



Trade and Logistics Report:



Research Analysis

February 2016



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I. Background and Scope

Background

The Port of Portland has a long history of containerized shipping service from major international operators. Since 1974, the Port of Portland's Terminal 6 (T-6) has moved containerized cargo to and from world markets. In 2014, Portland Terminal 6 captured about 43% of the Portland Region containerized cargo marketⁱ and 53% of the Oregon containerized market (exports and imports). The remaining cargo moved by rail or truck through Puget Sound and Oakland ports. Eighty percent of Portland's container business was with key markets in China, Japan, and Korea. In recent years, there have been three container shipping lines calling at Portland: weekly Hanjin service to/from Asia, weekly Hapag-Lloyd service to/from Europe, and monthly Westwood service to Asia. Hanjin and Hapag-Lloyd discontinued their weekly Portland vessel calls in early 2015 with little advance notice, leaving Westwood calls as the only direct Portland container service.

With the withdrawal of these services, Oregon importers and exporters that had been using the Hanjin and Hapag-Lloyd services had to scramble to find alternatives. In most cases, the alternatives were to use the same or comparable carrier services at the Ports of Tacoma or Seattle, at the additional cost of truck or rail transportation to the Puget Sound ports. The long-standing Tidewater Barge container service on the Columbia-Snake river system no longer had an ocean-going connection at Portland, and customers that had relied on the barge option likewise had to truck containers to and from Puget Sound.

The timing was highly adverse to the interests of Oregon shippers because the Portland service withdrawals coincided with serious port congestion and delays at Tacoma and Seattle. These circumstances led to increased trucking costs and widespread service shortfalls. These conditions continued well into the spring of 2015.

Containerized trade is a large and vital part of the Oregon economy, linked to the health of agricultural, forestry, manufacturing, and distribution sectors. Efficient trade movement has a few basic elements:

- Capacity – the physical capability for facilities and vehicles to move goods where and when needed. Capacity is often taken for granted, but inefficiency and delay can reduce the ability of carriers to meet customer requirements.
- Service – different containerized commodities have differing needs for speed, frequency, special handling, etc.
- Reliability – modern supply chains operate with a minimum of inventory, so shipments must arrive and depart on schedule.
- Cost – shippers are always seeking to minimize transportation cost, especially exporters of highly price-sensitive agricultural commodities and forest products.

ⁱ Oregon, Idaho and Washington

The loss of direct weekly Portland vessel calls had the potential to impact the capacity, service, reliability, and cost factors faced by Oregon shippers, particularly the small- and medium-sized enterprises (SMEs) at greatest risk. Oregon shippers, the Port of Portland, and the State of Oregon are faced with two basic issues:

- What are the short-term and long-term impacts on Oregon shippers and Oregon trade?
- What can be done to assist Oregon shippers in coping with the near-term impacts, and to attract and retain new Portland vessel calls?

While the Port of Portland works to secure regular container service at T-6, it is important to the health of Oregon's economy for the State to work with SME shippers to identify interim logistics solutions, inventory specific local infrastructure challenges that may detract from Oregon's long term competitiveness, and build a foundation of knowledge and relationships between the State and SMEs to support Oregon's global trade resilience in the face of future challenges.

Scope

In April 2015, Oregon Governor Kate Brown initiated an International Trade and Logistics Initiative (T&L) – led by Business Oregon, Oregon Department of Agriculture, Oregon Department of Transportation, and the Port of Portland – to address the immediate needs of Oregon small- and medium-sized exporters and importers (SME shippers) impacted by the departure of transpacific container service at the Port of Portland, and the need to develop a sustainable strategy to support the ability of Oregon shippers to stay competitive in the global marketplace.

This project is Phase 1 of a three tiered strategy intended to ensure that SMEs stay competitive in the global marketplace, facilitate international trade in the state, and support longer term recruitment of new container service to the Port of Portland's T-6 for the benefit of all shippers. The three components of this T&L initiative include: trade research, regional shipper workshops, and freight logistics project business case development.

This research effort focused on:

- The impacts of service withdrawal on Oregon importers and exporters, with special attention to small- and medium-sized firms.
- Opportunities to assist Oregon shippers with trade and logistics solutions in the near term and prepare for new container services in the long term.

The study used trade data provided by the Port of Portland and interviews with a wide range of stakeholders to address both questions and includes the following components:

- An assessment of shipping cost impacts without direct T-6 vessel calls based on interviews.
- A description of any changes in routings or supply chain practices.

- Identification of opportunities and challenges, and recommendations for assisting affected Oregon shippers and supporting the state's overall goal of returning weekly vessel service to Portland.

II. Oregon Export and Import Markets

Overview of Methodology

The Port of Portland serves specific geographic and commodity markets in Oregon and southern Washington, with additional customers on the Columbia-Snake River system. A critical first step in the study was to document the extent and nature of the relevant export and import markets. To do so, Tioga relied heavily on 2014 Port Import-Export Reporting Service (PIERS) data from the Journal of Commerce. These data typically have shortfalls stemming from their source in U.S. Customs declarations:

- **Headquarters/paperwork bias** – records tend to show locations where transportation is arranged and managed rather than actual shipping and receiving points.
- **Third-party data loss** – shipments arranged by third parties tend to show the third party name and address rather than shipper or receiver data.
- **Incorrect data** – many records have foreign vs. domestic points shown (e.g., Madrid, OR), city-state mismatches (e.g., Portland, CA), incorrect entries (e.g., street name in city field, and variations on shipper names).
- **Missing data** – many records lack names, origin, or destination data.
- **Commodity inconsistency or generality** – commodity data varies between records or is generalized (e.g., “Misc. Manufactures” or “General merchandise”)

Customs declarations or their electronic equivalents usually give the U.S. export origin or import destination as the point at which paperwork will be processed and any fees paid. Goods may be shipped directly by the exporter or importer or through a third party such as a broker or forwarder. Third parties do not typically provide information on actual origins and destinations. These practices lead to the so-called “headquarters bias” in PIERS data – the tendency of shipment records to reflect corporate headquarters and broker office locations rather than actual production or distribution points where the cargo is handled. Exhibit 1 provides examples. Carotrans, CEVA Freight, DB Schenker, and Panalpina are well-know third parties, and the cities listed are office locations rather than actual shipping points. Ocean Beauty Seafoods is a fish processing and shipping firm in Seattle, WA so Seattle is the actual origin of the canned salmon shipments. Oceanic Container Line, on the other hand, is a shipping agency located in Staten Island, NY, and there is no indication in the records of where the “general merchandise” shown actually originated.

Exhibit 1: Sample PIERS Records

Name	City	State	HSCode	Commodity
CAROTRANS INTERNATIONAL	CONCORD	CA	120929	GRASS SEED
CEVA FREIGHT	EDISON	NJ	200410	FROZ FRENCH FRIES
CONAGRA	KENNEWICK	WA	200410	FROZEN POTATOES
DB SCHENKER	SEATTLE	WA	007985	GENERAL MERCHANDISE
OCEAN BEAUTY SEAFOODS	SEATTLE	WA	160411	CANNED SALMON
OCEANIC CONTAINER LINE	STATEN ISLAND	NY	007985	GENERAL MERCHANDISE
OEC FREIGHT COMPANIES	ROSEDALE	NY	440710	PONDEROSA PINE KILN DRIED
OREGON HAY PRODUCTS	BOARDMAN	OR	121490	TIMOTHY HORSE HAY
PANALPINA	KENT	WA	720610	STEEL INGOTS
SEA HORSE CONTAINER LINES	PORTLAND	OR	850790	BATTERY SEPARATOR

These concerns were addressed in the interviews and through additional data analysis with the goal of minimizing the effect of the PIERS headquarters bias on study findings. Tioga used a pro-ration method to allocate movements with unknown origin/destination points according to the pattern of known shipments. This process corrects for most of the headquarters bias, but again, minor inconsistencies may remain.

Data from Customs declarations also show inconsistencies in commodity description and classification. An export load of plastic battery cell separators, for example, may be described as plastics, electrical equipment, miscellaneous manufactured products, or general merchandise. Tioga adjusted descriptions where possible, but some inconsistencies inevitably remain.

The trade data provided in this report, therefore, should be interpreted as *estimates of identifiable container flows*, rather than precise figures. These data are consistent with the study goal of identifying Oregon trade patterns and impacts, and reflect the best available picture of relevant containerized trade in 2014

Oregon Containerized Commodities

The major containerized Oregon export commodities reflect major state products:

- Hay, straw, and animal feed products;
- Grass and agricultural seeds of all kinds;
- Forest products, including wood pulp, paper and cardboard, and lumber and plywood;
- Vegetables, fruits, nuts, and prepared foods and beverages; and
- Metal scrap, a “product” of regional population and industry.

The Port of Portland’s market share has been strongest in the Portland metro area, in the Willamette Valley, and along the Columbia River. Over 1,000 Oregon shippers shipped through T-6 in 2014ⁱⁱ. Every county has a stake in the movement of the international trade. T-6 is Oregon’s only international container terminal.

ⁱⁱ Port of Portland

Exhibit 2: 2014 Oregon Containerized Export Commodities

Export Commodity Group	Est. Oregon Containers	Est. T-6 Containers	Oregon Export Share	Cumulative Export Share	T-6 Share
Hay, Straw, Seeds	23,326	8,878	40%	40%	38%
Wood Pulp	5,496	4,984	9%	49%	91%
Wood Products	5,402	2,494	9%	58%	46%
Vegetables	4,283	631	7%	66%	15%
Paper & Cardboard	3,051	41	5%	71%	1%
Prepared Foodstuffs	2,643	35	5%	75%	1%
Aluminium and articles	2,462	858	4%	80%	35%
Seafood	2,069	83	4%	83%	4%
Prepared Foodstuffs	1,693	546	3%	86%	32%
Other base metals, metal scrap	1,527	508	3%	89%	33%
Plastics	1,279	601	2%	91%	47%
Iron and steel	645	108	1%	92%	17%
Copper and articles thereof	489	203	1%	93%	42%
Mineral Products	394	363	1%	93%	92%
Machinery and mechanical appliances	385	141	1%	94%	37%
Fodder, food byproducts	359	186	1%	95%	52%
All Other	3,121	1,478	5%	100%	47%
Oregon Total	58,623	22,139	100%	100%	38%

In exports (Exhibit 2), Oregon accounts for 100% of many categories, especially those such as hay, wood products, and wood pulp where transportation is a large part of total delivered cost and must be minimized. With greater transportation cost sensitivity, exporters are more likely to be impacted by the need to use Tacoma or Seattle instead of Portland. For imports, the higher cargo values often justify longer inland trips.

Import commodities (Exhibit 3) are more varied, reflecting Portland's role as an inbound gateway and distribution center for Oregon, the Pacific Northwest, and the nation. The largest categories are:

- Furniture and Bedding, a high-volume commodity group for the West Coast as a whole.
- Rubber and Plastics, including consumer goods but specifically imported tires from Korea and other Asian sources.
- A wide range of consumer and industrial goods.

Many commodity classifications show substantial volumes in both directions, yet the actual commodities may differ. In Wood Products, for example, the main exports may be plywood produced in Oregon, while the main imports are hardwood laminates from Asia.

Exhibit 3: 2014 Oregon Containerized Import Commodities

Import Commodity Group	Est. Market Containers	Est. T-6 Containers	Oregon Export Share	Cumulative Export Share	T-6 Share
Furniture; bedding	7,221	5,674	14%	14%	79%
Wood Products	6,176	2,811	12%	25%	46%
Rubber	4,138	3,724	8%	33%	90%
Articles of iron or steel	3,443	2,646	7%	40%	77%
Machinery and mechanical appliances	2,589	2,069	5%	45%	80%
Toys, games and sports	2,372	1,983	5%	49%	84%
Plastics	2,319	1,672	4%	54%	72%
Glass and glassware	2,008	1,423	4%	58%	71%
Vehicles & Transport Equip	1,901	1,641	4%	61%	86%
Machinery & Electrical	1,752	1,279	3%	65%	73%
Footware & Misc Apparel	1,640	1,058	3%	68%	64%
Paper & Cardboard	1,119	739	2%	70%	66%
Leather Products	907	591	2%	72%	65%
Hay, Straw, Seeds	836	436	2%	73%	52%
Ceramic products	753	571	1%	75%	76%
Prepared Foodstuffs	726	106	1%	76%	15%
Chemical Products	718	426	1%	77%	59%
Beverages, spirits and vinegar	677	532	1%	79%	79%
Apparel	588	523	1%	80%	89%
Miscellaneous articles of base metal	576	351	1%	81%	61%
Miscellaneous Cargo	513	430	1%	82%	84%
Iron and steel	502	372	1%	83%	74%
Other made up textile articles	433	303	1%	84%	70%
Coffee, Tea	414	414	1%	84%	100%
Animal Or Vegetable Fats And Oils	396	256	1%	85%	65%
Wood Pulp	386	183	1%	86%	47%
Optical, photographic, medical instrument	385	254	1%	87%	66%
Chemical Products	384	234	1%	87%	61%
Aluminium and articles	373	243	1%	88%	65%
Fruit & Nuts	367	262	1%	89%	71%
Tools, implements	350	269	1%	89%	77%
Miscellaneous Manufactured Articles	338	177	1%	90%	52%
Articles of stone, plaster, cement	320	193	1%	91%	60%
Prepared Foodstuffs	282	263	1%	91%	93%
Soaps, waxes	269	244	1%	92%	91%
Fertilizers	259	27	0%	92%	10%
Prepared Foodstuffs	253	144	0%	93%	57%
Rail Vehicles & Transport Equip	249	174	0%	93%	70%
Seafood	231	11	0%	94%	5%
Textiles	225	120	0%	94%	54%
Manufactures of straw	224	151	0%	94%	67%
Headgear and parts thereof	213	63	0%	95%	29%
All Other	2,741	1,892	5%	100%	69%
Oregon Total	52,567	36,934	100%	100%	70%

Oregon County Market Analysis

For the county market analysis, Tioga took multiple steps to adjust inconsistent PIERS commodity descriptions, locate actual shipping points where known, and allocate trade with unknown shipping points according to the known geographic pattern.

Exports

Exhibit 4 shows 2014 containerized Oregon exports, grouped into major market areas. About 89% of the Oregon containerized exports through the Port of Portland's T-6 came from Portland and the Willamette Valley, with the reminder from Central, Eastern, and Southern Oregon. The Port

of Portland's market share of containerized exports was 38% overall, and highest in the Middle Willamette market.

Exhibit 4: 2014 Oregon Export Containers by Market Area

Market	T-6 Exports	Other Port Exports	Total Exports	Share of T-6 Exports	T-6 Market Share
Portland - North Willamette	4,294	9,763	14,057	19%	31%
Middle Willamette	15,502	13,803	29,305	70%	53%
Southern Oregon	338	832	1,170	2%	29%
Central Oregon	1,573	11,113	12,686	7%	12%
Eastern Oregon	431	973	1,404	2%	31%
Oregon Total	22,139	36,484	58,623	100%	38%

Exhibit 5 shows total and Port of Portland container counts and shares for exports by Oregon county. The export sources are dispersed in agricultural and forest production areas.

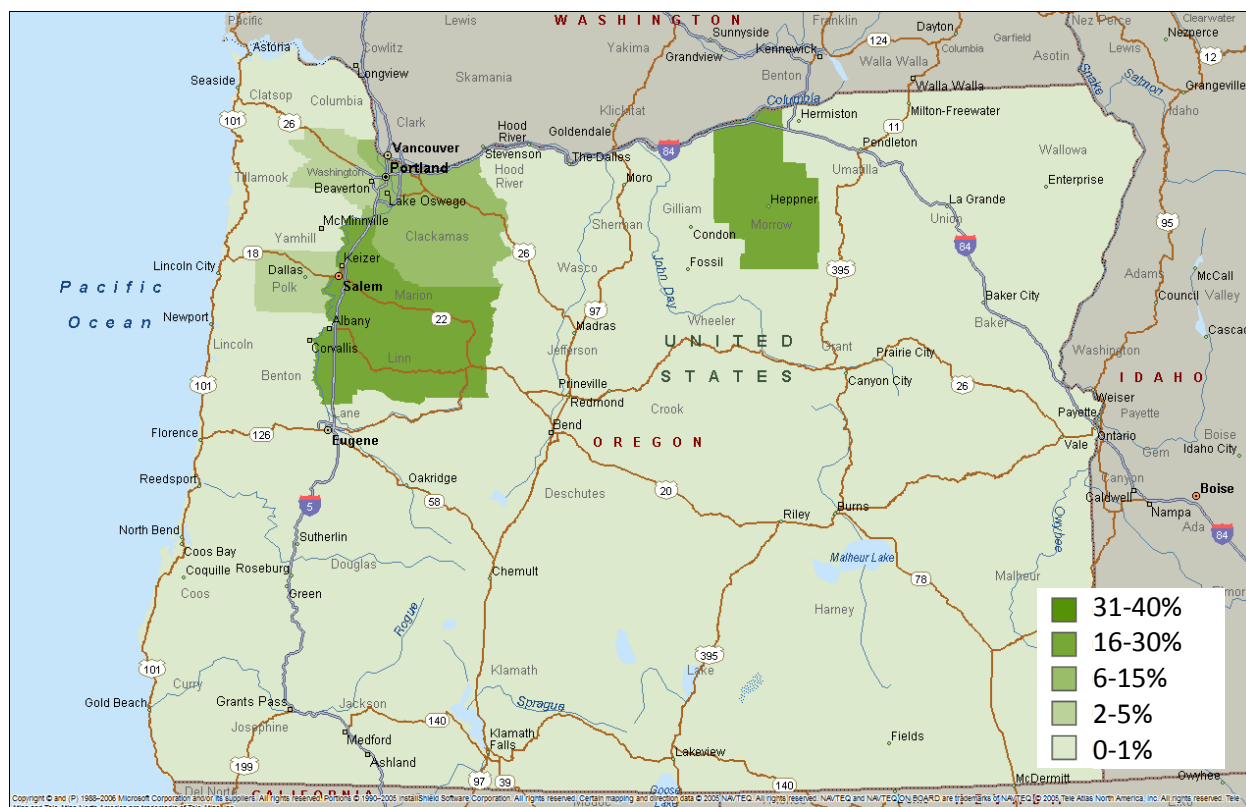
Exhibit 5: Port of Portland 2014 Container Exports by County

County	Est. Market Exports	Est. T-6 Exports	Oregon Share	Cumulative Oregon Share	T-6 Share of County Exports
Linn	13,629	8,588	23%	23%	63%
Morrow	12,614	1,504	22%	45%	12%
Marion	10,105	2,768	17%	62%	27%
Multnomah	6,615	2,385	11%	73%	36%
Clackamas	5,088	1,541	9%	82%	30%
Polk	3,279	3,041	6%	88%	93%
Washington	1,562	286	3%	90%	18%
Lincoln	1,121	24	2%	92%	2%
Lane	1,073	1,053	2%	94%	98%
Klamath	646	19	1%	95%	3%
Lake	635	10	1%	96%	2%
Yamhill	535	49	1%	97%	9%
Malheur	400	374	1%	98%	93%
Umatilla	364	42	1%	98%	11%
Jackson	266	81	0%	99%	31%
Clatsop	258	32	0%	99%	13%
Curry	129	129	0%	99%	100%
Douglas	115	97	0%	100%	84%
Benton	98	27	0%	100%	28%
Hood River	35	34	0%	100%	96%
Jefferson	30	30	0%	100%	100%
Coos	13	11	0%	100%	90%
Wasco	6	4	0%	100%	72%
Grant	5	5	0%	100%	100%
Deschutes	1	1	0%	100%	100%
Crook			0%	100%	
Josephine			0%	100%	
Columbia			0%	100%	
Baker			0%	100%	
Tillamook			0%	100%	
Union			0%	100%	
Harney			0%	100%	
Gilliam			0%	100%	
Sherman			0%	100%	
Wallowa			0%	100%	
Wheeler			0%	100%	
Oregon Total	58,623	22,139	100%	100%	38%

Linn, Morrow, Marion and Multnomah counties together account for an estimated 73% of the exports. Linn County's prominence is due to Cascade Pulp, the major exporter in Halsey, as well as major hay, seed, and fruit and nut exporters in Tangent, Albany, and Eugene. Portland, in Multnomah County, is home to many manufacturers, processors, and export shippers.

The map in Exhibit 6 shows the geographic pattern of export sources. The Port is connected to these areas by the Interstate 5 (I-5) corridor through the Willamette Valley, and by the Columbia River (and parallel I-84 and I-82) accessing production areas in all three states.

Exhibit 6: Port of Portland Export County Shares



Imports

Exhibit 7 displays the overall pattern of Oregon containerized imports. By far the largest portion is destined for the major Portland-North Willamette population and distribution center, accounting for 75% of Oregon's total. Overall, the Port of Portland handled about 70% of Oregon's containerized imports in 2014, with the strongest market shares in the Portland-North Willamette and Central Oregon markets.

Exhibit 7: 2014 Oregon Import Containers by Market Area

Market	T-6 Imports	Other Port Imports	Total Imports	Share of T-6 Imports	T-6 Market Share
Portland - North Willamette	27,532	10,509	38,041	75%	72%
Middle Willamette	4,398	3,309	7,707	12%	57%
Southern Oregon	577	674	1,251	2%	46%
Central Oregon	4,199	1,007	5,205	11%	81%
Eastern Oregon	228	135	363	1%	63%
Oregon Total	36,934	15,633	52,567	100%	70%

Exhibit 8 shows the detailed results of Tioga's import allocation process. As expected, the Portland/Vancouver metropolitan area including Multnomah, Clackamas, and Washington Counties accounts for most of the imports – 72% of the state total. Those counties have the largest

populations and also the main concentration of importers and import distribution centers. These major import distribution centers include:

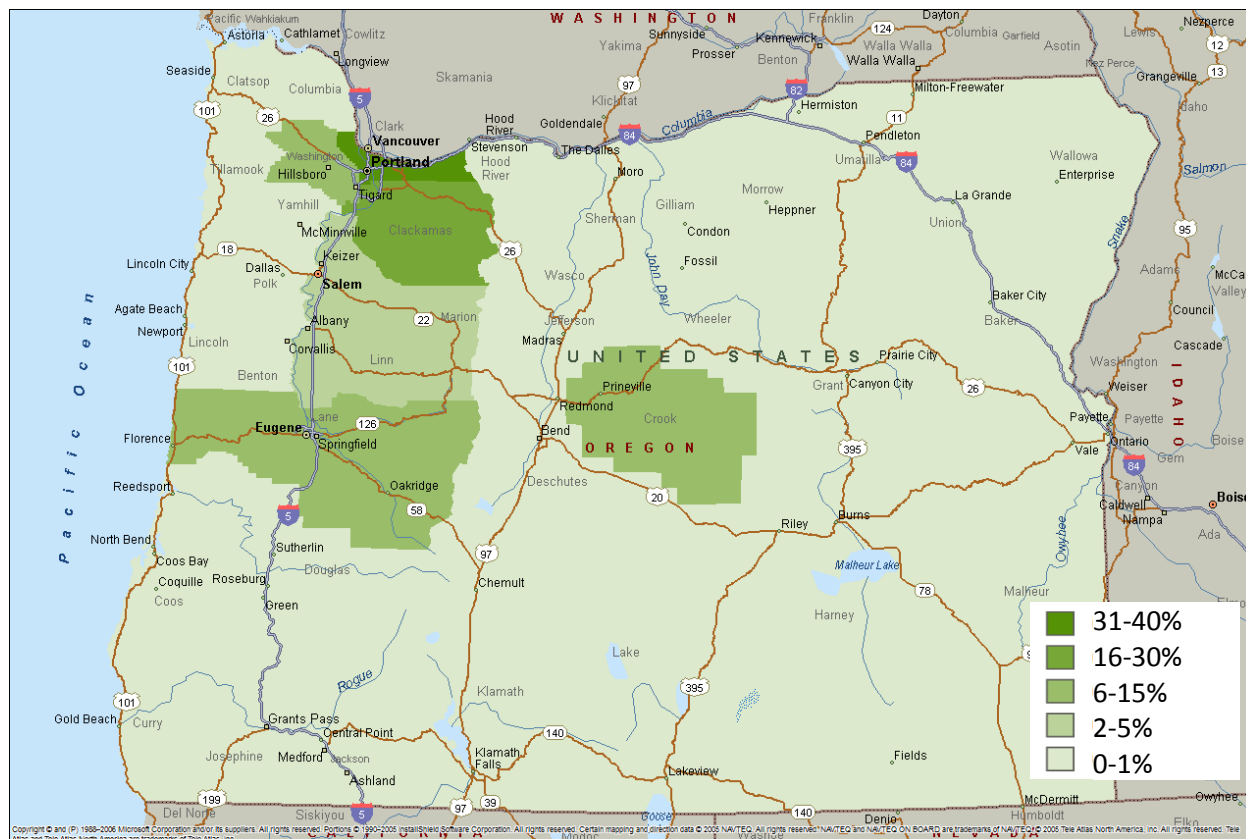
- Fred Meyer, Clackamas, Clackamas county
- Dr. Martens, Portland, Multnomah County

The geographic pattern shown in Exhibit 9 reinforces this import concentration in the urban areas, as the Eugene (Lane County) area is also prominent. The substantial import volume in Crook County is due to the Les Schwab tire distribution center in Prineville.

Exhibit 8: Port of Portland 2014 Container Imports by County

County	Est. Market Imports	Est. T-6 Imports	Oregon Share	Cumulative Oregon Share	T-6 Share of County Imports
Multnomah	18,577	10,786	35%	35%	58%
Clackamas	13,868	12,713	26%	62%	92%
Washington	5,221	3,781	10%	72%	72%
Lane	4,900	2,909	9%	81%	59%
Crook	3,731	3,532	7%	88%	95%
Linn	1,296	719	2%	91%	55%
Marion	1,157	521	2%	93%	45%
Jackson	943	376	2%	95%	40%
Deschutes	612	289	1%	96%	47%
Jefferson	423	9	1%	97%	2%
Umatilla	348	227	1%	97%	65%
Morrow	304	293	1%	98%	96%
Yamhill	227	156	0%	98%	69%
Benton	219	140	0%	99%	64%
Douglas	187	139	0%	99%	75%
Lincoln	116	105	0%	99%	90%
Hood River	115	55	0%	99%	48%
Clatsop	88	66	0%	100%	76%
Josephine	67	41	0%	100%	60%
Columbia	58	28	0%	100%	49%
Klamath	44	17	0%	100%	40%
Wasco	21	21	0%	100%	99%
Polk	19	6	0%	100%	29%
Coos	10	2	0%	100%	25%
Malheur	7	0	0%	100%	1%
Baker	6	0	0%	100%	0%
Tillamook	2	2	0%	100%	96%
Union	1	0	0%	100%	0%
Curry	1	1	0%	100%	100%
Grant	1	1	0%	100%	100%
Harney	0	0	0%	100%	1%
Lake			0%	100%	
Gilliam			0%	100%	
Sherman			0%	100%	
Wallowa			0%	100%	
Wheeler			0%	100%	
Oregon Total	52,567	36,934	100%	100%	70%

Exhibit 9: Port of Portland Import County Shares



III. Service Loss Impacts

Approach

Tioga used multiple avenues to identify the impacts of container service loss to Oregon importers and exporters.

- Extensive structured interviews with importers, exporters, brokers, and trucking firms.
- Attendance at the July 24, 2015 workshop, and input from other workshops.
- Development of a drayage trucking cost model.
- On-line and literature research into carrier services and industry shipping needs.

Interviews

Tioga obtained lists of exporters and importers from the PIERs trade data. Tioga contacted 52 stakeholders representing both importers and exporters, a diversity of commodities, shipper volumes, and geographic locations including 24 exporters, 25 importers, and 3 carriers. Tioga targeted large shippers to understand the circumstances behind the largest volume movements, and a cross-section of small- and medium-sized shippers to understand the different impacts and challenges they face. Firms were also chosen to include a reasonably broad variety of businesses.

Tioga completed 33 importer/exporter and carrier interviews. The list of stakeholders contacted is shown in Exhibit 10 below.

Exhibit 10: Stakeholder Interviews

Company	City	Complete ?	Company	City	Complete ?
Importers			Exporters		
AASOM	LAKE OSWEGO	Y	ANDERSON HAY AND GRAIN	AURORA	
AG SPECIALTIES, INC.	TIGARD		BRIDGEWELL RESOURCES	TIGARD	Y
AOSOM	LAKE OSWEGO	Y	CALBEE NORTH AMERICA LLC	BOARDMAN	Y
AUTHENTIC MODELS	EUGENE	Y	CASCADE PACIFIC FLOOR DISTRIBUTORS	PORTLAND	
BENSON INDUSTRIES	PORTLAND	Y	COLUMBIA GRAIN INTERNATIONAL	PORTLAND	Y
BRIGHT WOOD CORPORATION	MADRAS		DINSDALE FARM & EQUIPMENT CO	SILVER LAKE	Y
BURLEY DESIGN	EUGENE		EL TORO EXPORT	EL CENTRO	
CUI, INC.	BEAVERTON		GILMOUR PACIFIC TRADING	ALBANY	Y
DR. MARTENS AIRWARE, USA	PORTLAND		GOLD DUST POTATO/WALKER BROS	MALIN	
GLACIER TANKS	VANCOUVER	Y	GOLDEN VALLEY FARMS	BROOKS	Y
GUNDERSON	PORTLAND		KETTLE FOODS	PORTLAND	
KANTO CORPORATION	PORTLAND	Y	METRO METALS NORTHWEST	PORTLAND	
KARCHER NORTH AMERICA	DENVER		NNR GLOBAL LOGISTICS	PORTLAND	Y
OREGON TILE AND MARBLE	PORTLAND	Y	NORPAC FOODS	PORTLAND	Y
PLANAR SYSTEMS	BEAVERTON	Y	NORTHWEST HARDWOODS INC	PORTLAND	Y
PROACTIVE SPORTS	CANBY	Y	OREGON HAY PRODUCTS	BEAVERTON	Y
RICHARDS HOUSEWARES	PORTLAND	Y	OREGON HAY PRODUCTS	BOARDMAN	Y
SHELTER FOREST INTERNATIONAL	PORTLAND	Y	PACIFIC SEAFOOD OREGON	PORTLAND	
SOLARWORLD INDUSTRIES AMERICA	HILLSBORO		S. L. FOLLEN CO	PORTLAND	Y
THE FURNITURE CONNEXION	PORTLAND	Y	SCHNITZER STEEL INDUSTRIES	PORTLAND	Y
TRAEGER PELLET GRILLS	WILSONVILLE		SUNRISE TRADING	DALLAS	Y
WARN INDUSTRIES	CLACKAMAS	Y	TILLING TIMBER (USA)	PORTLAND	
WILLIAMS CONTROLS	PORTLAND	Y	VANPORT INTERNATIONAL	BORING	Y
WISH PETS	BEAVERTON	Y	WILLAMETTE VALLEY COMPANY	EUGENE	
WOOD BROKERAGE INTERNATIONAL	LAKE OSWEGO				
Carriers					
BOSHART TRUCKING	TANGENT	Y			
MITCHELL BROS TRUCKING	VANCOVER	Y			
NORTHWEST CONTAINER SERVICES	PORTLAND	Y			

All interviews used a survey guide (Exhibit 11) to direct the interview topics. In addition to, and at times as an alternative to telephone interviews, some parties received copies of the survey guide via email. Parties either responded via email, or used the guides they received to obtain the desired information prior to the telephone interview.

Exhibit 11: Interview Guide

**Business Oregon
Oregon Shipper Study Survey Guide**

This survey guide is intended for telephone contacts with Oregon importers, exporters, and third parties affected by the loss of Port of Portland container service.

The Tioga Group is working with Business Oregon and the Port of Portland to determine how Oregon importers, exporters, and 3PLs have been affected by the loss of regular container service at Portland, and what steps might be taken to help affected parties cope.

Name _____ Company _____ Location _____ Phone _____

1. Was your company importing/exporting containerized cargo through the Port of Portland prior to the loss of service? Yes _____ (*continue*) No _____ (*verify and end survey*)
2. How would you describe your company? (*i.e. importer, exporter, broker, third party, etc.*) _____
3. Roughly how many containers were you moving through Portland per month/year before service was discontinued? _____. Was the movement seasonal? _____.
4. About how long had you been shipping through Portland? _____.
5. What was the actual location where you were shipping/receiving the containers? (*e.g. city or address*) _____.
6. How were the containers moved to/from the Port? (*e.g. truck, barge/truck, rail*) _____.
7. Primary commodities imported/exported/handled (*description, to be coded later*) _____, _____, _____.
8. What is your company doing now instead? (*i.e. trucking to Tacoma, moved location, not exporting, etc.*) _____
9. How has that affected your company? (*i.e. paying more for trucking, lower reliability, loss of export market*) _____
_____ (*Depending on answer*)
 - a. Can you give me a rough estimate of the extra cost per container? _____
 - b. About what has that cost your company in sales or lost business in a year? _____
 - c. What did it cost you to make that change? _____
10. Do you have plans to do something different in the long run? _____

What will that entail? (*cost, disruption, loss of business*) _____
11. Is there an option you would rather have instead? (*e.g. transloading, rail move, barge to Tacoma*) _____
12. How has the loss of service affected your customers or suppliers? (*i.e. they are having to pay more, they are buying or selling less, etc.*) _____
13. Do you know of other companies that have been particularly affected? (*i.e. who else should we be contacting?*) _____
14. Overall comments on the impact of Port of Portland service losses? (*i.e. is there anything else we should know?*) _____

Thank you for your time. If you have additional thoughts, please contact me at:

Key Interview Findings

Preference for Portland Service

Every importer and exporter interviewed would resume shipping through Portland if regular container service resumed. None have made long-term plans that would preclude their future use of container service from Portland. The volume of relatively lower valued shipments originating in Oregon in particular, such as hay and lumber, gives an inherent advantage to shipping directly via Portland. Interviewees uniformly stated that any strategy for dealing with the current situation is subject to change if and when regular scheduled container service returns to Portland.

Importer and Exporter Strategies

The most common replacement for direct Portland service has been service through Tacoma and Seattle, WA. Shippers are using multiple strategies to get their goods to or from Tacoma/Seattle, but most seem to be using truck or rail in the same way they were using them in Portland. Most of the importers still shipped their goods from Seattle/Tacoma to their Oregon facilities before sending them elsewhere, so the distribution and processing jobs are staying in Oregon so far. Similarly, most of the exporters gather the goods at Oregon locations and then send them to Seattle/Tacoma, rather than having parties ship directly to Seattle/Tacoma. If direct Portland calls are not resumed, however, there may be more permanent re-routing.

The larger shippers have generally been able to cope with the loss of Hanjin and Hapag-Lloyd services. Large shippers typically split their trade between Portland and the Puget Sound Ports of Seattle and Tacoma (now known collectively as the Northwest Seaport Alliance or NWSA). Such shippers had trucking or rail capability to access Seattle and Tacoma in place long before the T-6 service loss. Larger shippers are also better able to negotiate favorable rates.

The smaller shippers have had more difficulty finding alternate transportation options, and their circumstances differ. Smaller shippers may import or export only a few containers annually, connecting to a very limited range of foreign ports and customers. When vessel, truck, or rail capacity is short, they are more likely to suffer shortfalls or delays.

“Smaller” container shippers shown in the data may be small firms for which a few annual containers is a large portion of their business. Such firms likely experienced significant adverse impacts. Other “small” shippers may be large firms for which containerized shipments are a small part of their total activity. Firms of that type would not have been markedly affected.

The importance of cost increases and other impacts also depends on the commodity.

- A 25-ton export load of grass hay valued at about \$150 per ton would be worth roughly \$3,750, and an additional trucking cost of \$450 could raise the delivered price by 12%.
- A container load of 1,000 radial tires may have retail value of \$100,000 or more, and an extra \$450 trucking cost would raise the delivered price by 0.5%.

This relationship is at the core of the serious concerns expressed by exporters of price-sensitive agricultural products.

Both exporters and importers reported losing some business because of the increased difficulty. The increased costs were a contributor to lost business, but a loss of timely shipments was a much bigger one. The congestion at Tacoma and Seattle during November 2014-February 2015 and lingering into April 2015 appears to have accounted for much of the reliability problem. Workshop participants indicated that some of this impact may have extended into the summer of 2015.

Other Impacts

Interviewees made many comments to the effect that the 2014-15 labor difficulties in the West Coast ports generally, and not just the issues at Portland, caused difficulty for Oregon firms.

A few importers mentioned delays in clearing U.S. Customs in Tacoma/Seattle that they did not experience in Portland, largely because of familiarity of the Portland customs agents with the Oregon importer's business. Tioga's understanding is the problems were due in part to congestion and staffing at Seattle/Tacoma, and in part to lack of familiarity by Puget Sound Customs with some former Portland cargos.

Ocean Carrier Service and Cost Impacts

Overall ocean carrier service and cost impacts from the lost of direct Portland vessel calls have been minimal:

- Pre-2015 Portland services also called at either Seattle or Tacoma, and the same or equivalent services are still available.
- TransPacific rate levels were depressed in early 2015 and remain so in early 2016, so many shippers were paying less than before.

The most serious ocean carrier service issues experienced by Oregon customers actually began in late 2014 and were attributable to port congestion and vessel delays concurrent with West Coast longshore labor issues. The resulting service issues affected the entire U.S. West Coast port system before gradually abating in the spring of 2015.

Reliability of container shipping remains an issue for Oregon customers independent of direct Portland calls. The reliability of vessel schedules remains low across the industry. While this issue is outside the influence of state public agencies, it remains a factor in the ability of Oregon exporters to compete in the global market and the ability of Oregon importers to serve their customers.

Ocean Carrier Services

Schedule convenience and service to and from specific foreign ports were significant factors in importer and exporter use of the Port of Portland. As of 2014, Hanjin (and the COSCO, "K" Line, Yang Ming, Hanjin, Evergreen "CKYHE" alliance) reportedly accounted for about 80% of Portland's container cargo. Hapag-Lloyd (APL, Hapag-Lloyd, Hyundai, MOL, NYK, OOCL – "G-6" Alliance) accounted for about 17% of Portland's container cargo, and Westwood for about 3%.

Hanjin. The service Hanjin and the CKYHE alliance offered at Portland also made West Coast calls at Seattle, WA, Vancouver and Prince Rupert, B.C., and served Busan, the major Korean port, and Shanghai and Ningbo in China. Interview results indicate that service to Korea was a major factor for Oregon agricultural exporters, particularly hay shippers. With the withdrawal of Hanjin at T-6, former Portland customers could use the same service at Seattle's Terminal 46.

Hapag-Lloyd. Prior to the early 2015 withdrawal, Hapag-Lloyd and Hamburg Süd offered the MedPac service linking West Coast, Mexican, and South American ports with ports in the Mediterranean. Hapag-Lloyd dropped the Portland call, so customers had to use Seattle instead.

Westwood. Westwood Shipping's current fleet consists of four "ConBulk" vessels that can carry break bulk cargo as well as containers. Westwood provides a monthly export service at Portland's T-6, serving Japanese ports and Busan, Korea. From Portland, Westwood provides a 20-day sailing time to Yokohama, Japan and a 25-day sailing time to Busan, Korea. The longer and less-frequent sailings offered by Westwood are more suitable for low-cost, durable exports moving from producers to distributors than for higher value imports to distributors or retailers.

Ocean Carrier Rates

Ocean carrier rates for Oregon shippers may have been affected by the Portland service withdrawal in complex ways, and there may be more significant impacts to come.

The high level of competition for TransPacific Pacific Northwest-Asia services tends to keep rates low for Oregon importers and especially for Oregon exporters. The presence of carriers with direct calls at Portland led other competing carriers to "equalize" rates so customers could use either direct or indirect services interchangeably. Many ocean carriers with direct calls at Tacoma or Seattle also offer Portland rates that include Northwest Container Rail Services (NWCS) transportation between Portland and Puget Sound. Based on Tioga's interviews and the experience of Port staff, the Portland/Puget Sound rate differentials reportedly range from \$350 to \$450 per container, with the extra cost representing the NWCS linkage.

Based on the experience of Port staff and Tioga's interviews, it appears that the additional ocean carrier rate for Portland service was \$350 to \$450 per container over the Tacoma rate. This range overlaps with the additional charge for using NWCS from Portland to Tacoma and Seattle, as would be expected since the rail option was in competition with the direct calls.

Tioga learned in interviews that in early 2015 the underlying rate differences were obscured by strong ocean carrier price cutting. Overcapacity in the Asia-Pacific Northwest trades led to what some shippers described as a "price war". For the first part of 2015, many Oregon shippers were paying less in total than they paid in 2014, regardless of their port choice. One important result of this volatile pricing period is that ocean carrier cost impacts in early 2015 are not a complete or comprehensive guide to long-term effects.

Without competing direct Portland calls, other carriers are likely to be less aggressive in pricing their combination ocean/NWCS options through Puget Sound. It is possible that carriers will discontinue their equalization policies now that there are no longer any major direct Portland services. If so, Tacoma and Seattle carriers could try to recapture the full cost of the NWCS option rather than, as appears likely, offering an implicit discount to compete with direct calls.

Port Terminal Service and Cost Impacts

Interviews suggest that as of late 2015 Oregon shippers are obtaining comparable or better service at Tacoma and Seattle than was previously experienced at Portland's T-6. Importers, exporters, and truckers contacted by Tioga indicate that T-6 often had long truck turn times, notably for refrigerated containers. There are no objective data available, however, and it is no longer possible to verify T-6 turn time problems.

Immediately after withdrawal of services at Portland truckers were experiencing very long waits and turn times at Tacoma and Seattle terminals. There were anecdotal reports of waits as long as four hours to reach terminal gates, although once again there are no objective data. These long turn times, however, could be attributable to the West Coast port congestion that paralleled International Longshore and Warehouse Union (ILWU) contract negotiations from November 2014 through February 2015. The backlog of cargo prolonged the congestion and long turn times into March and even April of 2015. By mid-2015, truckers contacted by Tioga were reporting shorter "normal" waits and turn times at Seattle and Tacoma terminals.

Trucking Service and Cost Impacts

The time consumed by truckers at marine terminals reduces the number and length of trips a driver can make in a working day, thus reducing the effective capacity of drayage firms. The loss of capacity became a hindrance to Oregon shippers during the recent port congestion. The additional distance trucks must travel to serve Tacoma or Seattle instead of Portland likewise reduces effective capacity.

Driver Shortage. Oregon, like most states, has a persistent truck driver shortage. Trucking companies interviewed for this study report difficulty recruiting and retaining both employee and owner-operator drivers despite increasing compensation and paying signing bonuses. Even the longest, best known truckload carriers typically experience 100% annual driver turnover. In other words, the average driver stays with the firm only about a year.

The driver shortage has multiple causes:

- Much of the trucking labor force has historically consisted of military veterans, rural residents, and immigrants. These labor pools have shrunk, and many candidates now have more attractive opportunities.
- The existing trucking labor force is aging and retiring, or shifting to other occupations.
- Port drayage, in particular, is a stressful and demanding occupation. A significant number of drivers left port drayage during the 2014-2015 West Coast congestion.

The entry barriers to port drayage have risen. Drivers must now have Transportation Worker Identification Credentials (TWICs) issued by the Transportation Security Administration. Owner-operators could formerly enter the business with a used diesel tractor for \$20,000 to \$40,000. A new 2010 or later "clean" diesel tractor costs \$100,000 to \$120,000.

The shortage has adversely affected the ability of the drayage industry to serve Oregon customers. The problem is being compounded by the additional time required for drivers to reach Tacoma or

Seattle. With substantially longer times required for each move, drivers with hours of service limits can move fewer containers.

Exhibit 12 provides estimates of the additional round-trip miles, hours, and costs of drayage to Tacoma instead of Portland from the County Seat of each Oregon County. For points such as Clackamas or Halsey south of Portland, or other points accessed via Interstate 5, the round trip difference is basically double the distance between Portland and Tacoma, or about 270 miles, plus an allowance for tractor-only (“bobtail”) positioning moves. For points east of Portland, the difference depends on geography and highway network distances.

Exhibit 12: Estimated Drayage Time and Cost Impacts

County	County Seat	Est. 2014 T-6 Containers	Est. 2015 Truck Share*	Est. Trucked CTRs	Miles to T-6	Miles to Port of Tacoma	Additional One-Way Miles	Allowance for bobtail moves	Additional Truck Miles per CTR	Est. Additional Drayage Cost per Container	Est. Annual Additional Drayage Cost
Baker	Baker City	0	100%	0	311	381	70	10%	147	\$ 257	\$ 7
Benton	Corvallis	167	50%	83	94	228	134	10%	281	\$ 492	\$ 41,054
Clackamas	Oregon City	14,254	50%	7,127	29	164	135	10%	284	\$ 496	\$ 3,535,954
Clatsop	Astoria	98	100%	98	95	156	61	10%	128	\$ 224	\$ 22,073
Columbia	Saint Helens	28	100%	28	29	126	97	10%	204	\$ 356	\$ 10,158
Coos	Coquille	14	50%	7	247	384	137	10%	288	\$ 503	\$ 3,505
Crook	Prineville	3,532	50%	1,766	152	289	137	10%	288	\$ 503	\$ 889,177
Curry	Gold Beach	130	50%	65	309	446	137	10%	288	\$ 503	\$ 32,757
Deschutes	Bend	290	50%	145	186	303	117	10%	246	\$ 430	\$ 62,393
Douglas	Roseburg	237	50%	118	189	326	137	10%	288	\$ 503	\$ 59,599
Gilliam	Condon	-	50%	-	159	293	134	10%	281	\$ 492	\$ -
Grant	Canyon City	6	50%	3	281	405	124	10%	260	\$ 456	\$ 1,388
Harney	Burns	0	50%	0	294	428	134	10%	281	\$ 492	\$ 0
Hood River	Hood River	88	50%	44	87	222	135	10%	284	\$ 496	\$ 21,941
Jackson	Medford	457	50%	229	284	422	138	10%	290	\$ 507	\$ 115,899
Jefferson	Madras	39	50%	19	124	258	134	10%	281	\$ 492	\$ 9,548
Josephine	Grants Pass	41	50%	20	255	393	138	10%	290	\$ 507	\$ 10,300
Klamath	Klamath Falls	36	50%	18	291	427	136	10%	286	\$ 500	\$ 9,079
Lake	Lakeview	10	50%	5	361	475	114	10%	239	\$ 419	\$ 2,078
Lane	Eugene	3,962	50%	1,981	121	258	137	10%	288	\$ 503	\$ 997,528
Lincoln	Newport	128	50%	64	123	277	154	10%	323	\$ 566	\$ 36,315
Linn	Albany	9,308	50%	4,654	81	217	136	10%	286	\$ 500	\$ 2,326,099
Malheur	Vale	374	100%	374	397	469	72	10%	151	\$ 265	\$ 99,007
Marion	Salem	3,289	50%	1,644	57	195	138	10%	290	\$ 507	\$ 834,029
Morrow	Heppner	1,797	100%	1,797	225	301	76	10%	160	\$ 279	\$ 502,045
Multnomah	Portland	13,172	50%	6,586	0	146	146	10%	307	\$ 537	\$ 3,533,800
Polk	Dallas	3,047	50%	1,523	67	209	142	10%	298	\$ 522	\$ 795,044
Sherman	Moro	-	50%	-	126	261	135	10%	284	\$ 496	\$ -
Tillamook	Tillamook	2	50%	1	72	218	146	10%	307	\$ 537	\$ 573
Umatilla	Pendleton	269	100%	269	216	286	70	10%	147	\$ 257	\$ 69,257
Union	La Grande	0	100%	0	264	336	72	10%	151	\$ 265	\$ 0
Wallowa	Enterprise	-	100%	-	329	406	77	10%	162	\$ 283	\$ -
Wasco	The Dalles	25	50%	12	88	223	135	10%	284	\$ 496	\$ 6,129
Washington	Hillsboro	4,067	50%	2,033	20	164	144	10%	302	\$ 529	\$ 1,076,149
Wheeler	Fossil	-	50%	-	178	313	135	10%	284	\$ 496	\$ -
Yamhill	McMinnville	205	50%	103	48	186	138	10%	290	\$ 507	\$ 52,056
Total		59,073		30,820							\$ 15,154,943

* Counties with less than a 100-mile T-6/Tacoma difference were assumed to be 100% truck

Overall, Tioga estimated that the additional annual cost of trucking to Oregon shippers and receivers would be about \$15.1 million.

The round trip takes an additional 4 to 6 hours. In some cases, the Tacoma trip may require more than one driver working day, necessitating an overnight trip. Drivers may in practice work around the federal Hours of Service (HOS) rules by under-reporting time (e.g., reporting 15 hours for a trip that actually took 17 hours). Drivers may also log terminal queue time as non-driving time,

even though they are moving every few minutes. These practices, however, will be curtailed as electric on-board recorders (EOBRs) replace paper logs in the next few years.

The time differences are most significant at points such as Halsey, where a driver may have been able to make two round trips to Portland, or Clackamas, where a driver may have been able to make three round trips. In both cases, multiple Portland round trips would be replaced by a single Tacoma round trip. The cost difference may be higher than shown because the Tacoma trip will likely use up the driver's entire working day. Those shippers would also need multiple trucks and drivers to do the work formerly done by one.

While interviews typically reported a net increase in overall costs of \$400 to \$450 per container, the largest trucking cost differences are mostly for points south and east of Portland, at around \$450 to \$550 per container. Tioga verified the rough accuracy of this estimate in contacts with drayage truckers. Some customers may have faced an even larger cost difference during the port congestion, when wait time fees of \$60 to \$75 per hour were added.

The \$450 to \$550 additional cost can probably be considered an upper limit on the added transportation cost. As noted elsewhere, the typical added ocean carrier cost for Portland service via the NWCS rail shuttle is \$350 to \$450. Customers will use the rail service whenever the added trucking cost is higher. Customers would face the maximum \$450 to \$550 trucking cost difference when:

- NWCS did not have sufficient capacity (as in early 2015).
- NWCS does not serve the specific Tacoma terminal needed on a day when the customer is facing an outgoing vessel cutoff or a last free day on an import container.
- The move requires a marine container type not available at Portland.
- The customer's geographic location or other circumstance eliminates the rail option.

Customers who operate their own trucks or who have balanced import/export traffic may be able to access Tacoma terminals at lower costs.

The additional drayage cost, where applicable, would be offset in the short-term by the \$350 to \$450 lower ocean rates at Tacoma. For some customers, the impacts would effectively cancel out.

Rail Intermodal Service and Cost Impacts

Northwest Container Services (NWCS) operates rail intermodal container service between a terminal in Portland south of T-6 and the Ports of Tacoma and Seattle. NWCS provides railcar loading/unloading at its Portland terminal. Union Pacific (UP) moves NWCS cars between Portland and Tacoma or Seattle. At Tacoma, UP interchanges blocks of NWCS cars with Tacoma Rail, and Tacoma Rail moves the cars to and from Tacoma intermodal yards. At Seattle, UP moves the cars to and from the NWCS terminal, and containers are drayed to and from Seattle terminals.

The NWCS Portland terminal covers about 87 acres and has capacity for about 8,000 containers. In early 2015, this facility was overburdened due to withdrawal of vessel calls at Portland without

advance notice, a build-up of empty containers being repositioned to the West Coast, and port congestion that reduced NWCS railcar productivity. The terminal is no longer congested as of September 2015, and NWCS had added lift equipment to increase its throughput capabilities.

NWCS also operates rail service between Boardman out of the Port of Morrow and Portland. This service connects with the new barge service launched in fall 2015 between Boardman and the upper Columbia River ports.

Critically for Oregon importers and exporters, the NWCS Portland terminal also functions as a marine container depot and equipment supply point. This arrangement allows Oregon customers to pick up and return empty containers at NWCS Portland as if it were a marine terminal. Use of NWCS Portland as an empty container supply point also allows NWCS to avoid routine repositioning of empty containers by rail. NWCS primarily moves loaded containers in both directions between Portland and the Puget Sound ports.

NWCS does not ordinarily charge importers or exporters directly for its services. NWCS services are included in ocean carrier rates for containers originating or terminating at Portland instead of at Tacoma or Seattle. The difference between a Portland rate and a Tacoma or Seattle rate for the same cargo and ocean trip is the effective NWCS cost to the customer.

The Portland/Tacoma-Seattle rate differential differs by carrier, foreign port, and commodity. Confidential contract ratemaking allows for negotiated rates and differentials that are not publicly available. Rate differentials and implicit NWCS costs reported in interviews and by Port of Portland staff range from a low of around \$300 for low-valued exports such as scrap metal or hay cubes, to a high of around \$600 for high-value import merchandise.

Barge Service Impacts

Tidewater Barge Lines, based in Vancouver, WA, operates barges on the Columbia-Snake River System. Tidewater's core business has been moving petroleum products, grain, solid waste, paper products, and special cargoes in a fleet of bulk barges. Tidewater offered container service between Portland and Boardman, OR; Pasco, WA; and Lewiston, ID by carrying containers on barge decks. Containers were drayed between Tidewater's Vancouver terminal and T-6 to connect with ocean carrier services.

The barge container service between Vancouver and the Columbia River ports was very economical compared to trucking, and was well suited to lower-valued commodities such as grain, paper products, or animal feeds that did not require expedited handling. Besides lowering shipping costs, the barge service took truck trips off the highways and reduced environmental impacts.

Representative round-trip (empty/load) barge costs between Columbia River ports and T-6, including river port handling charges, are shown in Exhibit 13. The Boardman rate of \$434 for a 20-foot container typically used for export pulses (e.g., lentils) contrasts favorably with Tioga's estimated trucking cost of \$666 for the same Portland trip (Exhibit 12). At Portland, the exporter would have paid about \$300 extra for direct vessel service there, making the Portland barge cost about \$734 over the actual ocean transport cost. Trucking to Tacoma is estimated to cost about \$997. (Boardman customers have reported trucking costs of around \$1,000, suggesting that the

estimate is reasonably close.) The Boardman exporter would be incurring about \$263 per container in additional transport cost for trucking versus barging commodities.

Exhibit 13: Representative Barge Costs

Port	Container		
	20 ft Dry	40 ft Dry	20/40ft Refrig.
Boardman, OR	\$ 434	\$ 505	\$ 665
Umatilla, OR	\$ 434	\$ 543	\$ 853
Pasco, WA	\$ 434	\$ 543	\$ 853
Lewiston, ID	\$ 517	\$ 685	na

The barge service is still available in the sense that the barges are operating and could carry containers, but the connecting ocean carrier services to Portland were discontinued. As the market analysis in Section I suggests, customers in the more distant Pasco and Lewiston markets that must now truck containers to Tacoma or Seattle have been most severely affected by the loss of the container barge service.

Summary Impacts

The preceding analysis illustrates the complexity of the service and cost impacts, the effect of offsetting influences, the variability of movement-specific negotiated outcomes, and the tendency of volatile industry conditions to obscure the impacts of service loss.

The matrix in Exhibit 14 attempts to summarize the range of outcomes in the basic dimensions of cargo movement. Impacts by category are discussed in greater detail below.

Exhibit 14: Summary Impacts Matrix

Impact Category	Implications
Capacity	Significant impact on port trucking industry exacerbated by driver shortage, potential capacity shortages for Oregon shippers in peak periods.
Service	Primary service issue will be movement to and from ports in peak periods due to trucking capacity and marine terminals congestion.
Reliability	Primary reliability issue may also be in port-customer trips, although vessel reliability continues to be an industry problem,
Cost	Up to \$15.1 million annual trucking cost increase for Oregon shippers

Capacity. Oregon shippers have experienced no significant change in ocean carrier capacity since they are commonly using the same services at Tacoma or Seattle instead of at Portland. NWCS rail capacity was overwhelmed in early 2015, but by mid-2015 NWCS investment and reduced demand have created adequate capacity for near-term growth. The need for longer truck trips to

Tacoma and Seattle has reduced the effective capacity of the port trucking industry. This reduction is being compounded by the persistent driver shortage.

Service. Depending on the ocean carrier and foreign port combination, Oregon shippers may have experienced minor service changes. The vessel services that made direct calls at Portland also called at Tacoma or Seattle. Marine terminal services at Tacoma and Seattle reportedly are comparable to the former T-6 services. NWCS service is basically unchanged. Oregon shippers do, however, have to ship earlier for the same outbound voyage to allow for the rail or truck move to Puget Sound.

Reliability. Reliability was extremely poor when the direct Portland services were withdrawn in early 2015, largely due to the concurrent West Coast port congestion. As the interviews revealed, Oregon customers were more seriously affected by service lapses, delayed shipments, and missed opportunities than by cost increases.

The increased complexity of truck or rail/truck movement to and from the Puget Sound ports and traffic congestion in the Interstate 5 corridor will tend to reduce long-term reliability. The difference is unlikely to be large once use of the Puget Sound ports becomes routine – which it already is for many shippers that have been using both Puget Sound and Portland all along.

Cost. Despite a host of countervailing cost influences, there is likely to be an overall upward cost trend. The loss of a competitive direct call for service to Japan, Korea, and China will likely result in upward price pressure for service at Puget Sound. The cost of moving boxes to and from Puget Sound will likely exceed any savings from Puget Sound rates. The loss of the Columbia-Snake barge option will result in higher landside costs for those shippers.

Tioga estimated the annual additional trucking cost at \$15.1 million. This total, would be offset by lower ocean carrier rates at Tacoma or Seattle, but still represents additional trucking activity and expense that was previously unnecessary.

More precise estimates might be formulated in later study efforts by working with shipper records to compare cost experience in mid-2014, prior to the West Coast port congestion, with cost experience in late 2015, after the congestion and cost-cutting periods.

Importer and Exporter Challenges

It is clear from the market analysis, interview results, and impact analysis that the challenges facing Oregon customers vary with location, commodity, shipping pattern, and size.

The loss of direct Portland calls is likely to pose its greatest challenges to Willamette Valley exporters of low-value, low-margin agricultural and forest products, and other small and medium-sized shippers unable to negotiate favorable ocean and drayage rates. Such shippers face the highest additional costs to use Puget Sound ports and the most price competition in the global market place. Exports account for a significant part of annual production in these market segments.

At the other extreme may be Oregon importers of high-value consumer goods such as electronics. Their cargo provides higher ocean carrier margins and will encourage rate competition and the consumer market is more likely to allow the importer to pass on any cost increase.

Some Oregon shippers lost foreign trade opportunities in early 2015, but these adverse impacts were largely due to the overall West Coast congestion rather than to the loss of direct Portland calls. Portland was served by the same labor union and vessels as other West Coast ports and would not have been immune to congestion and delay.

The long-term challenge facing Oregon shippers is to locate and use the most effective and efficient combination of ocean carrier service, port, truck service, and rail service for each shipment. A key success factor will be establishing repeatable shipment patterns and sustainable carrier relationships.