            23        74.19
           150          1        3.23            24        77.42
           200          6       19.35            30        96.77
           440          1        3.23            31       100.00
```

Table 172: Variable: Q10A (Percentage increase in the transit time needed to switch)

```
                              Moments

N                          31    Sum Weights                 31
Mean               91.1290323    Sum Observations          2825
Std Deviation      93.6634906    Variance            8772.84946
Skewness           1.99492253    Kurtosis            5.12785513
Uncorrected SS         520625    Corrected SS        263185.484
Coeff Variation    102.781175    Std Error Mean      16.8224595
```

Table 173: Basic Statistical Measures

```
        Location                    Variability

    Mean     91.12903     Std Deviation           93.66349
    Median   50.00000     Variance                    8773
    Mode     50.00000     Range                  425.00000
                          Interquartile Range    130.00000
```

Table 174: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max           440
99%                440
95%                200
90%                200
75% Q3             150
50% Median          50
25% Q1              20
10%                 15
5%                  15
1%                  15
0% Min              15
```

Table 175: Variable: Q10A (Percentage increase in the transit time needed to switch)

```
                                   Missing Values

                                             -----Percent Of-----
               Missing                                    Missing
                 Value       Count     All Obs                Obs

                     .         146       68.87              80.66
                     D           3        1.42               1.66
                     M          32       15.09              17.68
                 Total         181       85.38             100.00
```

Table 176: Frequency Counts

```
                         Percents                                     Percents
Percents
Value Count  Cell   Cum                Value Count  Cell   Cum                Value Count  Cell   Cum

15     6  19.4  19.4                    60     1   3.2  58.1                  110     1   3.2  74.2
20     2   6.5  25.8                    75     2   6.5  64.5                  150     1   3.2  77.4
25     1   3.2  29.0                    80     1   3.2  67.7                  200     6  19.4  96.8
30     1   3.2  32.3                   100     1   3.2  71.0                  440     1   3.2 100.0
50     7  22.6  54.8
```

Table 177: If reliability decreased xx%, would you switch to alternative

```
                                                           Cumulative    Cumulative
                          Q11    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Missing                                15          .               .            .
Skipped                                51          .               .            .
Switch to Alternative mode             91       62.33             91        62.33
Continue to use Original mode          55       37.67            146       100.00
```

Table 178: Percentage decrease in the reliability needed to switch

```
                                             Cumulative    Cumulative
          Q11A    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Don't Know            3          .               .            .
Missing              29          .               .            .
Skipped             142          .               .            .
            10        1        2.63              1         2.63
            20        2        5.26              3         7.89
            25        1        2.63              4        10.53
            30        6       15.79             10        26.32
            35        1        2.63             11        28.95
            40        1        2.63             12        31.58
            50       13       34.21             25        65.79
            60        1        2.63             26        68.42
            61        1        2.63             27        71.05
            70        1        2.63             28        73.68
            75        1        2.63             29        76.32
            80        1        2.63             30        78.95
            85        1        2.63             31        81.58
           100        3        7.89             34        89.47
           150        1        2.63             35        92.11
           200        3        7.89             38       100.00
```

Table 179: Variable: Q11A (Percentage decrease in the reliability needed to switch)

```
                            Moments

N                          38    Sum Weights                38
Mean               64.7631579    Sum Observations         2461
Std Deviation      48.4458094    Variance           2346.99644
Skewness           1.86711883    Kurtosis           3.03762692
```

```
Uncorrected SS        246221    Corrected SS        86838.8684
Coeff Variation   74.8045817    Std Error Mean      7.85894804
```

Table 180: Basic Statistical Measures

```
             Location                    Variability

    Mean     64.76316     Std Deviation           48.44581
    Median   50.00000     Variance                    2347
    Mode     50.00000     Range                  190.00000
                          Interquartile Range     45.00000
```

Table 181: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max           200
99%                200
95%                200
90%                150
75% Q3              75
50% Median          50
25% Q1              30
10%                 25
5%                  20
1%                  10
0% Min              10
```

Table 182: Variable: Q11A (Percentage decrease in the reliability needed to switch)

```
                       Missing Values

                                 -----Percent Of-----
  Missing                                     Missing
    Value       Count     All Obs                 Obs

        .         142       66.98               81.61
        D           3        1.42                1.72
        M          29       13.68               16.67
    Total         174       82.08              100.00
```

Table 183: Frequency Counts

```
                             Percents                                   Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

10     1   2.6   2.6                    50    13  34.2  65.8                     80     1   2.6  78.9
20     2   5.3   7.9                    60     1   2.6  68.4                     85     1   2.6  81.6
25     1   2.6  10.5                    61     1   2.6  71.1                    100     3   7.9  89.5
30     6  15.8  26.3                    70     1   2.6  73.7                    150     1   2.6  92.1
35     1   2.6  28.9                    75     1   2.6  76.3                    200     3   7.9 100.0
40     1   2.6  31.6
```

Warehouse Characteristics

The stability of the industry and the ability/timeliness of moving to new locations were investigated by determining the length of time each business had been at its current location. Some of the firms had been in business at that location for as little as two years while 12 of them indicated that they had been there for 95 years (Table 184). The distribution of years at that location had groupings around 25 years, 50 years, 65-75 years and around 95 years. The groupings around 25 years were probably firms located at the ports, since the Lower Granite Dam, opening up the river to slack water navigation was completed in 1975.

Those at the older years were grain elevators that had been developed early in the regions grain industry development. The average age being at that location was 46 years with a standard deviation of 26 years, indicating substantial variation in the industry (Tables 185 and 186) Twenty five percent of the firms had been at that location for 25 years with the median being 45 years (Table 187).

The importance of logistic costs in determining the current plant location was also queried. Over 57% felt that logistics costs were very important and another 19% felt they were somewhat important. Only 8% felt that logistics costs were not very important or were not important at all (Table 188). Firms were offered an alternative plant location that would result in lower logistical and transportation costs and asked what percentage of decrease in logistics and transportation costs would be necessary to relocate. Eighty four percent, 152 firms indicated that they would not relocate at all (Table 189). Of the 30 that indicated that they would relocate, the percentage decrease in logistics costs necessary to make that move ranged from 10% to 100% (Table 190). The average amount necessary to make the change was 36% and a standard deviation of 22% (Tables 191 and 192). Fifty percent of the firms would require a 25% or less decrease in logistics costs while 75% would require a decrease of 50% or less (Table 193). The most common percentage cited was 25, from about one third of the firms who had indicated that they would make a move (Table 195).

Specific information was sought as to what modes of transportation were commonly used for inbound and outbound shipments, with some indication of the frequency of use. Tables 196-199 indicate whether each of the modes were used at all by the firms for inbound shipments. Private truck was by far the most common, used by 89% of the firms for their inbound shipments. For-hire truck was also used by many of the firms, 54% of them. As expected, barge was used by 2% of the firms for their inbound shipments, while rail was used by 15% of the firms as they collected their inbound shipments. Barge shipments were predominantly fertilizer and chemicals while rail had these and other miscellaneous inputs.

Table 184: Length elevator has been at current location

```
                                          Cumulative    Cumulative
          Q12    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Don't Know              18         .               .          .
Missing                  5         .               .          .
             2           2        1.06             2         1.06
             3           2        1.06             4         2.12
             4           3        1.59             7         3.70
             5           4        2.12            11         5.82
             6           2        1.06            13         6.88
             7           4        2.12            17         8.99
             8           4        2.12            21        11.11
             9           1        0.53            22        11.64
            10           2        1.06            24        12.70
            14           2        1.06            26        13.76
            15           1        0.53            27        14.29
            18           2        1.06            29        15.34
            19           2        1.06            31        16.40
            20           3        1.59            34        17.99
            23           1        0.53            35        18.52
            24           4        2.12            39        20.63
            25          10        5.29            49        25.93
            29           1        0.53            50        26.46
            30          14        7.41            64        33.86
            32           2        1.06            66        34.92
            34           1        0.53            67        35.45
            35           3        1.59            70        37.04
            36           1        0.53            71        37.57
            38           3        1.59            74        39.15
            40           8        4.23            82        43.39
            41           1        0.53            83        43.92
            42           2        1.06            85        44.97
            44           1        0.53            86        45.50
            45          11        5.82            97        51.32
            46           2        1.06            99        52.38
            47           3        1.59           102        53.97
            48           3        1.59           105        55.56
            50          10        5.29           115        60.85
            51           1        0.53           116        61.38
            52           1        0.53           117        61.90
            55           2        1.06           119        62.96
            60          14        7.41           133        70.37
            62           1        0.53           134        70.90
            63           1        0.53           135        71.43
            64           1        0.53           136        71.96
            65           3        1.59           139        73.54
            67          11        5.82           150        79.37
            69           3        1.59           153        80.95
            70           7        3.70           160        84.66
            71           1        0.53           161        85.19
            75          10        5.29           171        90.48
            77           1        0.53           172        91.01
            80           1        0.53           173        91.53
            85           1        0.53           174        92.06
            88           1        0.53           175        92.59
            94           1        0.53           176        93.12
            95          12        6.35           188        99.47
           100           1        0.53           189       100.00
```

Table 185: Variable: Q12 (Length elevator has been at current location)

```
                              Moments

N                         189    Sum Weights                189
Mean               46.0740741    Sum Observations          8708
Std Deviation      25.5785152    Variance            654.260441
Skewness            0.1327424    Kurtosis            -0.7590378
Uncorrected SS         524214    Corrected SS        123000.963
Coeff Variation      55.51607    Std Error Mean      1.86056321
```

Table 186: Basic Statistical Measures

```
         Location                    Variability

    Mean     46.07407     Std Deviation           25.57852
    Median   45.00000     Variance               654.26044
    Mode     30.00000     Range                   98.00000
                          Interquartile Range     42.00000
```

Table 187: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max           100
99%                 95
95%                 95
90%                 75
75% Q3              67
50% Median          45
25% Q1              25
10%                  8
5%                   5
1%                   2
0% Min               2
```

Table 188: Variable: Q12 (Length elevator has been at current location)

```
                     Missing Values

                               -----Percent Of-----
    Missing                                 Missing
      Value       Count     All Obs             Obs

          D          18        8.49           78.26
          M           5        2.36           21.74
      Total          23       10.85          100.00
```

Table 189: Frequency Counts

```
                        Percents                                        Percents
Percents
Value Count  Cell   Cum               Value Count  Cell   Cum               Value Count  Cell   Cum

 2     2   1.1   1.1                  30    14   7.4  33.9                  60    14   7.4  70.4
 3     2   1.1   2.1                  32     2   1.1  34.9                  62     1   0.5  70.9
 4     3   1.6   3.7                  34     1   0.5  35.4                  63     1   0.5  71.4
 5     4   2.1   5.8                  35     3   1.6  37.0                  64     1   0.5  72.0
 6     2   1.1   6.9                  36     1   0.5  37.6                  65     3   1.6  73.5
 7     4   2.1   9.0                  38     3   1.6  39.2                  67    11   5.8  79.4
 8     4   2.1  11.1                  40     8   4.2  43.4                  69     3   1.6  81.0
 9     1   0.5  11.6                  41     1   0.5  43.9                  70     7   3.7  84.7
10     2   1.1  12.7                  42     2   1.1  45.0                  71     1   0.5  85.2
14     2   1.1  13.8                  44     1   0.5  45.5                  75    10   5.3  90.5
15     1   0.5  14.3                  45    11   5.8  51.3                  77     1   0.5  91.0
18     2   1.1  15.3                  46     2   1.1  52.4                  80     1   0.5  91.5
19     2   1.1  16.4                  47     3   1.6  54.0                  85     1   0.5  92.1
20     3   1.6  18.0                  48     3   1.6  55.6                  88     1   0.5  92.6
23     1   0.5  18.5                  50    10   5.3  60.8                  94     1   0.5  93.1
24     4   2.1  20.6                  51     1   0.5  61.4                  95    12   6.3  99.5
25    10   5.3  25.9                  52     1   0.5  61.9                 100     1   0.5 100.0
29     1   0.5  26.5                  55     2   1.1  63.0
```

Table 190: Importance of logistic costs in determining plant location

```
                                                     Cumulative    Cumulative
                         Q13    Frequency     Percent    Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                               21           .            .            .
Very important                       110       57.59          110        57.59
Somewhat important                    37       19.37          147        76.96
Not very important                    11        5.76          158        82.72
Not important at all                   5        2.62          163        85.34
Not applicable                        28       14.66          191       100.00
```

Table 191: Check here if you would not relocate.

```
                                                 Cumulative    Cumulative
                 Q14CK    Frequency     Percent    Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                         30           .            .            .
Checked                        152       83.52          152        83.52
Not checked                     30       16.48          182       100.00
```

Table 192: Percentage decrease in logistics and transportation costs necessary to relocate

```
                                                 Cumulative    Cumulative
                   Q14    Frequency     Percent    Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                         30           .            .            .
Skipped                        152           .            .            .
                    10           2        6.67            2         6.67
                    20           6       20.00            8        26.67
                    25           9       30.00           17        56.67
                    35           2        6.67           19        63.33
                    40           2        6.67           21        70.00
                    50           4       13.33           25        83.33
                    60           2        6.67           27        90.00
                    75           1        3.33           28        93.33
                    80           1        3.33           29        96.67
                   100           1        3.33           30       100.00
```

Table 193: Variable: Q14 (Percentage decrease in logistics and transportation costs necessary to relocate)

```
                            Moments

N                          30    Sum Weights                 30
Mean               36.3333333    Sum Observations          1090
Std Deviation      21.5731847    Variance            465.402299
Skewness           1.32542992    Kurtosis             1.4816221
Uncorrected SS          53100    Corrected SS        13496.6667
Coeff Variation    59.3757378    Std Error Mean      3.93870664
```

Table 194:

```
          Basic Statistical Measures

    Location                    Variability

Mean     36.33333     Std Deviation           21.57318
Median   25.00000     Variance               465.40230
Mode     25.00000     Range                   90.00000
                      Interquartile Range     30.00000
```

Table 195:

```
Quantiles (Definition 5)

          Quantile      Estimate

          100% Max         100.0
          99%              100.0
          95%               80.0
          90%               67.5
          75% Q3            50.0
          50% Median        25.0
          25% Q1            20.0
          10%               20.0
          5%                10.0
          1%                10.0
          0% Min            10.0
```

Table 196: Variable: Q14 (Percentage decrease in logistics and transportation costs necessary to relocate)

```
               Missing Values

                       -----Percent Of-----
Missing                             Missing
  Value       Count     All Obs         Obs

      .         152       71.70       83.52
      M          30       14.15       16.48
  Total         182       85.85      100.00
```

Table 197:

```
                            Frequency Counts

                         Percents                                 Percents
Percents
Value Count  Cell   Cum                  Value Count  Cell   Cum                  Value Count  Cell   Cum

10     2   6.7   6.7                     40     2   6.7  70.0                     75     1   3.3  93.3
20     6  20.0  26.7                     50     4  13.3  83.3                     80     1   3.3  96.7
25     9  30.0  56.7                     60     2   6.7  90.0                    100     1   3.3 100.0
35     2   6.7  63.3
```

Table 198: Is this mode used inbound: Private Truck

```
                                           Cumulative    Cumulative
         Q15IA    Frequency     Percent     Frequency       Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                  5        .               .          .
Yes                    180       86.96          180       86.96
No                      27       13.04          207      100.00
```

Table 199: Is this mode used inbound: For-Hire Truck

```
                                           Cumulative    Cumulative
         Q15IB    Frequency     Percent     Frequency       Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                  5        .               .          .
```

```
Yes                    110       53.14           110       53.14
No                      97       46.86           207      100.00
```

Table 200: Is this mode used inbound: Barge

```
                                           Cumulative    Cumulative
         Q15IC    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Missing                  5          .              .          .
Yes                      4        1.93             4        1.93
No                     203       98.07           207      100.00
```

Table 201: Is this mode used inbound: Rail

```
                                           Cumulative    Cumulative
         Q15ID    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Missing                  5          .              .          .
Yes                     31       14.98            31       14.98
No                     176       85.02           207      100.00
```

When private truck is used, it is heavily used, with 90% and 100% being by far the most common answers (Table 200). For-hire truck was used most often for either 10% or 100 percent suggesting that for some of the firms the for-hire truck was only used to fill in when the need arose, while for others, the firm relied solely on the for-hire truck for their inbound shipments (Table 201). Barge, used only by four firms for inbound shipments was used for up to 16% but also as little as 2% (Table 202). Rail, when used for inbound shipments, varied greatly from 1% to 100%, with the variation being related to the product being moved (Table 203).

Some descriptive statistics on private truck are available in Tables 204-208. The average usage was 83 percent, with a median of 100%, again indicated the heavy dependence on private truck for inbound movements. Similar information on for-hire trucks is presented in Tables 209-213 where an average usage of 44% and a standard deviation of 41% are seen. Half of the firms use for-hire trucks for 25% or less of their movements inbound.

Barge, when used, is used for only about 10% of the inbound movements (Tables 214-218). The maximum is only 16% and the median was 10%. The estimates were spread fairly equally from 2% to 16%. Again, similar descriptive statistics for rail are presented in Tables 219-223. When rail is used for inbound movements it is used, on the average, for 27% of those shipments with the median being 10%, similar to barge. Seventy five percent of the shippers using rail for inbound shipments used it for 50% or less of those movements.

The same series of questions was focused on outbound shipments. Private truck was used by 131 or 64% of these firms for their outbound shipments to some degree or another (Table 224) For-hire truck was used by even more of the firms for outbound shipments, 168 or 82%. Barge was used by only 13% of the firms for shipments from that location. Actually, since there are rail-barge movements and truck-barge movements the number of firm reliant on barge is substantially higher. However this question asked specifically about shipments from that location for outbound shipments. Rail was used, as expected, more than barge, 38% (Table 227).

When private truck was used, it was commonly used for over 50% of the outbound movements (Table 228) and 16% of the firms relied on this mode of transportation for all of their movements. The most common usage was 50%, 80%, 90% and 100%. For-hire trucks were used either as a fill in to the private truck fleet when demand was high, or was used solely by the firm. For-hire truck was used by

Table 202: Percentage of shipments that come in this way: Private Truck

```
                                           Cumulative    Cumulative
         Q15I1    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                 20         .               .          .
Skipped                 27         .               .          .
             0           1        0.61             1         0.61
             1           3        1.82             4         2.42
             2           3        1.82             7         4.24
             4           1        0.61             8         4.85
             5           1        0.61             9         5.45
            10           3        1.82            12         7.27
            20           3        1.82            15         9.09
            25           3        1.82            18        10.91
            30           3        1.82            21        12.73
            40           1        0.61            22        13.33
            45           1        0.61            23        13.94
            50           7        4.24            30        18.18
            60           2        1.21            32        19.39
            75           2        1.21            34        20.61
            80           5        3.03            39        23.64
            90          20       12.12            59        35.76
            95           4        2.42            63        38.18
            99           9        5.45            72        43.64
           100          93       56.36           165       100.00
```

Table 203: Percentage of shipments that come in this way: For-Hire Truck

```
                                           Cumulative    Cumulative
         Q15I2    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                 17         .               .          .
Skipped                 97         .               .          .
             0           7        7.14             7         7.14
             1           8        8.16            15        15.31
             2           1        1.02            16        16.33
             5           6        6.12            22        22.45
             9           1        1.02            23        23.47
            10          22       22.45            45        45.92
            20           3        3.06            48        48.98
            25           2        2.04            50        51.02
            40           3        3.06            53        54.08
            45           2        2.04            55        56.12
            50           6        6.12            61        62.24
            70           2        2.04            63        64.29
            75           2        2.04            65        66.33
            80           2        2.04            67        68.37
            85           1        1.02            68        69.39
            90           7        7.14            75        76.53
            95           1        1.02            76        77.55
            98           4        4.08            80        81.63
            99           2        2.04            82        83.67
           100          16       16.33            98       100.00
```

Table 204: Percentage of shipments that come in this way: Barge

```
                                           Cumulative    Cumulative
         Q15I3    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                  5         .               .          .
Skipped                203         .               .          .
             2           1       25.00             1        25.00
             5           1       25.00             2        50.00
            15           1       25.00             3        75.00
            16           1       25.00             4       100.00
```

Table 205: Percentage of shipments that come in this way: Rail

```
                                           Cumulative    Cumulative
         Q15I4    Frequency     Percent     Frequency      Percent
```

```
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing             6          .             .         .
Skipped           176          .             .         .
            0       1       3.33             1      3.33
            1       4      13.33             5     16.67
            2       3      10.00             8     26.67
            3       1       3.33             9     30.00
            5       2       6.67            11     36.67
            6       1       3.33            12     40.00
           10       8      26.67            20     66.67
           13       1       3.33            21     70.00
           20       1       3.33            22     73.33
           50       1       3.33            23     76.67
           70       2       6.67            25     83.33
           85       1       3.33            26     86.67
           94       1       3.33            27     90.00
           95       1       3.33            28     93.33
           99       1       3.33            29     96.67
          100       1       3.33            30    100.00
```

Table 206: Variable: Q15I1 (Percentage of shipments that come in this way: Private Truck)

```
                               Moments

N                         165    Sum Weights               165
Mean               83.3272727    Sum Observations        13749
Std Deviation      30.0759534    Variance           904.562971
Skewness           -1.7665948    Kurtosis           1.66904796
Uncorrected SS        1294015    Corrected SS       148348.327
Coeff Variation     36.093769    Std Error Mean     2.34140979
```

Table 207: Basic Statistical Measures

```
            Location                    Variability

    Mean      83.3273     Std Deviation            30.07595
    Median   100.0000     Variance                904.56297
    Mode     100.0000     Range                   100.00000
                          Interquartile Range      10.00000
```

Table 208: Quantiles (Definition 5)

```
                Quantile      Estimate

                100% Max           100
                99%                100
                95%                100
                90%                100
                75% Q3             100
                50% Median         100
                25% Q1              90
                10%                 25
                5%                   5
                1%                   1
                0% Min               0
```

Table 209: Variable: Q15I1 (Percentage of shipments that come in this way: Private Truck)

```
                          Missing Values

                                  -----Percent Of-----
          Missing                              Missing
            Value       Count     All Obs          Obs

                .          27       12.74        57.45
                M          20        9.43        42.55
            Total          47       22.17       100.00
```

Table 210: Frequency Counts

```
                         Percents                                  Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

 0     1   0.6   0.6                    25     3   1.8  10.9                    75     2   1.2  20.6
 1     3   1.8   2.4                    30     3   1.8  12.7                    80     5   3.0  23.6
 2     3   1.8   4.2                    40     1   0.6  13.3                    90    20  12.1  35.8
 4     1   0.6   4.8                    45     1   0.6  13.9                    95     4   2.4  38.2
```

```
 5     1   0.6   5.5                   50     7   4.2  18.2                   99     9   5.5  43.6
 10     3   1.8   7.3                  60     2   1.2  19.4                  100    93  56.4 100.0
 20     3   1.8   9.1
```

Table 211: Variable: Q15I2 (Percentage of shipments that come in this way: For-Hire Truck)

```
                                 Moments

N                          98    Sum Weights                 98
Mean               44.2755102    Sum Observations          4339
Std Deviation      40.7974076    Variance            1664.42847
Skewness            0.3232946    Kurtosis            -1.6814136
Uncorrected SS         353561    Corrected SS        161449.561
Coeff Variation    92.1444099    Std Error Mean      4.12116051
```

Table 212:

```
Basic Statistical Measures

       Location                    Variability

    Mean     44.27551     Std Deviation           40.79741
    Median   25.00000     Variance                    1664
    Mode     10.00000     Range                  100.00000
                          Interquartile Range     80.00000
```

Table 213:

```
   Quantiles (Definition 5)

                Quantile      Estimate

                100% Max          100
                99%               100
                95%               100
                90%               100
                75% Q3             90
                50% Median         25
                25% Q1             10
                10%                 1
                5%                  0
                1%                  0
                0% Min              0
```

Table 214: Variable: Q15I2 (Percentage of shipments that come in this way: For-Hire Truck)

```
                       Missing Values

                               -----Percent Of-----
   Missing                                  Missing
     Value       Count     All Obs              Obs

         .          97       45.75            85.09
         M          17        8.02            14.91
     Total         114       53.77           100.00
```

Table 215:

```
                                    Frequency Counts

                        Percents                                    Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

 0     7   7.1   7.1                    25     2   2.0  51.0                    85     1   1.0  69.4
 1     8   8.2  15.3                    40     3   3.1  54.1                    90     7   7.1  76.5
 2     1   1.0  16.3                    45     2   2.0  56.1                    95     1   1.0  77.6
 5     6   6.1  22.4                    50     6   6.1  62.2                    98     4   4.1  81.6
 9     1   1.0  23.5                    70     2   2.0  64.3                    99     2   2.0  83.7
10    22  22.4  45.9                    75     2   2.0  66.3                   100    16  16.3 100.0
20     3   3.1  49.0                    80     2   2.0  68.4
```

Table 216:

```
               Variable:  Q15I3  (Percentage of shipments that come in this way: Barge)

                                                        Moments

                            N                            4    Sum Weights                  4
                            Mean                       9.5    Sum Observations            38
                            Std Deviation      7.04745817    Variance            49.6666667
                            Skewness           -0.1371335    Kurtosis            -5.0216657
                            Uncorrected SS            510    Corrected SS               149
                            Coeff Variation    74.1837702    Std Error Mean      3.52372909
```

Table 217:

```
                              Basic Statistical Measures

                                     Location                    Variability

                                 Mean      9.50000     Std Deviation            7.04746
                                 Median   10.00000     Variance                49.66667
                                 Mode       .          Range                   14.00000
                                                       Interquartile Range     12.00000
```

Table 218:

```
                                         Quantiles (Definition 5)

                                                 Quantile      Estimate

                                                 100% Max          16.0
                                                 99%               16.0
                                                 95%               16.0
                                                 90%               16.0
                                                 75% Q3            15.5
                                                 50% Median        10.0
                                                 25% Q1             3.5
                                                 10%                2.0
                                                 5%                 2.0
                                                 1%                 2.0
                                                 0% Min             2.0
```

Table 219:

```
                Variable:  Q15I3  (Percentage of shipments that come in this way: Barge)

                                                     Missing Values

                                                             -----Percent Of-----
                                      Missing                             Missing
                                        Value       Count     All Obs         Obs

                                            .         203       95.75       97.60
                                            M           5        2.36        2.40
                                        Total         208       98.11      100.00
```

Table 220:

```
                                  Frequency Counts

                         Percents                                 Percents
Percents
Value Count  Cell   Cum                  Value Count  Cell   Cum                  Value Count  Cell   Cum

 2     1  25.0  25.0                     15     1  25.0  75.0                     16     1  25.0 100.0
 5     1  25.0  50.0
```

Table 221: Variable: Q15I4 (Percentage of shipments that come in this way: Rail)

```
                                  Moments

N                          30    Sum Weights                 30
Mean               26.8333333    Sum Observations           805
Std Deviation      35.7511353    Variance            1278.14368
Skewness           1.24404526    Kurtosis            -0.1826209
Uncorrected SS          58667    Corrected SS        37066.1667
Coeff Variation    133.234045    Std Error Mean      6.52723443
```

Table 222:

```
Basic Statistical Measures

  Location                    Variability

Mean     26.83333     Std Deviation           35.75114
Median   10.00000     Variance                    1278
Mode     10.00000     Range                  100.00000
                      Interquartile Range     48.00000
```

Table 223:

```
Quantiles (Definition 5)

             Quantile      Estimate

             100% Max         100.0
             99%              100.0
             95%               99.0
             90%               94.5
             75% Q3            50.0
             50% Median        10.0
             25% Q1             2.0
             10%                1.0
             5%                 1.0
             1%                 0.0
             0% Min             0.0
```

Table224: Variable: Q15I4 (Percentage of shipments that come in this way: Rail)

```
                         Missing Values

                                  -----Percent Of-----
     Missing                                   Missing
       Value       Count     All Obs               Obs

           .         176       83.02             96.70
           M           6        2.83              3.30
       Total         182       85.85            100.00
```

Table 225:

```
                              Frequency Counts

                         Percents                                  Percents
Percents
Value Count  Cell   Cum               Value Count  Cell   Cum               Value Count  Cell   Cum

0     1   3.3   3.3                   10     8  26.7  66.7                   85     1   3.3  86.7
1     4  13.3  16.7                   13     1   3.3  70.0                   94     1   3.3  90.0
2     3  10.0  26.7                   20     1   3.3  73.3                   95     1   3.3  93.3
3     1   3.3  30.0                   50     1   3.3  76.7                   99     1   3.3  96.7
5     2   6.7  36.7                   70     2   6.7  83.3                  100     1   3.3 100.0
6     1   3.3  40.0
```

Table 226: Is this mode used outbound: Private Truck

```
                                          Cumulative    Cumulative
Q15OA    Frequency      Percent            Frequency       Percent
```

```
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Missing              6           .            .           .
Yes                131       63.59          131       63.59
No                  75       36.41          206      100.00
```

Table 227:

```
   Is this mode used outbound: For-Hire Truck

                                             Cumulative    Cumulative
         Q15OB    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Missing              6           .            .           .
Yes                168       81.55          168       81.55
No                  38       18.45          206      100.00
```

Table 228:

```
   Is this mode used outbound: Barge

                                             Cumulative    Cumulative
         Q15OC    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Missing              6           .            .           .
Yes                 27       13.11           27       13.11
No                 179       86.89          206      100.00
```

Table 229:

```
    Is this mode used outbound: Rail

                                             Cumulative    Cumulative
         Q15OD    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Missing              6           .            .           .
Yes                 77       37.38           77       37.38
No                 129       62.62          206      100.00
```

19% of the firms for 100% of their outbound movements. It was also common to use it for 10%, 20% 50% and 80% of their movements (Table 229). Tables 230 and 231 indicate that 30% of those using barge for outbound shipments use it almost exclusively while rail shipments vary, but with 17% still relying on rail for 90% of their outbound movements. The variation in rail reflects the differing rail rates that are available and the competitive situation surrounding the firms at those locations.

When private truck is used, as indicated earlier, it is used quite heavily. The average usage was 55% with a median of 50% (Tables 232-236). Over 50% used private truck for 80% or more of their shipments. For-hire trucks, Tables 237-241, are used slightly less, 49%, than private trucks but have a similar median for their distribution of responses. For-hire truck usage was very common at 5%, 10%, 20%, 50% and 100%. Nineteen percent of the firms used for-hire trucking for 100% of their outbound shipments.

Barge and rail movements, if used, were heavily used, 85% and 43%, respectively (Tables 242-251). The median for barge was 99% and for rail it was only 30%, again revealing the heavier dependence, when used, on barges and more flexibility on rail. This is expected since those firms located on the river did so to make use of the barge efficiencies and they are doing so. Firms using rail usually have other options available, as presented earlier in this report, and the wide range in usage supports this statement.

The capacity of the locations to load many rail road cars at one time was of interest because it often determines the rail rate that can be accessed and the ability to respond to large “buys” in the market. Over 57% of the firms indicated that they did not have the capability to load or unload rail cars at their site (Table 252). Of those that indicated that they could load or unload at the site, 23% indicated their capacity was around the 25-26 car load level, suggesting these facilities had developed this capacity in response to and desire to access the 25-26 car rail rates. The other common size was at 3 cars, which also has a rate of its own (Table 253). The average for the respondents to the question was 19, but as indicated above, was distributed heavily on the 3 and 26 car capacity (Tables 254 and 255). Seventy five percent of the firms had 26 cars or less capacity to load or unload at that facility.

Information was sought as to the value of the commodity being shipped. The question (#17) asked for the past three years what the average price in the county was before it was shipped. The responses are offered in Table 259 in price per ton. There are two distinct groups, one relating to the grain product and another relating to the fertilizer, chemicals, and assorted products which are significantly higher value. The average price was $28 but the standard deviation, reflecting the two distinct groups, was $106.

Table 230: Percentage of shipments that go out this way: Private Truck

```
                                           Cumulative    Cumulative
         Q15O1    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing             12         .               .          .
Skipped             75         .               .          .
             0           2        1.60             2         1.60
             1           5        4.00             7         5.60
             2           3        2.40            10         8.00
             4           1        0.80            11         8.80
             5          12        9.60            23        18.40
            10           8        6.40            31        24.80
            15           1        0.80            32        25.60
            20           7        5.60            39        31.20
            25           3        2.40            42        33.60
            30           1        0.80            43        34.40
            33           1        0.80            44        35.20
            34           1        0.80            45        36.00
            35           1        0.80            46        36.80
            40           1        0.80            47        37.60
            49           1        0.80            48        38.40
            50          16       12.80            64        51.20
            60           2        1.60            66        52.80
            70           1        0.80            67        53.60
            75           1        0.80            68        54.40
            80          16       12.80            84        67.20
            85           2        1.60            86        68.80
            90          13       10.40            99        79.20
            95           6        4.80           105        84.00
           100          20       16.00           125       100.00
```

Table 231: Percentage of shipments that go out this way: For-Hire Truck

```
                                           Cumulative    Cumulative
         Q15O2    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing             13         .               .          .
Skipped             38         .               .          .
             0           1        0.62             1         0.62
             1           8        4.97             9         5.59
             3           2        1.24            11         6.83
             5          18       11.18            29        18.01
            10          21       13.04            50        31.06
            15           1        0.62            51        31.68
            20          20       12.42            71        44.10
            25           2        1.24            73        45.34
            30           2        1.24            75        46.58
            34           1        0.62            76        47.20
            35           1        0.62            77        47.83
            40           2        1.24            79        49.07
            49           2        1.24            81        50.31
            50          12        7.45            93        57.76
            60           2        1.24            95        59.01
            65           1        0.62            96        59.63
            66           1        0.62            97        60.25
            70           2        1.24            99        61.49
            75           5        3.11           104        64.60
            80           9        5.59           113        70.19
            85           2        1.24           115        71.43
            89           1        0.62           116        72.05
```

Table 231 (continued): Percentage of shipments that go out this way: For-Hire Truck

```
                                           Cumulative    Cumulative
         Q15O2    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

            90           9        5.59           125        77.64
            93           1        0.62           126        78.26
            95           1        0.62           127        78.88
            98           2        1.24           129        80.12
            99           1        0.62           130        80.75
           100          31       19.25           161       100.00
```

Table 232: Percentage of shipments that go out this way: Barge

```
                                           Cumulative    Cumulative
         Q15O3    Frequency     Percent     Frequency      Percent
fffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing              9         .               .          .
Skipped            179         .               .          .
             0           1        4.17             1         4.17
            10           1        4.17             2         8.33
            25           1        4.17             3        12.50
```

```
             45           1        4.17            4        16.67
             88           1        4.17            5        20.83
             90           2        8.33            7        29.17
             94           1        4.17            8        33.33
             97           1        4.17            9        37.50
             98           1        4.17           10        41.67
             99           7       29.17           17        70.83
            100           7       29.17           24       100.00
```

Table 233: Percentage of shipments that go out this way: Rail

```
                                            Cumulative    Cumulative
          Q15O4    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                13           .             .            .
Skipped               129           .             .            .
              0         3        4.29             3         4.29
              1         2        2.86             5         7.14
              2         2        2.86             7        10.00
              5         4        5.71            11        15.71
             10        12       17.14            23        32.86
             11         1        1.43            24        34.29
             15         4        5.71            28        40.00
             20         1        1.43            29        41.43
             25         1        1.43            30        42.86
             30         6        8.57            36        51.43
             33         1        1.43            37        52.86
             35         2        2.86            39        55.71
             40         1        1.43            40        57.14
             45         1        1.43            41        58.57
             50         2        2.86            43        61.43
             60         3        4.29            46        65.71
             70         2        2.86            48        68.57
             80         7       10.00            55        78.57
             90        12       17.14            67        95.71
             96         1        1.43            68        97.14
            100         2        2.86            70       100.00
```

Table 234: Variable: Q15O1 (Percentage of shipments that go out this way: Private Truck)

```
                              Moments
N                          125    Sum Weights              125
Mean                    54.888    Sum Observations        6861
Std Deviation       37.2266848    Variance          1385.82606
Skewness            -0.2041953    Kurtosis          -1.5756181
Uncorrected SS          548429    Corrected SS      171842.432
Coeff Variation     67.8229938    Std Error Mean    3.32965592
```

Table 235: Basic Statistical Measures

```
           Location                    Variability

    Mean      54.8880     Std Deviation           37.22668
    Median    50.0000     Variance                    1386
    Mode     100.0000     Range                  100.00000
                          Interquartile Range     75.00000
```

Table 236: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max           100
99%                100
95%                100
90%                100
75% Q3              90
50% Median          50
25% Q1              15
10%                  5
5%                   1
1%                   0
0% Min               0
```

Table 237: Variable: Q15O1 (Percentage of shipments that go out this way: Private Truck)

```
                           Missing Values

                                  -----Percent Of-----
       Missing                                 Missing
         Value       Count     All Obs             Obs

             .          75       35.38           86.21
             M          12        5.66           13.79
         Total          87       41.04          100.00
```

```
Table 238:                        Frequency Counts
                         Percents                                 Percents
Percents
Value Count  Cell   Cum                  Value Count  Cell   Cum                  Value Count  Cell   Cum

  0     2   1.6   1.6                     25     3   2.4  33.6                     60     2   1.6  52.8
  1     5   4.0   5.6                     30     1   0.8  34.4                     70     1   0.8  53.6
  2     3   2.4   8.0                     33     1   0.8  35.2                     75     1   0.8  54.4
  4     1   0.8   8.8                     34     1   0.8  36.0                     80    16  12.8  67.2
  5    12   9.6  18.4                     35     1   0.8  36.8                     85     2   1.6  68.8
 10     8   6.4  24.8                     40     1   0.8  37.6                     90    13  10.4  79.2
 15     1   0.8  25.6                     49     1   0.8  38.4                     95     6   4.8  84.0
 20     7   5.6  31.2                     50    16  12.8  51.2                    100    20  16.0 100.0
```

Table 239: Variable: Q15O2 (Percentage of shipments that go out this way: For-Hire Truck)

```
                           Moments

N                       161    Sum Weights               161
Mean             48.5962733    Sum Observations         7824
Std Deviation    38.5094759    Variance           1482.97974
Skewness         0.17222102    Kurtosis           -1.6695703
Uncorrected SS       617494    Corrected SS       237276.758
Coeff Variation  79.2436813    Std Error Mean     3.03497187
```

Table 240: Basic Statistical Measures

```
         Location                    Variability

     Mean      48.5963     Std Deviation           38.50948
     Median    49.0000     Variance                    1483
     Mode     100.0000     Range                  100.00000
                           Interquartile Range     80.00000
```

Table 241: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max           100
99%                100
95%                100
90%                100
75% Q3              90
50% Median          49
25% Q1              10
10%                  5
5%                   1
1%                   1
0% Min               0
```

Table 242: Variable: Q15O2 (Percentage of shipments that go out this way: For-Hire Truck)

```
                    Missing Values

                         -----Percent Of-----
  Missing                              Missing
    Value       Count     All Obs          Obs

        .          38       17.92        74.51
        M          13        6.13        25.49
    Total          51       24.06       100.00
```

Table 243: Frequency Counts

```
                         Percents                                        Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

 0      1   0.6   0.6                   35     1   0.6  47.8                    80     9   5.6  70.2
 1      8   5.0   5.6                   40     2   1.2  49.1                    85     2   1.2  71.4
 3      2   1.2   6.8                   49     2   1.2  50.3                    89     1   0.6  72.0
 5     18  11.2  18.0                   50    12   7.5  57.8                    90     9   5.6  77.6
10     21  13.0  31.1                   60     2   1.2  59.0                    93     1   0.6  78.3
15      1   0.6  31.7                   65     1   0.6  59.6                    95     1   0.6  78.9
20     20  12.4  44.1                   66     1   0.6  60.2                    98     2   1.2  80.1
25      2   1.2  45.3                   70     2   1.2  61.5                    99     1   0.6  80.7
30      2   1.2  46.6                   75     5   3.1  64.6                   100    31  19.3 100.0
34      1   0.6  47.2
```

Table 244: Variable: Q15O3 (Percentage of shipments that go out this way: Barge)

```
                                                        Moments

                            N                          24    Sum Weights                 24
                            Mean               84.5833333    Sum Observations          2030
                            Std Deviation      30.5356764    Variance            932.427536
                            Skewness           -2.0680416    Kurtosis            2.92640105
                            Uncorrected SS         193150    Corrected SS        21445.8333
                            Coeff Variation    36.1012924    Std Error Mean      6.23306885
```

Table 245: Basic Statistical Measures

```
                                     Location                    Variability

                                 Mean     84.58333     Std Deviation            30.53568
                                 Median   99.00000     Variance                932.42754
                                 Mode     99.00000     Range                   100.00000
                                                       Interquartile Range      10.00000
```

Table 246: Quantiles (Definition 5)

```
                                                 Quantile      Estimate

                                                 100% Max           100
                                                 99%                100
                                                 95%                100
                                                 90%                100
                                                 75% Q3             100
                                                 50% Median          99
                                                 25% Q1              90
                                                 10%                 25
                                                 5%                  10
                                                 1%                   0
                                                 0% Min               0
```

Table 247: Variable: Q15O3 (Percentage of shipments that go out this way: Barge)

```
                                                     Missing Values

                                                             -----Percent Of-----
                                      Missing                             Missing
                                        Value       Count     All Obs         Obs

                                            .         179       84.43       95.21
                                            M           9        4.25        4.79
                                        Total         188       88.68      100.00
```

Table 248: Frequency Counts

```
                         Percents                                 Percents
Percents
Value Count  Cell   Cum                  Value Count  Cell   Cum                  Value Count  Cell   Cum

 0     1   4.2   4.2                     88     1   4.2  20.8                     98     1   4.2  41.7
10     1   4.2   8.3                     90     2   8.3  29.2                     99     7  29.2  70.8
25     1   4.2  12.5                     94     1   4.2  33.3                    100     7  29.2 100.0
45     1   4.2  16.7                     97     1   4.2  37.5
```

Table 249: Variable: Q15O4 (Percentage of shipments that go out this way: Rail)

```
                                                        Moments

                            N                          70    Sum Weights                 70
                            Mean               42.6571429    Sum Observations          2986
                            Std Deviation      35.1728179    Variance            1237.12712
                            Skewness           0.31996971    Kurtosis            -1.5648435
                            Uncorrected SS         212736    Corrected SS        85361.7714
                            Coeff Variation    82.4546971    Std Error Mean      4.20395583
```

Table 250: Basic Statistical Measures

```
          Location                    Variability

      Mean     42.65714     Std Deviation           35.17282
      Median   30.00000     Variance                    1237
      Mode     10.00000     Range                  100.00000
                            Interquartile Range     70.00000
```

Table 251:

```
        Quantiles (Definition 5)

              Quantile      Estimate

              100% Max         100.0
              99%              100.0
              95%               90.0
              90%               90.0
              75% Q3            80.0
              50% Median        30.0
              25% Q1            10.0
              10%                3.5
              5%                 1.0
              1%                 0.0
              0% Min             0.0
```

Table 252: Variable: Q15O4 (Percentage of shipments that go out this way: Rail)

```
                        Missing Values

                                   -----Percent Of-----
       Missing                                  Missing
         Value       Count     All Obs              Obs

             .         129       60.85            90.85
             M          13        6.13             9.15
         Total         142       66.98           100.00
```

Table 253:

```
                        Frequency Counts

                        Percents                                    Percents
Percents
Value Count  Cell   Cum                 Value Count  Cell   Cum                 Value Count  Cell   Cum

 0     3   4.3   4.3                    20     1   1.4  41.4                    50     2   2.9  61.4
 1     2   2.9   7.1                    25     1   1.4  42.9                    60     3   4.3  65.7
 2     2   2.9  10.0                    30     6   8.6  51.4                    70     2   2.9  68.6
 5     4   5.7  15.7                    33     1   1.4  52.9                    80     7  10.0  78.6
10    12  17.1  32.9                    35     2   2.9  55.7                    90    12  17.1  95.7
11     1   1.4  34.3                    40     1   1.4  57.1                    96     1   1.4  97.1
15     4   5.7  40.0                    45     1   1.4  58.6                   100     2   2.9 100.0
```

Table 254: Check here if you cannot load or unload rail cars at this facility

```
                                              Cumulative    Cumulative
         Q16CK    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Missing                  4           .             .             .
Checked                119       57.21           119         57.21
Not checked             89       42.79           208        100.00
```

Table 255: How many rail cars can be loaded or unload at your facility

```
                                              Cumulative    Cumulative
           Q16    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ
Missing                  5           .             .             .
Skipped                119           .             .             .
             1           6        6.82             6          6.82
             2           6        6.82            12         13.64
             3          10       11.36            22         25.00
             4           6        6.82            28         31.82
             5           8        9.09            36         40.91
             6           6        6.82            42         47.73
             7           2        2.27            44         50.00
             8           2        2.27            46         52.27
             9           1        1.14            47         53.41
            10           3        3.41            50         56.82
            12           2        2.27            52         59.09
            18           1        1.14            53         60.23
            25           5        5.68            58         65.91
            26          15       17.05            73         82.95
            27           7        7.95            80         90.91
            30           2        2.27            82         93.18
```

```
                40          1        1.14          83        94.32
                52          1        1.14          84        95.45
```

Table 255 (continued): How many rail cars can be loaded or unload at your facility

```
                                           Cumulative    Cumulative
           Q16    Frequency     Percent     Frequency      Percent
ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

            75           1        1.14            85        96.59
           110           1        1.14            86        97.73
           150           1        1.14            87        98.86
           275           1        1.14            88       100.00
```

Table 256: Variable: Q16 (How many rail cars can be loaded or unload at your facility)

```
                             Moments

N                            88    Sum Weights                   88
Mean                 19.6022727    Sum Observations            1725
Std Deviation        35.2917364    Variance              1245.50666
Skewness             5.25666301    Kurtosis              33.6055089
Uncorrected SS           142173    Corrected SS           108359.08
Coeff Variation      180.039003    Std Error Mean        3.76211175
```

Table 257: Basic Statistical Measures

```
    Location                    Variability

Mean     19.60227     Std Deviation           35.29174
Median    7.50000     Variance                    1246
Mode     26.00000     Range                  274.00000
                      Interquartile Range     22.50000
```

Table 258: Quantiles (Definition 5)

```
Quantile      Estimate

100% Max         275.0
99%              275.0
95%               52.0
90%               27.0
75% Q3            26.0
50% Median         7.5
25% Q1             3.5
10%                2.0
5%                 1.0
1%                 1.0
0% Min             1.0
```

Table 259: Variable: Q16 (How many rail cars can be loaded or unload at your facility)

```
                      Missing Values

                          -----Percent Of-----
Missing                               Missing
  Value       Count     All Obs           Obs

      .         119       56.13         95.97
      M           5        2.36          4.03
  Total         124       58.49        100.00
```

Table 260: Frequency Counts

```
                         Percents                                 Percents
Percents
Value Count  Cell   Cum                  Value Count  Cell   Cum                  Value Count  Cell   Cum

 1     6   6.8   6.8                     9     1   1.1  53.4                     30     2   2.3  93.2
 2     6   6.8  13.6                    10     3   3.4  56.8                     40     1   1.1  94.3
 3    10  11.4  25.0                    12     2   2.3  59.1                     52     1   1.1  95.5
 4     6   6.8  31.8                    18     1   1.1  60.2                     75     1   1.1  96.6
 5     8   9.1  40.9                    25     5   5.7  65.9                    110     1   1.1  97.7
 6     6   6.8  47.7                    26    15  17.0  83.0                    150     1   1.1  98.9
 7     2   2.3  50.0                    27     7   8.0  90.9                    275     1   1.1 100.0
 8     2   2.3  52.3
```

Table 261: What was the average commodity price over the last three years

```
                                           Cumulative    Cumulative
```

```
           Q17    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Don't Know            1           .             .            .
Missing              29           .             .            .
          0.01        1         0.55            1         0.55
           0.1        1         0.55            2         1.10
          0.14        1         0.55            3         1.65
           0.2        1         0.55            4         2.20
           0.4        1         0.55            5         2.75
           0.8        1         0.55            6         3.30
             2        1         0.55            7         3.85
           2.7        3         1.65           10         5.49
           2.9        2         1.10           12         6.59
             3        2         1.10           14         7.69
           3.1        1         0.55           15         8.24
           3.2       12         6.59           27        14.84
          3.25        1         0.55           28        15.38
           3.3        6         3.30           34        18.68
          3.36       10         5.49           44        24.18
           3.4        2         1.10           46        25.27
          3.43        1         0.55           47        25.82
          3.44       24        13.19           71        39.01
          3.45        3         1.65           74        40.66
          3.47        6         3.30           80        43.96
          3.49        1         0.55           81        44.51
           3.5       26        14.29          107        58.79
          3.51        3         1.65          110        60.44
          3.52        2         1.10          112        61.54
          3.55        3         1.65          115        63.19
           3.6        5         2.75          120        65.93
          3.61        3         1.65          123        67.58
          3.62        3         1.65          126        69.23
           3.7        2         1.10          128        70.33
          3.73        2         1.10          130        71.43
          3.75        1         0.55          131        71.98
          3.81        1         0.55          132        72.53
          3.85        1         0.55          133        73.08
             4       12         6.59          145        79.67
           4.5        3         1.65          148        81.32
             5        4         2.20          152        83.52
             9        1         0.55          153        84.07
          9.95        1         0.55          154        84.62
```

Table 261 (continued): What was the average commodity price over the last three years

```
                                           Cumulative    Cumulative
           Q17    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

            10        1         0.55          155        85.16
            15        3         1.65          158        86.81
            17        2         1.10          160        87.91
         18.72        1         0.55          161        88.46
            20        3         1.65          164        90.11
            22        2         1.10          166        91.21
          35.5        1         0.55          167        91.76
            70        1         0.55          168        92.31
            90        1         0.55          169        92.86
            95        1         0.55          170        93.41
            98        1         0.55          171        93.96
           100        1         0.55          172        94.51
           113        1         0.55          173        95.05
           125        2         1.10          175        96.15
           200        1         0.55          176        96.70
           225        1         0.55          177        97.25
           300        1         0.55          178        97.80
           500        1         0.55          179        98.35
           680        1         0.55          180        98.90
           750        1         0.55          181        99.45
           800        1         0.55          182       100.00
```

Table 262: Variable: Q17 (What was the average commodity price over the last three years)

```
                              Moments
  N                          182    Sum Weights                182
  Mean                27.7637363    Sum Observations          5053
  Std Deviation       106.372353    Variance            11315.0775
  Skewness            5.82273908    Kurtosis            35.6103037
  Uncorrected SS      2188319.18    Corrected SS        2048029.02
  Coeff Variation     383.134143    Std Error Mean      7.88484339
```

Table 263: Basic Statistical Measures

```
           Location                    Variability
       Mean     27.76374     Std Deviation          106.37235
```

```
                              Median    3.50000     Variance                  11315
                              Mode      3.50000     Range                 799.99000
                                                    Interquartile Range     0.60000
```

Table 264:

```
                                 Quantiles (Definition 5)

                                Quantile      Estimate

                                100% Max        800.00
                                99%             750.00
                                95%             113.00
                                90%              20.00
                                75% Q3            4.00
                                50% Median        3.50
                                25% Q1            3.40
                                10%               3.20
                                5%                2.70
                                1%                0.10
                                0% Min            0.01
```

The median was $3.50 per ton, indicating that the grain price estimates were below this estimate, and 90% of the prices were still at or below $20 (Table 262). Seventy four of the estimates were around $3 and 64 were around $4. No other common estimate is identifiable. Table 265 indicates how many estimates were in bushels, tons, gallons, etc. Bushels were quoted by 78% of the respondents, supporting our earlier statements of the two groups of different commodities.

Another attempt to determine the size of the facility was made by inquiring about the total amount of annual units shipped. Table 266 shows the broad array of volumes identified in response to this question. This table is in raw numbers so can include gallons, bushels, pounds, etc., with the units reported in Table 267, where bushels are almost 80% of the total. Descriptive statistics of a general nature are shown in Tables 268-270.

Particular attention was paid to the storage capacity that was available at this site. Again, respondents were asked to identify the unit used in estimating the storage capacity of the facility. The wide array of estimates are presented in Table 271, with the same conditions on units as was with the size of facility question above. Similar descriptive statistics are presented in Tables 272 to 277. Of potential use is a comparison of the storage capacity to the annual units shipped from the facility. The average units shipped, 2,725,691 were significantly larger than the average storage capacity of 1,402,009. A common indicator of capacity utilization is turnover ratio, which in this rough comparison, is 1.94.

Table 265: Variable: Q17 (What was the average commodity price over the last three years)

```
                                Missing Values

                                           -----Percent Of-----
                    Missing                            Missing
                      Value       Count     All Obs        Obs

                          D           1        0.47       3.33
                          M          29       13.68      96.67
                      Total          30       14.15     100.00
```

Table 266: Frequency Counts

```
                        Percents                                    Percents
Percents
Value Count  Cell   Cum                Value Count  Cell   Cum                Value Count  Cell   Cum

 0     1   0.5   0.5                    3     1   0.5  44.5                    17     2   1.1  87.9
 0     1   0.5   1.1                    4    26  14.3  58.8                    19     1   0.5  88.5
 0     1   0.5   1.6                    4     3   1.6  60.4                    20     3   1.6  90.1
 0     1   0.5   2.2                    4     2   1.1  61.5                    22     2   1.1  91.2
 0     1   0.5   2.7                    4     3   1.6  63.2                    36     1   0.5  91.8
 1     1   0.5   3.3                    4     5   2.7  65.9                    70     1   0.5  92.3
 2     1   0.5   3.8                    4     3   1.6  67.6                    90     1   0.5  92.9
 3     3   1.6   5.5                    4     3   1.6  69.2                    95     1   0.5  93.4
 3     2   1.1   6.6                    4     2   1.1  70.3                    98     1   0.5  94.0
 3     2   1.1   7.7                    4     2   1.1  71.4                   100     1   0.5  94.5
 3     1   0.5   8.2                    4     1   0.5  72.0                   113     1   0.5  95.1
 3    12   6.6  14.8                    4     1   0.5  72.5                   125     2   1.1  96.2
 3     1   0.5  15.4                    4     1   0.5  73.1                   200     1   0.5  96.7
 3     6   3.3  18.7                    4    12   6.6  79.7                   225     1   0.5  97.3
 3    10   5.5  24.2                    5     3   1.6  81.3                   300     1   0.5  97.8
 3     2   1.1  25.3                    5     4   2.2  83.5                   500     1   0.5  98.4
 3     1   0.5  25.8                    9     1   0.5  84.1                   680     1   0.5  98.9
 3    24  13.2  39.0                   10     1   0.5  84.6                   750     1   0.5  99.5
 3     3   1.6  40.7                   10     1   0.5  85.2                   800     1   0.5 100.0
 3     6   3.3  44.0                   15     3   1.6  86.8
```

Table 267: Unit for this commodity

```
                                          Cumulative    Cumulative
          Q17A    Frequency     Percent    Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                25          .             .            .
Tons                   12        6.42           12         6.42
Bushels               145       77.54          157        83.96
Cwt.                   17        9.09          174        93.05
Gallons                 2        1.07          176        94.12
Other                  11        5.88          187       100.00
```

Table 268: Total Amount of Annual Units Shipped

```
                                          Cumulative    Cumulative
           Q18    Frequency     Percent    Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                16          .             .            .
             0          1        0.51            1         0.51
            20          1        0.51            2         1.02
            60          1        0.51            3         1.53
           250          1        0.51            4         2.04
           500          1        0.51            5         2.55
          2850          1        0.51            6         3.06
          3000          1        0.51            7         3.57
          5000          2        1.02            9         4.59
          5800          1        0.51           10         5.10
          6000          1        0.51           11         5.61
          8000          1        0.51           12         6.12
          8100          1        0.51           13         6.63
          8320          1        0.51           14         7.14
```

```
              9000           1        0.51            15          7.65
             10000           2        1.02            17          8.67
             14000           1        0.51            18          9.18
             15000           1        0.51            19          9.69
             18000           1        0.51            20         10.20
             25000           2        1.02            22         11.22
             28000           1        0.51            23         11.73
             35000           1        0.51            24         12.24
             50000           1        0.51            25         12.76
             56000           2        1.02            27         13.78
             60000           2        1.02            29         14.80
             62000           2        1.02            31         15.82
             65000           2        1.02            33         16.84
             74685           1        0.51            34         17.35
             75000           2        1.02            36         18.37
             77144           1        0.51            37         18.88
             88000           1        0.51            38         19.39
            100000           8        4.08            46         23.47
            104000           1        0.51            47         23.98
            119729           1        0.51            48         24.49
            120000           3        1.53            51         26.02
            125000           1        0.51            52         26.53
            142000           1        0.51            53         27.04
            150000           4        2.04            57         29.08
            153000           2        1.02            59         30.10
            155000           1        0.51            60         30.61
            160000           1        0.51            61         31.12
            170000           2        1.02            63         32.14
            178000           1        0.51            64         32.65
            180000           1        0.51            65         33.16
            182000           1        0.51            66         33.67
            195983           1        0.51            67         34.18
            196000           1        0.51            68         34.69
            197000           1        0.51            69         35.20
            198000           1        0.51            70         35.71
            199259           1        0.51            71         36.22
            200000           3        1.53            74         37.76
            201000           1        0.51            75         38.27
            202000           1        0.51            76         38.78
            220000           1        0.51            77         39.29
            222000           1        0.51            78         39.80
            225000           1        0.51            79         40.31
```

Table 268 (continued):

```
                          Total Amount of Annual Units Shipped

                                                  Cumulative    Cumulative
               Q18    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

            234105           1        0.51            80         40.82
            236000           1        0.51            81         41.33
            250000           4        2.04            85         43.37
            254367           1        0.51            86         43.88
            255000           1        0.51            87         44.39
            260000           2        1.02            89         45.41
            284000           1        0.51            90         45.92
            286170           1        0.51            91         46.43
            287773           1        0.51            92         46.94
            290000           1        0.51            93         47.45
            294134           1        0.51            94         47.96
            295451           1        0.51            95         48.47
            300000           5        2.55           100         51.02
            304000           1        0.51           101         51.53
            310000           1        0.51           102         52.04
            314000           1        0.51           103         52.55
            320000           1        0.51           104         53.06
            322000           1        0.51           105         53.57
            334000           1        0.51           106         54.08
            334080           1        0.51           107         54.59
            350000           3        1.53           110         56.12
            352000           1        0.51           111         56.63
            357000           2        1.02           113         57.65
            366000           1        0.51           114         58.16
            391000           1        0.51           115         58.67
            400000           1        0.51           116         59.18
            400800           1        0.51           117         59.69
            402735           1        0.51           118         60.20
            415000           1        0.51           119         60.71
            426000           1        0.51           120         61.22
            431000           2        1.02           122         62.24
            448000           1        0.51           123         62.76
            450000           1        0.51           124         63.27
            485773           1        0.51           125         63.78
            500000           1        0.51           126         64.29
            507000           1        0.51           127         64.80
            514000           1        0.51           128         65.31
            521000           1        0.51           129         65.82
```

```
          522066           1        0.51           130        66.33
          543000           1        0.51           131        66.84
          548000           1        0.51           132        67.35
          550000           2        1.02           134        68.37
          595619           1        0.51           135        68.88
          600000           8        4.08           143        72.96
          619000           2        1.02           145        73.98
          650000           1        0.51           146        74.49
          700000           1        0.51           147        75.00
          800000           2        1.02           149        76.02
          900000           2        1.02           151        77.04
         1000000           2        1.02           153        78.06
         1073000           1        0.51           154        78.57
         1100000           1        0.51           155        79.08
         1110000           1        0.51           156        79.59
         1140000           1        0.51           157        80.10
         1164000           1        0.51           158        80.61
```

Table 268 (continued): Total Amount of Annual Units Shipped

```
                                                Cumulative    Cumulative
             Q18    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

         1170000           1        0.51           159        81.12
         1300000           1        0.51           160        81.63
         1400000           2        1.02           162        82.65
         1500000           1        0.51           163        83.16
         1560000           1        0.51           164        83.67
         1593000           1        0.51           165        84.18
         1701715           1        0.51           166        84.69
         2000000           1        0.51           167        85.20
         2168000           1        0.51           168        85.71
         2198000           1        0.51           169        86.22
         2300000           1        0.51           170        86.73
         2670000           1        0.51           171        87.24
         2991000           1        0.51           172        87.76
         3124279           1        0.51           173        88.27
         3200000           1        0.51           174        88.78
         3500000           1        0.51           175        89.29
         4000000           2        1.02           177        90.31
         5000000           3        1.53           180        91.84
         5446276           1        0.51           181        92.35
         6000000           2        1.02           183        93.37
         9000000           1        0.51           184        93.88
        10000000           3        1.53           187        95.41
        11286142           1        0.51           188        95.92
        12000000           1        0.51           189        96.43
        12967234           1        0.51           190        96.94
        14000000           1        0.51           191        97.45
        15000000           1        0.51           192        97.96
        19000000           1        0.51           193        98.47
        40000000           1        0.51           194        98.98
        90000000           1        0.51           195        99.49
       158319967           1        0.51           196       100.00
```

Table 269: Unit for this elevator

```
                                                Cumulative    Cumulative
            Q18A    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                   19          .             .            .
Tons                      17        8.81            17         8.81
Bushels                  153       79.27           170        88.08
Cwt.                      13        6.74           183        94.82
Gallons                    2        1.04           185        95.85
Other                      8        4.15           193       100.00
```

Table 270: Variable: Q18 (Total Amount of Annual Units Shipped)

```
                           Moments

N                        196    Sum Weights              196
Mean              2725690.74    Sum Observations   534235386
Std Deviation     13441110.4    Variance          1.80663E14
Skewness          9.58558299    Kurtosis            101.6551
Uncorrected SS    3.66855E16    Corrected SS      3.52294E16
Coeff Variation   493.126757    Std Error Mean    960079.312
```

Table 271: Basic Statistical Measures

```
          Location                    Variability

    Mean      2725691     Std Deviation          13441110
    Median     300000     Variance             1.80663E14
```

```
                                  Mode       100000     Range                 158319967
                                                        Interquartile Range      630000
```

Table 272:

```
                    Quantiles (Definition 5)

                          Quantile        Estimate

                          100% Max       158319967
                          99%             90000000
                          95%             10000000
                          90%              4000000
                          75% Q3            750000
                          50% Median        300000
                          25% Q1            120000
                          10%                18000
                          5%                  5800
                          1%                    20
                          0% Min                 0
```

Table 273:

```
              Variable:  Q18  (Total Amount of Annual Units Shipped)

                                   Missing Values

                                         -----Percent Of-----
                   Missing                                Missing
                     Value       Count     All Obs            Obs

                         M          16        7.55         100.00
```

Table 274:

```
                                          Frequency Counts

                        Percents                                   Percents
Percents
Value Count  Cell   Cum                   Value Count  Cell   Cum                   Value Count  Cell   Cum

    0     1   0.5   0.5                   198000     1   0.5  35.7                  543000     1   0.5  66.8
   20     1   0.5   1.0                   199259     1   0.5  36.2                  548000     1   0.5  67.3
   60     1   0.5   1.5                   200000     3   1.5  37.8                  550000     2   1.0  68.4
  250     1   0.5   2.0                   201000     1   0.5  38.3                  595619     1   0.5  68.9
  500     1   0.5   2.6                   202000     1   0.5  38.8                  600000     8   4.1  73.0
 2850     1   0.5   3.1                   220000     1   0.5  39.3                  619000     2   1.0  74.0
 3000     1   0.5   3.6                   222000     1   0.5  39.8                  650000     1   0.5  74.5
 5000     2   1.0   4.6                   225000     1   0.5  40.3                  700000     1   0.5  75.0
 5800     1   0.5   5.1                   234105     1   0.5  40.8                  800000     2   1.0  76.0
 6000     1   0.5   5.6                   236000     1   0.5  41.3                  900000     2   1.0  77.0
 8000     1   0.5   6.1                   250000     4   2.0  43.4                 1000000     2   1.0  78.1
 8100     1   0.5   6.6                   254367     1   0.5  43.9                 1073000     1   0.5  78.6
 8320     1   0.5   7.1                   255000     1   0.5  44.4                 1100000     1   0.5  79.1
 9000     1   0.5   7.7                   260000     2   1.0  45.4                 1110000     1   0.5  79.6
10000     2   1.0   8.7                   284000     1   0.5  45.9                 1140000     1   0.5  80.1
14000     1   0.5   9.2                   286170     1   0.5  46.4                 1164000     1   0.5  80.6
```

```
  15000     1   0.5   9.7              287773     1   0.5  46.9              1170000     1   0.5  81.1
  18000     1   0.5  10.2              290000     1   0.5  47.4              1300000     1   0.5  81.6
  25000     2   1.0  11.2              294134     1   0.5  48.0              1400000     2   1.0  82.7
  28000     1   0.5  11.7              295451     1   0.5  48.5              1500000     1   0.5  83.2
  35000     1   0.5  12.2              300000     5   2.6  51.0              1560000     1   0.5  83.7
  50000     1   0.5  12.8              304000     1   0.5  51.5              1593000     1   0.5  84.2
  56000     2   1.0  13.8              310000     1   0.5  52.0              1701715     1   0.5  84.7
  60000     2   1.0  14.8              314000     1   0.5  52.6              2000000     1   0.5  85.2
  62000     2   1.0  15.8              320000     1   0.5  53.1              2168000     1   0.5  85.7
  65000     2   1.0  16.8              322000     1   0.5  53.6              2198000     1   0.5  86.2
  74685     1   0.5  17.3              334000     1   0.5  54.1              2300000     1   0.5  86.7
  75000     2   1.0  18.4              334080     1   0.5  54.6              2670000     1   0.5  87.2
  77144     1   0.5  18.9              350000     3   1.5  56.1              2991000     1   0.5  87.8
  88000     1   0.5  19.4              352000     1   0.5  56.6              3124279     1   0.5  88.3
 100000     8   4.1  23.5              357000     2   1.0  57.7              3200000     1   0.5  88.8
 104000     1   0.5  24.0              366000     1   0.5  58.2              3500000     1   0.5  89.3
 119729     1   0.5  24.5              391000     1   0.5  58.7              4000000     2   1.0  90.3
 120000     3   1.5  26.0              400000     1   0.5  59.2              5000000     3   1.5  91.8
 125000     1   0.5  26.5              400800     1   0.5  59.7              5446276     1   0.5  92.3
 142000     1   0.5  27.0              402735     1   0.5  60.2              6000000     2   1.0  93.4
 150000     4   2.0  29.1              415000     1   0.5  60.7              9000000     1   0.5  93.9
 153000     2   1.0  30.1              426000     1   0.5  61.2             10000000     3   1.5  95.4
 155000     1   0.5  30.6              431000     2   1.0  62.2             11286142     1   0.5  95.9
 160000     1   0.5  31.1              448000     1   0.5  62.8             12000000     1   0.5  96.4
 170000     2   1.0  32.1              450000     1   0.5  63.3             12967234     1   0.5  96.9
 178000     1   0.5  32.7              485773     1   0.5  63.8             14000000     1   0.5  97.4
 180000     1   0.5  33.2              500000     1   0.5  64.3             15000000     1   0.5  98.0
 182000     1   0.5  33.7              507000     1   0.5  64.8             19000000     1   0.5  98.5
 195983     1   0.5  34.2              514000     1   0.5  65.3             40000000     1   0.5  99.0
 196000     1   0.5  34.7              521000     1   0.5  65.8             90000000     1   0.5  99.5
 197000     1   0.5  35.2              522066     1   0.5  66.3            158319967     1   0.5 100.0
```

Table 274:

```
                        Unit for this elevator

                                                   Cumulative    Cumulative
          Q19A    Frequency     Percent     Frequency      Percent
ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
Missing                 19           .              .            .
Tons                    11        5.70             11         5.70
Bushels                161       83.42            172        89.12
Cwt.                    10        5.18            182        94.30
Gallons                  3        1.55            185        95.85
Other                    8        4.15            193       100.00
```

Table 275:

```
   Variable:  Q19  (Total Amount of Storage Capacity)

                              Moments
N                          195    Sum Weights              195
Mean                1402009.35    Sum Observations   273391824
Std Deviation       6228507.05    Variance          3.87943E13
Skewness            11.0258486    Kurtosis          134.231329
Uncorrected SS      7.90939E15    Corrected SS      7.52609E15
Coeff Variation     444.255742    Std Error Mean    446032.654
```

Table 276:

```
                  Basic Statistical Measures

              Location                    Variability

      Mean      1402009      Std Deviation           6228507
      Median     366000      Variance             3.87943E13
      Mode       200000      Range                  79999987
                             Interquartile Range      678000
```

Table 277:

```
             Quantiles (Definition 5)

                  Quantile       Estimate

                  100% Max       80000000
                  99%            30000000
```

```
                                         95%             3843000
                                         90%             2198000
                                         75% Q3           820000
                                         50% Median       366000
                                         25% Q1           142000
                                         10%               45000
                                         5%                14000
                                         1%                  800
                                         0% Min               13
```

Table 278: Variable: Q19 (Total Amount of Storage Capacity)

```
                                             Missing Values

                                                   -----Percent Of-----
                                   Missing                      Missing
                                     Value       Count     All Obs        Obs

                                         M          17        8.02     100.00
```

Table 279: Frequency Counts

```
                         Percents                                 Percents
Percents
Value Count  Cell   Cum              Value Count  Cell   Cum              Value Count  Cell   Cum

    13     1   0.5   0.5             182000     1   0.5  31.3             525000     2   1.0  62.6
   800     1   0.5   1.0             189000     1   0.5  31.8             537000     1   0.5  63.1
  1125     1   0.5   1.5             194000     1   0.5  32.3             561000     1   0.5  63.6
  1500     1   0.5   2.1             197000     1   0.5  32.8             566000     1   0.5  64.1
  2500     2   1.0   3.1             200000     8   4.1  36.9             567000     1   0.5  64.6
  3270     1   0.5   3.6             203000     1   0.5  37.4             574000     1   0.5  65.1
  6000     1   0.5   4.1             216000     1   0.5  37.9             581000     1   0.5  65.6
 12000     1   0.5   4.6             220000     1   0.5  38.5             587000     1   0.5  66.2
 14000     3   1.5   6.2             221000     1   0.5  39.0             598000     1   0.5  66.7
 14950     1   0.5   6.7             222000     2   1.0  40.0             600000     2   1.0  67.7
 20000     1   0.5   7.2             225000     1   0.5  40.5             606000     1   0.5  68.2
 28000     1   0.5   7.7             235000     1   0.5  41.0             610000     1   0.5  68.7
 30000     2   1.0   8.7             250000     1   0.5  41.5             611000     1   0.5  69.2
 35500     1   0.5   9.2             255000     1   0.5  42.1             626000     1   0.5  69.7
 40000     1   0.5   9.7             267000     1   0.5  42.6             638000     1   0.5  70.3
 45000     1   0.5  10.3             269000     1   0.5  43.1             659312     1   0.5  70.8
 50000     2   1.0  11.3             278000     1   0.5  43.6             687000     1   0.5  71.3
 56000     1   0.5  11.8             284000     1   0.5  44.1             700000     1   0.5  71.8
 58000     1   0.5  12.3             285000     1   0.5  44.6             745000     1   0.5  72.3
 60000     1   0.5  12.8             300000     1   0.5  45.1             754000     2   1.0  73.3
 62000     1   0.5  13.3             304000     1   0.5  45.6             768000     1   0.5  73.8
 65000     1   0.5  13.8             314000     1   0.5  46.2             783000     1   0.5  74.4
 66000     1   0.5  14.4             321000     1   0.5  46.7             799000     1   0.5  74.9
 75000     1   0.5  14.9             325000     1   0.5  47.2             820000     1   0.5  75.4
 80000     2   1.0  15.9             326000     1   0.5  47.7             831000     1   0.5  75.9
 83000     1   0.5  16.4             336938     1   0.5  48.2             876000     1   0.5  76.4
 90000     1   0.5  16.9             350000     1   0.5  48.7             900000     1   0.5  76.9
 96000     1   0.5  17.4             352000     1   0.5  49.2             980000     1   0.5  77.4
100000     1   0.5  17.9             360000     1   0.5  49.7            1000000     3   1.5  79.0
102000     2   1.0  19.0             366000     1   0.5  50.3            1032000     1   0.5  79.5
110000     1   0.5  19.5             383416     1   0.5  50.8            1035000     1   0.5  80.0
115000     1   0.5  20.0             386000     1   0.5  51.3            1073000     1   0.5  80.5
120000     2   1.0  21.0             404000     2   1.0  52.3            1077000     1   0.5  81.0
123000     1   0.5  21.5             407000     1   0.5  52.8            1110000     1   0.5  81.5
125000     3   1.5  23.1             412000     1   0.5  53.3            1200000     1   0.5  82.1
132000     1   0.5  23.6             414000     1   0.5  53.8            1213000     1   0.5  82.6
140000     2   1.0  24.6             416000     1   0.5  54.4            1280000     1   0.5  83.1
142000     1   0.5  25.1             433000     2   1.0  55.4            1281000     1   0.5  83.6
143000     1   0.5  25.6             435000     1   0.5  55.9            1480000     1   0.5  84.1
148000     1   0.5  26.2             442000     1   0.5  56.4            1597000     1   0.5  84.6
150000     1   0.5  26.7             450000     2   1.0  57.4            1755000     1   0.5  85.1
155000     1   0.5  27.2             460000     2   1.0  58.5            1774000     1   0.5  85.6
159000     1   0.5  27.7             470000     1   0.5  59.0            1800000     1   0.5  86.2
160000     2   1.0  28.7             481000     1   0.5  59.5            1825000     1   0.5  86.7
172000     1   0.5  29.2             494000     1   0.5  60.0            1915000     1   0.5  87.2
175000     1   0.5  29.7             500000     1   0.5  60.5            1996000     1   0.5  87.7
178000     1   0.5  30.3             506000     1   0.5  61.0            2000000     2   1.0  88.7
180000     1   0.5  30.8             520000     1   0.5  61.5            2038000     1   0.5  89.2
2091000     1   0.5  89.7            2991000     1   0.5  93.3             4600000     1   0.5  96.9
2198000     1   0.5  90.3            3300000     1   0.5  93.8             5844000     1   0.5  97.4
2500000     1   0.5  90.8            3331000     1   0.5  94.4             7000000     1   0.5  97.9
2537000     1   0.5  91.3            3500000     1   0.5  94.9            11500000     1   0.5  98.5
2670000     1   0.5  91.8            3843000     1   0.5  95.4            12621000     1   0.5  99.0
2700000     1   0.5  92.3            4100000     1   0.5  95.9            30000000     1   0.5  99.5
2800000     1   0.5  92.8            4500000     1   0.5  96.4            80000000     1   0.5 100.0
```

SURVEY DOCUMENTATION

The following information provides various aspects of the survey methodology and individual components so as to better document the process.

Cover Letter – Grain Businesses

October 19, 2004

«company»
«contact_name», «contact_title»
«address»
«city», «state» «zip»

Dear «contact_name»:

The U.S. Army Corps of Engineers is currently evaluating policy changes related to the maintenance and support of the navigable waterway along the Snake and Columbia Rivers in our area. In order to assess the potential impact and demand responses to different levels of investment, the Corps is collecting information related to transportation movements along our waterway.

We need to know more about the transportation and shipping decisions you make when shipping your commodities. Enclosed is a questionnaire about Columbia / Snake River Transportation Choices and Needs for you to complete, one for each individual elevator.

All of the information you provide on this questionnaire will be kept strictly confidential. A code number is printed on the back page; this is only used to check your code number off the mailing list when it is returned. We have included a token of our appreciation as a way of saying thanks for helping with this study.

We hope you will complete and return the questionnaire so that we can have the benefit of knowing your opinions and decisions regarding shipping and transportation choices available at the different elevators in our region. Previous experience suggests each questionnaire takes 5-10 minutes to complete.

We would be happy to answer any questions that you might have about this study or your participation. Feel free to call us at (800) 833-0867 and ask for the Transportation Choice Survey, or send a fax message to (509) 335-0116. You can also email me at KJMiller@wsu.edu if you prefer.

Thank you for your assistance!

Sincerely,

Ken Casavant
Professor of Agricultural Economics
School of Economic Sciences
Washington State University

Kent Miller
Study Director
Social & Economic Sciences Research Center
Washington State University

PS. This project has been reviewed and approved by the Washington State University Institutional Review Board. If you have any questions concerning your rights about participating in this project, please contact 509-335-9661 and ask for the IRB coordinator.

Cover Letter – Port Businesses

November 5, 2004

«company»
«contact_name»
«address»
«city», «state» «zip»

Dear «contact_name»:

The U.S. Army Corps of Engineers is currently evaluating policy changes related to the maintenance and support of the navigable waterway along the Snake and Columbia Rivers in our area. In order to assess the potential impact and demand responses to different levels of investment, the Corps is collecting information related to transportation movements along our waterway.

We need to know more about the transportation and shipping decisions you make when shipping your commodities. Enclosed is a questionnaire about Columbia / Snake River Transportation Choices and Needs for you to complete.

All of the information you provide on this questionnaire will be kept strictly confidential. A code number is printed on the back page; this is only used to check your code number off the mailing list when it is returned. We have included a token of appreciation as this is a unique and important study for our region.

We hope you will complete and return the questionnaire so that we can have the benefit of knowing your opinions and decisions regarding shipping and transportation choices available of the different shippers in our region. Previous experience suggests each questionnaire takes 5-10 minutes to complete.

We would be happy to answer any questions that you might have about this study or your participation. Feel free to call us at (800) 833-0867 and ask for the Transportation Choice Survey, or send a fax message to (509) 335-0116. You can also email me at KJMiller@wsu.edu if you prefer.

Thank you for your assistance!

Sincerely,

Ken Casavant
Professor of Agricultural Economics
School of Economic Sciences
Washington State University

Kent Miller
Study Director
Social & Economic Sciences Research Center
Washington State University

PS. This project has been reviewed and approved by the Washington State University Institutional Review Board. If you have any questions concerning your rights about participating in this project, please contact 509-335-9661 and ask for the IRB coordinator.

Follow-Up Postcard

Recently, we mailed a questionnaire(s) to you entitled "Columbia/Snake River Transportation Choice and Needs Survey – 2004." If they have already been completed and returned, please accept our sincere thanks. If not, could you do so as soon as possible; your views regarding the maintenance, support, and your use of the navigable waterway along the Snake and Columbia Rivers are very insightful and important. The U.S. Army Corps of Engineers is evaluating policy changes of investments related to that waterway,

If you did not receive a questionnaire, or it was misplaced, please call us toll free at (800) 833-0867, send us a fax message at (509) 335-0116, or send an email message to kjmiller@wsu.edu. We will then quickly mail you a replacement.

Ken Casavant
Professor of Agricultural Economics
School of Economic Sciences
Washington State University
Pullman, WA 99164

Kent Miller
Study Director
SESRC
Washington State University
Pullman, WA 99164-1801

Follow-Up Letter

November 12, 2004

«company»
«contact_name», «contact_title»
«address»
«city», «state» «zip»

Dear «contact_name»:

About three weeks ago, we wrote to you about the Columbia / Snake River Transportation Choice and Needs Survey. As of today, we have not received your completed questionnaire(s). We realize that this is a busy time of the year and you may not have had time yet to complete it. However, we would sincerely appreciate hearing from you. The purpose of the survey is to gather as much information as possible for the U.S. Army Corps of Engineers in support, maintenance of, and access to the navigable waterways along the Snake and Columbia Rivers.

We are writing to you again because your questionnaire(s) is important to the usefulness of this study. In order to truly represent the operations, needs and opinions of all grain shippers in the state, on the water or not, it is important that each questionnaire be completed. We have included another token of appreciation to emphasize the importance of this study.

All of the information you provide will be kept strictly confidential. Your participation is voluntary and you may skip any question you prefer not to answer.

If you have any questions or would like help completing the survey, please call toll free at (800) 833-0867 and ask for the "Transportation Choice Survey" or send a fax message to (509) 335-0116. You may also send an email message to KJMiller@wsu.edu if you prefer.

Thanks for your help!

Sincerely,

Ken Casavant
Professor of Agricultural Economics
School of Economic Sciences

Kent Miller
Study Director
SESRC

Changes made to coding manual after coding began are in italic. The symbols listed below indicate the date of the change, and surround the changes made.

- **GENERAL CODING INSTRUCTIONS:** Any question not answered, or with more than one answer, is coded as "M". (Addition: *except where specified*.) Answers such as "Don't Know", "Not Sure", and "?" are coded as "D". (Addition: unless "don't know" is offered as a category.) Missing values, such as "M" and "D" will *not* follow skip patterns, they will continue to the next question. Answers of "None", "-", or "/" will be entered as "0".
- ***Range Coding:*** If the answer given is a range of values, take the average. If this average is a fraction, round based on the ID# -- round to the even number if the ID# is even, to the odd number if the ID# is odd. This coding will be used on all questions with a notation **CODING: Range coding**" in the "coding instructions" column. If an answer given includes a decimal or a fraction, round to the nearest whole number. If exactly ½ or **.**5, round based on the ID# -- round to the even number if the ID# is even, to the odd number if the ID# is odd.
- ***Multiple Answer Reminder:*** Please place a √ next to questions where the CATI will allow more than one answer to be entered. Noted by "**CODING: Use check reminder**" in the "coding instructions" column.
- ***Yes / No Coding:*** If there are only some "yes" answers given, but other items are unanswered, code the unanswered as "no". Similarly, if the number or letter to the left of the item is circled, code those circled as "yes" and those not as "no". However, if there are any "no" answers given, or if ONLY "no" answers are given, code those items unanswered as missing ("M"). This coding will be used on all questions with a notation **CODING: Yes / No coding**" in the "coding instructions" column. Answers such as "n/a" will be coded as missing ("M").

Questions to check for coding issues: Skim entire questionnaire.

Q#	Type; Range	Entry	Skip To	Coding Instructions
ID#	N; 1001-78001			SESRC ID#
CINI	A; 3 characters			Coder's Initials
Q1	A; 30 characters			***What is the primary commodity you ship from this elevator***
Q2	A; 30 characters			How large was your last single outbound shipment
Q2a	C; 1-5	5		Type of unit for last single outbound shipment
Q3A_L-Q3C_L	C; 1-2			Do you have loading capabilities for…
Q3A_U-Q3C_L	C; 1-2			Do you have unloading capabilities for…
Q3B	N; 1-500			How close is the nearest barge loading facility
Q3C	N; 1-500			How close is the nearest rail loading facility
Q4	MA; 1-5			Type of transportation you use most often from this location
Q5	A; 30 characters			Commodity was shipped in your very last freight shipment
Q6A1	C; 1-2	2	Q6A2	Available: Truck to Pasco then Barge to Portland
Q6B1_T	D.2; 0.00-10.00			Transportation rate: Truck to Pasco
Q6B1_B	D.2; 0.00-10.00			Transportation rate: Barge to Portland

Q6C1	N; 1-99			Average shipment time: Truck to Pasco then Barge to Portland
Q6D1	N; 0-100			Percent of on-time arrivals: Truck to Pasco then Barge to Portland
Q6A2	C; 1-2	2	Q6A3	Available: Truck to (Blank) then Barge to Portland
Q6_Port	A; 30 characters			Write in River port other than Pasco
Q6B2_T	D.2; 0.00-10.00			Transportation rate: Truck to (Blank)
Q6B2_B	D.2; 0.00-10.00			Transportation rate: Barge to Portland
Q6C2	N; 1-99			Average shipment time: Truck to (Blank) then Barge to Portland
Q6D2	N; 0-100			Percent of on-time arrivals: Truck to Pasco then Barge to Portland
Q6A3	C; 1-2	2	Q6A4	Available: Rail to Portland
Q6B3_R	D.2; 0.00-10.00			Transportation rate: Rail to Portland
Q6C3	N; 1-99			Average shipment time: Rail to Portland
Q6D3	N; 0-100			Percent of on-time arrivals: Rail to Portland
Q6A4	C; 1-2	2	Q6A5	Available: Truck to Rail then Rail to Portland
Q6B4_T	D.2; 0.00-10.00			Transportation rate: Truck to Rail
Q6B4_R	D.2; 0.00-10.00			Transportation rate: Rail to Portland
Q6C4	N; 1-99			Average shipment time: Truck to Rail then Rail to Portland
Q6D4	N; 0-100			Percent on-time arrivals: Truck to Rail then Rail to Portland
Q6A5	C; 1-2	2	Q6A6	Available: Barge to Portland
Q6B5_B	D.2; 0.00-10.00			Transportation rate: Barge to Portland
Q6C5	N; 1-99			Average shipment time: Barge to Portland
Q6D5	N; 0-100			Percent on-time arrivals: Barge to Portland
Q6A6	C; 1-2	1	Q6_Other	Available: Other *If not answered, code as 2*
Q6_other	A; 30 characters			
Q6B6	D.2; 0.00-10.00			Transportation rate: Other
Q6C6	N; 1-99			Average shipment time: Other
Q6D6	N; 0-100			Percent on-time arrivals: Other
Q7	C; 1-6			Use for very last freight shipment
Q8	C; 1-7	7	Q12	Alternative transportation mode/destination
Percent	C; 10, 20, 30, 40, 50, 60			Percent change
Q9	C; 1-2	1	Q10	If transportation rate increased xx%, would you switch to alternative
Q9a	N; 1-1000			Percentage increase in transportation rate needed to switch
Q10	C; 1-2	1	Q11	If transit time increased xx%, would you switch to alternative
Q10a	N; 1-1000			Percentage increase in transit time needed to switch
Q11	C; 1-2	1	Q12	If reliability decreased xx%, would you switch to

				alternative
Q11a	N; 1-1000			Percentage decrease in reliability need to switch
Q12	N; 1-125			Length elevator has been at the current location
Q13	C; 1-5			Importance of logistic costs in determining plant location
Q14_check	C; 1-2	1	Q15	Check here if you would not relocate (2=not checked) *If box is checked and answer given, enter as "2-not checked" and put percentage in F5 notes*
Q14	N; 1-100			Percentage decrease in logistic and transportation costs necessary to relocate
Q15IA-Q15ID	C; 1-2	2	next	Is this mode used for Inbound shipments *Yes=1 and No=2*
Q15IA_%-Q15ID_%	N; 1-100			Percentage of total shipments that come in this way *Total =100%*
Q15OA-Q15OD	C; 1-2	2	next	Is this mode used for Outbound shipments *Yes=1 and No=2*
Q15OA_%-Q15OD_%	N; 1-100			Percentage of total shipments that go out this way *Total =100%*
Q16_check	C; 1, 2	1	Q17	Check here if you cannot load or unload rail cars at this facility (2=not checked)
Q16	N; 1-150			How many rail cars can be loaded or unloaded at your facility
Q17	D.2; 0-100			What was the average commodity price over the last three years
Q17a	C; 1-5			Unit for this commodity in Q17
Q18	N; 1-10,000,000			How large is this elevator facility
Q18a	C; 1-5			Unit for this elevator in Q18
Q19	N; 1-10,000,000			Total Amount of storage capacity
Q19a	C; 1-5			Unit for this elevator in Q19
N1-N3	T			

DEFINITIONS FOR THE "TYPE" COLUMN ABBREVIATIONS:

C = Categorical question with set answers listed in the questionnaire for the respondent to choose from. A simple frequency table is produced in the listing.
N = Numeric question – Respondent is allowed to give any whole number as an answer. The numbers (N; *1-99*) indicate the range of answers SESRC believes would be acceptable responses. These questions will have a univariate procedure, listing the mean, median, mode, lowest value, and highest value in addition to the normal frequency table.
D = Decimal question. Similar to a numeric question, but allows respondents to give a fraction answer. The data is handled exactly the same as a numeric question.
A = Question allows alphabetic entries only. Usually these are questions where the respondent is asked to choose one item from a list. A simple frequency table is produced in the listing.

T (text) = Questions that allow respondent to write in any answer they choose. These are often called "open-ended" or "comments" questions. The verbatim response is entered by SESRC, and the answers are kept in a separate file from the other, numeric data.

MA = A categorical question with set answers listed in the questionnaire for the respondent to choose from -- except that they can choose more than one of the answers listed.

FREQUENTLY USED CODING DECISIONS:
The following can be copied into any coding manual. This page should be deleted once the coding manual is written.

Under the "General Coding Instructions" Section

- Any question not answered, or with more than one answer, is coded as "M". (Addition: *except where specified*.)
- Answers such as "Don't Know", "Not Sure", and "?" are coded as "D". (Addition: unless "don't know" is offered as a category.)
- Missing values, such as "M" and "D" will *not* follow skip patterns, they will continue to the next question.
- Answers of "None", "-", or "/" will be entered as "0".
- Range Coding: If the answer given is a range of values, take the average. If this average is a fraction, round based on the ID# -- round to the even number if the ID# is even, to the odd number if the ID# is odd. This coding will be used on all questions with a notation **<u>CODING:</u> Range coding**" in the "coding instructions" column.
- If an answer given includes a decimal or a fraction, round to the nearest whole number. If exactly ½ or **.**5, round based on the ID# -- round to the even number if the ID# is even, to the odd number if the ID# is odd.
- Multiple Answer Reminder: Please place a √ next to questions where the CATI will allow more than one answer to be entered. Noted by "**<u>CODING:</u> Use check reminder**" in the "coding instructions" column.
- Yes / No Coding: If there are only some "yes" answers given, but other items are unanswered, code the unanswered as "no". Similarly, if the number or letter to the left of the item is circled, code those circled as "yes" and those not as "no". However, if there are any "no" answers given, or if ONLY "no" answers are given, code those items unanswered as missing ("M"). This coding will be used on all questions with a notation **<u>CODING:</u> Yes / No coding**" in the "coding instructions" column.
- Yes / No "Other": If there is an "other" category, but neither "yes" nor "no" is answered, then: If there is text, code as "yes"; if there is no text, code as "no". This question should NOT be M unless the whole list is not answered.
- Answers such as "n/a" will be coded as missing ("M").
- List question "other": If there is no rating for this option code as follows: If there is no text, code as M; if there is text, create a code.

<u>Under the "Coding Instructions" Column</u>

- **<u>CODING:</u> Use check reminder.**
- **<u>CODING:</u> Yes / No coding.** (Or if only on one or two questions, use from above)
- **<u>CODING:</u> Range coding.** (Or if only on one or two questions, use from above)
- For a yes / no series question (or a yes/no/not applicable or don't know series) with an "other" item: **<u>CODING:</u> If there is an answer given in the text portion of the "other " item, but the yes/no is not answered, assume a "yes", if no answer in the text portion, assume "no". (There should be no missing "M" unless the entire page is unanswered.)**
- For a series question with other than yes / no categories with an "other" item: **<u>CODING:</u> If there is an answer given in the text portion of the "other " item, but the rating is**

not answered, code as (create code #); if no answer in the text portion, code as missing ("M").

- For education level question: **<u>CODING:</u> Code as the highest number answered.**
- For multiple answers on a stand alone question with an other option, and the Study Director does not want to allow multiple answers in the CATI: **<u>CODING:</u> If multiple answers are given, code as (other option #) and type in text from all categories answered.**
- For numeric answers with a qualifier: **<u>CODING:</u> If the answer includes a "+", "over", or ">" type of qualifier, code as the number given and ignore the qualifier.**
- Race / Ethnicity: Allow a multiple answer.
- Education Level: Code as the highest number circled.
- Screening questions: If the respondent does not follow the indicated branching pattern, create a code, and don't have it follow the branch.

Questionnaire – Cati Screens

```
    Q1: What is the primary commodity you ship from this elevator?
@Q1
    Q2: How large was your last single outbound shipment?
@Q2
@Q2A Q2A:Type of unit for last single outbound shipment

 1 = Tons
 2 = Bushels
 3 = Cwt.
 4 = Gallons
 5 = Other

 D = Don't know  M = Missing
```

```
@Q3A_L Q3A_L: Do you have loading capabilities for:Trucks
@Q3B_L Q3B_L: Do you have loading capabilities for:Barges
@Q3C_L Q3C_L: Do you have loading capabilities for:Rail Cars
@Q3A_U Q3A_U: Do you have loading capabilities for:Trucks
@Q3B_U Q3B_U: Do you have loading capabilities for:Barges
@Q3C_U Q3C_U: Do you have loading capabilities for:Rail Cars

 1 = Yes   2 = No

 Q3B: How close is the nearest barge loading facility to this facility?
@Q3B miles

 Q3C: How close is the nearest rail loading facility to this facility?
@Q3C miles

   D = Don't know  M = Missing
```

```
 Q4: Type of transportation do you use most often from this location
 @Q4

   1 = Private Truck
   2 = For-Hire Truck
   3 = Barge
   4 = Rail
   5 = Other
   D = Don't know
   M = Missing
```

```
    Q5: What commodity was shipped in your very last freight shipment?
 @Q5
 D = Don't know   M = Missing
```

```
@Q6A1 Q6A1: Available :Truck to Pasco then Barge to Portland
1 = Yes   2 = No

Q6B1T: Transportation rate:Truck to Pasco
@Q6B1T Truck

Q6B1B: Transportation rate:Barge to Portland
@Q6B1B Barge

Q6C1: Average shipment time: Truck to Pasco then Barge to Portland
@Q6C1 Days

Q6D1: Percent of on time arrive : Truck to Pasco then Barge to Portland>
@Q6D1  % on-time arrivals

D = Don't know   M = Missing
```

```
@Q6A2 Q6A2: Available :Truck to river port then Barge to Portland
1 = Yes   2 = No

Q6Pot: Truck to river port other than Pasco
@Q6Pot
Q6B2T: Transportation rate:Truck to river port
@Q6B2T Truck

Q6B2B: Transportation rate:Barge to Portland
@Q6B2B Barge
Q6C2: Average shipment time: Truck to river port then Barge to Portland
@Q6C2 Days

Q6D2: Percent of on time arrive : Truck to river port then Barge to Portland
@Q6D2  % on-time arrivals

D = Don't know   M = Missing
```

```
@Q6A3 Q6A3: Available :Rail to Portland

1 = Yes   2 = No

Q6B3R: Transportation rate:Rail to Portland
@Q6B3R Rail

Q6C3: Average shipment time: Rail to Portland
@Q6C3 Days

Q6D3: Percent of on time arrive : Rail to Portland
@Q6D3  % on-time arrivals

D = Don't know   M = Missing
```

```
@Q6A4 Q6A4: Available :Truck to Railroad then Rail to Portland
1 = Yes   2 = No

Q6B4T: Transportation rate:Truck to Railroad
@Q6B4T Truck

Q6B4R: Transportation rate:Rail to Portland
@Q6B4R Barge

Q6C4: Average shipment time: Truck to Railroad then Rail to Portland
@Q6C4 Days

Q6D4: Percent of on time arrive : Truck to Railroad then Rail to Portland
@Q6D4  % on-time arrivals

D = Don't know   M = Missing
```

```
@Q6A5 Q6A5: Available :Barge to Portland
1 = Yes   2 = No

Q6B5B: Transportation rate:Barge to Portland
@Q6B5B Barge

Q6C5: Average shipment time: Barge to Portland
@Q6C5 Days

Q6D5: Percent of on time arrive : Barge to Portland
@Q6D5  % on-time arrivals

D = Don't know   M = Missing
```

```
@Q6A6 Q6A6: Available :other
1 = Yes   2 = No

Q6OT  other
@Q6OT

Q6B6: Transportation rate:other
@Q6B6

Q6C6: Average shipment time: other
@Q6C6 Days

Q6D6: Percent of on time arrive : other
@Q6D6  % on-time arrivals

D = Don't know   M = Missing
```

```
@Q7   Q7: Use for your very last freight shipment

@Q8   Q8: Alternative transpotation mode/destination

 1 = Truck to Pasco then Barge to Portland
 2 = Truck to _then Barge to Portland
 3 = Rail to Portland
 4 = Truck to Railroad then Rail to Portland5
 5 = Barge to Portland
 6 = Other (Specify mode and destination)

 7 = No alternatives available
 D = Don't know
 M = Missing
```

```
@Perct Perct: Percent change
 1 = 10
 2 = 20
 3 = 30
 4 = 40
 5 = 50
 6 = 60

@Q9 Q9: If the transportation rate increased XX%, would you switch to
        the alternative
 1 = Switch to Alternative mode
 2 = Continue to use Original mode

Q9A: Percentage increase in the transportation rate need to switch
@Q9A % increase

 D = Don't know   M= Missing
```

```
@Q10 Q10: If the transit time increased XX%, would you switch to
          the alternative

 1 = Switch to Alternative mode
 2 = Continue to use Original mode

Q10A: Percentage increase in the transit time need to switch
@Q10A % increase

@Q11 Q11: If the reliability decreased XX%, would you switch to
          the alternative

 1 = Switch to Alternative mode
 2 = Continue to use Original mode

Q11A: Percentage decrease in the reliability need to switch
@Q11A % decrease
```

```
@Q12 Q12:Length elevator has been at current location>

@Q13 Q13:Importance of logistic costs in determining your plant location

 1 = Very important
 2 = Somewhat important
 3 = Not very important
 4 = Not important at all
 5 = Not applicable

 D = Don't know
 M = Missing
```

```
@Q14CK Q14CK: Check here if you would not relocate.

 1= Checked  2= Not checked

Q14: Percentage decrease in logistics and transportation costs necessary
     to relocate
@Q14 % decrease in costs

 M = Missing
```

```
@Q15IA Q15IA:Is this mode used:Private Truck
@Q15IB Q15IB:Is this mode used:For-Hire Truck
@Q15IC Q15IC:Is this mode used:Barge
@Q15ID Q15ID:Is this mode used:Rail

 1 = Yes 2 = No

@Q15I1 Q15I1:Percentage of total shipments that come in this way:
               Private Truck
@Q15I2 Q15I2:Percentage of total shipments that come in this way:
               For-Hire Truck
@Q15I3 Q15I3:Percentage of total shipments that come in this way:Barg
@Q15I4 Q15I4:Percentage of total shipments that come in this way:Rail

D = Don't know   M = Missing
```

```
@Q15OA Q15OA:Is this mode used:Private Truck
@Q15OB Q15OB:Is this mode used:For-Hire Truck
@Q15OC Q15OC:Is this mode used:Barge
@Q15OD Q15OD:Is this mode used:Rail

 1 = Yes 2 = No

@Q15O1 Q15O1:Percentage of total shipments that come in this way:
               Private Truck
@Q15O2 Q15O2:Percentage of total shipments that come in this way:
               For-Hire Truck
@Q15O3 Q15O3:Percentage of total shipments that come in this way:Barg
@Q15O4 Q15O4:Percentage of total shipments that come in this way:Rail

D = Don't know   M = Missing
```

```
@Q16CK Q16CK: Check here if you cannot load or unload rail cars
                at this facility.

  1= Checked   2= Not Checked

 Q16: How many rail cars can be loaded or unloaded at your facility
 @Q16 # of cars

  M = Missing
```

```
Q17:What was the average commodity price over the last three years
@Q17               price per unit

@Q17A Q17A:Unit for this commodity
 1 = Tons
 2 = Bushels
 3 = Cwt.
 4 = Gallons
 5 = Other

 D= Don't know   M = Missing
```

```
Q18:Capacity of elevator of facility: Annual Units Shipped
@Q18                Total Amount of Annual Units Shipped

@Q18A Q18A:Unit for this elevator
 1 = Tons
 2 = Bushels
 3 = Cwt.
 4 = Gallons
 5 = Other

 D= Don't know   M = Missing
```

```
Q19:Capacity of elevator of facility: Amount of Storage Capacit
@Q19                Total Amount of Storage Capacity

@Q19A Q19A:Unit for this elevator
 1 = Tons
 2 = Bushels
 3 = Cwt.
 4 = Gallons
 5 = Other

 D= Don't know   M = Missing
```

```
  Comments from page 15 of questionnaire:

       @N1 Ending Comment
       @N2 Ending Comment
       @N3 Ending Comment


       1 = Comment Present
       2 = No Comment
```

```
-----------------------------------------
-  @INT  Enter the Termination Code     -
-----------------------------------------
-  CM - 1st Entry                       -
-  VM - Verified Entry                  -
-  ZZ - Practice Case                   -
-----------------------------------------
```

```
Please double check the INT code

 INT now is <INT               >

 @check
 1  YES IT IS A 1st entry
 2  YES IT IS A Verified entry
 3  YES IT IS A Wrong Izzy Case / Practice Case
```

Columbia/Snake River Transportation Choice and Needs Survey - 2004

Companies Sample

```
        Project:    ELEV                Prior letter:
                              First Mailing: 10/19/2004
        Study Director: Kent           Postcard: 10/27/2004
                              Second Mailing: 11/10/2004
        Sample Size:    78
  --------------------------------------------------------------------------
  |        Cumulative   Daily                                   No     |
  |  Date   Complete    Complete     Refusals Ineligible RTS  Other Response |
  --------------------------------------------------------------------------
                                                     78
  10/25/2004     3  |       3    |   0       1     0    0       74
  10/26/2004     8  |       5    |   0       0     0    0       69
  10/27/2004    15  |       7    |   0       0     0    0       62
  10/28/2004    22  |       7    |   0       0     1    0       54
  10/29/2004    25  |       3    |   0       0     0    0       51
  11/01/2004    28  |       3    |   0       0     0    0       48
  11/03/2004    36  |       8    |   0       1     0    0       39
  11/04/2004    37  |       1    |   0       0     0    0       38
  11/05/2004    38  |       1    |   0       0     0    0       37
  11/08/2004    39  |       1    |   0       1     0    0       35
  11/10/2004    40  |       1    |   0       0     0    0       34
  11/15/2004    41  |       1    |   0       1     0    0       32
  11/16/2004    41  |       0    |   1       0     0    0       31
  11/17/2004    41  |       0    |   1       0     0    0       30
  11/18/2004    44  |       3    |   0       0     0    0       27
  11/19/2004    45  |       1    |   0       3     0    0       23
  11/30/2004    47  |       2    |   0       0     0    0       21
  12/08/2004    48  |       1    |   0       0     0    0       20
  12/29/2004    49  |       1    |   0       0     0    0       19
                                 ==================================
                                    2       7     1    0

      * Response Rate: 62.82 % *       * Completion Rate: 70.00 % *
         (cm's/sample size)          (cm's/(cm's+rf's+no response))
```

Columbia/Snake River Transportation Choice and Needs Survey - 2004

Warehouses

```
      Project:   ELEV              Prior letter:
                           First Mailing: 10/19/2004
      Study Director: Kent            Postcard: 10/27/2004
                           Second Mailing: 11/10/2004
      Sample Size:   414
  ---------------------------------------------------------------------------
  |       Cumulative   Daily                                   No     |
  | Date   Complete    Complete      Refusals Ineligible RTS  Other Response |
  ---------------------------------------------------------------------------
                                                   414
  10/25/2004     8  |      8     |    0        1       0    0      405
  10/26/2004    22  |     14     |    0        0       0    3      388
  10/27/2004    68  |     46     |    0        3       0   20      319
  10/28/2004    85  |     17     |    8        1       0    2      291
  10/29/2004    88  |      3     |    0        0       0    0      288
  11/01/2004    97  |      9     |    0        2       0    6      271
  11/03/2004   113  |     16     |    0        4       0    3      248
  11/04/2004   115  |      2     |    0        0       0    0      246
  11/05/2004   129  |     14     |    0        3       0    1      228
  11/08/2004   130  |      1     |    0        1       0    0      226
  11/10/2004   131  |      1     |    0        0       0    0      225
  11/15/2004   154  |     23     |    0        2       0    5      195
  11/16/2004   154  |      0     |   44        0       0    0      151
  11/17/2004   154  |      0     |    3        0       0    0      148
  11/18/2004   165  |     11     |    0        1       0    0      136
  11/19/2004   166  |      1     |    0        3       0    0      132
  11/22/2004   167  |      1     |    0        0       0    0      131
  11/23/2004   169  |      2     |    0        1       0    0      128
  11/30/2004   174  |      5     |    0        0       0    0      123
  12/08/2004   180  |      6     |    0        0       0    5      112
  12/16/2004   180  |      0     |    0        1       0    0      111
  12/29/2004   181  |      1     |    0        0       0    0      110
                                 =================================
                                      55       23      0   45

     * Response Rate: 43.72 % *       * Completion Rate: 52.31 % *
        (cm's/sample size)          (cm's/(cm's+rf's+no response))
```

Columbia/Snake River Transportation Choice and Needs Survey - 2004

Port shippers

```
      Project:    ELEV              Prior letter:
                             First Mailing: 11/05/2004
      Study Director: Kent          Postcard: 11/12/2004
                             Second Mailing:
      Sample Size:    89
  ------------------------------------------------------------------------
  |       Cumulative   Daily                                  No     |
  | Date   Complete    Complete      Refusals Ineligible RTS  Other Response |
  ------------------------------------------------------------------------
                                                        89
  11/09/2004     1  |      1     |    0       2      3    0       83
  11/10/2004     2  |      1     |    0       0      1    0       81
  11/12/2004     6  |      4     |    0       1      1    0       75
  11/15/2004    11  |      5     |    0       2      0    0       68
  11/16/2004    17  |      6     |    0       1      0    0       61
  11/17/2004    18  |      1     |    0       0      0    0       60
  11/18/2004    19  |      1     |    0       0      0    0       59
  11/22/2004    20  |      1     |    0       1      0    0       57
  11/23/2004    21  |      1     |    0       0      2    0       54
  11/29/2004    21  |      0     |    0       1      0    0       53
  12/01/2004    21  |      0     |    0       2      0    0       51
  12/02/2004    23  |      2     |    0       2      0    0       47
  12/06/2004    23  |      0     |    0       3      0    0       44
  12/08/2004    26  |      3     |    0       5      0    0       36
  12/14/2004    27  |      1     |    0       0      0    0       35
  12/16/2004    28  |      1     |    0       0      0    0       34
  12/20/2004    29  |      1     |    0       0      0    0       33
  12/21/2004    31  |      2     |    0       0      0    0       31
  12/29/2004    31  |      0     |    0       1      0    0       30
                               =================================
                                   0       21      7     0

      * Response Rate: 34.83 % *       * Completion Rate: 50.82 % *
        (cm's/sample size)          (cm's/(cm's+rf's+no response))
```

NETS

navigation · economics · technologies

The NETS research program is developing a series of practical tools and techniques that can be used by Corps navigation planners across the country to develop consistent, accurate, useful and comparable information regarding the likely impact of proposed changes to navigation infrastructure or systems.

The centerpiece of these efforts will be a suite of simulation models. This suite will include:

- A model for forecasting **international and domestic traffic flows** and how they may be affected by project improvements.
- A **regional traffic routing model** that will identify the annual quantities of commodities coming from various origin points and the routes used to satisfy forecasted demand at each destination.
- A **microscopic event model** that will generate routes for individual shipments from commodity origin to destination in order to evaluate non-structural and reliability measures.

As these models and other tools are finalized they will be available on the NETS web site:

http://www.corpsnets.us/toolbox.cfm

The NETS bookshelf contains the NETS body of knowledge in the form of final reports, models, and policy guidance. Documents are posted as they become available and can be accessed here:

http://www.corpsnets.us/bookshelf.cfm

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