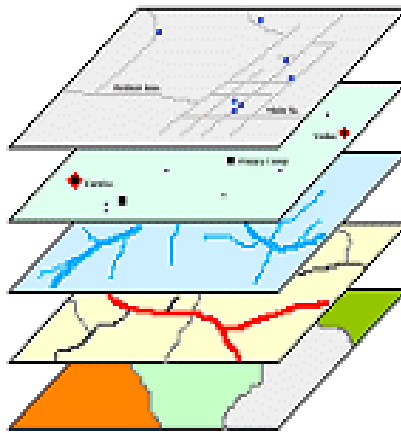

Development of a Washington State Freight Data System



Washington State Department of Transportation

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16. ABSTRACT This study identified freight data uses, needs, and gaps, both nationally and in the state of Washington. Specific recommendations for providing the needed data and data generating processes include the following: <ul style="list-style-type: none"> Phase I: Identification of Data Gaps, Needs, and Uses (Timeframe: current and ongoing) An ongoing inventory of available freight data, relative to identified freight data needs, should be performed throughout the state and region. This process may be incorporated into the expected activities/duties proposed in these recommendations. Phase II: Librarian/Educator, Resource to Manage Freight Data Warehouse (Timeframe: within six months) This individual or resource is a "data source" for the state; a contact for all agencies and businesses using transportation flow and operational data; and a participant in discussions as freight data needs arise in the state. Phase III: Freight Database Manager, Technical Resource (Timeframe: within one year) The Freight Database Manager will design/develop and maintain the freight data warehouse for the Washington State Department of Transportation (WSDOT). 			
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Development of a Washington State Freight Data System

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Freight Systems Division

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August 2007

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Executive Summary

Recommendations

This study identified freight data uses, needs, and gaps, both nationally and in the state of Washington. Specific recommendations for providing the needed data and data generating processes include the following:

- **Phase I: Identification of Data Gaps, Needs, and Uses (Timeframe: current and ongoing)**

An ongoing inventory of available freight data, relative to identified freight data needs, should be performed throughout the state and region. This process may be incorporated into the expected activities/duties proposed in these recommendations.

- **Phase II: Librarian/Educator, Resource to Manage Freight Data Warehouse (Timeframe: within six months)**

This individual or resource is a “data source” for the state; a contact for all agencies and businesses using transportation flow and operational data; and a participant in discussions as freight data needs arise in the state.

- **Phase III: Freight Database Manager, Technical Resource (Timeframe: within one year)**

The Freight Database Manager will design/develop and maintain the freight data warehouse for the Washington State Department of Transportation (WSDOT).

- **Phase IV: Dedicated Funds for Operations/Data Development (Timeframe: year one and ongoing)**

The fourth phase of this proposal is to dedicate resources to design, develop, and use freight data collection efforts addressing deficiencies. An ongoing piece of this effort will involve developing relationships with

private or quasi-public firms in order to determine their desired transportation system performance and needs, and to earn the confidence of these decision makers.

Background

At the heart of an effective and efficient U.S. transportation system, especially freight, is the data that support transportation investment decisions, prioritization, and overall policy development at the national, regional, and local level. Very little system data exists to inform decision makers about the economic impact, system bottlenecks, and supply chains flowing through freight systems that support Washington State producers and delivery of goods to consumers.

Many public and private sector entities collect some data on goods movement. However, there is no link between these different sources and some information isn't collected by anyone. In addition, the combination of data from different sources, known as "data fusion," raises concerns about quality and comparability of the resulting fused data. What is needed is a plan for WSDOT to collect timely and complete freight data, across all modes and supply chains. This results in maximum efficiency of the state's freight system and preserving the state's economic vitality.

Freight Data Literature Sources and Survey of Other State DOT's Data Collection and Needs

An inventory of 32 major freight data sources (many multiple data series are available from these sources) are listed and documented, classified by international, national, and state freight movements, and inventoried by public or private source as to the detail and availability of the specific data. This information is also presented in five tables that will be available on WSDOT's Web site.

The broad inventory of freight data sources was further supplemented with a survey of other state Departments of Transportation from 15 states as to freight data usage and needs throughout the U.S. Over all, the need for a coordinated approach to data generation at the policy, program, and project level was identified.

The State of Washington’s Data Usage and Needs

Two freight data discussion group meetings of in-state data users were held, one each on the west and east side of the state. It is evident that a wide range of information is used throughout the state, with some common freight data challenges expressed by most participants. The detailed responses for each organization for both freight data uses and needs are presented in Appendix A.

The Freight Data Framework for the State of Washington

A summary of the freight data gaps, and the tools and approaches to addressing these gaps, is presented in the last chapter. This summary will lead to the development of the proposed freight data framework for the state of Washington and a process to address these freight data needs and gaps in the future.

The recommended overall freight data framework is presented in Figure 2A. This shows a new Freight Data Librarian/Educator leads the overall effort and is supported by a Database Manager. Collectively this group will maintain existing data sources (local, state, and national) and also coordinate future freight data collection efforts. The Database Manager will provide technical support while the Librarian will interact with state freight clientele (to develop freight data partnerships) and policymakers at the state and national level. Freight transportation research efforts at area universities will also interact with the framework, especially to the extent that new data are generated. The following phases offer a freight data framework approach that would vastly improve freight data accessibility and build knowledge within the region, state, and nation for a variety of policy, planning, and project uses across agencies.

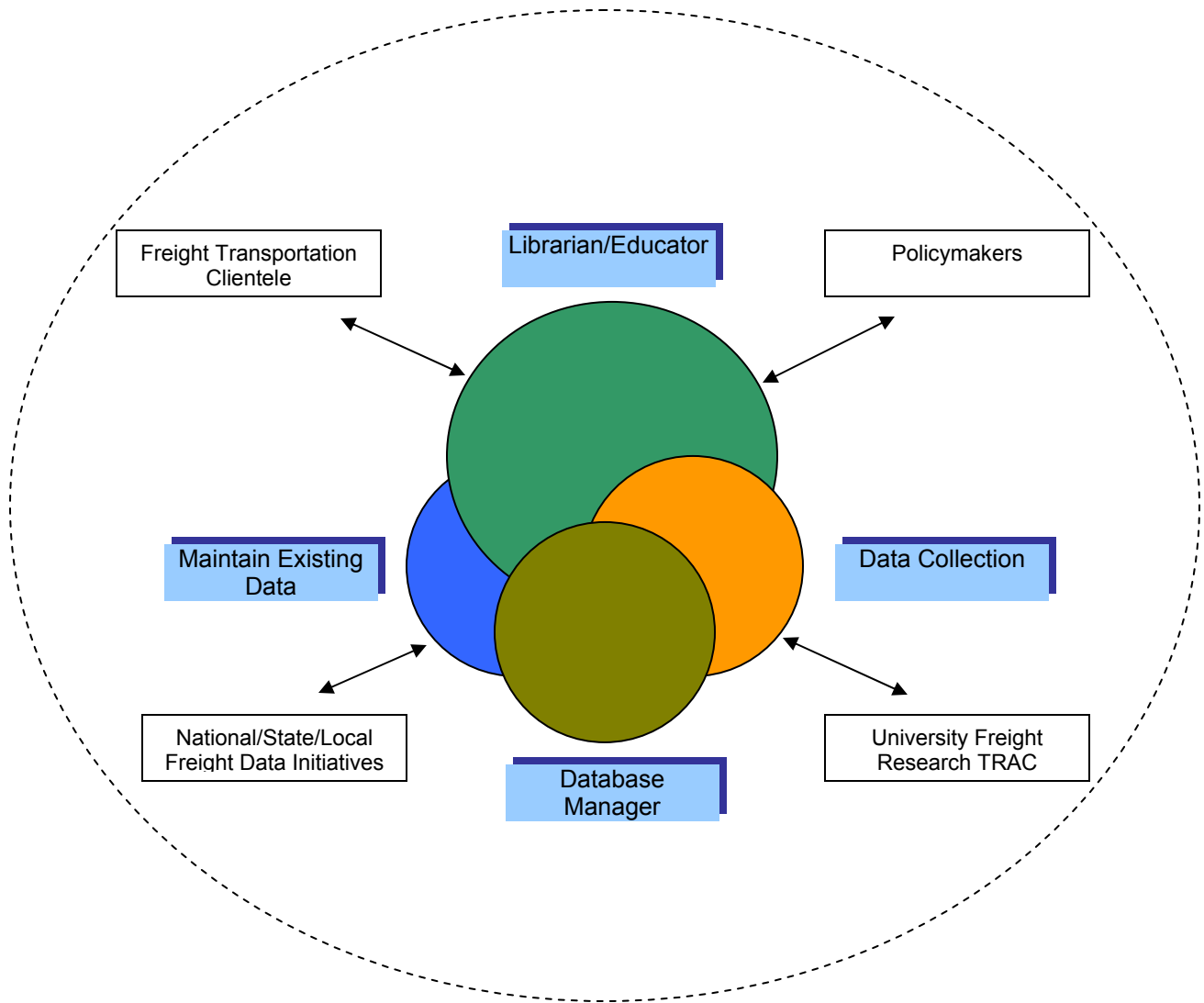


Figure 2A: Washington State Freight Data Framework*

*The horizontal blue text boxes indicate the recommended activities and the vertical blue text boxes show recommended personnel additions. The upper white text boxes identify the clientele and the lower white text boxes present the data sources. The circles indicate the extent of interaction.

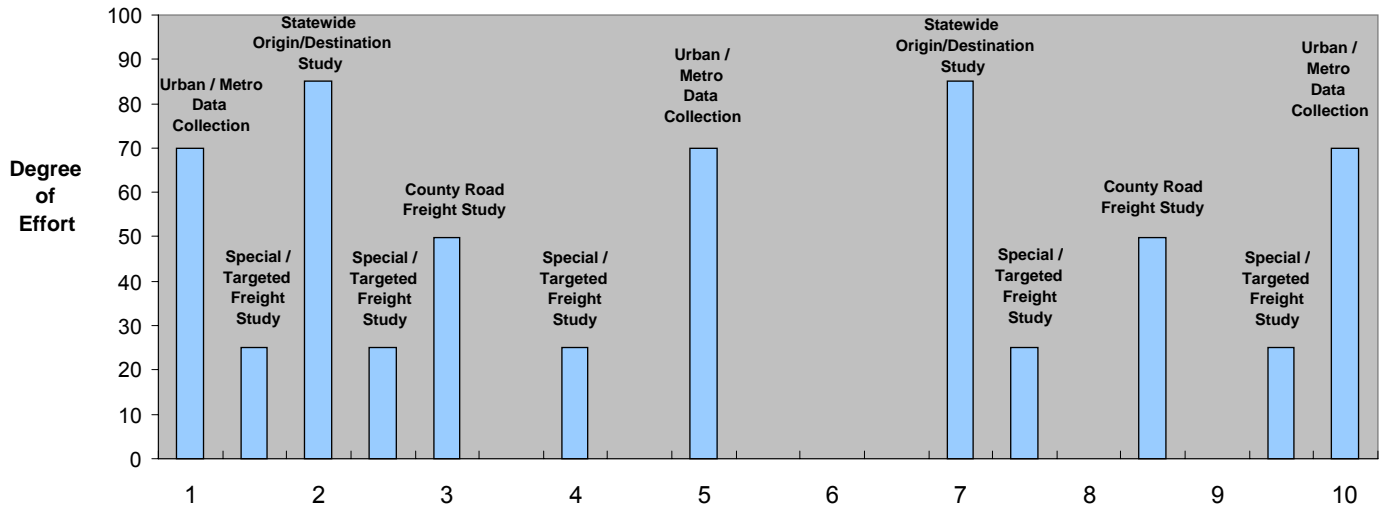
Data Generation and Timeline

Origin and destination studies of carriers, shippers, or receivers are an ongoing need in the state. Both statewide and local distribution movements suffer the most from data gaps. Updating the statewide survey with a carrier survey appears to be the most manageable and productive data collection effort. A

survey every three to five years would provide current data of the transportation system serving the shippers and carriers of the state. This could be supplemented by similar surveys, done on a rolling basis (one survey done every year or so) at the local distribution level, so that at least every five years every area would be covered. These surveys would be refined on focused corridors in an “as needed” basis within that time period.

The data collection efforts may be scheduled into the future in a way that data gaps and needs are addressed on a continued basis, which capture the dynamic changes that occur. A recommended plan of WSDOT’s timeline is presented in Figure 3A. This shows how four separate types of efforts are implemented on a revolving basis, as needs require and budget resources allow.

Figure 3A: Proposed WSDOT Data Collection Timeline



Introduction

The U.S. transportation system is continually responding to new and increasing demands while globalization, competitive industry trends and new technologies increase freight volumes and change the dynamics of freight transportation. Transportation security concerns, congestion, and increasing volumes of passenger traffic increase the demands on this system while lowering the productive efficiency of the system. This multi-modal transportation system supports the economic vitality of the nation.

At the heart of an effective and efficient transportation system, especially freight, is the data that support transportation investment decisions, prioritization, and overall policy development at the national, regional and local level. As recognized by the Transportation Research Board (TRB), data on goods and freight movements are needed to identify and evaluate options for easing congestion, improving regional and global economic competitiveness, and encouraging land use planning. Other needs are to inform investment and policy decisions about optimizing system efficiency, enhancing transportation safety and security, and reducing fuel consumption while improving air quality.

Substantial components of national data do exist to generally understand and provide context for freight systems that support international trade through Washington gateways; yet, very little systematic data exists to inform decision makers about the economic impact, system bottlenecks, and supply chains flowing through freight systems that support Washington State producers and delivery of goods to consumers. For example, the Washington Freight Transportation Plan mentions that up to 80 percent of all urban truck trips are made by smaller and medium-sized trucks in the local distribution system—but state and local agencies typically don't have local flow or origin-destination information readily available.

TRB points out that, at all levels, existing freight data and collection efforts by many diverse agencies are not coordinated, and the results not available to all agencies needing the data. As a result, these data do not completely address business needs. Many public and private sector entities collect some data on goods movement. However, there is no link between these different sources and some information isn't collected by anyone. In addition, the combination of data from different sources, known as "data fusion," raises concerns about quality and comparability of the resulting fused data. Once a linkage is determined, data gaps and inconsistencies may be recognized and solutions to solve these problems identified. Thus, a search for a freight data framework at all levels is needed.

TRB's concept, as seen in Figure 1, puts emphasis on customer input and supply chains, rather than the traditional notion of modal analysis. Washington State University's Strategic Freight Transportation Analysis' (SFTA) multiple studies provide important origin-destination information on main line, long-haul routes and some on intra-city movements, but many specific movements have to be inferred from the general SFTA origin-destination data. WSDOT completed a first ever statewide shipper and carrier survey in August 2004, using statistically valid surveys, interviews, and focus groups.

However, these are but several pieces of the puzzle and much more information is needed. At the regional level, more flow data is needed and, while some regions conduct freight-related studies, freight data development is not uniform across all regions of the state. Air cargo is another identified area where little detailed data is available, except by the air companies themselves.

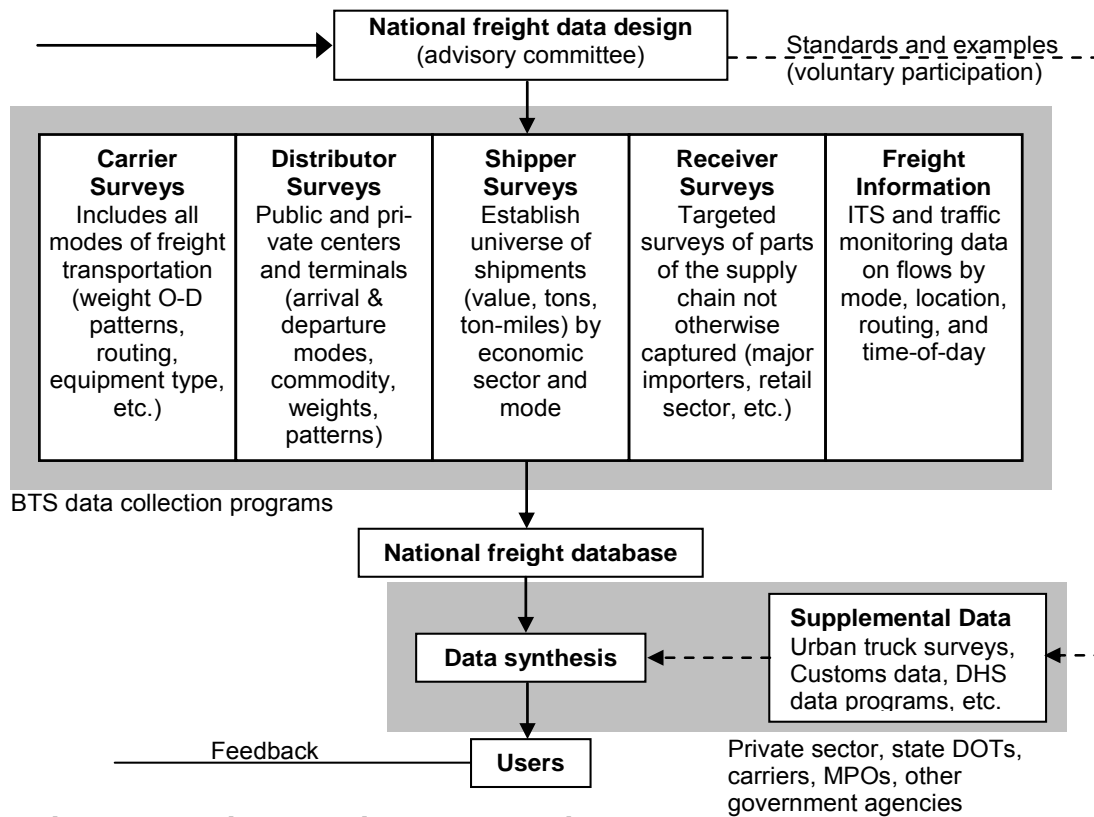


Figure 1: National Freight Data Design

What is needed is a plan for the Washington State Department of Transportation (WSDOT) to collect timely and complete freight data, across all modes and supply chains, in order to maximize efficiency of the state’s freight system and preserve the state’s economic vitality. Such a system should link users, generators, and archivists of the data. It should also propose maintenance solutions to fill in the gaps and allow for data fusion. This plan is important because of the increased focus on customer requirements and supply chains related to Washington’s global gateways, manufacturers and producers, and local distribution system, all of which are currently data deficient to some degree.

Project Objectives

The overall goal of this project is to support economic activity in the state and to maximize efficiency of the state’s transportation system by creating a plan of

available and needed data to address critical freight planning and management questions. It will also propose methods to collect timely and complete freight data in an efficient and effective manner. Specific objectives to achieve that overall goal include:

1. Identify general data inventory warehouse design, and system architecture, based on WSDOT's system software and design criteria.
2. Determine approaches, experiences, and attempted solutions used by the federal government and other states and regions.
3. Inventory and specify freight data needs and data sources for the state and region, including the where, what, why, how, and when of these needs.
4. Inventory current data within the state and determine gaps, redundancies, inaccuracies and weaknesses in current data collection in the state (supply chains, corridors, modes, industry, trade flows).
5. Develop a plan to fill data gaps and present a maintainable, systematic, and coordinated data collection system.

Report Structure

This report presents the findings of the research effort. Chapter I presents the results of the review of literature relating to data sources and structure.

Chapter II presents the results of a survey and interviews with various states, detailing the approaches used and structure within the state departments of

transportation for data generation. Chapter III looks to the data gaps specific to the state of Washington that have been found, based on the earlier work and subsequent workshops with practitioners in the field. The final chapter (Chapter IV) presents a data plan for the state of Washington reviewing how the gaps are to be filled, discusses assignment of responsibility, and suggests potential funding timing.

Chapter I: Freight Data Sources

The need for freight data and the search for current available sources has received much attention at the federal level over the past five years. Various conferences, research projects, and state planning bodies' activities have generated a shotgun approach and scattered results in the data arena.

Various ways of classifying the data have been offered, including the federal approach mentioned above where the data are divided by the source or methodology of the data collection. An accompanying approach to classifying the data, rather than looking at the different participants in the supply chain, is to look at the type of data being generated, typically divided into origin-destination data, performance data and documentation data. Origin-destination data, like the two statewide surveys and various industry surveys conducted by Washington State University under the Eastern Washington Intermodal Transportation Study (EWITS) and SFTA project, provide trip and vehicle information dealing with an individual trip. Such data can be used in modeling freight flows, statewide, locally and even regionally.

A second category needed in policy analysis is performance data, such as time in transit, speed, delay, reliability, cost, and access. Such information is useful in determining congestion points, bottlenecks, and costs of delay from recurring or

unexpected events. Such information, if captured overtime, allow evaluation of the benefits of improvement projects.

A final category, documentation data, is one captured to aid managers of the transportation systems in monitoring and improving the performance of the system under the manager's control. Such data include truck configuration, size weight over time, tonnage hauled on a road segment and other operational performance measures.

The overall concern is not that data are not available but that these data are not complete, are sometimes duplicative and many times may be in conflict with each other. As will be noted in the following sources, the goals of the data gatherer need to be considered as the data are reported or used for any purpose other than the initial source. These data range from large data gathering activities undertaken by the national government to significant state efforts to metro urban surveys to local planning organization/port studies. These selected data come from a variety of data sources, including Web sites of the major sources as well as various earlier surveys of existing data production points. The overall focus is to determine what is available from these different sources for Washington State decision makers. The overall categories of sources range from the general or global to the specific areas of the state of Washington.

International Freight Movements

There are multiple sources of data explaining international flows across the borders of the United States and its neighbors. Some of the primary sources are listed below, organized by public and private sources and listed alphabetically.

Public Data Sources for International Freight Movements

Airports Council International (ACI)

Air cargo movements for all major airports in the world are presented annually in the **Worldwide Airport Traffic Report** by the Airports Council International (ACI) of Geneva, Switzerland. An annual survey by ACI produces information by airport, weight, mode and type of commercial operation on a monthly and annual basis. Some concerns of the reporting of transshipment statistics have been noted. The data can be purchased for a fee at:

www.airports.org/cda/aci_common/display/main/aci_content07_c.jsp?zn=aci&cp=1-6-43-5732^14337_666_2.

Bureau of Transportation Statistics: U.S. Department of Transportation

The **Transborder Surface Freight Data Series** is produced by the Bureau of Transportation Statistics of the USDOT covering all states and specific detail on 20 cities. It provides North American merchandise trade data by commodity type, by surface mode of transportation (rail, truck, pipeline, mail and other), and with geographic detail for United States (U.S.) exports to and imports from Canada and Mexico. These data, available since April 1993, are a subset of official U.S. international merchandise trade data. The purpose of the data, updated on a monthly basis, is to provide transportation information on North American trade flows. This information monitors freight flows and changes since the signing of the North American Free Trade Agreement (NAFTA) by the U.S., Canada, and Mexico in December 1993.

This dataset incorporates all statistical shipments entering or exiting the U.S. by surface modes of transport (other than air or maritime vessel) to and from Canada or Mexico. Statistics are available from the Government Printing Office and on the Census Bureau's web site at:

ntlsearch.bts.gov/tris/record/ntl/12163.html.

Table 1: Public Sources for Information on International Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
Airports Council International	Worldwide Airport Traffic Report	Air cargo movements for all major airports in the world.	Air	annually	annually	www.airports.org/cda/aci_common/display/main/aci_content07_c.jsp?zn=aci&cp=1-6-43-5732^14337_666_2
Bureau of Transportation Statistics of the U.S. Department of Transportation	Transborder Surface Freight Data Series	Air cargo movements for all major airports in the world provides North American merchandise trade data by commodity type, surface mode of transportation (rail, truck, pipeline, mail and other), and with geographic detail for U.S. exports to and imports from Canada and Mexico.	Air, rail, truck, pipeline	annually	monthly	ntlsearch.bts.gov/tris/record/ntl/12163.html
Foreign Trade Division of the U.S. Department of Commerce and U.S. Census	U. S. Census Foreign Trade Statistics	Statistical information on U.S. export and import trade.	Ocean, air	annually	monthly, yearly, historically	www.census.gov/foreign-trade/reference/products/catalog/port.html www.census.gov/foreign-trade/reference/codes/sitc/sitc.txt www.census.gov/foreign-trade/www/index.html
Maritime Administration (MARAD) of the USDOT	U.S. Exports and Imports Transshipped via Canadian Ports	Total value and estimated weight of commodities transshipped via Canada by port of entry and exit or foreign country of origin/destination.	Ocean/barge	annually	annual basis, with a normal lag time of one to two years	www.marad.dot.gov/MARAD_statistics/index.html
Massachusetts Institute for Social and Economic Research (MISER)	U.S. Exports by State of Origin of Movement	States of origin of movements of the export shipments and the foreign country of destination provide detailed shipment flows.	Air, ocean	quarterly and annual, lag time 3-6 mos	quarterly, annually	www.massbenchmarks.org/statedata/statedata.htm
Statistics Canada	For-Hire Trucking (Commodity Origin and Destination) Survey	Provides commodity movements and the outputs of the Canadian trucking industry.	Truck	annually	quarterly	www.statcan.ca/Daily/English/040707/d040707b.htm
U.S. International Trade Commission (USITC)	USITC Interactive Tariff and Trade Data Web	Provides international trade statistics and tariff data on a self-service, interactive basis, responding to user-defined queries integrating international trade statistics with fairly complex tariff and customs treatment.	Air, truck, ocean, barge	annually	monthly, quarterly, annual and year-to-date	dataweb.usitc.gov/

The Transborder Freight Dataset is extracted from the Census Foreign Trade Statistics Program. Historically, these data were obtained from import and export paper documents from the U.S. Customs Service (Customs). However, an increasing amount of information is now being captured electronically. The Automated Broker Interface System (ABI) collects approximately 98 percent of the value of all U.S. imports. On the export side approximately 80 percent of the value of all U.S. exports is collected (35 percent is collected through the U.S./Canada Data Exchange and 45 percent through the Automated Export System (AES)). The data in the Transborder Surface Freight Dataset are captured from these same administrative records.

U.S. Census Bureau

The **U. S. Census Foreign Trade Statistics** issues statistical information on U.S. export and import trade, usually in a monthly, yearly or historical basis. Information on up to 18,000 import commodity codes, 9,000 export commodity codes, 240 U.S. trading partners, 400 U.S. ports, over 50 states and territories, and 45 districts is available. Some of the statistics include quantities, values, shipping weights, methods of transportation (air or vessel), duties collected, unit prices, and market share. This foreign trade data can be provided in different formats based on several commodity classification systems, including the Harmonized System (HS), Standard International Trade Classification (SITC), North American Industry Classification System (NAICS), and End-Use Commodity Classification System. Relevant sites include:

www.census.gov/foreign-trade/reference/products/catalog/port.html

www.census.gov/foreign-trade/reference/codes/sitc/sitc.txt

www.census.gov/foreign-trade/www/index.html

The data are available from, and are the responsibility of, the Foreign Trade Division of the U.S. Department of Commerce and U.S. Census. Information on U.S. exports of merchandise are compiled on a transaction basis from the

Shipper's Export Declaration (SED) or its electronic equivalent as filed by qualified exporters, forwarders, or carriers. These data measure the physical movement of merchandise out of the U.S. to foreign countries.

Historically, no information was compiled from the SED as to which state the goods were shipped from. Only volume and type of commodities exported, through which U.S. Customs districts/ports, and to which countries was known. In 1985 a new field showing where the export journey begins was added. Later, an existing field, the ZIP code of the exporter's office address, was used to develop a series based on exporter location, not the location or origin/destination of the movement itself, decreasing its value for understanding freight flows. These fields allowed compilation of the following state exports series:

- State of the Exporter Location (EL) Series—1993 to December 2002.
- State of Origin of Movement (OM) Series—1987 to Present.

Because of significant shifts in the EL series beginning in 1999, the series was discontinued as of January 2003 statistics. These shifts should not affect the OM series.

Users of the OM series, available since 1987, should note that it provides export statistics based on the state where the merchandise starts its journey to the port of export; that is, the data reflect the transportation origin of exports. In certain cases, the origin of movement is not the transportation origin. Whenever shipments are consolidated, the state of origin of movement will reflect the consolidation point. This effect is particularly noticeable for agricultural shipments. Intermediaries located in inland states ship agricultural commodities down the Mississippi River for export from the port of New Orleans. In this case, they would report Louisiana, the state where the port of New Orleans is located, as the state of origin of movement.

The primary impact of this data limitation for Washington is on the state distribution of non-manufactured exports, which are generally exported by intermediaries. The most visible result is a tendency to understate exports from some agricultural states and to overstate exports from states like Louisiana that have ports that handle high-value shipments of farm products. The series DOES NOT represent the production origin of U.S. export merchandise. In some cases considerable manufactured exports are attributed to states that are known to have little manufacturing capability. One reason is that commodities produced by out-of state suppliers can be shipped from in-state distribution centers. Another factor is shipments of manufactured commodities from in-state warehouses and other distribution centers that are arranged by exporters located out-of-state. In both cases, manufactured exports from the non-industrial state are magnified in the OM series.

Maritime Administration (MARAD) of the USDOT

The Maritime Administration (MARAD) of the USDOT produces the **U.S. Exports and Imports Transshipped via Canadian Ports** database on an annual basis, with a normal lag time of one to two years. Total value and estimated weight of commodities transshipped via Canada by port of entry and exit or foreign country of origin/destination are compiled. Some of the data are available on:

www.marad.dot.gov/Marad_statistics/index.html.

Massachusetts Institute for Social and Economic Research (MISER)

The Massachusetts Institute for Social and Economic Research (MISER) has compiled and made available the **U.S. Exports by State of Origin of Movement** database. Both statewide reports and data files can be obtained at:

www.massbenchmarks.org/statedata/statedata.htm. Census data offers quarterly and annual data of over 200 countries, with a lag time of three to six months. States of origin of movements of the export shipments and the foreign country of destination provide detailed shipment flows.

Statistics Canada

The **For-Hire Trucking (Commodity Origin and Destination) Survey** is produced by Statistics Canada on a quarterly basis and requires a fee to access the information. It is available at:

www.statcan.ca/Daily/English/040707/d040707b.htm.

The purpose of this survey is to measure various outputs of the Canadian for-hire trucking industry by providing estimates of intercity commodity movements. Information is provided for shipments, revenue, weight, and distance. The survey complements the results of the Motor Carriers of Freight Survey by providing additional information.

The target population of this survey is Canada-based for-hire trucking companies with annual operating revenues of one million dollars or more, the major part of which is derived from long-distance deliveries. The For-Hire Trucking Survey is a sample survey based on a two-stage sample of approximately 800,000 shipments made by intercity for-hire carriers. Once the population has been grouped according to areas of operation, type of services, commodities carried, and revenue class, the first stage consists of selecting, in each group, a number of firms. This should correspond to the desired number of firms determined at the sample selection stage. The sample of firms is then converted to a sample of Document Storage Location Point (DSLIP) by including in the latter sample all DSLIP of the selected firms. The second stage of the sample design consists of selecting a systematic sample of shipments from the files of each selected DSLIP.

Responding to this survey is mandatory. Data are collected directly from survey respondents. Interviewers from Statistics Canada Regional Offices carry out the data collection across Canada.

U.S. International Trade Commission

Another major source of international trade and transportation flows is the U.S. International Trade Commission, which operates the **USITC Interactive Tariff and Trade Data Web**. Covering the customs border regions this site provides international trade statistics and tariff data on a self-serve, interactive basis, responding to user-defined queries integrating international trade statistics with fairly complex tariff and customs treatment. These data are available from 1989 to the present on a monthly, quarterly, annual and year-to-date basis. Pre-defined reports on international trade statistics are also available by geographic region and partner country. Current U.S. tariffs, which are maintained and published by the USITC as a statutory responsibility, can be accessed via the USITC DataWeb, and retrieved with relevant international trade data. The appropriate Web site is: dataweb.usitc.gov/.

Private Data Sources for International Movements

Colography Group, Inc.

The Colography Group, inc. produces the **U.S. Air Freight Origin Traffic Statistics**, which is available for a fee on an annual basis. It details domestic and export air cargo shipments by weight, volume and number of shipments. It is based on state, county and market area of origin in the U.S. Destination areas are only reported as domestic versus foreign shipments.

Information by final destination, routing or carrier is not part of the report. The source is available at www.colography.com/.

Table 2: Private Sources for Information on International Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
Colography Group, Inc.	U.S. Air Freight Origin Traffic Statistics	Details domestic and export air cargo shipments by weight, volume and number of shipments.	Air	annually	quarterly, annually	www.colography.com/
Commonwealth Business Media, Inc.	Directory of U.S. Importers/Exporters	A cross-referencing index of company listings by geographical location, alphabetical name and products.	Air, ocean	annually	annually	www.cbizmedia.com/promo/subscribe.cfm?code=947F26BF6310DBD2ED6BF9B11F7C146F
Commonwealth Business Media, Inc.	Port Import/Export Reporting Service	Offers the most comprehensive statistics dating back to the 1970s on global cargo movements transiting seaports in the U.S., Mexico, and South America to companies around the globe.	Ocean	weekly, monthly, or quarterly	weekly, monthly, or quarterly	www.piers.com/
DRI/McGraw-Hill	World Sea Trade Service	Produce detailed historical data and forecasts of cargo movements for major trade routes around the world.	Ocean	quarterly	quarterly	The www.dri.mcgraw-hill.com Web site is not currently available. Contact information: Ms. Jill Thompson, Lexington, MA, (617) 863-5100, Freight Transportation and Logistics Service.
Lloyd's Maritime Information Services, Inc.	Ship Movements Database	The only single source of information on worldwide merchant ship movements.	Ocean	daily	daily	www.lloydsniu.com/niu/index.htm
Maritime Research Inc.	Chartering Annual	Presents yearly listings of charter fixture information (vessel, ownership, rate, lease/charter detail, etc.), including commodity, week and trade route.	Ocean	annually	daily	www.maritime-research.com/

Commonwealth Business Media, Inc.

A source of potential survey participants, rather than the data themselves, is the **Directory of U.S. Importers/Exporters**, produced by Commonwealth Business Media, Inc. Each volume is a cross-referencing index of company listings by geographical location, alphabetical name and products. Every listing provides a detailed picture of the company's trade activity, including U.S. ports of entry, countries of origin, foreign country of trading, modes of transportation, SIC codes, number and weight of shipments, product descriptions, and executive personnel contact information.

However, the database is based on the address of the exporter and not the origin of the movement, so specific origin/destination connections by movement cannot be made. The main Web link is:

www.cbizmedia.com/promo/subscribe.cfm?code=947F26BF6310DBD2ED6BF9B11F7C146F.

A very commonly used source of trade flows, particularly through ports, is the **Port Import/Export Reporting Service**, produced by Commonwealth Business Media, Inc., usually referred to as the PIERS data. These data are available on a fee basis. This database offers the most comprehensive statistics dating back to the 1970s on global cargo movements transiting seaports in the United States, Mexico and South America to companies around the globe. PIERS research reports monitor global shipments of goods and commodities on everything from raw materials to consumer goods. PIERS reporters throughout the country collect import and export information daily from over 25,000 bills of lading and vessel manifests.

To ensure accuracy, the PIERS quality-assurance staff audits and crosschecks shipping documentation. Shipping lines, along with importers and exporters that subscribe to PIERS, verify their own shipments and notify PIERS of any discrepancies among the shipment records. PIERS global trade information and

specific market services are an often noted marketing and research resource tool for a variety of international businesses and organizations. The general Web site is: www.piers.com/.

DRI/McGraw-Hill, Inc.

Another source of information is the **World Sea Trade Service** produced by DRI/McGraw-Hill and developed from waterborne shipment data reported from other country-based foreign trade data sources. Over 1,000 trade corridors are covered in this economic model for forecasting ocean traffic across major international trade routes by cargo type, type of service, and size of shipment. Trade routes are projected by coastal, country, or regional pairs of origins/destinations. Data are reported by total weight and number of container loads on waterborne shipments. The data do not report in-transit shipments and only report the ports of loading or unloading as origins and destinations. Contact can be made at: Ms. Jill Thompson, Lexington, MA, (617) 863-5100, Freight and Transportation and Logistics Service. The DRI/McGraw-Hill Web site is not currently available.

Lloyd's Maritime Information Services, Inc.

Ship Movements Database is produced by Lloyd's Maritime Information Services, Inc and is available on-line on a subscription basis. This database contains what appears to be the only source of information on worldwide merchant ship movements. It includes daily updates on ship movement, gathered at principal ports worldwide, allowing determination of vessel service patterns in international waterborne routes, by arrival and departure dates. It does not allow cargo routing patterns to be precisely determined. For more information, go to www.lloydsniu.com/lmiu/index.htm.

Maritime Research, Inc.

A related source of the characteristics of a major segment of the supply chains is the **Chartering Annual**, produced by Maritime Research, Inc. This publication,

focusing on the shipping industry, presents yearly listings of charter fixture information (vessel, ownership, rate, lease/charter detail, etc.), including commodity, week and trade route. It is produced annually and the Web site is at: www.maritime-research.com/.

National Freight Movements

The public and private sources of data at the national level and from national sources are quite varied in coverage and detail. An examination of Web sites and studies using these data results in over 30 various sources, most of which are summarized below.

Public Data Sources for National Freight Movements

Agricultural Marketing Service, U.S.D.A.

The Agricultural Marketing Service (AMS) of the United States Department of Agriculture (USDA) produces the **Fresh Fruit and Vegetable Shipments by Commodities, States, and Months** on an annual basis. Free of charge, the database reports seasonal movements in domestic, export and import volumes for fresh fruits and vegetables in the U.S. Rail refrigerated and piggyback shipments as well as truck, air and boat shipments are in the database, by state or country of origin, weight and mode. These data are available on a state-by-state basis. Concerns about duplication of the intermodal shipments should be noted.

The AMS, USDA also generates a **Grain Transportation Report**, which identifies volume of movements for domestic, export and total grain. Some routing information is available for ports and barge locks, but no specific origin and destination pairs are offered. Truck, rail, and waterway are covered throughout the U.S. on a weekly basis. This data set can be found at: www.ams.usda.gov/tmdtsb/grain/.

Table 3: Public Sources for Information on National Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
Agricultural Marketing Service of the USDA	Fresh Fruit and Vegetable Shipments by Commodities, States, and Months	Reports seasonal movements in domestic, export and import volumes for fresh fruits and vegetables in the U.S.	Barge, rail, air, truck, ocean	annually	monthly	www.ams.usda.gov/fv/mncs/shipsumm05.pdf
	Grain Transportation Report	Identifies volume of movements for domestic, export and total grain.	Barge, truck, rail, ocean	weekly	weekly	www.ams.usda.gov/tmdtsb/grain/
Bureau of Transportation Statistics	Display Tool CD	Various components of the transportation network.	Air, truck, barge, ocean, rail			
	National Transportation Statistics	Statistics on the U.S. transportation system, including its physical components, safety record, economic performance, the human and natural environment, and national security.		annually	annually	www.bts.gov/publications/ national_transportation_statistics/
	Transportation Statistics Annual Report	Review of the state of transportation statistics with recommendations for improvements and a presentation of the data.		annually	annually	www.bts.gov/publications/transportation_statistics_annual report/
Federal Aviation Administration	Air Passenger and All-Cargo Statistics	Contains revenue passenger boarding and all-cargo data.	Air	annually	monthly	www.faa.gov/airports_airtraffic/airports/planning_capacity/p assenger_allcargo_stats/
	Airport Activity Statistics of Certificated Route Air Carriers	Summary data for all scheduled and nonscheduled service by large certificated U.S. air carriers.	Air	annually	selected monthly & quarterly	www.bts.gov/publications/airport_activity_statistics_of certi ficated air carriers/2000/entire.pdf
FHWA and the Office of the Secretary	GeoFreight: The Intermodal Freight	Uses a routing model to assign data on freight flows.	Truck, rail	once	once	www.bts.gov/pdc/user/products/src/products.xml?p=704
Federal Motor Carrier Safety Administration	Carrier Financial and Operating Statistics Information for Filers	Collects balance sheet and income statement data along with information on tonnage, mileage, employees, transportation equipment and other related items.	Truck	annually	annually	www.fmcsa.dot.gov/facts-research/facts-research.htm
Oak Ridge National Laboratory	Freight Model Improvement Program	Shares information on current and best practices in local freight data collection.	Truck, rail, barge, ocean	varied	varied	www.fmip.gov/data/index.htm

Table 3: - continued- *Public Sources for Information on National Freight Movements*

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
Office of Airline Information, Bureau of Transportation Statistics	Air Carrier Statistics	Contains domestic and international airline market and segment data.	Air	monthly	monthly	www.transtats.bts.gov/Tables.asp?DB_ID=111&DB_Name=Air%20Carrier%20Statistics%20%28Form%2041%20Traffic%29-%20All%20Carriers&DB_Short_Name=Air%20Carriers
Office of Freight Management and Operations of the USDOT	Freight Analysis Framework	Designed to estimate commodity flows and related freight transportation activity every five years among states, sub-state regions, and major international gateways.	Truck, air, ocean, rail	every five years	annually	ops.fhwa.dot.gov/freight/freight_analysis/faf/index.htm
Office of Highway Policy Info. of the USDOT	Highway Performance Monitoring System	Data on the extent, condition, performance, use, and operating characteristics of the nation's highways on an annual basis.	Truck	annually	annually	www.fhwa.dot.gov/policy/ohpi/hpms/
U.S. Census Bureau	Annual Survey of Manufacturers	Useful source of information on traffic and volume growth.	Truck, rail, ocean, air, barge	annually	every five years	www.census.gov/mcd/asmhome.html
	Census of Manufactures	Major source of information about the structure and functioning of the manufacturing sector.		every five years	every five years	www.census.gov/epcd/www/97EC31.HTM
	Commodity Flow Survey	5-year rotation, covering mining, manufacturing, wholesale trade and selected retail activities, in both national and metropolitan areas.		every five years	every five years	www.census.gov/svsd/www/cfsmain.html
	County Business Patterns	Data for self-employed persons, employees of private households, railroad employees, agricultural production workers, and most government agencies.		annually	annually	www.census.gov/epcd/cbp/view/cbpview.html
	Truck Transportation, Messenger Services & Warehousing	Operating revenue and operating revenue by source; percentage of motor carrier freight revenue by commodity type, weight of shipments handled, length of haul, and shipments country of origin and destination; and vehicle fleet inventory.	Truck	every five years	annually	www.census.gov/svsd/www/sas48.html

Table 3: - continued- Public Sources for Information on National Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
U.S. Census Bureau	Vehicle Inventory and Use Survey	Data on the physical and operational characteristics of the nation's private and commercial truck population.	Truck	every five years	every five years	www.census.gov/econ/overview/se0501.html
U.S. Corp of Engineers	Waterborne Commerce and Vessel Operators	Data on barge and other vessel movements.	Barge, ocean	annually	monthly	www.iwr.usace.army.mil/ndc/prod.htm#NDC%20Data%20Bases
U.S. Department of Energy	Quarterly Coal Report	Detailed quarterly summary statistics of coal production, distribution, trade, receipts, consumption and stocks.	Rail, barge, ocean	quarterly	quarterly	www.eia.doe.gov/cneaf/coal/page/pubs.html
USDOT	Highway Statistics	Data on the physical, operational, use, extent, and performance characteristics of public roads in the U.S.	Truck	annually	annually	www.fhwa.dot.gov/policy/ohpi/hss/index.htm
USDOT's Surface Transportation Board	Rail Carload Waybill Sample	A grouped sample of carload waybills for terminated shipments by railroad carriers.	Rail	annually	annually	www.stb.dot.gov/stb/industry/econ_waybill.html

Bureau of Transportation Statistics

GeoFreight: The Intermodal Freight Display Tool CD is a new source of data and data structure produced by the USDOT, Federal Highway Administration and the Office of the Secretary, Bureau of Transportation Statistics, starting in December 2003. It is available at:

www.bts.gov/pdc/user/products/src/products.xml?p=704.

This 2-CD set uses a routing model to assign data on freight flows to various components of the transportation network. The tool uses existing data bases described in this report and is a prototype that serves two purposes: to graphically display geographic relationships between freight movements and infrastructure; and to assist freight policymakers and planners in identifying the flows of domestic and international freight nationwide and in assessing the current and potential major freight bottlenecks in the U.S. transportation system.

Transportation Statistics Annual Report (TSAR), produced by the Bureau of Transportation Statistics, U.S. Department of Transportation, is available at:

www.bts.gov/publications/transportation_statistics_annual_report/.

It is a congressionally mandated publication, providing a data overview of U.S. transportation issues. Each TSAR has two essential components: a review of the state of transportation statistics with recommendations for improvements and a presentation of the data. TSAR, first published in 1994, has been redesigned every few years. The most recent format was introduced in October 2003. In this TSAR all transportation data and analysis are captured in one indicators chapter with 15 topics. Most of these topics were specified in the Intermodal Surface Transportation Act of 1991, which originally authorized the Bureau of Transportation Statistics (BTS).

Underlying the above is **the National Transportation Statistics (NTS)**, produced by the Bureau of Transportation Statistics, U.S. Department of

Transportation and available at:

www.bts.gov/publications/national_transportation_statistics/.

NTS presents statistics on the U.S. transportation system, including its physical components, safety record, economic performance, the human and natural environment, and national security. This series is available to the public, is produced annually, but relies on other sources of data described in this report. No information is available on commodity shipments, flows and routing of traffic.

Federal Aviation Administration

The Federal Aviation Administration (FAA) of the USDOT produces **Airport Activity Statistics of Certificated Route Air Carriers**. This report is produced annually, with selected monthly and quarterly versions and is available at:

www.bts.gov/publications/airport_activity_statistics_of_certificated_air_carriers/2000/entire.pdf. Data are reported by express and non-express freight and mail.

However, no in-transit shipment data are available since only loading data are required in the Schedule T-3 reports to the FAA. Further, small certified carriers or commuter airlines are not included.

Air Passenger and All-Cargo Statistics is produced by the Federal Aviation Administration and is available at:

www.faa.gov/airports_airtraffic/airports/planning_capacity/passenger_allcargo_stats/.

Enplanement and cargo data are extracted from the Air Carrier Activity Information System (ACAIS), a database that contains revenue passenger boarding and all-cargo data. The database supports the FAA's Airport Improvement Program apportionment formula calculations. Passenger boarding and all-cargo data are collected for a full calendar year and determine entitlements for the next full fiscal year (i.e., calendar year 2003 data determines fiscal year 2005 entitlement funds).

Monthly data are reported by certified U.S. and foreign air carriers on passengers, freight and mail transported. The series also includes aircraft type, service class, available capacity and seats, and aircraft hours ramp-to-ramp and airborne. These data are publicly available, usually on an annual basis.

A similar series of monthly data is collected as the **Air Carrier Statistics** by the Bureau of Transportation Statistics, and has been done so since 1990. It is available at:

www.transtats.bts.gov/Tables.asp?DB_ID=111&DB_Name=Air%20Carrier%20Statistics%20%28Form%2041%20Traffic%29-%20All%20Carriers&DB_Short_Name=Air%20Carriers

This Air Carrier Statistics database, commonly referred to as the T-100 data bank, contains domestic and international airline market and segment data. Certified U.S. air carriers report monthly air carrier traffic information using Form T-100. Foreign carriers having at least one point of service in the U.S. or one of its territories report monthly air carrier traffic information using Form T-100(f). The four segments in this database respectively provide domestic market, domestic segment, international market, and international segment data. This database is frequently used by the aviation industry, the press, and the legislature to produce reports and analyses on air traffic patterns, carrier market shares, as well as passenger, freight, and mail cargo flow within the aviation mode. The data is useful for producing carrier load-factors, but does not contain carrier financial information.

The Large Air Carrier Statistics database, also known as the T-100 data bank and a subset of the above, contains domestic and international airline market and segment data. Large certified U.S. air carriers report monthly air carrier traffic information using Form T-100. Foreign carriers having at least one point of service in the U.S. or one of its territories report monthly air carrier traffic

information using Form T-100(f). The data are collected by the Office of Airline Information, Bureau of Transportation Statistics.

Federal Motor Carrier Safety Administration

The Federal Motor Carrier Safety Administration produces the **Carrier Financial and Operating Statistics Information for Filers**, publicly available at:

www.fmcsa.dot.gov/facts-research/facts-research.htm. Regulations require motor carriers of property with annual revenues of \$3 million or more to file annual reports, and carriers with annual revenues of \$10 million or more to file quarterly reports with BTS, as required by 49 CFR 1420, Reports of Motor Carriers. This program collects balance sheet and income statement data along with information on tonnage, mileage, employees, transportation equipment and other related items.

Oak Ridge National Research Laboratory

The Oak Ridge National Laboratory produces a **Freight Model Improvement Program (FMIP) Database**, which shares information on current and best practices in local freight data collection. It contains and summarizes information from other databases. It is not a new data generator, but works on training and tools for analysis development, emphasizing local data collection and the use of those data. Existing data can be downloaded from:

www.fmip.gov/data/index.htm.

U.S. Department of Transportation

The **Freight Analysis Framework (FAF)**, produced by the Office of Freight Management and Operations of the USDOT, is designed to estimate commodity flows and related freight transportation activity every five years among states, sub-state regions, and major international gateways. The FAF also forecasts changes in those flows and activity based on shifts in economic conditions, availability of transportation facilities, and other factors.

The FAF was designed as a policy analysis tool for the USDOT. To make the FAF a more effective tool for measuring and analyzing the changing world of freight transportation, FHWA is pursuing a 3-pronged strategy that have implications for the data blueprint for the state of Washington.

First, FAF methods will be improved to provide a more accurate and timely characterization of freight flows through two major products:

- Origin-Destination Database of commodity flows among the 106 to 114 Commodity Flow Survey (CFS) regions plus major international gateways benchmarked every five years and updated annually with provisional estimates. The 2002 benchmark Origin-Destination Database will include forecasts every five years from 2010 to 2035; the 2007 benchmark Origin-Destination Database will include forecasts through 2040.
- Network Flow Database of commodity movements assigned to major transportation facilities, with forecasts and updates corresponding to the Origin-Destination Database.

Second, the FAF data sources will be maintained and improved. Third, methods for using the FAF as a context for local issues will be developed through the Freight Model Improvement Program. Currently no information on specific origin and destinations by commodities, other than aggregate state and regional flows, is available. The Freight Model Improvement Program goes well beyond the FAF to enhance both the state of the art and the state of practice in freight modeling at the national, regional, and local scales. The program is targeted primarily on models for estimating and forecasting commodity flows and vehicle or vessel activity, and secondarily on models for turning flows and activity into safety exposure, environmental consequences, economic consequences, and other societal costs and benefits. The program also emphasizes improvements in local data collection to support freight models.

This data study shows that the planned FAF improvements and the Freight Model Improvement Program are designed to:

- improve the quality of published information,
- encourage development of local knowledge in lieu of dependence on default values from national surveys and overextended models,
- minimize competition with private vendors and dependence on proprietary data,
- focus FHWA resources on improvements in the completeness and timeliness of the FAF and on the development of complementary analytical tools.

The FAF will provide a framework—rather than become a substitute—for local data collection and analysis to support small-area planning and project design.

Detailed outputs from the FAF are available to all offices within USDOT and to state and local entities, and include:

1. For each county of origin, estimates for 1998 and forecasts for 2010 and 2020 of the tons of freight moved in the U.S. by county of destination, type of commodity, and mode of transportation.
2. For shipments through a region or location, estimates for 1998 and forecasts for 2010 and 2020 of the tons of freight moved by county of origin, county of destination, type of commodity, and mode of transportation.
3. For segments on major highways, rail lines, and waterways, estimates for 1998 and forecasts for 2010 and 2020 of the tons of freight moved by county of origin, county of destination, and type of commodity; and for highway segments, the number of trucks.

Measures of the transportation system performance available from the FAF are limited primarily to truck vehicle miles of travel by highway level of service. Truck

travel times can be cited based on relationships between volume, capacity, and speed. Additional information needs are beyond the FAF's initial capabilities.

Examples of such constraints include:

- estimates of commodity flows for geographic units smaller than counties;
- flows of commodities by local (intra-county) trucking;
- flows of commodities by pipelines;
- origin-destination or network flows of commodities by hazard class;
- origin-destination or network flows that are less than three years old;
- updates of origin-destination and network flows;
- network flows by season or time of day;
- transportation costs;
- capacity constraints and performance indicators for rail and water facilities; and
- policy-sensitive mode split models and related analytical tools.

Local trucking is another major gap in the FAF. The FAF estimates intercounty movements of commodities by truck, but not intracounty movements.

A comprehensive catalog of commodity flows excluded from the FAF has not been compiled. Municipal solid waste, household goods movements, and other missing flows are not as large in the national picture as pipelines and local trucking, but may be locally significant and warrant local analysis in Washington as well as other states and regions.

The FAF converts commodity flows between places into commodity flows and vehicle activity over major segments and nodes of the transportation network. The transportation networks used in the FAF include most rail and water routes, the larger harbors and other major transfer points, and most major highways. The accuracy of estimated truck flows over the highway network depends on many factors and the FAF developers warn about these, among others, potential inadequacies.

- Estimates of individual county-to-county flows from nationally collected data are subject to significant error.

- The relationships between the geographical patterns of commodity flows and vehicle movements are not precise since trucks often pick up and drop off shipments as part of a tour or carry the shipment for only part of the way between the shipper and the consignee.

Data sources supporting the FAF are multiple and usually available from federal government levels. They include, among others, the following, some of which are detailed later in this report:

Carload Waybill Sample

www.stb.dot.gov/stb/industry/econ_waybill.html

Domestic Waterborne Commerce of the United States

www.iwr.usace.army.mil/ndc/wcsc/wcsc.htm

Federal Energy Regulatory Commission Annual Report

www.ferc.gov/about/strat-docs/annual_rep.asp

Fisheries of the United States Annual Report

www.st.nmfs.gov/st1/fus/current/2002-

[fus.pdf#search='Fisheries%20of%20the%20United%20States%20Annual%20Report%202002'](http://www.st.nmfs.gov/st1/fus/current/2002-fus.pdf#search='Fisheries%20of%20the%20United%20States%20Annual%20Report%202002')

International Waterborne Commerce of the United States

www.iwr.usace.army.mil/ndc/usforeign/index.htm

Import and export data are found at:

www.iwr.usace.army.mil/ndc/db/foreign/data/

Municipal Solid Waste-BioCycle and Beck/Chartwell Studies

www.jgpress.com/archives/free/000089.html

www.jgpress.com/archives/free/000138.html

Municipal Solid Waste-Franklin/EPA Study

www.epa.gov/epaoswer/non-hw/muncpl/pubs/msw2001.pdf

Regional Elevator Survey: Grain Transportation and Industry Trends for Great Plains Elevators

www.ndsu.nodak.edu/ndsu/ugpti/DPpdf/DP143.pdf#search='north%20dakota%20Regional%20elevator%20study'

Transborder Surface Freight

www.bts.gov/programs/international/transborder/

U.S. Air Freight Movements

www.transtats.bts.gov/

U.S. Census Bureau-County Business Patterns 2002

www.census.gov/epcd/cbp/view/cbpview.html

U.S. Census Bureau-County Population Change

www.census.gov/Press-Release/www/releases/archives/population/001758.html

U.S. Census Bureau-County to County Migration Flow 2002

www.census.gov/Press-Release/www/releases/archives/tip_sheets/001397.html

U.S. Commodity Flow Survey 2002

www.census.gov/svsd/www/cfsdat/2002cfs.html

U.S. Department of Agriculture-Agricultural Statistics Annual Report

www.usda.gov/nass/pubs/agstats.htm

U.S. Department of Agriculture-Census of Agriculture 2002

www.agcensus.usda.gov

U.S. Department of Energy-Energy Information Administration

www.eia.doe.gov/emeu/aer/contents.html

Vehicle Inventory and Use Survey

www.census.gov/econ/overview/se0501.html

The **Highway Performance Monitoring System (HPMS)** is a national level highway information system, publicly available and coordinated by the Office of Highway Policy Information of the USDOT that includes data on the extent, condition, performance, use, and operating characteristics of the nation's highways on an annual basis. It is available at:

www.fhwa.dot.gov/policy/ohpi/hpms/. In general, the HPMS contains administrative and system information on all public roads, while information on other characteristics is represented in HPMS as a mix of universe and sample data for arterial and collector functional systems. Limited information on travel and paved miles is included in summary form for the lowest functional systems.

The HPMS was originally developed in 1978 as a continuing database to replace special biennial condition studies that had been conducted by the states since 1965. The HPMS has been modified several times since its inception, most recently in 1998. Changes in coverage and detail have been made since 1978 to reflect changes in highway systems, legislation, and national priorities, to reflect new technology, and to consolidate or streamline reporting requirements.

The major purpose of the HPMS is to support a data driven decision process within FHWA, the USDOT, and Congress. The HPMS data are used extensively in the analysis of highway system condition, performance, and investment needs that make up the biennial Condition and Performance Reports to Congress. These reports are used by Congress in establishing both authorization and appropriation legislation, activities that ultimately determine the scope and size of the Federal-aid Highway Program, and determine the level of federal highway taxation.

These data are also used for assessing changes in highway system performance brought about by implementing funded highway system improvement programs and for apportioning federal-aid highway funds to individual states under TEA-21. HPMS is a nationally unique source of highway system information that is made available to those in the transportation community for highway and transportation planning and other purposes through the annual Highway Statistics and other data dissemination media.

Individual state departments of transportation are responsible for the collection of data and reporting of these data to the FHWA headquarters through FHWA developed and maintained PC-based submittal software. While the FHWA receives, screens, organizes, and uses these data, these are still the states' data and the states are ultimately responsible for the quality of the data. The state departments of transportation are encouraged to cooperate with local

governments and metropolitan planning organizations (MPOs) in the collection, assembling and reporting of the necessary information.

By June 1 of each year, the state must provide an annual Certification of Public Road Miles (23 CFR 460) signed by the current Governor or his/her designee. These data are used by the National Highway Transportation Safety Administration (NHTSA) to apportion highway safety funds to the states. By June 15 of each year, the state must report the HPMS data for the previous year to FHWA headquarters using the HPMS submittal software.

Highway Statistics is the baseline reference for much of the data collected by the USDOT, and is publicly available at:

www.fhwa.dot.gov/policy/ohpi/hss/index.htm.

The section on roadway extent, characteristics, and performance contains data on the physical, operational, use, extent, and performance characteristics of public roads in the U.S. Other roads and trails that are privately owned or not publicly maintained or restricted from use by the general public are excluded. These data are derived from the HPMS described above.

The HPMS data, produced in Highway Statistics, is a combination of sample data on the condition, use, performance and physical characteristics of facilities functionally classified as arterials and collectors (except rural minor collectors) and system level data for all public roads within each state.

Nearly all tables in this section contain rural and urban groups. In some tables, urban may be further grouped into small urban (5,000 to 49,999 population) and urbanized (>50,000 population). The Bureau of the Census establishes urbanized area boundaries based on the density of population (persons per square mile).

About half of the states have adjusted the urbanized area boundaries based on the 2000 Census and the others are still based on the 1990 Census. In some areas, changes to the urban/urbanized boundaries are significant and these will affect the rural area data.

The tables in this section have been organized into eight general areas: Public Road Length, Federal-Aid Highways National Highway System, Functional System, Urbanized Areas, State Highway Agency-Owned Public Roads, Highway Use and Performance, Motor Vehicle Fatalities, and Metric Measurements.

Except for connectors on the National Highway System (NHS), roads that are functionally classified as rural minor collector or rural or urban local are excluded.

The functional systems used in the reports and data bases result from the grouping of public roads according to the character of service they are intended to provide. Functional classification defines the role that a particular public road plays in serving the flow of trips through a highway network. The functional systems are: (1) arterial highways, which generally handle the long trips; (2) collector facilities, which collect and disperse traffic between the arterials and the lower level roads; and (3) local roads, streets, and other public ways, which serve a land access function to homes, businesses, individual farms and ranches, and other uses. Road length by functional system is identified by ownership, surface type, lane width, traffic lanes, access control, and traffic volume.

Information is also available on estimated lane length by functional system. FHWA assumes two through traffic lanes for the lane length estimate for rural minor collector and rural/urban local functional systems. Number of through traffic lanes as reported by the states is used to estimate lane length for all other functional systems for the NHS and federal-aid highways.

The surface classification used in the data base identifies the pavement type used on the traveled portion of the roadway. Many highways, either by original design or because of reconstruction, consist of more than one major type of construction material. No data relative to vertical composition are presented, although material and layer thickness criteria are used to define the reporting categories.

Many other categories of data are available from this data source. Notable are volume-service flow ratios, urbanized area data, state highway agency data, highway use and performance data, serviceability, and highway vehicle travel, among others.

In summary, The HPMS provides a generally uniform, consistent, statistically valid, and credible national level database built from state-provided data. The HPMS is the most comprehensive and accurate database available on the extent and performance of the nation's highways. The HPMS data are to be used with full understanding of the data reporting and estimating processes and recognition of their strengths and weaknesses. When making state-to-state comparisons, the user must be aware of the differences that exist between the states being compared; it is inappropriate to use these statistics without recognizing, and accounting for, the major differences that may impact comparability.

The **Rail Carload Waybill Sample**, produced by the USDOT's Surface Transportation Board every year, is one of the most commonly used data sources for rail freight and is available at:

www.stb.dot.gov/stb/industry/econ_waybill.html.

The Carload Waybill Sample (Waybill Sample) is a grouped sample of carload waybills for terminated shipments by railroad carriers. Carriers may file waybill sample information by using either: (1) authenticated copies of a sample of

audited revenue waybills (the manual system); or (2) a computer-generated sample containing specified information (the computerized system, or Machine Readable Input). Railroads terminating over 4,500 cars per year are required to file a sample of waybills with the STB.

The primary purpose of the Carload Waybill Sample is regulatory oversight. This database contains rail shipments data such as origin and destination points; type of commodity; number of cars, tons, revenue; length of haul; participating railroads; interchange locations; and Uniform Rail Costing System shipment variable cost estimates. The Waybill Sample contains confidential information and is used primarily by federal and state agencies. It is not available for public use; however many universities and researchers can get access to the database under conditions of confidentiality.

U.S. Census Bureau

The **Annual Survey of Manufacturers (ASM)** is a useful source of information on traffic and volume growth. It is produced by the U.S. Census yearly between the Economic Census, which is collected in years ending in a 2 or 7. It is available at: www.census.gov/mcd/asmhome.html.

The ASM provides sample estimates of statistics for all manufacturing establishments with one or more paid employee. The U.S. Census Bureau conducts the ASM in each of the four years between the economic censuses. For the economic census, manufacturing is the population from which the ASM is chosen and presents more detailed data than the ASM. Among the detailed data included in this survey are: employment, payroll, value added by manufacture, cost of materials consumed, value of shipments, detailed capital expenditures, supplemental labor costs, fuels and electric energy used, and inventories by stage of fabrication.

Census of Manufacturers sometimes referred to as the manufacturing economic census can be found at: www.census.gov/epcd/www/97EC31.HTM.

The manufacturing economic census is a source of information about the structure and function of the manufacturing sector. It provides basic information for government, business, industry, and the general public. The Census Bureau conducts the economic census every five years, covering years ending with a two or seven. The economic census furnishes an important part of the framework for such composite measures as the gross domestic product estimates, input/output measures, production and price indexes, and other statistical series that measure short-term changes in economic conditions.

The **Commodity Flow Survey (CFS)** is produced by the U.S. Census Bureau on a 5-year rotation, covering the industries of mining, manufacturing, wholesale trade and selected retail activities, in both national and metropolitan areas. Its aggregate Web site is: www.census.gov/svsd/www/cfsmain.html.

The 2002 Commodity Flow Survey (CFS) was undertaken through a partnership between the Bureau of the Census, U.S. Department of Commerce, and the Bureau of Transportation Statistics, USDOT. This survey produces data on the movement of goods in the U.S. The data from the CFS are used to assess the demand for transportation facilities and services, energy use, and safety risk and environmental concerns.

Users of the data base must be aware that, unfortunately, the survey coverage excludes establishments classified as farms, forestry, fisheries, governments, construction, transportation, foreign establishments, services, and most establishments in retail. The CFS captures data on shipments originating from selected types of business establishments located in the 50 states and the District of Columbia. The following information is available about the respondent's shipments:

- domestic destination or port of exit,
- commodity,
- value,
- weight,
- mode(s) of transportation,
- date on shipment was made,
- whether the shipment was an export, or
- hazardous material.

For shipments that include more than one commodity, respondents are to report the commodity that makes up the greatest percentage of the shipment's weight. For exports, the foreign destination city and country is also available. Beginning with 1997, the survey was conducted every five years for years ending in two and seven. Commodity surveys were conducted between 1963 and 1983, but data for 1983 were not published. No data were collected for 1987. The survey and data for 2007 are being developed at this time.

The 2002 CFS consisted of a sample of 50,000 establishments chosen by geographic location and industry. Information is available in printed reports and electronic form for the 1997 Commodity Flow Survey. The initial 2002 CFS report was released in December 2003, with more recent estimates now being available at the national level, for tons, miles, ton-miles, value by mode of transportation (including intermodal combinations), shipment distance, commodity, and weight.

Another public and national data source providing broad coverage of transportation related information is the **County Business Patterns (CBP)**, produced by the U.S. Census on an annual basis. It provides sub-national economic data by industry. It is a broad data set, covering all businesses, but does not include data for self-employed persons, employees of private households, railroad employees, agricultural production workers, and most government agencies. Thus, this limits its usefulness for developing freight

transportation flows. It is available at:

www.census.gov/epcd/cbp/view/cbpview.html.

The series is useful for studying the economic activity of small areas and the economics underlying the freight transportation flows; analyzing economic changes over time; and as a benchmark for statistical series, surveys, and databases between economic censuses. Businesses use the data for analyzing market potential, measuring the effectiveness of sales and advertising programs, setting sales quotas, and developing budgets. CBP covers most of the country's economic activity.

The **Truck Transportation, Messenger Services & Warehousing** is a data series developed and produced by the U.S. Census on a 5-year interval and is publicly available at: www.census.gov/svsd/www/sas48.html.

The goal is to provide national estimates of revenue and vehicle fleet inventories for commercial motor freight transportation and public warehousing service industries. The United States Code (USC), Title 13, authorizes this survey and provides for mandatory responses from companies with employment that provides commercial motor freight transportation and public warehousing services (NAICS 484, 492 and 493). Prior to 1999, this annual survey did not include transportation industries; they were surveyed separately as the Transportation Annual Survey.

Data collected include operating revenue and operating revenue by source; percentage of motor carrier freight revenue by commodity type; weight of shipments handled; length of haul; shipments country of origin and destination; and vehicle fleet inventory. Current and previous year data are requested for the first year of a new sample. In subsequent years, only current year data are requested.

A popular and productive source of truck transportation flow and operational characteristics is the **Vehicle Inventory and Use Survey (VIUS)**, produced by the U.S. Census Bureau on a five year rotation and available at: www.census.gov/econ/overview/se0501.html. The VIUS provides data on the physical and operational characteristics of the nation's private and commercial truck population. Its primary goal is to produce national and state-level estimates of the total number of trucks by covering all private and commercial trucks registered (or licensed) in the U.S. as of July 1 of the survey year. The survey excludes vehicles owned by federal, state, or local governments; ambulances; buses; motor homes; farm tractors; un-powered trailer units; and trucks reported to have been sold, junked, or wrecked prior to January 1 of the survey year.

VIUS data are often of value to government, business, academia, and the general public. Data on the number and types of vehicles and how they are used are important in studying the future growth of transportation and in calculating fees and cost allocations among highway users. The data also are used in evaluating safety risks to highway travelers and in assessing the energy efficiency and environmental impact of the nation's truck fleet. Businesses and others make use of these data in conducting market studies and evaluating market strategies; assessing the utility and cost of certain types of equipment; calculating the longevity of products; determining fuel demands; and better use of other data sets representing limited segments of the truck population.

For a description of the sample design and the errors associated with such sampling, the reader is directed to the Web site identified above. The recent sampling frame was constructed from files of truck registrations identified as being active as of July 1, 2002. The frame was grouped by geography and truck characteristics.

Estimates in published tables are based on data from the 2002 VIUS and administrative records. To maintain confidentiality, no estimates are published

that would disclose the operations of an individual truck. Individuals who use the VIUS estimates to create new estimates are required to cite the Census Bureau as the source of only the original estimates.

Additional statistics not shown in the tables are obtainable by accessing a CD-ROM containing the survey micro-data. These additional estimates have not been included in the published reports because of high sampling variability, poor response, or other factors that may make them potentially misleading. It should be noted that some unpublished estimates can be derived directly from these reports by subtracting published estimates from their respective totals. However, the estimates obtained by such subtraction would be subject to the poor response rates or high sampling variability. Data users are cautioned to take into account the magnitude of "Not Reported" categories when assessing estimates computed using data contained in the CD-ROM.

U.S. Army Corp of Engineers

An ongoing source of data on barge and other vessel movements is the **Waterborne Commerce and Vessel Operators** series produced by the U.S. Army Corp of Engineers annually. This data series covers almost all waterborne transportation and the waterway infrastructure. Regional Corps offices can provide origin and destination by port, lock, commodity, month, and other relevant analyses. Other coverage includes shipment type, direction, draft, etc. Domestic waterborne shipment statistics are collected by the Corps from the Vessel Operations Reports. Foreign waterborne statistics are developed from the U.S. Bureau of the Census data source on waterborne general imports and exports of merchandise.

The public domain database is available in diskette or printed format for various state-to-state commodity origin-destination flows for \$5 per data file and \$15 per printed data source. Overall information on these data reported by the U.S. Army

Corps of Engineers can be obtained from the following Web site:
www.iwr.usace.army.mil/ndc/prod.htm#NDC%20Data%20Bases/.

The database does not provide routing information for domestic state-to-state movements. Dock-to-dock shipments are only available on the master tape.

U.S. Department of Energy

For freight information dealing with coal movements, the **Quarterly Coal Report** is a basic source. The publishing organization is U.S. Department of Energy and the data are publicly available. It provides detailed quarterly summary statistics of coal production, distribution, trade, receipts, consumption and stocks. Specific information is available on British Thermal Unit (BTU) content, by origin, origin-destination flows, weight and routing by all modes on a quarterly and an annual basis (only by customs district for imports and exports). The report is available at: www.eia.doe.gov/cneaf/coal/quarterly/qcr_sum.html.

Private Data Sources for National Freight Movements

American Association of Railroads

Freight Commodity Statistics, published annually by the American Association of Railroads (AAR), summarizes Class I railroad traffic by commodity (in many cases up to the 5-digit STCC level) for the Eastern and Western districts and for the U.S. as a whole. The source of the data are the quarterly and annual commodity statistics reports filed with the STB by the Class I railroads.

Publications of Freight Commodity Statistics are available five to six months after the end of each quarterly period for an annual cost of \$80 per annual publication.

Data include gross freight revenues; carloads and tonnage originated; carloads and tonnage terminated; and total carloads and tonnage carried. Freight movements are published as: freight originated and terminated, freight originated and delivered to another railroad, freight received and terminated, and freight received and delivered to another railroad.

The online data version includes an Excel spreadsheet and a pdf version of the Freight Commodity Statistics publication. It is available at:

www.aar.org/pubstores/. The series does not cover Class II and Class III railroads. Shipments are based on the location of the headquarters of the railroad, rather than origin and destination. Further, no information on origin-destination and routing by commodity is available.

The **North American Trucking Survey (NATS)** is also provided by the AAR and is available at: www.aar.org/. These data were collected in 1993-94, and a report generated in 1997, by sampling trucks that were selected by shipment length-of-haul at specific truck stop locations. The sampled truck drivers were interviewed regarding the commodity/shipment, O-D data, the operator, and the annual vehicle miles traveled by the drivers. No updated surveys are available.

The AAR produces a publication, **RR Industry Info* Railroads and States**, annually. Using data from other published sources, it highlights the importance and performance of freight railroads by providing state-by-state statistics of the U.S. freight railroad industry. Summary statistics include number of miles, number of employees, carloads/tons carried, number of railroads, and the total wages earned.

American Trucking Association

On a subscription basis, a series of traffic movements and characteristics is available on **LTL (Less-than-truckload) Commodity and Market Flow**. More information is available from www.truckline.com/index in the form of data files and printed reports. It is published by the American Trucking Association (ATA) and covers issues and data on such variables as prices, routing, shipment characteristics, tonnage, regulation, politics, etc. It covers metropolitan, state and national flows and issues.

Table 4: Private Sources for Information on National Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
American Association of Railroads	Freight Commodity Statistics	Summarizes Class I railroad traffic by commodity.	Rail	annually	quarterly	www.aar.org/pubstores/displayitem.aspx?id=14
	North American Trucking Survey	Sampling trucks that were selected on the basis of shipment length-of-haul at specific truck stop locations.	Truck	stopped	one year	www.aar.org
	RR Industry Info* Railroads and States	Using data from other published sources, it highlights the importance and performance of freight railroads by providing state-by-state statistics of the U.S. freight railroad industry.	Rail	annually	annually	www.aar.org/AboutTheIndustry/StateInformation.asp
American Trucking Association	A series of traffic movements and characteristics	Issues and data on such variables as prices, routing, shipment characteristics, tonnage, regulation, politics, etc.	Truck	varied	varied	www.truckline.com/index
DRI/McGraw-Hill	Freight Transportation and Logistics Service	Historical data and a series of forecasts of spatial origin and destination by mode and commodity.	Barge, truck, rail	not sure	not sure	www.dri.mcgraw-hill.com is not currently available. Alternative URL www.ops.fhwa.dot.gov/freight/fpd/Docs/freightdata/freightdata.htm
ENO Transportation Foundation	Transportation in America	More than two dozen tables provide an overview of data on tonnage and passenger-miles by mode, public and private costs for transportation employment, fatality rates, petroleum demand, vehicle purchases, and more.	Rail, truck, air, barge, ocean	annually	monthly	www.enotrans.com/store/page2.html
Global Insight	Freight Locator	Identifies who are shipping goods and what commodities are being shipped.	Rail, truck, air, barge, ocean	annually	annually	www.globalinsight.com/ProductsServices/ProductDetail1024.htm
	TRANSEARCH Insight and Freight Locator	County-level freight movement data by commodity group and mode of transportation.		annually	annually	www.globalinsight.com/ProductsServices/ProductDetail700.htm
	U.S. Intermodal Freight Flow	Projects freight flows by truck, air, rail, and water for all 3,000+ U.S. counties.		twice a year	annually	www.globalinsight.com/ProductsServices/ProductDetail1024.htm
Institute of Transportation Engineers	ITE Trip Generation, accompanied by the Trip Generation Handbook	Handbook and data series provide guidelines for application and interpretation of trip generation data.	Truck	none	none	www.ite.org/tripgen/trippubs.asp
Intermodal Association of North America	Intermodal Market Trends and Statistics	Quarterly report of industry statistics, and attempts to provide an in-depth look at intermodal industry data.	Truck, rail	quarterly	quarterly	www.intermodal.org/statistics_files/report_s.shtml#QtrlyReport

DRI/McGraw-Hill Inc.

Freight Transportation and Logistics Service (FTLS) is a for-fee database produced by DRI/McGraw-Hill that reports historical data and a series of forecasts of product origin and destination by mode and commodity. Some data on operating costs of shipments by mode is available for purchase, some pricing information is available and an overall demand for transportation is generated. Cargo tonnage is reported by mode and equipment type. The data sets remain proprietary so no corroboration of the data projections with other data sources is possible. The data series also does not provide commodity by routing or specific origin/destination pairs.

Eno Transportation Foundation

Transportation in America is published by the ENO Transportation Foundation, and is available at: www.enotrans.com/store//page2.html.

More than two dozen tables provide an overview of data on tonnage and passenger-miles by mode, public and private costs for transportation employment, fatality rates, petroleum demand, vehicle purchases, and more. Although data generally covers only national trends and these data come from other sources cited in this review.

Global Insight

A proprietary source of information widely used (estimates are that up to 40 percent of state DOTs rely on it) is the **TRANSEARCH Insight and Freight Locator**, found at:

www.globalinsight.com/ProductsServices/ProductDetail700.htm.

The publisher/owner is Global Insight. The TRANSEARCH Insight database is a subscription-only source for U.S. county-level freight movement data by commodity group and mode of transportation. This database combines information from public sources and data on primary shipments obtained from

major freight carriers. It provides detailed U.S. and cross-border origin and destination freight shipment at the state, Bureau of Economic Analysis (BEA), county, metropolitan area, and zip code level by commodity type and mode of transportation.

With the recent acquisition of Reebie Associates, this database has been extended to include projections consistent with Global Insight's macro forecasts. Service features include the following:

- Truck shipments of manufactured goods and selected non-manufactured goods
- Rail shipments, including carload and intermodal
- Waterborne and air freight shipments
- U.S./Mexico and U.S./Canada shipments for selected transportation modes

Global Insight's **Freight Locator** is a companion to the TRANSEARCH Insight data service, adding specific facilities to the freight shipment information TRANSEARCH Insight provides. Containing more than 168,000 records on U.S. manufacturing and warehousing establishments, Freight Locator identifies who are shipping goods and what commodities are being shipped. This series also provides estimates of annual tonnage, equipment needs, and rates of business growth or contraction.

As an extension of the historical TRANSEARCH Insight database, Global Insight's **U.S. Intermodal Freight Flow** database projects freight flows by truck, air, rail, and water for all 3,000+ U.S. counties. Twice a year, Global Insight provides detailed annual data for 38 different commodity groups. This database links freight forecasts with detailed economic activity from Global Insight's business demographic database.

The accuracy of the data produced by these efforts is dependent on the accuracy of the multiple and varying sources of those data. Sampling frames and statistical coverage or bias is not always reported.

Institute of Transportation Engineers

A series of data produced by the Institute of Transportation Engineers is the **ITE Trip Generation**, accompanied by the **Trip Generation Handbook**, available at: www.ite.org/tripgen/trippubs.asp. This recommended practice handbook and data series provide guidelines for application and interpretation of trip generation data. Topics covered in the handbook and data series include guidelines for estimating site trip generation, collecting local trip generation data, developing local trip generation rates, estimating pass-by trips, and estimating trip generation for multiuse land developments. Informational pieces also are provided on truck trip generation, the effects of travel demand management (TDM), transit on trip generation, and a summary of literature on multiuse developments.

The seventh edition of Trip Generation includes numerous updates to the statistics and plots published in earlier editions. A significant amount of new data has been collected and several new land uses have been added. Data from more than 500 new studies have been added to the existing database for a total of more than 4,250 individual trip generation studies. New land uses include: assisted living; continuing care retirement community; batting cages; adult cabaret; multiplex movie theater; soccer fields; athletic club; private school (kindergarten to grade 8); baby superstore; pet supply superstore; office supply superstore; book superstore; discount home furnishing superstore; arts and craft store; automobile parts and service center; and automated car wash.

The Handbook incorporates changes necessary for consistency with the data contained in the Seventh Edition of Trip Generation, which was released in November 2003. Additional data have been added to Chapter 5, Pass-By,

Diverted and Linked Trips. All other changes were strictly editorial updates to the material contained in the 2001 handbook.

Intermodal Association of North America

Intermodal Market Trends and Statistics (IMC) is produced by the Intermodal Association of North America and is available at:

www.intermodal.org/statistics_files/reports.shtml#QtrlyReport. It is a quarterly report of industry statistics, and attempts to provide an in-depth look at intermodal industry data. IMC statistics include intermodal volume, highway truckload volume, total loads, intermodal revenue, and highway revenue. Comparisons of prior quarter and prior year activities are measured, as well as current year to date activity. Trends for activities over the prior 18 months are also illustrated. Rail statistics include movements by equipment size, key corridor activity, and traffic flows between regions, including Canada and Mexico.

State and Local Freight Movements

Data sources at the state level, in addition to above, are predominately public sources and include continuing traffic counts on state highways, metro areas and many other locations, as well as individual traffic counts for specific projects and policy needs. The following are selected examples of state and some local data generation efforts.

Public Data Sources for State Freight Movements

Intelligent Transportation System (ITS) Research Program, University of Washington

The ITS Research Program at the University of Washington developed the **Traffic Data Acquisition and Distribution (TDAD)**, available at:

www.its.washington.edu/tdad/.

The TDAD project is more versatile than the larger data bases because it provides data for anytime and location, and for any length of time interval. The goal of the TDAD project was to supply traffic data for a wide area over long periods of time to enable various traffic agencies to perform research activities. It can be queried for differing locations, coverages, and traffic characteristics.

Washington State Department of Transportation (WSDOT)

The heart of the data collection on traffic counts in the state of Washington is the Transportation Data Office (TDO) of WSDOT. TDO collects and manages statewide traffic, roadway and collision data for many differing clientele. Various categories of data compiled and managed include many aspects of collisions, various aspects of highway descriptive and performance data, traffic data dealing with collection of data and operational aspects of the highway elements, travel data of numerous aspects, and also technical support of analysis and planning with data. WSDOT has developed the **WSDOT GeoData Distribution Catalog**, available at: www.wsdot.wa.gov/mapsdata/GeoDataCatalog/default.htm.

The **WSDOT GeoData Distribution Catalog**, maintained by the Office of Information Technology, is a centralized distribution site for sharing; therefore, data on this site are available for download free-of-charge. The data are provided in ESRI shapefiles, georeferenced .jpg at www.esri.com, and Mr. SID formats at www.lizardtech.com. If the user does not have a GIS solution to view this data, they can download, free of charge, open source software for Windows, Macintosh, or Linux from Quantum GIS (Qgis) at www.qgis.org or Refractions Research (uDig) at www.udig.refractions.net/confluence/display/UDIG/Home/. Data provided are used by WSDOT's transportation partners, government entities, schools, private businesses, researchers and the general public.

The use of GIS allows a geospatial framework to be used in presenting the data and conducting analysis. It is the largest and most useful of the data bases in

the state of Washington, mainly since it operates as a catalog or repository for many other data sets.

The **Long-Term Air Transportation Study (LATS)** for the state of Washington was signed into law in 2005. It authorized a long-term air transportation planning study for general aviation and commercial airports statewide. The purpose of LATS is to understand what capacity currently exists in aviation facilities and what will be needed to meet future demand for air transportation. The bill requires WSDOT Aviation to conduct an airport capacity/facility assessment in Phase One and a demand/market analysis in Phase two. In the final phase the Governor will appoint a 10-member aviation planning council. The council will review the data and make recommendations to the Governor, legislature, and Transportation Commission on how to best meet statewide commercial and general aviation capacity needs. The Governor's aviation planning council is being developed as of May 2007. The first two phases are expected to produce data and data analysis on the overall needs of the aviation industry in the state of Washington.

WSDOT produces the **Freight and Goods Transportation System (FGTS)**, which ranks roads in the state by average gross annual truck tonnage moved on each stretch. This is not new data but is a configuration of data presented in other sources in this review. The designation of the system is revised annually by the local agencies assigned responsibility over each road segment. The FGTS identifies the routes most heavily used by trucks and provides data that are used to support funding for project that improve conditions for freight transportation, supporting pavement upgrades, traffic congestion management and other investment decisions. It is available at:

www.wsdot.wa.gov/planning/FreightGoodsTransportation.htm.

Other sources of data exist within any state, such as Washington. Weigh in Motion (WIM) sites, short-term vehicle counts, and other traffic counting locations

provide the base data for the GeoData extensive database of WSDOT. Many port and harbor studies are available from the Public Ports Association and individual ports. Many of these include projections by commodity, region, and destination for varying timeframes. Metropolitan Planning Organizations (MPOs), such as the Puget Sound Regional Council (PSRC), International Mobility and Trade Corridor (IMTC), and SWEST/VANCOUVER, etc., often participate in and produce regional specific, but data driven, analyses that are easily available at their Web sites. In a similar fashion, Regional Transportation Planning Organizations (RTPOs) conduct freight movement studies in their respective areas that do generate some primary data, but often rely on the data sources mentioned above. Many of these studies are available in WSDOT's **Planning Studies List and the Statewide Map of Studies** (located at: www.wsdot.wa.gov/planning/Studies/List.htm), which identify the location and sponsor of each study. Other metro and county entities are also continually producing small studies with data sets generated only for the purpose of the individual study. These are available and can be useful to a certain degree, though corroboration of these data with other sources is critical.

A data source that is increasing in usage is the **Washington Transportation Plan Data Library**, compiled by the WSDOT, at: www.wsdot.wa.gov/planning/wtp/datalibrary/. This source focuses on the data and studies that were reviewed and used in the development of the Washington Transportation Plan and policy decisions within the state. A recently developed highway data source is the **Tribal Transportation Database Project (TTDP)**, initiated by WSDOT in conjunction with the Tribal Transportation Planning Organization (TTPO), which documents road characteristics such as physical features, average annual daily traffic, etc. It presents the data by county, Bureau of Indian Affairs (BIA), or tribal ownership and inventories the current conditions and future needs of this tribal road system. Their Web site is: www.wsdot.wa.gov/planning/tribal/.

Table 5: Public Sources for Information on State Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
ITS Research Program at UW	Traffic Data Acquisition and Distribution	Provides data for anytime and location, and for any length of time interval.	Truck	twenty seconds	daily	www.its.washington.edu/tdad/
Office of Information Technology of WSDOT	WSDOT GeoData	Numerous but mainly are based on traffic counters of various types.	Truck, rail, barge	daily, weekly, monthly, annually	daily, weekly, monthly, annually	www.wsdot.wa.gov/mapsdata/GeoData Catalog/default.htm
Washington State Transportation Center	TRAC Truck Data	Provides specific site statistics, segment statistics, data summaries (both predefined and custom) and site comparisons.	Truck	varied	varied	depts.washington.edu/trac/index.html
Washington State University	Strategic Freight Transportation Analysis	Many faceted study of freight movement in and around the state of Washington.	Truck, rail, barge	varied	varied	www.sfta.wsu.edu
WSDOT	Washington Transportation Plan Data Library	Source focuses on the data and studies that were reviewed and used in the development of the State Transportation Plan and policy decisions within the state.	Rail, air, truck, barge, ocean	varied	varied	www.wsdot.wa.gov/planning/wtp/datalibr ary/
	Weigh in Motion (WIM)	Permanent traffic reporting.	Truck	continuous	daily	www.wsdot.wa.gov/mapsdata/TDO/elect ronics.htm
	Freight and Goods Transportation System	Ranks roads in the state by average gross annual truck tonnage moved on each stretch.	Truck	annually	annually	www.wsdot.wa.gov/planning/FreightGoo dsTransportation.htm
	Long –Term Air Transportation Study	Understand what capacity currently exists in aviation facilities and what will be needed to meet future demand for air transportation.	Air	not published	not published	www.wsdot.wa.gov/aviation/LATS.htm
	Tribal Transportation Database Project	Documents road characteristics such as physical features, average annual daily traffic, etc.	Truck	varied	varied	www.wsdot.wa.gov/planning/Tribal/

Washington State Transportation Center

Closely related to the above is the **TRAC Truck Data**, available at:

depts.washington.edu/trac/index.html. This data series again uses truck counts to provide a basic analytical package. It provides specific site statistics, segment statistics, data summaries (both predefined and custom), and site comparisons.

Washington State University, Strategic Freight Transportation Analysis

The **Strategic Freight Transportation Analysis (SFTA)** is a multi-modal study of freight movements in and around the state of Washington. Connected to its predecessor, the Eastern Washington Intermodal Transportation Study (EWITS), SFTA has produced multiple product, mode, commodity, and supply chain studies. Most of the major industries in the state of Washington have been surveyed over the past five to ten years under this research effort. Studies recently completed include warehouse/distribution centers, mining, and mineral and agricultural commodities. Two specific studies offer information for data generation in the state.

First, a statewide truck origin and destination study was done under both EWITS and SFTA, allowing a time trend on truck movements and characteristics to be developed. These reports present the findings of an extensive year-long survey assessment of freight truck movements on highways in the state of Washington. This study follows up on the EWITS, which was completed in 1993-1994, and is analogous in scope to EWITS Research Report Number 9 (Nov. 1995). The SFTA study involved almost 300 individuals who conducted personal interviews with truck drivers at 28 separate survey locations around the state. This statewide origin and destination survey obtained approximately 24,000 observations, providing the state of Washington and Strategic Freight Transportation Analysis (SFTA) project researchers an updated, extensive database for examining statewide freight movements.

Documenting the geographic movement of freight truck shipments between individual cities and regions within the state of Washington is a key component of SFTA.

Geographic coordinates (geo-codes) were developed for each Washington origin and

destination identified by truck drivers participating in the origin-destination study. This process was performed within the Geographic Information System (GIS) software: ArcInfo. Utilizing an Arc Macro Language program, a list of five potential routes was developed for each origin-destination pair. The route that most closely matched the highway usage provided by the survey respondent was selected and assigned to each respective survey observation. The assignment of the truck origin-destination data to geographic coordinates allows for very detailed and accurate analysis between any attributes from the survey data (truck configuration, commodity, weight, base of operation, origin, destination, facility type, etc.) to anything that has a geographical property (highway, land, people, socio-economic data, etc.).

Summary

The above inventory of data sources reveals multiple sources with multiple approaches to data sourcing and presentation. Blending these disparate sources into a data framework, one that reflects the needs of the users and the gaps between the user needs and existing data, will allow development of an action plan for the state of Washington as it searches to provide the data necessary for productive decision making at all levels of government and in the private sector.

Chapter II: Survey of Other State Department's of Transportation Freight Data Usage and Application

This second chapter of the interim report provides information on and from state DOTs as to how transportation data are used in their state and what data are currently being used. Chapter III looks at the needs for improved or more applicable data as identified by the state DOTs.

The general source for this chapter is a series of telephone interviews with selected state DOTs, requesting information as to what data are used, what issues are arising that require new or more complete data, and what are those data needs for the states. In addition, previous studies detailing freight data usage and concerns are used as sources, as were other conference proceedings, reports/literature, and popular articles dealing with the freight data issues in the states. Information developed for this report, from all three sources, covered a broad spectrum of states, some heavily agricultural and resource based, some quite urban in character, some very trade oriented for both import and export movement, and some with the split of population/urban character and economic activity as evidenced, for example, by the state of Washington and the state of New York. The states providing information to interviews or to reports were:

- Alaska
- California
- Colorado
- Florida
- Georgia
- Idaho
- Kentucky
- Minnesota
- North Dakota
- New York
- Ohio
- Oregon
- Pennsylvania
- South Dakota
- Wisconsin

The condition of freight data for improved transportation decision making at all levels has received significant attention over recent years. This is evident in the literature reviewed for the data sources identified in Chapter I and also in the responses of states to questions regarding overall data availability and usage. This interest is based on the changing nature of the transportation and logistics issues affecting state DOTs, especially the global economic situation, with its competition, partnerships, and shifting

landscapes of both. Thus, Transportation Research Board (TRB) activities have spent more and more time trying to tie the international, national, regional, and local transportation interests into the global or larger picture, and do it so state DOTs will have the perspective and capability to link all levels of interests into their planning and service provision.

A good example is the Peer Exchange conducted by the TRB and reported in Circular E-C080 as it attempted to identify the freight data current situation for state transportation agencies. This effort was preceded by other TRB committee aided efforts as well. This included Data Needs in the Changing World of Logistics and Freight Transportation, a conference held in New York, and a review/workshop report discussing the issues and option for future enhancements of one particular freight data source, the Freight Analysis Framework (FAF), produced by the Federal Highway Administration. These and similar efforts resulted in a Concept for a National Freight Data Program, also prepared by the Committee on Freight Transportation Data, designed to recommend a framework for the development of national freight data. This framework, focused at the national level, articulates the types of freight data needed by the variety of users in transportation and the roles of different data providers.

Of particular note is the recent Data Requirements in Transportation Reauthorization Legislation conference organized by the TRB. Its focus was to identify the data issues associated with the program proposals in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The analysis of the challenges and data requirements for this authorization legislation, and the strategies offered to fulfill those requirements, can be useful to states as they work with the new focus relative to the needs of their states. But, as identified by states, there are burdens that come with these activities; burdens that are both financially and data intensive. Various states mentioned these activities as having guided their thinking as they sought to improve the availability and applicability of data for their planning and investment purposes.

A similar activity, undertaken by the Northern Plains-Pacific Northwest Center for Freight Mobility (NORPAC), a regional center for freight mobility comprised of Washington and North Dakota Universities, emphasized the issues and data needs from a regional, rather than a local or state perspective. Again, state interests within the regional context are identified, providing some value to state DOTs in their policy and program deliberations.

How freight transportation data are used in the states and what data are used does vary somewhat from state to state. Current usage of data was often broken down by many of the states into policy, planning, and project usage, with the line between the usages sometimes being very thin.

Policy Applications

Policy formation occurs at both the state and national level. State DOTs emphasized that they consider themselves the implementers of state policy, as developed by the appropriate decision makers, usually the Governor and the legislature. However, they also understand their persuasive role as analysts and evaluators of the impacts and results of alternative policies relative to the identified goals of the decision makers. They also feel they provide a service to the state policymakers when the state position towards alternative national policies is developed. Much of the data discussed in this report are utilized in these policy development processes at both the state and national levels, and in some circumstances, at local and regional policy deliberations as well.

Transportation data provide insights for the state agencies into policy issues such as the impact of rail line abandonment and overall loss of rail infrastructure. Truck and rail volume counts, classification and weight, flow data, pricing data, and road damage/management data were commonly in the development of state positions on ownership/investment/partnerships with railroads or port entities. Availability and accuracy of these data was of concern to several of the states.

Congestion, capacity, chokepoints, and associated declining service levels and safety considerations were common issues, and studies and data sets were developed to analyze these issues, particularly seeking to quantify the contribution of trucks to the issue. Traffic flows by hour, location, and density, and the performance measures of drive time, accidents, etc., were useful in the studies.

Underlying these analyses were attempts by some states to quantify the cost of congestion, cost to the trucking and passenger sectors as well as cost to the economy of the delays. Corridor studies and analyses, as baseline knowledge bases, were common uses. Such studies provide the state and local/MPO analysts to have a readily available set of data. Concerns of availability and cost were mentioned.

Truck size and weight issues were commonly tasked to the state DOTs for analysis, sometimes along with the enforcement of attendant rules and regulations. Data on loads, weights, and general flows of trucks are accumulated by weigh stations and WIM sites in most states, though the number of locations does seem to vary heavily. These data assist the state in making its own decisions, but also serve to prepare the state to enter into the national and regional debate about length and weight issues.

Truck cost allocation studies by the states were also dependent on data that are usually available. Resultant cost allocations are often challenged by special interests, as reported by some states, and definite data on road usage relative to registration and licensing revenue are critical and are often used for analysis and defense of decisions.

A consistent use of data by the states was to identify current traffic flows and project the composition and magnitude of such flows into the future to support the policies as they are developed by the states. Several states have used limited origin-destination studies to provide the composition and characteristics of industries necessary to make those future projections. Such use seemed to be invaluable, but sporadic and expensive. These origin and destination data series, or at least databases, were of more interest for

port or border states, than for inland states, that seemed to emphasize through or transit movements in their data usage.

Some of the data series identified in Chapter I of this report were used, to the degree possible, in multi-state analysis and coordination, particularly on major interstate corridors. Such analyses were used to develop state coordination regional policies on capital investment in a system fashion, where state borders were ignored and the focus was on the passenger or freight movement. Data from differing states, which was noted to sometimes come in different forms and formats, are combined in attempts to do full origin-destination flows in each corridor of interest.

An emerging area of data usage is the issue of toll roads, congestion pricing, and related traffic management/revenue enhancement schemes in various states. Traffic count data are used to provide the benchmark for analysis of proposed fee structures, with other data having to be generated specific to each study to ascertain carrier response to the alternative levels. These latter data have to be discovered on a case by case basis, often with attendant expenses. Policies dealing with toll roads are being developed by many states, as revenue for even basic maintenance is falling short of required levels.

Most states find they are tasked with modal studies and evaluation, from air to rail to truck to water as states develop policies related to individual modes within their state. Data usage by states dealing with these studies is usually derived from national data and or mode association reports. The broad data sets identified in Chapter I dealing with air, rail, and water are most commonly used by the states in these analyses and reports. This is one area specifically reported by states using the data of private consultants to formulate general flows and trends in those flows; those data sources are also identified in Chapter I as private, for-fee sources.

A relatively new area of data usage was examination of security risks, whether catastrophe, terrorism, or hazardous materials sources. Data on traffic flows over

bridges and road sections, alternatives to those corridors, seasonality, and timing during the days of movements are being combined with hazardous material identifiers and used to determine exposure and diminish uncertainty wherever possible. This is of common usage, especially in the port and border states, where origin and destination data, from whatever possible source, are being pieced together to understand movements and vulnerability.

Planning Purposes

Planning for most of the states involved multiple activities, levels, and varying goals. Requisite plans for federal requirements were heavy users of traffic count data. In addition, local and regional data was used for benchmarking of the plans, whether for state needs or participation in federal funding/planning. Freight data were used in MPO regional planning studies and related transportation studies as well as the district/regional plans within the DOTs. Some of these plans were heavy users of the traffic count data, in time and space, as in the mobility plans of the state and regions within the states. States recounted numerous times of providing traffic and trade data to economic development entities as they were involved in economic development planning; such entities range from RTPOs to MPOs to urban development groups such as chambers of commerce, port districts or public utility districts. These data do, to some degree, provide information as to the impact of such growing traffic on the highway system in areas of congestion and safety.

Port master plans relied on surrounding traffic flows, congestion, delay time and other volume related performance information, some of which is provided by the state DOTs. In particular, data describing and explaining the performance of intermodal connectors, which support the traffic movement out of the ports, are heavily used by the ports. Underlying port master plans, and in fact most plans, is an increasing use of any available data to provide supply chain, industry and commodity flow, and distribution center analyses. State DOTs seem to have come to the realization that examination of supply chains, as one integrated unit, results in better decision making, understanding

of problems, and alternative solutions than segmented analysis, even though available data may not be sufficient at this time to fully address such chains. Several states have had university researchers conduct industry supply chain studies on a one-time basis to get at least a snapshot of the entire supply chain.

A related analytical use of the data by the states is the development of performance goals, performance norms, and benchmarks for the plans, as they are developed, to be able to judge progress. Such data usage results in the state DOTs being able to undertake special studies for executive management or respond to legislative requests. Similarly, even at the project level, plans must be developed and transportation data are the foundation upon which these projects are ranked, implemented, and evaluated. Data usage is both broad and deep in these areas.

In the long term context, freight transportation data are used to undertake long term capital planning and investment by the states, including the prioritization of projects and capital expenditures. The data form the base from which emerging issues, such as the new federal security mandates or the growing number of ethanol/bio-diesel plants as they dramatically change freight flows, can be analyzed. Further, the data, again to the limited extent available, allow planning to proceed for traffic patterns, growth structure, and development pace for small urban areas.

Project Purposes

Construction projects, whether new capacity or maintenance/restoration/preservation, are the heart of every highway or transportation department. Every project evaluation and construction relies on traffic flow data, current and projected, to determine the timing of the project relative to other projects in the existing budget, the design of the project, and the ultimate costing of the project. Bids are determined and evaluated within the context of the data driven magnitude of the project. Every state DOT reviewed in this survey commented that construction and operations costs were the most basic information, were the most critical for day-to-day service provision, and

these projects that provided that service. Certified traffic flows are necessary to value engineer design and build efforts.

In a broader context, all projects have impacts outside of each stretch of pavement or bridge. For example, they can be used to foster or support development of intermodal/multimodal facilities that are cost efficient system wide. Several states commented that these broader data were used in this fashion but were often sparse or lacked continuity among sources. They felt that available knowledge about freight traffic generators was being used, but was not specific in nature as to route utilized, timing of shipments, and alternative pricing or efficiency of routing.

Summary of State Departments of Transportation Data Needs

This chapter summarized how state DOTs utilized the data sources identified in Chapter II earlier. Much of the active usage was at the planning and policy level where freight transportation data allowed and improved decisions, both current and future. But data on project evaluations were critical in the short run and formed the majority of near term data usage. These data used at the project level, however, are often used at all three levels and require attention of the data masters and researchers for that reason. The chapter focused on actual usage of the data but, of necessity, commented on potential failings of the data available to, and as reported by, those decision makers. The next chapter looks to the data needs identified by the states in the literature and survey, both as to data type and questions desired to be answered by these data.

State DOTs were explicit that a new emerging need for correct and defensible data was due to the new higher profile of freight at the executive administration level, and the development of freight policies, program management, and intermodal choices at that level. This emerging global need results in data needs at every level and from every source possible to inform the policy discussions. In this chapter the issues as identified by the states, arising, current, or recurrent, that cause needs for data are reviewed and analyzed. Then the needs themselves will be summarized from the states' perspective,

and finally any perceived limitations to the data as they currently exist will be inventoried.

Issues

Issues increasing or reinforcing the need for improved freight transportation data are both new and recurrent. A continuing need is for data that can inform the long-term capital planning and investment process by the states. This need is enhanced by the growing truck traffic on the highway system creating congestion/safety concerns—traffic that is expected by some to double by 2020, during a time period of funding shortfalls and revenue flattening.

Several specific issues were common among many of the states. A need for origin-destination information on freight traffic generators within the states was paramount; yet there appears to be a need for further development of east-west, or at least long-haul, intermodal/multimodal rail loading facilities; facilities that could carry traffic off the road in a cost competitive position. These needs are complicated by concerns about the loss of rail lines through abandonment of branch lines or closure of short-line railroads. These issues were, in some states, specifically related to the increase in number of ethanol/bio-diesel plants, plants that are dramatically changing or increasing freight flows.

Related issues were concerns about the truck size/weight disparities across the states and the impact on efficiencies of overall movement, as well as fuel costs and hours of service specific to the trucking firms' operations.

Specific questions that came up from the state DOTs, not necessarily as issues, were related to whether freight corridors can handle the projected traffic levels safely and efficiently. To answer that question information on the identification of exact commodities or goods moving across state highways and a better understanding of private sector logistics operation was desired. Associated with that question is, "What is the impact on planning by the state to answer these questions?" Specific questions on

freight movements in sub-regions of the states, including the many local distribution centers, warehouses, and associated short delivery movements in urban areas, should also be addressed based on the states' comments.

Another question arising in the minds of the state DOTs dealt with concerns about the compatibility of each state's data with the surrounding state's data and the lack of coordination among those states. This issue relates to process, but the outcome, if not corrected, is data that don't connect or data bases that can't be combined as needed. Several of the states spoke to the potential redundancy among the data collected by different states in addition to the other concerns.

Another issue, related to the funding issue noted above, is the drive for public/private partnerships on projects in the future. This calls for a different type of data to be generated, both for the private business plan and the governmental technical and political decision process.

In summary, the states seemed to feel that the number one issue in the future would be congestion and capacity concerns overall, with contributing issues of traffic growth, safety, security, and their effect on capacity and efficiency of the overall system. Other issues affecting the type and construct of needed data included adequate funding, energy and the environment, intermodal facility development, and innovative technology.

Needed Data

Accurate data are critical to the needs of the states and some of these data are not clear. The states felt that the state public data were fairly accurate, but the private data were sometimes found to be inaccurate. Further, the regional and national databases identified in Chapter I were more accurate than the local public data, often developed by special interest bodies with acknowledged biases. A concern about the accuracy of private data was mentioned, especially since it is less frequently collected than public efforts but still utilized by data vendors and buyers.

States seemed to be concerned about the limited information on freight movements and patterns; especially on an origin-destination or commodity/industry level. Obtaining and using such data would answer one of the major needs as identified by the states. This need has increased due to the recent transportation reauthorization legislation and its emphasis on freight and relevant freight data. This occurs at a time when freight data collection and evaluation have not been, and may still not be, a mainstream function in most states; specifically, the location and profile (or lack of it) of various states' data offices should be noticed.

The types of data used and the problems associated with these data include the limited freight baseline study available in most states, resulting in freight data that are out of date or not available, such as smaller truck trips, local distribution patterns, etc. If shipment origin and destination pairs were developed correctly and completely, model builders and state wide planners could operate with the same toolkit of analytical approaches, increasing the overall productivity of analyses and planning.

Micro data needs are those of routing, time of day, real time operational data, the domestic leg of the international shipment, shipment weight and truck configuration, volume shipped, actual road route using specific origin and destination of the shipment, land use at both origin and destination sites, etc. It was felt by respondents that such studies, done at both the small urban delivery level and the overall state flow level and inclusive of international shipments, would answer many of the questions and needs of the freight planning, modeling, and policy community.

Data Limitations

The states identified the data limitations in the fashions discussed earlier. Data are often inaccurate, incomplete, or missing, relative to the goal of the study or policy discussion underway. Consultant support is often used to fill in those data gaps but are expensive, too general, and don't often allow data sets to be combined.

Existing origin destination studies are few and suffer from being outdated rather quickly due to the dynamic nature of the transportation market. As such they have to be used with corrected assumptions, modified, and recalibrated as necessary. These studies continue to provide much of the analytical power of the statewide evaluations, but selective use of the data is appropriate to avoid drawing implications past the power of the data.

The major limitation is the shortage of publicly available data. The data sources identified in the extensive review in Chapter I are both public and private. Private transportation or commercial businesses are reluctant to share their databases for proprietary reasons or competitive disadvantages. This concern is compounded by the expense of manual interviews and counts, though these counts are the most accurate and are available to the public.

Related to the above is that fact that outdated data are better than no data, but data do die...as far as usefulness of policy considerations or project evaluations. Most data sets are five years between collections and some of the better ones rely on a 10-year time span between collection, again due to the expense and the magnitude of the data collection task.

Another limitation is the dearth of good freight data in urban areas. States have started collecting some of these data, but usually in partnership with local port, MPO, or RTPO efforts. Because of the physical difficulty of collecting such data within urban boundaries, existing data in most states do not offer the needed information in this critical area. Such an area is even more critical because of the pressures of passenger movements, combined with local freight movements, on the overall system.

Summary

These data serve two sets of customers, private businesses and governmental entities. Over all, the stated need is for a coordinated approach to data generation at the policy, program, and project level, as the data needs are addressed. Existing and newly

created data need to be transparent as to source, method of discovery, costs to access, and strengths and weaknesses.

These two initial chapters of this report set the stage for the in-depth interviews and internal focus on the state of Washington. With the basic understanding of what data sources are available, what data are needed, and what data limitations exist nationally, specific attention is now paid in the second part of this report to Washington's specific data needs and the data framework that would be useful to achieve and answer those needs.

Chapter III: Washington State Freight Data Users

This chapter focuses on information collected from Washington State freight data users and transportation policy planners/personnel. Its purpose is to document the specific data and information sources used by different constituents within the state and illustrate the freight data needs across different state agencies and transportation organizations. The information presented in this chapter was collected at two separate freight data discussion meetings in Washington State; one on the west side (near Sea-Tac, WA) and one on the east side (Spokane, WA). Given the obvious economic and socio-demographic (urban/rural) differences between these two regions, information was collected separately to allow the unique data sources and needs to be detailed from each region. Representatives from the freight transportation community in each region were invited to complete a short freight data user questionnaire prior to the meeting related to current freight data sources and uses. This information was further clarified and expanded at each freight data user meeting.

Table 6: Freight Organization Attending Freight Data User Meetings

Western Washington Meeting Organization/Attendees (March 5, 2007)	Eastern Washington Meeting Organization/Attendees (March 12, 2007)
<ul style="list-style-type: none"> • Husky Terminal Services 	<ul style="list-style-type: none"> • Benton-Franklin Council of Governments
<ul style="list-style-type: none"> • Northwest Container Services 	<ul style="list-style-type: none"> • Center for Trade and Economic Development
<ul style="list-style-type: none"> • Port of Portland, OR 	<ul style="list-style-type: none"> • Kootenai/Spokane County MPO/RTPO
<ul style="list-style-type: none"> • Port of Seattle, WA 	<ul style="list-style-type: none"> • North Central Washington, MPO/RTPO
<ul style="list-style-type: none"> • Port of Tacoma, WA 	<ul style="list-style-type: none"> • Palouse RTPO (Whitman, Asotin, Garfield, Columbia Counties)
<ul style="list-style-type: none"> • Port of Vancouver, WA 	<ul style="list-style-type: none"> • Port of Seattle, E. Washington Rep.
<ul style="list-style-type: none"> • Puget Sound Regional Council 	<ul style="list-style-type: none"> • Washington State Department of Transportation, Eastern Region Office
<ul style="list-style-type: none"> • Washington State Department of Transportation, Freight Systems Division 	<ul style="list-style-type: none"> • Washington State Department of Transportation, Freight Systems Division
<ul style="list-style-type: none"> • Washington State Freight Mobility Strategic Investment Board 	<ul style="list-style-type: none"> • Washington State Potato Commission
<ul style="list-style-type: none"> • Washington State Department of Transportation, Seattle/Urban Corridors 	<ul style="list-style-type: none"> • Yakima Council of Governments
<ul style="list-style-type: none"> • Whatcom Council of Governments 	

Western Washington Freight Data Discussion: Current Data Use and Data Needs

The following information is provided in greater detail in Appendix A, where specific response information was documented during the individual freight data discussion meetings. Two tables were created for each meeting, capturing current data use and freight data needs. Practically all respondents and attendees indicated that, in order to address necessary policy, planning, and project needs, a variety of data sources were used. Below is a summary for those organizations which provided information.

Port of Portland, OR

The Port of Portland is somewhat unique when compared to the Ports of Seattle and Tacoma. It is the only area port that maintains a research department (and professional research personnel) and is involved in a variety of research efforts. Almost all of these research efforts influence policy, planning, and projects at some level. However, there

are four primary data sources that are used by the Port, including the Portland-Vancouver commodity flow forecast, the national (state-to-state) commodity flow forecast produced by the Bureau of Transportation Statistics, the regional trade capacity study, and the regional freight data collection project in the Portland/Metro area. The Portland-Vancouver commodity flow forecast is conducted every five years and provides detailed commodity flow information on 41 categories by mode. The national commodity flow forecast is useful for state-to-state comparisons of commodity movements. The regional trade capacity study provides regional changes in land-use patterns and the ability of the region to accommodate future freight trade. The recently completed regional freight data collection project should provide more detailed urban freight information relative to origin-destination, commodity, route, and time-of-day information. The Portland/Metro regional freight data collection projects represent a partnership by the Port (with the Oregon Department of Transportation and Portland Metro) to develop improved freight data within the urban area. When making transportation investment and policy decisions, the Port attempts to take a broad perspective so that a decision to improve freight flow in one area doesn't create bottlenecks in other areas (modes). Future efforts to collect freight data may be more successful if the broader region joins forces and submits proposals for federal research dollars.

Port of Seattle, WA

The Port of Seattle also relies on a variety of data sources to address port and harbor transportation issues, including the Puget Sound Regional Council (PSRC) truck model, the Washington Public Ports Association Rail Capacity Study, the Container Cargo Forecast study, and several studies conducted by Heffron Consulting related to the Duwamish Access Study. Similar to the Port of Portland and the Port of Tacoma, the Port of Seattle is investing in data collection efforts through the development of a Radio Frequency Identification (RFID) system to track containers moving into and out of the Port area. Once completed, this will allow detailed information on route, origin-destination, and time data on container shipments. Unlike the Port of Portland, the Port of Seattle is not focused on policy issues, but rather program and project level issues.

In responding to the current freight data needs, the Port of Seattle indicated that specific objectives regarding how the information would be used should first be decided and then let this shape what would be collected, organized, compiled, and modeled. The broader economic significance of transportation infrastructure to support freight movements and the relationship between the efficiency of this freight system and the health of the local economy should drive our freight data framework.

Port of Tacoma, WA

The Port of Tacoma uses the greatest breadth of data and information sources, including:

- The traditional PIERS Data
- Washington Public Ports Association Rail Capacity Study
- Washington State Transportation Commission Statewide Rail Capacity Study
- Comparative Port Studies on Truck, Road and Rail Capacity and Traffic
- Portland Metro Data
- Port of Portland Data
- Data from private studies conducted by Heffron (Regional Freight Data Collection) and Parametrix.
- Portland State University: Portal Data Project
- Regional Transportation Council Data
- BNSF: Business Exchange System for real time info on trains/port movements

The primary purpose of freight data is to support port project expansion plans and also to improve efficiency and eliminate freight bottlenecks. Emerging freight data needs include access to information related to freight congestion and emission modeling to address growing air quality concerns, requiring greater detail on specific freight movements, by commodity, origin-destination, and route. The Port of Tacoma has already completed several growth and capacity studies in recent years and doesn't rank this type of information as a high priority need.

Port of Vancouver, WA

The Port of Vancouver is much smaller than the neighboring ports of Portland, Tacoma, and Seattle and indicated that they use several sources of information to satisfy freight

data needs. Some of these sources are those listed by the neighboring ports or are provided by the ports themselves. The freight data needs documented by the Port of Vancouver included more detailed information on truck counts, shipment commodity and origin-destination information on specific highway corridors. The Port hoped to follow the Port of Tacoma's lead in implementing technology to help track and access this information for freight moving through the port's facilities.

Puget Sound Regional Council (PSRC)

The PSRC maintains and updates the regional transportation truck model, which forecasts truck trips to and from transportation analysis zones in the Puget Sound area, and allocates truck trips onto the street and highway network. This model is used by many regional agencies, including local and county RTPOs and transportation planning agencies for evaluating project and planning needs into the future. The model is built on employment data by industry classification (NAICS) and validated against truck trip data (for each highway segment) compiled and collected at the WSDOT Transportation Data Office (WIM, Permanent Traffic Reporting (PTR), Mobile Traffic Counters). The model is updated and recalibrated every three years and provides forecasts up to 30 years into the future. Given access to more detailed information on commodity specific shipments by highway segment in the urban area, the PSRC truck model may be better estimated, calibrated, and forecasted with increased accuracy. This would have multiplier effects throughout the region for area agencies that rely on the PSRC truck model forecast.

Washington State Freight Mobility Strategic Investment Board (FMSIB)

FMSIB partners with several agencies throughout the region and uses many different data sources to help prioritize freight investment projects and measure performance improvements to the freight system. FMSIB influences policy, program, planning, and project level issues as part of evaluating alternative freight investment outcomes. Among the data sources commonly used are the Marine Exchange Reports, which track all marine vessels accessing area ports (cruise and freight vessels) and FHWA reports and data. One recent study, conducted by the firm Science Applications International

Corporation (SAIC) tested the process for counting trucks via GPS transponder, video surveillance, and loop detectors. FMSIB also received funding in the 2007 Legislature to partner with Nextel and purchase data on truck shipments, routes, origin-destination, time-of-day, and delivery locations.

Washington State Department of Transportation, Seattle/Urban Corridors

The WSDOT Urban Corridors Office in Seattle relies primarily on the Freight Goods and Transportation System (FGTS) classification of freight tonnage on specific highway segments, in addition to the vehicle classification counts compiled by the WSDOT Transportation Data Office. In addition, they use information collected as part of individual projects, such as the Alaskan Way Viaduct Project. However, when asked what their freight data needs were, they provided a very extensive and detailed list of freight data attributes that are needed. These include,

- Daily truck volumes and percentage of daily traffic.
- AM and PM peak period volumes and percentage of peak period traffic.
- Time of day truck volume variations.
- Truck classification counts on selected routes to determine the mix of respective truck classifications.
- Commercial vehicle volumes (these are vehicles used for commercial purposes) as compared to truck volumes.
- Economic data:
 - Commodity flow.
 - Cargo value.
- Oversize/over dimensional vehicle trip demand.
- Breakdown of traffic by FHWA truck classification and measured axle weights by classification.
- Load zone availability and use.
- Vehicles that may exceed the legal axle load.
- Truck travel time studies.
- Change in number of trucks and drivers to mitigate the negative impacts of growing congestion.
- Intermodal yard rail and truck volumes.
- Local rail service (to industrial properties) frequencies.
- Number of truck trips generated by the Port of Seattle, travel routes, and time of day characteristics.
- Current truck counts on state highway system with origin-destination, higher quality data.
- Air cargo information.

Whatcom Council of Governments

The Whatcom Council of Governments is very active in the freight community, being within close proximity of one of the busiest ports in the country (I-5 to and from Canada) and significant freight trade moving up and down the I-5 Corridor. They are primarily focused on improving freight system efficiency and performance at the port of entry and rely on a large number of data sources to address different policy, planning, and project needs. These sources include the U.S./Canadian Customs data on bi-directional truck flows, the 2003 Rail Study conducted by the International Mobility and Trade Corridor (IMTC) and Reebie Associates, Short Sea Shipping Study using Transship, TransSearch, and SFTA Data, the 1999/2000 Commercial Vehicle Intercept Study, U.S. Customs Manifests, Canadian National Roadside Survey, and the Truck Processing Study conducted by the IMTC, Western Washington University, the Border Policy Research Institute, and Transport Canada.

In terms of current freight data needs, the Whatcom Council of Government indicated that better partnerships are needed with private freight companies to better understand the business and economic environment of how these companies operate and some way to “incentive-ize” the private business sector to help provide information on freight movements and freight data. Accurate and convenient access to yearly tonnage information, by mode, was also listed as needed, as well as itemized performance objectives.

Washington State Department of Transportation, Freight Systems Division

Perhaps the most active state organization in the freight arena, the WSDOT Freight Systems Division, uses an array of different data sources to help guide and shape freight policy and address agency needs. Much of this information is compiled and presented as part of the Washington State Freight Plan, one critical component of the larger Washington State Transportation Plan. The different data sources includes internal WSDOT data captured within the WSDOT Data Office and local projects information, in addition to data from other state agencies such as the Department of Revenue, the Community, Trade and Economic Development (CTED) organization, the

Washington State Department of Agriculture, and data from the local and regional port associations. This information is supplemented with data from the Bureau of Transportation Statistics, Office of Financial Management, agricultural commissions, and the statewide freight research effort known as the Strategic Freight Transportation Analysis (SFTA) study. All of this information is used to varying degrees, for freight policy, program planning, and project level needs.

Even though the WSDOT Freight Systems Division currently uses a wide variety of data sources, their current data needs are extensive, especially for detailed information on truck counts and performance measures within the urban and metropolitan areas. Better information on commodity and industry specific freight movements are needed, in addition to information on freight system bottlenecks and supply-chain inefficiencies. Greater access to multimodal information is also needed, especially related to project level benefit-cost information and improvements to the freight system performance. Origin-destination and route level information is needed and necessary for all industry sectors and the ability to predict future freight growth by highway segment and industry sector.

Eastern Washington Freight Data Discussion: Current Data Use and Data Needs

Similar to the Western Washington Freight Data Discussion results, the Eastern Washington information summarized below is also provided in more detail in Appendix A. While many of the data sources used by eastern Washington freight data users are similar, the different planning, programming and project challenges of the more rural side of the state are evident. Generally, the eastern Washington freight data users indicated a greater need for rail data, including information on short-line rail operations and abandonment impacts on shippers and the remaining infrastructure.

Benton/Franklin County RTPO

The Benton/Franklin RTPO is a very active transportation planning organization in eastern Washington, comprising the region surrounding the cities of Pasco, Kennewick,

and Richland (Tri-Cities), WA. To address prevailing freight policy, planning, and project needs in this area, the Benton/Franklin RTPO uses several sources including information collected as part of the EWITS/SFTA research projects at Washington State University, the Washington Transportation Plan, FGTS classification for state highways, WSDOT traffic counts, major employer reports for the area, the Marine Cargo Forecast, and the FHWA Freight Facts and Figures. In addition, they supplement this information by collecting primary data for local port and airport freight movements via shipper surveys. When asked about current data needs, they indicated that currently it is challenging to find accurate, detailed, up-to-date information on county road shipments (volume, commodities, specific highway segments, etc.). Also, there is very limited information related to rail line abandonment throughout the region and the impact potential (or actual) abandonment has on current shippers, alternative shipping services, and impact on other modes and transportation infrastructure. Better information on the economic significance of the Snake River/Columbia waterway system is also needed.

Center for Trade and Economic Development (Eastern Washington)

The primary role of CTED is information broker to help facilitate economic development and trade growth throughout the state and region. As a result, they serve as a conduit between prospective business partners and information and analysis that may foster new business growth or established firms relocating to the region. In the eastern Washington region, CTED also utilizes EWITS/SFTA data and also trade information from the Ports of Seattle and Tacoma, primarily for project specific needs rather than policy and program issues. While no specific data needs were provided, they echoed other participants' requests for more accurate, timely, and accessible information on freight flows in rural areas.

Kootenai/Spokane County MPO/RTPO

The Metropolitan Planning Organization of Kootenai and Spokane Counties indicated that much of the data they use for development of their travel demand model originates from an in-house survey conducted by this agency. They supplement this information

with data from the Roads Standard Study, in addition to information collected and compiled as part of the Avista-led effort known as the Inland Pacific Hub Analysis to help forecast future growth of north/south freight traffic along the U.S. 95 Inland Hub. In terms of persistent data needs by this agency, accurate employment data (location specific) from the Department of Revenue is very difficult to obtain. This information is also an input into the traffic demand models.

North Central Washington MPO/RTPO

Similar to the nearby MPO's in the region, much of the freight data required by the North Central Washington MPO/RTPO is obtained internally, via studies and surveys through the local region. This planning agency utilizes WSDOT traffic counts to help supplement the recently completed study on Washington/Canadian Freight Movements (primarily wood and natural resource products). An extensive list of current freight data needs were provided by this planning agency, including better information on truck shipments, commodities hauled, vehicle configurations, rail data, short-line railroad information and abandonment impacts, increased coordination of truck weigh stations, rest stops and fuel stations, and information on Class I railroad container movements. This agency felt that it could do a much better job planning for transportation infrastructure investments if they had access to this information on a more timely and consistent basis.

Palouse RTPO (Whitman, Asotin, Columbia and Garfield Counties)

This organization is embarking on an extensive data collection effort in order to fill needed freight data and transportation shipping information gaps. A consulting firm has been hired to collect information from freight shippers in each of the counties, with plans to conduct this survey every three to five years. They are also funding a study to identify a consistent standard for designating county roads "all-weather" status. For highway pavement condition information, they rely on the WSDOT Video of Pavement Conditions throughout each of the counties. However, concerns were expressed regarding access to freight movements on all modes into and out of each of the counties as well as concerns of better access to railroad information, specifically short-

line railroad information and how regulation changes impact operator services. An additional desire was expressed regarding access to data on businesses located outside the state, but could have significant consequences on freight movements within the state.

Port of Seattle, Eastern Washington Representative

The eastern Washington representative for the Port of Seattle indicated that they work to develop business relationships with customers throughout the region in order to obtain the necessary information related to freight movements. Information from the Port Import Export Reporting Service (PIERS) was also used, as well as specific studies targeted for business opportunities, such as the Comparative Price Analysis study conducted between Quincy/Tri-Cities recently.

Washington State Potato Commission

The goal of the Washington State Potato Commission is to help market Washington potatoes and identify growth opportunities, including improving the freight transportation efficiency of moving potatoes to market (both fresh and processed). As a result, they use many sources of information including United States Department of Agriculture (USDA) reports, Washington State Department of Agriculture reports, production information from the National Agriculture Statistical Service, and trade information from different national and international sources. For information on local movements, the commission has funded a study, in partnership with the SFTA research effort at Washington State University, to identify how, where, and when potatoes move from production to market. The current freight data needs expressed by the commission included better information on the state and federal transportation priorities (by mode) to help align their priorities and plan for future investments.

Yakima Council of Governments

The Yakima COG conducted their own origin-destination study several years back in order to obtain the necessary freight and transportation data for planning and project

demands. They also expressed a desire to have better access to information of freight movements within their county.

Chapter IV: A Systematic Freight Data Framework for Washington: Gaps, Tools, and Approaches

This report thus far has dealt sequentially with data sources, state data usage and needs, and specific data usage and needs for the state of Washington. A survey of the literature and studies provided an extensive list of data sources currently available and used by the transportation industry in attempts to understand and analyze transportation issues and search for solutions. These sources were categorized by geographic level (international, national, state, regional, and local), emphasizing the many disparate sources of differing data that were currently, if not consistently, available.

This was followed by a review of states' needs relative to data availability. The analysis of 15 states was structured as to various needs for the data: policy, program and planning, and project. Each level indicated differing types and applications of the data required for the alternative purposes of the three needs. The specific needs of the state of Washington were then identified by the use of focus groups, a mail survey of ports, MPOs and RTPOs, and examination of projects and studies completed or underway in the State.

It was found that many sources and much data are available for the decision makers, both public and private, in the State. Data availability has generally improved over the years, with many of the entities making creative use of the various data sets and series that are currently being produced. Specific areas of missing data and information were evident and were stressed in the literature and by the respondents.

But the work by the TRB and the responses of the states in the survey reveals a deep need for a systematic approach to producing, maintaining, and presenting the current and future data. In this section we examine the shortage or gaps between the identified sources and structures of current data and the needs of the entities undertaking policy formulation, planning efforts, or project development. The goal is to specify the gaps in data, to suggest approaches to filling those gaps, and to offer an overall framework for

the much needed coordination of maintaining and developing this overall data base in a dynamic, responsive fashion. These data need to be collected and compiled in response to needs and requests, presented and advertised to the potential users of the data, made easily accessible, maintained, and, finally, used by the entities to improve their understanding of the transportation industry. This will lead to improved decision making by private business and public agencies. In the final section we suggest a process to combine these current and new data series while continuously maintaining the system.

Geographical Data Gaps

International

The interest in international flows and movements continues to increase. Whether at land ports and border crossings or at maritime and air cargo ports of entry, data needs are evident and data gaps do exist.

Traffic flows across U.S./Canada ports of entry are currently being tracked, but not on a consistent basis. The federal sources do provide traffic levels on a general trade basis, but not on an origin-destination specific level. Customs data identify traffic flows at the border crossings but, again, no detailed information on commodity composition by value, weight of vehicle, origin, destination, or route data are produced. Information on shipper and receiver identification are collected, but are not generally given to the public. New editions of the Canadian National Roadside Survey may serve to generate selected pieces of the required data set. These data series would gain from increased collection of particular shipment characteristics, but at this time this information is not part of the charge to the collection agency and therefore is not collected.

Traffic flows across maritime and air ports and points of entry have received the attention of the ports, customs bureaus, and security agencies. General flows for maritime containers are available from the PIERS data both to and from the alternative

ports. General bulk shipping movements are also available. What is missing is the actual movement of those containers and shipments in the domestic or international leg of the supply chain. These container and commodity movements are critical components within the volume of movements on domestic highways and railroads of the internal transportation system. The local drayage of these containers and break bulk commodities has received little or no attention and the descriptive data on these movements are not yet available. Only individual studies, such as those done by IMTC and the Port of Portland/Metro, offer information and this is only on a piecemeal basis.

Information on the ports and the generated traffic also suffer from a lack of data that quantitatively and consistently estimate the degree of productivity or congestion in movements from local port yards and distribution points. Such analyses requires specific data flow information by time of day, vehicle classification and configuration, peak volumes (of both truck and rail relative to other uses and volume of use of the roads or trackage), shipment value, and destination of the movement. Knowledge of shipper and receiver quality of service needs, such as length of and variability in transit time, damage frequency and magnitude, and overall risk to the shipment, as well as total rate of the service, are also required for international shippers and receivers to make hard business decisions about modal choice within the supply chain. Filling this data void would also assist WSDOT and fellow agencies in prioritizing the investments useful in improving the efficiency and effectiveness of moving both port and non-port traffic through those areas of identified congestion.

These data are further constrained because several of them report state of origin of the shipment only as the last section of the movement. Hence, consolidated and intermodal shipments are often lost in the movements and some over and under estimation may occur.

Traffic flows of an international origin or destination are also not well tracked on a regional basis within the U.S. Cargo flows, as they enter into the domestic leg of the supply chain, are not known by ultimate destination or origin, and certainly are not

known from published data by shipper or receiver location. Knowing this regional aspect of the flows of the international cargo would allow overall industry trade economic perspectives to be used to project future usage, needs, and attendant investments on an entire supply chain foundation. Such data would permit identification of congestion points, capacity constraints, and other performance related measures on movements of these international traffic components.

National

Commodity flows across the nation are very comprehensive and non origin and destination specific. Information on those movements by origin and destination, as well as route detail, is an existing data gap. The existing data bases at the national level are proprietary in nature, expensive to access, and do not allow for verification amongst the data bases. Rail data do provide some of those movements, but usually only on a region by region basis, with some obvious missing commodity and trend information. Specific information will allow combining the modal information into total volume corridor studies.

Values and volumes of commodities by corridor are also difficult to create from available data, except at a very broad level. Some of the current data bases are blended or input from other indirectly linked data sets. The importance of intermodal locations and rail and highway transfer points can not be readily determined under the current data. An origin-destination study or studies that trace these flows, over different rail and road segments, would allow national prioritization of investments at choke or congestion points or points of high economic value to the nation's economy. A series of data over a period of time would strengthen the ability to trace and dissect the dynamics of the transportation industry as well as the supply chain decisions being made by the shippers and receivers.

Long distance travel times and safety experiences, as an indicator of quality of service, are not available with the current data sets. Published data, whether rail, air or

highway, do not include the modal travel times. Such information is critical in fully estimating competitive demand for transportation by mode, corridor, or commodity and industry and is an existing gap.

State

Shipment origin and destination is the data gap that is acknowledged as being so prevalent. Knowledge of the routes used, the commodity characteristics, loaded and unloaded weights (total and by axle), value of the payload, and hazardous materials movement is basic and critical. Further information on the mode of shipments, specific routing, time of day (peak hour movement), and vessel or vehicle classification completes the most basic needs of analysts in the state. Such data are only available for the state from the EWITS and SFTA surveys done by Washington State University. Such data are already almost five years old, cover only the routes captured in the statewide survey, and only general inferences can be made from these data sets. The gap relates directly to the fact that surveys like these must be conducted in a statewide framework, as broad as the budget will allow, and on a recurrent basis of every three to five years. It is the only type of data base currently available that combines all the data characteristics detailed above. If examination of commercial vehicle numbers versus all truck volumes is an issue, this data base structure will be needed to fill the gap, because typical traffic counts cannot discriminate amongst vehicle types, just configuration. New camera and “tagging” devices may help fill this gap in the future.

Local distribution, retail, and warehousing movements are a major gap when examining data needs. Little is known about such movements, yet modeling estimates of up to 80 percent of total trips are recounted in the literature. Trip patterns, weights, vehicle configuration, and routing are not systematically collected in the state. Surrounding states and some state universities have done warehousing studies and other piecemeal/focused studies detailing these movements and operating characteristics of the firms, but it is difficult if not impossible to logically transfer those findings to other locations, ports, or movements. Truck travel times, routing, number of stops, weights,

etc., are needed but not available information. These data can be used in prioritizing urban and rural investments, port traffic flows, air quality work, safety investigations (including hazardous materials monitoring), security analyses, resiliency studies, and the transportation modeling that underlies most of these studies. Local economic impact studies also rely on having these local flows, and characteristics of those flows, available for analyses.

Basic daily truck volumes, as a percent of total traffic, can be calculated in some detail from the massive amounts of data collected and managed by the Transportation Data Office. They are only produced at the locations of the WIM and other mechanical weighing sites on the interstate and state roads. To be useful, these data require analysis that is often beyond the normal purview of the initial data collectors. Such weigh stations are currently being evaluated as to redundancy or non-coverage of relevant truck movements in the state, a critical issue for efficient data generation.

Oversize and over-dimension vehicle or vessel trip demands is another data series that isn't currently available. Data currently exist only on an individual trip basis. A fuller understanding of the characteristics of these trips would be useful to plan for the occurrences and determine damage and financial assessments to fit each case. A data base inventory and evaluation of these movements would provide benefit to the state.

The traffic generated by ports and their economic activities in international trade or local economic development efforts is critical to understand. Traffic flows and any capacity constraints are not available in an ongoing series, and certainly not by route, weight, and other dimensions noted above. Demand and trade projections rely on data of past, current, and projected movements from and through the ports, accompanied by capacity estimates for various modal line segments. Such data would allow varied studies to be conducted—whether security evaluations, emissions controls, capital investment by public and private partnerships (and the distribution of benefits that underlies those partnerships), and overall supply chain analyses for the customers/clientele of the ports or development agencies.

Determination of transportation hubs and generators of traffic and economic activity will aid many transportation planning efforts, both by private and public entities. Data on the service provided, the movements produced, and the capacity of modes in any particular point in the overall transportation system will support efficient and effective investment decisions, transportation planning, and other questions about freight movement. Origin and destination studies on an ongoing, if intermittent, framework may fill this data gap.

Regional and Local

The data needs of state, regional, and local entities are very similar to those discussed throughout this report but on a smaller, more focused scale. Most corridor, economic impact, or travel studies require origin and destination by specific road segment of the routing, by weight, truck configuration, value and commodity type, and the other associated variables. Relevant information on trip generators or receivers is particularly of interest to the many studies conducted on the local level. Truck travel trends and forecast estimates are particularly dependent on origin and destination data to understand the economics of the movements through, to, and from their area of interest. These data are available but usually in a segmented fashion. The same needs for data on local distribution, retail, and warehouse, along with movements on county, state, and interstate highways around the study area, must be provided. The issue is that filling these data gaps on an ongoing basis requires coordination and funding, significantly above current levels.

Data Gaps by Needs

An alternative structure for examining current data gaps is evaluating the “needs” for the data. The Washington Transportation Plan Freight Update divides the clientele of transportation planning and investment into those movements that serve global gateways (international trade components), those products and commodities that are

made in Washington and are searching for markets (both domestically and internationally) and those movements that serve to enhance citizens' quality of life by providing local distribution, warehousing service and retail availability.

Global Gateways

Understanding the global movements requires intimate knowledge of the commodities and products being moved, the markets and origins for those commodities, the demand nodes for the commodities, and the cost and market share by modes of the overall transportation system. National data sets do provide very broad information as to state flows, with some implied and assigned traffic destinations from various sources of data. No specific origin and destination as to shipper and receiver is available at this time on any broad basis.

Data specific to the port area's global trade are also available, but usually only on a study-by-study basis. Industry aspects of traffic density, routing, and operational characteristics are not normally produced from the ports or transportation agencies on a real-time basis, though the ports do a successful job in trying to generate such data on a project basis. This includes air, rail, truck, and water modes in their relevant roles in the supply chain. Such data could be instrumental in evaluating congestion and chokepoints in the supply chain of global imports and exports. A time series of movements would be useful in strengthening the predictive capabilities for freight movements, especially those of truck, rail, maritime, and air cargo now being used.

Made in Washington

This relates to the many agricultural, manufacturing, and commercial products originating in the state and destined for domestic and international markets. Providing efficient and effective transportation and logistics support to these industries is an ongoing effort by state agencies. Specific modal shares, rates or prices, and services provided by the different modes are data that are not available except by industry or

commodity-by-commodity market studies, such as those provided in the SFTA research effort. These are currently available in some detail. A useful data gap to fill is the provision by origin and destination studies, by mode, and then compilation into the total industry usage and movement profile. Ongoing origin and destination studies, with specific and detailed information by commodity, might be the tool to answer this issue. Such productive information could include rail car and track capacity work, truck and truck driver capacity, barge capacity under stress, and other issues affecting the alternative modes.

Delivering Goods to You

Getting the product to the consumer reflects the need to understand the workings of the local distribution system, bringing quality of life service to local consumers and citizens. The data needs for this effort have been detailed above. Routing of vehicles, timing of delivery and pick up, value of products, time sensitivity of products, and density of traffic all affect the models and transportation plans used at the city and regional levels.

Data Gaps by Mode

The traditional approach to evaluating transportation performance measures has been developing information and undertaking analyses by transportation modes. The focus now, at the state level and at the federal level, is on the supply chain itself, determining performance of the overall transportation system as businesses make choices among modes. Much of the discussion above has approached the gaps in freight data needs in that fashion.

All of the data gaps identified above dealing with the origin, destination, shipper, receiver, intermodal nodes, weight, value, commodity, etc., are all applicable to each of the modes. The data sources for the differing modes do vary somewhat in data detail and completeness, as indicated in the earlier discussion. Air suffers the most as far as route, weight, volume, etc., while rail analysis needs more information on origin and

destination to be made available in the public venue. Statewide origin and destination surveys have provided broad coverage for truck movements, but local retail and wholesale distribution by truck is a conspicuously missing data set. Water or barge transportation, due to the Army Corps of Engineers' work, has solid data sets available, but suffers from the lack of data on its connectivity, at both the origin and destination end of the supply chain.

Freight Data Framework Approach

A massive amount of data is collected and available from a variety of sources (state, local, and national). But, these data are not complementary to each other in all cases, and are often not available in the format or time period that is required for different freight organizations and planning agencies throughout the state, or are unknown to those individuals seeking specific freight information. In some cases specific types of information and data are available (as indicated by the review of data sources provided in this report) that may address many freight policy, planning, or project needs. In other cases there are specific types of data that do not exist or are not at a fine enough level of detail (geographic or industry specific) and must therefore be generated in the future. Some approaches or considerations towards developing freight data as a strength, and freight data as a leadership position for the state DOTs arise from the work done for this report.

Institutional Justification

The primary overriding force for this freight data framework is improved program policy and planning, freight system modeling, project analysis, and institutional coordination. Increasingly, state governments and agencies are required to provide performance measures for state projects and prioritize investments, which are competing for limited resources. By improving the accuracy, accessibility, and availability of current freight data, measurable performance standards may be established and evaluated to help

prioritize freight infrastructure investments. Additionally, by developing a coordinated freight data inventory and collection effort, improved budget efficiency may be achieved as freight data collection efforts no longer are conducted in a random, informal fashion. As stewards of the state transportation system, any subsequent improvement in system efficiency and productivity also improves taxpayer confidence in efficient investments.

Institutional Governance

It appears that, especially for the state of Washington, the current data being generated in the state are being generated quite efficiently. That still means that these data need to be supplemented and enhanced where data gaps exist and efforts made to improve coordination among data series. This requires a multi-phased effort and data framework strategy that is a seamless “coordination” of freight data, which evolves over time to address freight data needs throughout the state and region.

The recommended overall freight data framework is presented in Figure 4 below, where a new Freight Data Librarian/Educator leads the overall effort and is supported by a Database Manager. Collectively this group will maintain existing data sources (local, state, and national) and also coordinate future freight data collection efforts. The Database Manager will provide technical database management support while the Librarian will interact with state freight clientele (to develop freight data partnerships) and policymakers at the state and national level. Freight transportation research efforts at area universities will also interact with the framework, especially to the extent new data is generated. The following phases offer a freight data framework approach that would vastly improve freight data accessibility and build knowledge within the region, state, and nation for a variety of policy, planning, and project uses across agencies.

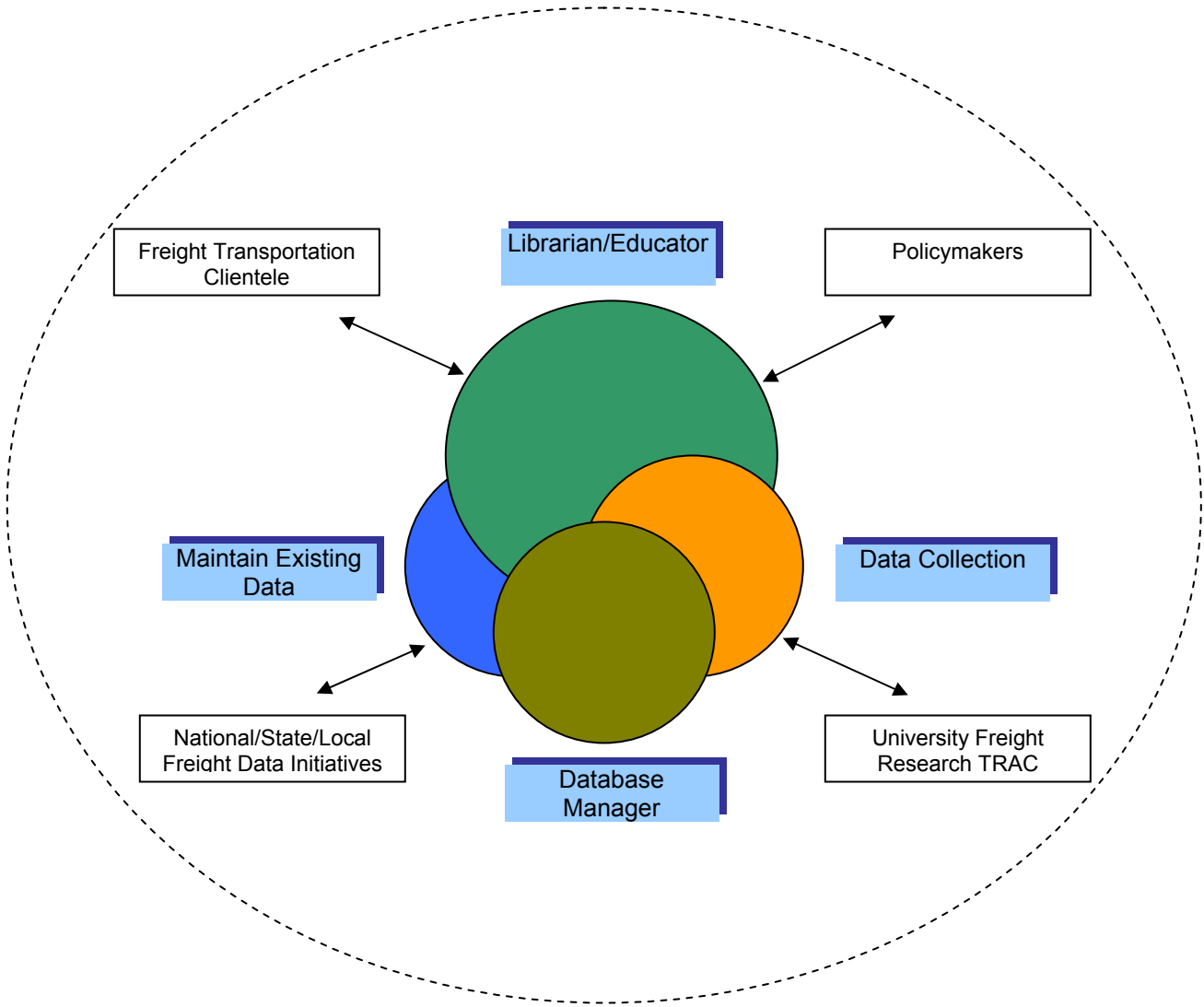


Figure 4: Washington State Freight Data Framework*

*The horizontal blue text boxes indicate the recommended activities and the vertical blue text boxes show recommended personnel additions. The upper white text boxes identify the clientele and the lower white text boxes present the data sources. The circles indicate the extent of interaction of the different actors and activities.

Phase I: Identification of Data Gaps, Needs, and Uses

This phase has been initially addressed in this research report, but is included in the freight data framework due to the dynamic nature of business, freight movements, and

technology. As governments and businesses evolve and access to different data collection technologies become available at declining costs, the resulting freight data gaps and needs will likewise change. Therefore, a periodic inventory of available freight data relative to identified freight data needs should be performed throughout the state and region. This process may be incorporated into the expected activities proposed within the freight data framework presented below.

Summary of key freight data needs or gaps:

- Greater geographic coverage and specific detail in urban and metro areas for origin/destination data, by commodity and industry sector.
- Reliable truck counts on county and local roads and highways, especially for small delivery-type vehicles currently not captured in industry studies.
- Information on a freight performance system for urban, metro, and local roads and ability to predict growth into the future.
- Data on specific industry's freight performance measures and how project or corridor changes impact freight performance efficiency (cost/benefit).
- Improved data, method, technology, and criteria for identifying and ranking freight corridors throughout the state.
- Comprehensive origin-destination traffic flow on a statewide, commodity specific, and vehicle classification basis.

Phase II: Librarian/Educator, Resource to Manage Freight Data Warehouse

Much freight information and many data sources currently exist in a variety of geographic detail, at a multitude of agencies, and in a variety of formats. Many of these data streams have evolved over time to address different agency needs. Repeating this information within a state freight data warehouse is neither efficient nor viable.

However, obtaining access to this information on a continual basis is both critical and viable with the creation of professional expertise to serve as a conduit between state and regional freight data needs and those existing local, state, federal, public, and private data. This librarian position would serve a valuable role within the region by providing freight data knowledge and continuity to area constituents, including local and

state transportation officials and policy planners, by keeping apprised of all existing and potential freight data sources and evolving freight data collection efforts at both the state and national level. This individual would not just be a “data source” for the state, but must also reach out to all agencies and businesses requiring or holding transportation flow and operational data, and would also participate as freight data needs arise and are discussed at the policy level, planning and program needs and specific project levels. The duties of this dedicated resource would be similar to that of a librarian or educator for the state and region where freight data users throughout the area go to access needed information and data, and whose responsibility it is to be actively involved with freight data collection processes, data needs, and research efforts. This resource would also serve as the facilitator for the many needs, sources, and activities related to data in the State. The primary duties of this position include:

- Freight data knowledge at the state and national level, of the many freight data sources, organizations, and emerging data collection efforts.
- Organize and document currently available public freight data and provide access via directory of Web links with summary information regarding data attribute detail. This information would be maintained and updated on a continuous basis.
- Archive freight data streams and merge with other data sources as necessary or applicable.
- Disseminate the compiled data sources throughout the state and region.
- Coordinate with the design and development of area freight data collection efforts to address known gaps and freight data needs.

Phase III: Freight Database Manager, Technical Resource

Providing technical and database management support, the Freight Database Manager will design, develop, and maintain the freight data warehouse for information that is determined to be housed internally within the freight data framework. This may include a variety of data currently being stored at academic institutions or at local agencies as part of creating a freight data repository that is updated and maintained into the future. This position would require additional technical resources in data management, data

synthesis, and data mining to service all freight data clientele. The skill-set of this resource should be technically advanced and proficient with relational database design, development, and implementation for large-scale data warehouses. Additionally, this resource will be required to interact with the strategic planning component and provide support for the librarian or educator.

Phase IV: Dedicated Funds for Operations or Data Development (Long-Term Strategic Planning)

A significant component of the proposed freight data framework is the ability to address current freight data gaps and needs as they arise and, in a systematic, coordinated fashion, to maximize data collection efficiency and accuracy. Therefore, the fourth phase of this proposal is to dedicate resources to design, develop, and implement freight data collection efforts to address those deficiencies outlined above. These may include many technologies and collection approaches to satisfy the freight data details and attributes necessary for future policy, planning, and project needs.

A continuing component of this effort will involve developing relationships with the private or quasi-public firms in order to learn their desired transportation system performance and needs, and earn the confidence of these decision makers. This high level understanding between the business community and the public service providers will allow data to be generated on the ground in a private-public relationship, with a win-win outcome. These activities to fill the identified data gaps will range from individual studies, often very local in nature, to statewide efforts to understand and document the flows on the modes resulting from and affecting business decisions.

Data Generation Possibilities

Developing new data conduits can be done in several ways, and has been accomplished to varying degrees of success in many studies. Remembering that the needs for most data involve a dynamic ongoing information flow, studies can be done

by private carrier surveys. These provide intimate data on individual trips, which, when summed carefully together, provide the desired routing, configuration, commodity, origin, destination, etc. These have been used very successfully in the state of Washington and the state is considered the leader in this effort.

The second common source is distributor surveys where private and public generators of traffic are queried as to pattern of vehicle or vessel usage, timing, commodity, routing, etc. Shipper surveys strive to identify the universe of shipments, usually from an industry of interest, providing data on value, volume, ton-miles, modal choice, rates, and other variables of interest to the researcher or policymaker. A commonly used survey source is that of the receivers, who, in many commodity movements, are the ultimate decision makers as to modal choice and routing. Major importers, retail, wholesale, and distribution centers are often reached in this survey.

It is evident throughout this review and report that origin and destination studies of carriers, shippers, or receivers, are an ongoing need in the state. Both statewide and local distribution movements suffer the most from data gaps. Updating the statewide survey with a carrier survey appears to be the most manageable and productive. A survey every three to five years would provide current data that reflect the dynamics of the transportation system serving the shippers and carriers of the state. This could be supplemented by similar surveys, done on a rolling basis (one survey done every year or so) at the local distribution level, so that every five years every area would be covered. These surveys would be refined on focused corridors on an “as needed” basis within that time period. The alternative tools to generate these data might be combined in a package, using information from shippers and receivers to determine traffic flow and operating characteristics of these local businesses.

Another alternative is freight informatics, which is being undertaken at various levels in the State and could be used in the future for the two origin-destination studies mentioned above. This approach is the use of Intelligent Transportation System (ITS)

with all of its sensors, transponders, and other monitoring devices that can help provide real time information to fill the identified data gaps.

These new technologies will require two specific investments. The technologies are expensive and they require the agreement of the carrier, shipper, or other agent in the supply chain that handles the container or product. The financial investment by carriers is currently being forced in some movements by the issue of national or homeland security, but not on a global basis. The second component, the willingness of the private operator or business to accept or even fund these technologies, will have to be agreed to by the business or mandated by the appropriate authorities.

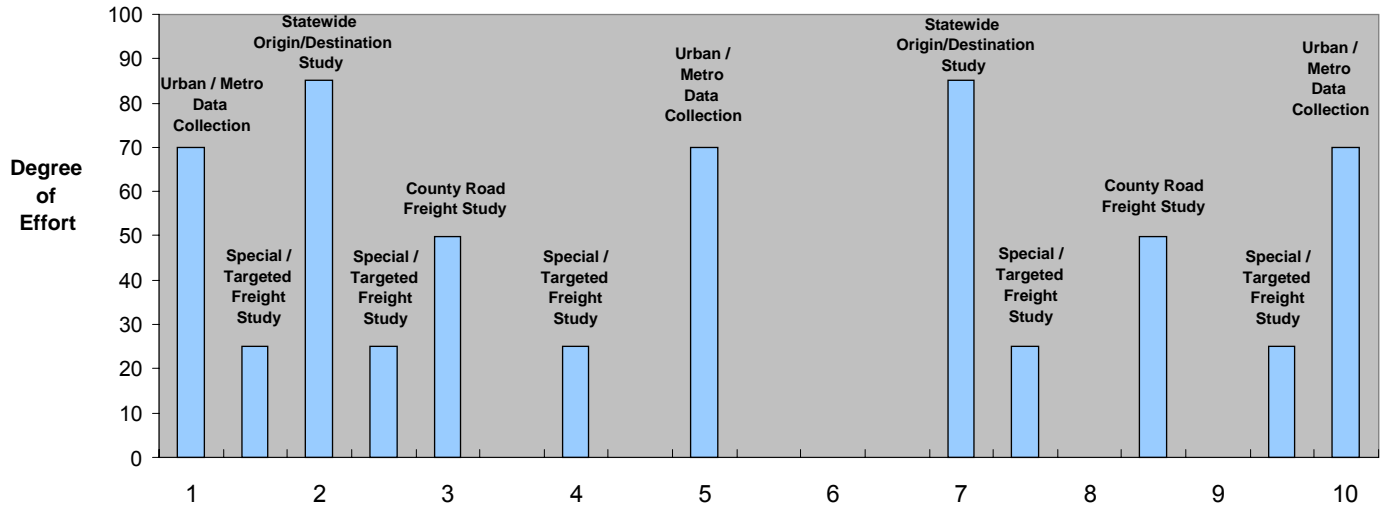
Data Generation Timeline

The data collection efforts may be sequenced into the future so that data gaps or needs are addressed on a continued basis and allowed to capture the dynamic changes which occur. This timeline is presented below in Figure 5, where four separate types of efforts are implemented on a revolving basis, as needs require and budget resources allow.

Given the existing freight data gap on urban freight movements, the initial effort in the first year is a data collection effort within the Puget Sound area to map freight movements, similar to the effort completed in Portland, Oregon with the Port of Portland and Portland Metro. This information could be complemented with targeted or special data collection efforts for specific geographic locations or business activities as guided by the legislature or the WSDOT Freight Systems Division. These types of targeted studies would be conducted as needed throughout the next several years. An example of these types of studies are those currently being led by the WSDOT Freight Systems Division related to predicting truck traffic on state highways into the future for specific industries (forest products, agricultural products, warehousing, etc.). On a 5-year rotation, it is recommended that a statewide data collection effort is undertaken, similar to those conducted under EWITS and SFTA at Washington State University in 1994 and

2003, respectively, using the improved technologies available over time. Additionally, freight data collection on county roads is also recommended every five years.

Figure 5: Proposed WSDOT Data Collection Efforts Timeline



This effort to achieve the agreement of private businesses would again be the role of the new “coordinator” of freight data for the state of Washington. If this institutional structure is combined with the new technologies, and the funding to support both the technology applications and the new position(s) made available, the state of Washington will have the ability to fill data gaps while leading other states in freight data provision.

Summary and Conclusions

Existing freight data were found to vary in its completeness and coverage. A framework for better freight data generation for the state of Washington has been developed.

Significant challenges to policymakers and transportation planners are caused by the lack of data on freight movements, potentially leading to inefficient freight transportation systems. This research project for the Washington State Department of Transportation (WSDOT) signifies a positive movement by WSDOT to address these data limits and to develop a freight data framework and organizational structure to address these problems, allowing Washington to serve as a leader in the nation in this critical area.

As part of this initial effort, an exhaustive inventory of available freight data sources is listed and documented. This current information is concentrated, characterized, and presented in five tables that will be available on WSDOT's Web site.

A survey of other state departments of transportation freight data usage and needs throughout the U.S., summarized by policy, planning, and project specific applications and the freight data limitations, provides national perspectives. A consistent theme of limited information on freight congestion, time delay, and volume-related performance information by highway type and mode was evident. Also, the difficulty in accessing data on emerging alternative fuels was prevalent as well, along with the problems of short-line rail abandonment and obtaining information on local rail freight movements.

The Washington State in-state freight data users and needs, investigated with one freight data discussion group meetings held on the west side and one on the east side of the state, identified current freight data uses by area agencies and freight clientele and captured the needs and gaps facing these freight constituents. It is evident that a wide array of information is used by these agencies throughout the state, with some common freight data challenges expressed by most participants. The detailed responses for each organization for both freight data uses and needs are presented in Appendix A.

Finally, a summary of the freight data gaps, tools, and approaches to addressing these gaps is offered. This information is categorized and presented from several different dimensions, including geographical (international, national, and state), type of need (global movements, made in Washington and getting the product to the consumer), and by mode. This data evaluation lead to the development of the proposed freight data framework for the state of Washington, and a process over time where these freight data needs and gaps are addressed into the future. When implemented, this proposed freight data framework could serve as a model to other Departments of Transportation throughout the U.S.

APPENDIX A

Table A.1: Western Washington Freight Data Discussion, Current Data Uses / Sources

Agency	Data Sources Utilized	Primary Use		
		Policy	Program/Planning	Project Level
I. Port of Portland	1. Portland-Vancouver Commodity Flow Forecast (41 Commodity Categories, by mode, projected into future, done every five years.	X	X	X
	2. BTS Commodity Flow Forecast (US) (State to State): not useful as information broken at state line.	X	X	X
	3. Regional Trade Capacity Study. Was done once last year, may continue; analyzes future capability, land use planning.	X	X	X
	4. Regional Freight Data Collection Project: truck surveys at weigh stations and ports of entry, warehouse survey. Purpose to improve metro's truck model, truck counts.			
II. Port of Tacoma Dave Slade, POT ITS lead Data purpose: - Support expansion plans - Eliminate bottlenecks	1. PIERS Data. Covers: container tonnage TEUs for west coast, auto for U.S., break-bulk, not grain, has 6- week lag time, includes full containers and partially full; done annually since 1993.	X	X	X
	2. Washington Public Ports Assoc. Rail Capacity Study	X	X	X
	3. Washington State Transportation Commission Rail Capacity Study	X	X	X
	4. Comparative Port Studies on Truck and Road Traffic: surveyed what six other ports did.	X	X	X
	5. Comparative Port Studies on Rail Capacity and Rail Movements: surveyed four other ports.	X	X	X
	6. Portland Metro Data	X	X	X

Table A.1: Western Washington Freight Data Discussion, Current Data Uses / Sources

Agency	Data Sources Utilized	Primary Use		
		Policy	Program/Planning	Project Level
	7. Regional Freight Data Collection Project (Port of Tacoma Specific): Heffron study. 8. PSU Portal Data (AEI, Customs, goal was triangulation using data from readers on port grounds; Business Exchange System) 9. Parametrix: one time study. 10. Regional Transportation Council = RAMP uses their data 11. Port of Portland 12. BNSF Web site 'Business Exchange System': real time info on number of trains/port.	X X X X X X	X X X X X X	X X X X X X
III. SDOT	1. FGTS 2. Individual truck counts 3. Alaskan Way Viaduct (WSDOT)	X	X	X
IV. Whatcom COG IMTC Data purpose: <ul style="list-style-type: none"> Improve functions of ports of entry 	1. U.S. & Canadian customs: truck counts bi-directional flow. 2. Rail Study by IMTC: infrastructure investments, BTS, Reebie; 2003 modeshift opportunities. 3. Short Sea Shipping Study (Trans-ship, SFTA, tonnage flows, used TransSearch data). 2006 modeshift opportunities. 4. Commercial Vehicle Intercept Study (at ports of entry, border). 1999/2000 5. Sampled U.S. Customs manifests (drivers, carriers, companies). Origin-destination commodity (as part of FAST border). 6. Canadian National Roadside Survey/CCMTA, border component, NRS commodity O-D, sampled one	X X X X X	X X X X X X	X X X X X

Table A.1: Western Washington Freight Data Discussion, Current Data Uses / Sources

Agency	Data Sources Utilized	Primary Use		
		Policy	Program/Planning	Project Level
	week/year in 1999 & 2006 7. Truck Processing Study studied queuing at border: IMTC, Western Wash./BPRI, Transport Canada			
V. Port of Seattle <ul style="list-style-type: none"> Focused on area within the harbor 	1. Duwamish Access Study: truck intercept. Feeds Heffron model used for POS Container Terminal Access Study, Duwamish ITS System, 1998. 2. PSRC Truck Model 3. WPPA Rail Study 4. Container Cargo Forecast Study 5. EModal tracking RFID on every container.		X X X X	X X X X
VI. FMSIB (Partnering with different agencies, freight mobility and investments) Data purpose: Build freight projects and measure project investment outcomes	Note: local cargo movements vary a lot based on day of week, time of day, season. 1. Rely on many sources for data. 2. Marine Exchange (counts all vessels, including cruise ships, coming and going at ports). 3. SAIC Study, FHWA (should be complete and published). Tested process to count trucks by GPS, video, chasing trucks, loops via FHWA grant; used volunteer truck carriers with transponders. Private Trucking Companies Data Collection, Effort (\$300,000). 4. Proposal in 2007 legislative budget to buy Nextel data to monitor truck performance.	X X X	X X X	X X X

Table A.1: Western Washington Freight Data Discussion, Current Data Uses / Sources

Agency	Data Sources Utilized	Primary Use		
		Policy	Program/Planning	Project Level
VII. PSRC Data purpose: Regional projections, forecasting	1. Truck Model (projects truck trips into TAZs which are geographic areas, built on employment security data, NAICS codes, primarily long-range planning, validated from WSDOT truck counts, updated every three years) Weakness: When actual truck trips don't match NAICS code, for example the air cargo industry at Sea-Tac.	X	X 30-year planning	X <u>Many other agencies use it</u> for projects; the four counties' agencies have agreed to use it as standard base model for forecasting.
VIII. WSDOT	<ul style="list-style-type: none"> • One-on-one interviews with high volume shippers and carriers • CTED import/export data for Washington State • WSDOT Transportation Data Office for truck counts on highways • WSDOT and local agency project information, when available, for high priority freight projects • Ports and local jurisdictions for any available counts (volume, growth projections, multimodal) and information on freight transportation system performance and needs • SFTA survey information and commodity reports • WA Department of Revenue for value of freight shipments • Agency/division sponsored freight customer survey research, location counts, and supply chain analysis • State/national industry organizations (Dept of Agriculture, Potato Commission, etc.) for published commodity and industry research/ data 	X	X X X X X X X	X X X X X

Table A.1: Western Washington Freight Data Discussion, Current Data Uses / Sources

Agency	Data Sources Utilized	Primary Use		
		Policy	Program/Planning	Project Level
	<ul style="list-style-type: none"> BTS and national data sources for port, border volumes, and international trade data OFM for current and predictive trends (population, industry employment, trade) – state and regional level 	X	X	X
			X	

Table A.2: Western Washington Freight Data Discussion, Current Data Needs

Agency	Primary Data Needs		
	Policy	Program/Planning	Project
I. Port of Portland	<ul style="list-style-type: none"> • Take a broader perspective (related to freight movements in the region) because we don't want to create bottlenecks elsewhere. Going after federal research dollars and projects may be better if we join as a region. • Partnership with Metro is how they generate their own data on freight movements. 		
II. Port of Tacoma	<ul style="list-style-type: none"> • Regulatory requirements on emissions. • Congestion modeling. • The ports have completed many capacity/growth studies...no need to reinvent the wheel. 		
III. SDOT	<ul style="list-style-type: none"> • Daily truck volumes and percentage of daily traffic. • AM and PM peak period volumes and percentage of peak period traffic. • Time of day truck volume variations. • Truck classification counts on selected routes to determine the mix of respective truck classifications. • Commercial vehicle volumes (these are vehicles used for commercial purposes) as compared to truck volumes. • Economic data: <ul style="list-style-type: none"> ○ Commodity flow ○ Cargo value • Oversize/over dimensional vehicle trip demand. • Breakdown of traffic by FHWA truck classification and measured axle weights by classification. • Load zone availability and use. • Vehicles that may be exceed the legal axle load. • Truck travel time studies. • Change in number of trucks and drivers to mitigate the negative impacts of growing congestion. • Intermodal yard rail and truck volumes. • Local rail service (to industrial properties) frequencies. • Number of truck trips generated by the Port of Seattle, travel routes, time of day characteristics. • Current truck counts on state highway system with origin-destination, higher quality data. • Air cargo: truck. 		

Table A.2: Western Washington Freight Data Discussion, Current Data Needs

Agency	Primary Data Needs		
	Policy	Program/Planning	Project
IV. WSDOT	<ul style="list-style-type: none"> • Reliable and more comprehensive truck counts. Currently not available for small trucks serving local distribution, not available on all highway segments, usually not available on local roads. • Information on urban freight system – delivering goods (O-D and flow information, predictive trends, volumes, performance measures that matter to system, current performance and primary constraints). • Current and predictive information by industry segment to understand current system and future transportation needs, trends, and impacts. • Freight performance measures that matter to customers: manufacturing, agribusiness, construction, timber/wood products, wholesale and retail distribution sectors, and trucking, rail, barge, air cargo, freight integrators, and logistics sectors. • Multimodal, project, and policy level benefit – cost analysis and economic impact data. • By industry segment, complete supply chain audit to determine primary problem in the transportation system for customer (i.e., travel time, cost, and unpredictable delay). • More comprehensive freight – related air quality information by source and benefit cost analysis of strategies. • Criteria for determining priority freight corridors for corridor analysis and project design. • For project and corridor analysis: freight customer information for corridor, customer performance needs, growth projections, etc. • List and ranking of primary truck bottlenecks and design constraints. • Design options to meet truck performance needs on priority freight corridors. 		
V. Port of Seattle	<ul style="list-style-type: none"> • What are we going to do with the information (let that determine what we collect, organize, compile, model, etc.). • Use this information to convey the message that freight drives the economy and our current existing infrastructure needs to be maintained, improved, expanded, etc. • The political component is the message related to the loss in economic productivity if we don't invest in infrastructure. • Given expected growth in freight traffic, what are the impacts? • Need to explain this to specific constituencies. • Focus on the retailing and drayage firms (top 10, 90/10 rule). • Export companies. • Air Cargo truck movements are a big component for regional movements. 		

Table A.2: Western Washington Freight Data Discussion, Current Data Needs

Agency	Primary Data Needs		
	Policy	Program/Planning	Project
VI. Port of Vancouver	<ul style="list-style-type: none"> • Need better information on truck counts, O-D info on specific corridors, highways, commodities. They are currently getting small pieces of the picture from different agencies. • As technology improves, and tolling becomes prevalent, can't we use these technologies to build databases — perhaps things that are already underway (Port of Tacoma is also doing this). • Get the info and data on the Portland State University (PSU) Web site related to I-5 freight movements (volume and velocity). 		
VII. Whatcom Co.	<ul style="list-style-type: none"> • Better partnerships with the private companies (strategic partnerships) related to backhaul opportunities, empties, etc. • Need yearly tonnage information by mode. • Itemize performance objectives. • How to encourage the private sector in relation to information and movements. 		
VIII. Northwest Container	<ul style="list-style-type: none"> • Do not use much state or local information, because they work directly with the private businesses. 		
What do we need?	<ul style="list-style-type: none"> • Location of shippers, O-D, routes, commodities, types of vehicles, time of day, business type. 		

Table A.3: Eastern Washington Freight Data Discussion, Current Data Uses and Sources

Agency	Data Sources Used	Primary Use		
		Policy	Program/Planning	Project
I. Benton-Franklin County RTPO	1. EWITS/SFTA 2. Washington Transportation Plan 3. WSDOT Annual Traffic Report/Counts 4. FGTS Data 5. Major Employer Report 6. FHWA Reports: Freight Facts and Figures 7. Marine Cargo Forecast 8. Local Collection of Port and Airport Freight Movements	X X X X X X X	X X X X X X X	X X X X
II. Washington State Potato Commission	1. Funding private study to collect information on potato movements (fresh/processed) (goal is to conduct every two years). 2. Production information from NASS.	X X	X X	
III. Port of Seattle (Eastern WA)	1. PIERS 2. Relationship with large port/container customers (Anderson Hay) to help understand demand for port traffic heading through the Port. 3. Comparative Price Analysis (Quincy/Tri-Cities) on request.	X X X	X X X	

Table A.3: Eastern Washington Freight Data Discussion, Current Data Uses and Sources

Agency	Data Sources Used	Primary Use		
		Policy	Program/Planning	Project
IV. Palouse RTPO/EDC (Whitman, Asotin, Garfield, Columbia Counties)	1. Currently funding study to capture and collect freight information from shippers and freight movers (every three to five years).		X	X
	2. Currently funding study to identify how roads are designated all-weather roads (road standards for county roads specifically).		X	X
	3. Compile information from county engineers regarding large firms or companies that may be shipping freight (collection of grain elevator and storage locations, 1994).	X		X
	4. WSDOT Video of Pavement Conditions.	X	X	
V. CTED (Eastern WA)	1. Port of Seattle (H. Granger)			X
	2. EWITS/SFTA			X
	3. Information Dissemination/Broker is primary role.			X
VI. North Central RTPO/MPO	1. State Road Traffic Counts			X
	2. North Central RPTO Study on Canadian/Washington Freight Movements (Wood/Natural Resource Products) regarding where and when products are moved.			X

Table A.3: Eastern Washington Freight Data Discussion, Current Data Uses and Sources

Agency	Data Sources Used	Primary Use		
		Policy	Program/Planning	Project
VII. Kootenai/Spokane MPO/RTPO	<ol style="list-style-type: none"> 1. In-house survey to collect information related to travel demand model. 2. Inland Pacific Hub Analysis (Legislative Request, ID, WA and DC). Anticipation of current freight infrastructure and future freight traffic (Avista Project). 3. Road Standards Study for these counties as well. 	X X	X X	X X
VIII. Yakima Council of Governments and Spokane	<ol style="list-style-type: none"> 1. Did their own O-D study several years ago. 	X	X	
IX. Other EDC folks collect information on targeted business/economic opportunities.	<ol style="list-style-type: none"> 1. Comprehensive Economic Development Strategy (CEDS) Compile narrative information related to emerging economic development districts and how the business landscape is changing in each region. Each EDA conducts this each year (mostly internally developed). 	X	X	
X. WSDOT Freight Systems Division	Currently conducts surveys at area meetings throughout each region.	X	X	X

Table A.4: Eastern Washington Freight Data Discussion, Current Data Needs

Agency	Primary Data Needs
I. Benton-Franklin County RTPO	<ul style="list-style-type: none"> • Detailed information, up to date, conducted consistently and frequently on county road shipments, commodities, volumes, and counts and collected in comparable time periods. • Information on rail abandonment. Identification of shippers on the line, what they haul, when they haul, and what would happen if these lines were abandoned. Currently do this about every ten years. • Information related to importance of the dams to freight and economic activity to the region and beyond. • Has there been any research conducted on designated truck lanes on I-5 in order to relieve congestion and improve freight efficiency?
II. Washington State Potato Commission	<ul style="list-style-type: none"> • Better information related to projections on different freight modes, infrastructure, freight system efficiency relative to the needs of the folks in the potato industry. What are the state/feds prioritizing. • What are the state/fed priorities on different modes, infrastructure, relationships/partnerships with other states. • How did policy lead to the current concentration of two stadiums, an international port, downtown business and how does policy change this?
III. Kootenai/Spokane MPO/RTPO	<ul style="list-style-type: none"> • Accurate employment data is very difficult to obtain from the Dept. of Revenue. This data is used for building traffic demand models.
IV. Port of Seattle	<ul style="list-style-type: none"> • At what point in time will the Ports tell WSDOT they are tired of seeing these trucks on the road? • Is it WSDOT's responsibility to shape or guide this policy to move freight onto other (rail/water) modes to relieve congestion in the Seattle/Port Urban area?
V. Palouse Economic Development Council	<ul style="list-style-type: none"> • In addition to truck freight movements, we need information on all modes of freight movements (rail, water, port, and airport). • Could use better access to rail information relative to short-line regulation. Could the state use this contractual relationship to collect information related to each operator's freight movements. • How do we collect or access information related to factors outside our state borders that have dramatic consequences to freight activity within the state?

Table A.4: Eastern Washington Freight Data Discussion, Current Data Needs

Agency	Primary Data Needs
VI. North Central RTPO	<ul style="list-style-type: none"> • Truck count numbers, commodities, vehicle configurations on a more consistent basis and more frequent. • Rail data and analysis for short-line movements and abandonment impacts for freight currently moving on those corridors. • Better coordination related to truck weigh stations, rest stops, fuel stations (predicting truck traffic patterns to do a better job of planning infrastructure investments). • Intersection of truck passing lanes on hills since private trucking has trucks that are more powerful and perhaps don't need passing lanes. • How does truck safety and inspection impact. • Will BNSF get double stack containers moving through Stampede Pass and how will this change the freight picture?
VII. WSDOT	<ul style="list-style-type: none"> • Need to include the economic realities of each regional economy relative to the freight characteristics within and across each region. • Many of the cities and counties have data, perhaps the Association of Cities and Counties should develop a standardize process for collection/compiling data on a regular frequency.