

Southern Alberta: Growth of Import and Export Opportunities for West Coast Ports

Southern Alberta is a natural transportation and agriculture hub. This research highlights opportunity to grow and develop exports and key segments of the supply chain required to enable goods movement.



THE VAN HORNE INSTITUTE

In Collaboration
With:



JRSB
LOGISTICS CONSULTING LTD.

Growth Potential for
Agricultural Back-
Haul Containers

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Introduction

In order to determine the growth potential for Agricultural Back-Haul Containers for export via the Port of Prince Rupert and the Port of Vancouver, interviews were carried out with potential export shippers in the Agricultural sector. The transit times and rates have been compared between the west coast ports to the Calgary region, as well as, to southern Ontario and Chicago. The research has amalgamated significant information as to the increased export volumes for these products. The research also outlines container equipment availability and transload opportunities in the southern Alberta region.

Overview of Agriculture Trade in Alberta

Between 1985 and 2015, the value of the Alberta economy increased from \$67.6 Billion to \$326.4 Billion.¹ The overall value of Agriculture and Forestry increased from \$2 Billion in 1985 to approximately \$4.99 Billion by 2015.

Alberta Economic Development and Trade reported that “Exports of crops and livestock rose 65% between 2010 and 2015, while processed food exports increased by 35%.”² These numbers are expected to continue to grow. The bulk of the revenue in Alberta from Agriculture comes from cattle and calves and most of the remaining value coming from crops. The two largest sectors of crops are canola and wheat (including Durum). Peas, beans and lentils are part of the Pulse Grain market which accounted for the next largest crop contribution.

Pulse Canada describes pulses as “part of the legume family” including dried peas, edible beans, lentils and chickpeas as the most common varieties of pulses. Pulses are very high in protein and fibre, and are low in fat. Like their cousins in the legume family, pulses are nitrogen-fixing crops that improve the environmental sustainability of annual cropping systems.³ Alberta has a solid pulse market that has grown in size over the last five years with the bulk of this production (85%) exported outside of Canada.⁴ The pulse market is expected to continue to grow due to the large demand from Asian markets that have a very large and growing population. Canada can grow these products and get a good return on the investment at current rates and demand.

The main crops of wheat and canola tend to move in bulk, both by rail and by ocean vessels in cargo holds. Due to the massive volumes and resulting costs grains tend not to move in trucks. One railcar can hold the equivalent of two and a half to three truckloads of grain. A fully loaded grain train of one hundred and twelve railcars would require an equivalence of three hundred truckloads. Moving grains (and other bulk products) by train is highly efficient because the rail network is designed to accommodate high volumes. The world demand for wheat and canola creates enough volume to fill the cargo holds on ships. Pulse volumes are transported in smaller quantities and do not usually have enough volume to fill a single cargo hold. Pulses are loaded into containers at stuffing facilities often near the port and then trucked to the port for loading onto the ocean vessel.

¹ https://www.albertacanada.com/files/albertacanada/SP-EH_highlightsABEconomyPresentation.pdf

² https://www.albertacanada.com/files/albertacanada/SP-EH_highlightsABEconomyPresentation.pdf

³ <http://www.pulsecanada.com/about-us/what-is-a-pulse>

⁴ <http://pulse.ab.ca/producers>

Southern Alberta has a number of grain loading facilities, transload locations and warehouses that all have the ability to load pulse products either into containers for truck transport or rail transport, as well as for the loading of the product into rail hopper cars. CP has the largest presence in southern Alberta for loading grain from elevators into rail cars. Both CN and CP have the ability to load and transload in southern Alberta into containers for rail transport to the west coast ports.

The main agricultural products that Phase 1 of this study is targeting are commodities that can move in containers without requiring temperature control. This will include dry grains, pulse grains, as well as bagged and sealed products that have been processed from other agricultural products such as wheat, lentils, potato chips, dried soups etc.

Interviews with Agricultural Related Organizations/Companies

Interviews were conducted over the phone and through a survey with agriculture, food, and animal products producers.⁵ The survey was sent out to 391 potential customers across southern and northern Alberta by email listed in “Alberta’s Agricultural Processing Industry”.⁶

Interviews were held over the phone with Agricultural companies in southern Alberta and calls were made to organizations that marketed for specific industries and or specific companies within those industries.

	AGRICULTURAL ASSOCIATIONS	AGRICULTURAL COMPANIES	TOTAL
CONTACTED	6	22	28
INTERVIEWED	6	10	16
INTERVIEW RATE	100%	45%	57%

FIGURE 1: INTERVIEWS RESPONSE RATE

The results from the online survey, while not yielding a high response rate, did provide important input as to the awareness and potential use of the Port of Prince Rupert. Most of those that responded do not export through Prince Rupert and many of the respondents do not currently export product overseas.

⁵ The responses from the animal products producers will be used for Phase 3 of this report throughout Alberta with a focus on Southern Alberta

⁶ <http://www.agric.gov.ab.ca/content/agprodir2016.pdf>

Responses from three of the questions are tabulated below:

Question #1

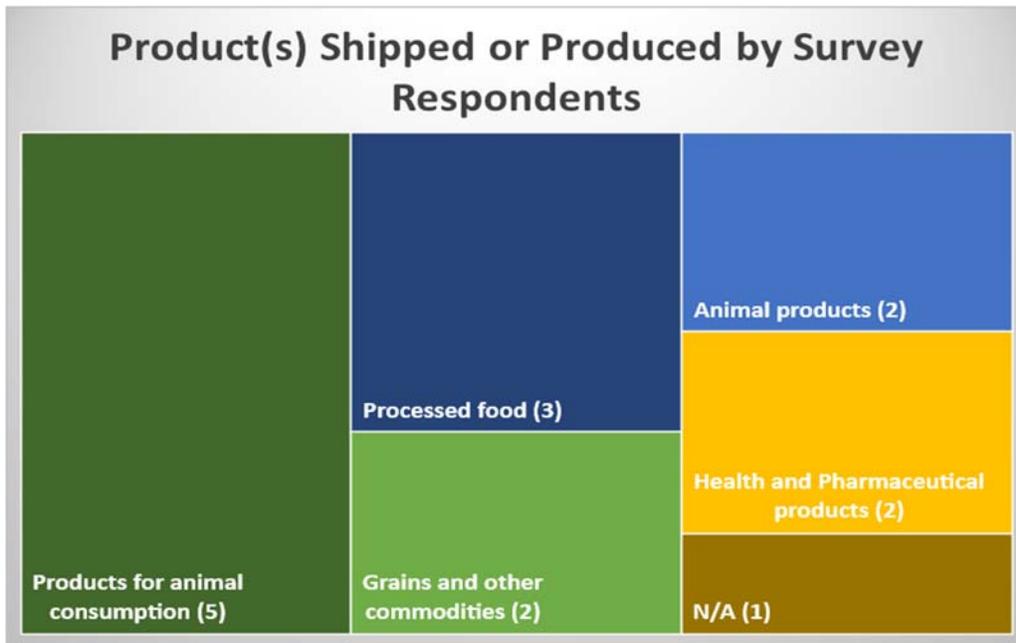


FIGURE 2: PRODUCT(S) SHIPPED OR PRODUCED BY SURVEY RESPONDENTS

Question #2

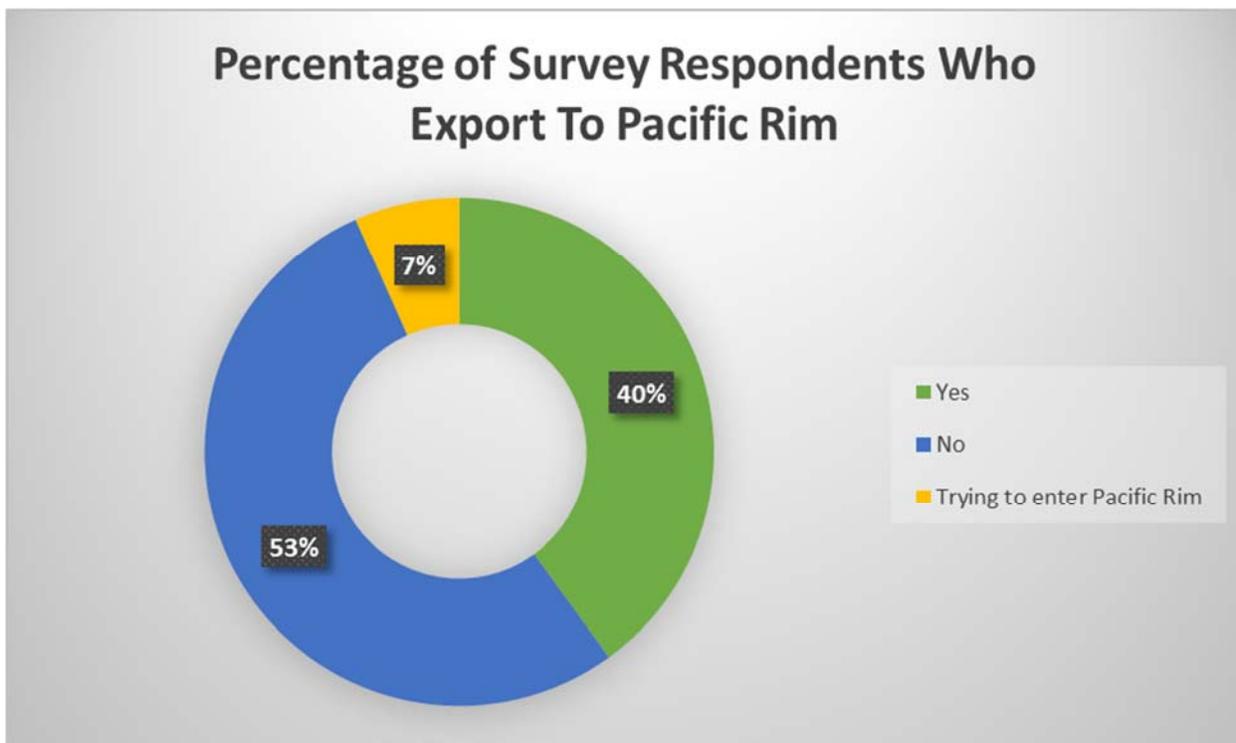


FIGURE 3: PERCENTAGE OF SURVEY RESPONDENTS WHO EXPORT TO PACIFIC RIM

Question #5

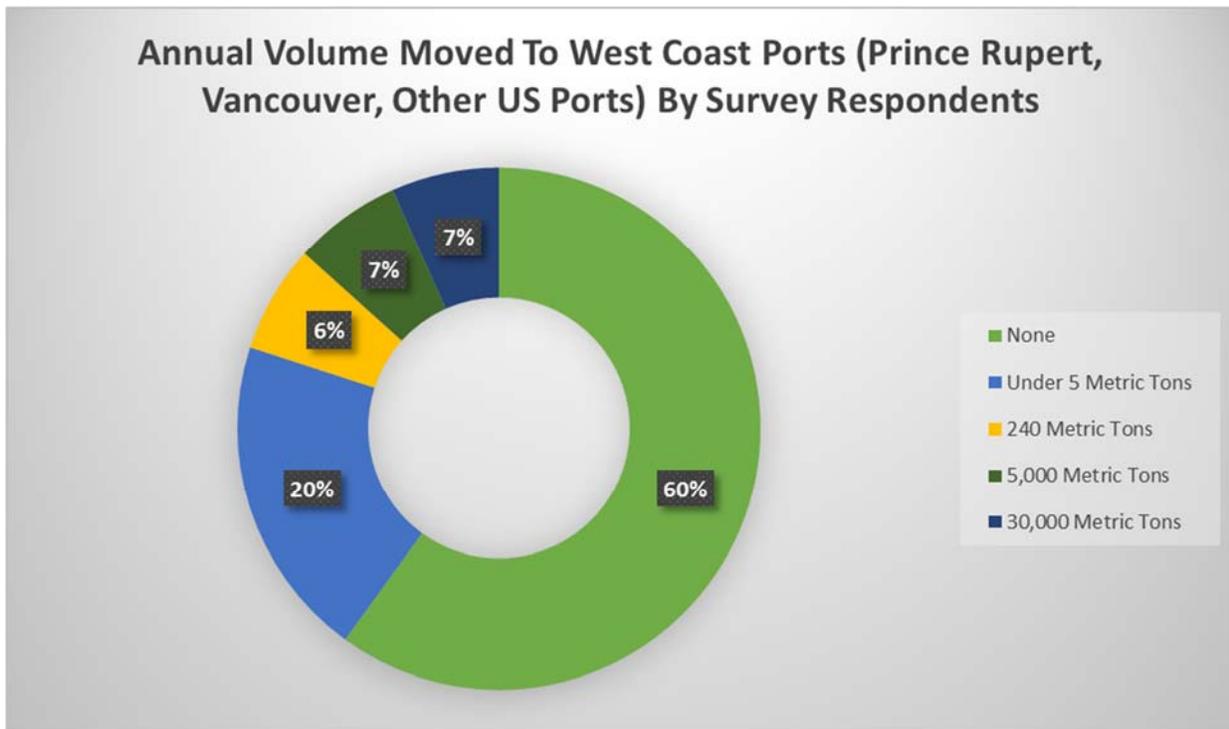


FIGURE 4: ANNUAL VOLUME MOVED TO WEST COAST PORTS BY SURVEY RESPONDENTS

Some interviewed companies do not export products overseas at all for the following reasons:

- Transit times are too long for “raw agricultural products” and the quality will degrade or rot in containers
- The availability of cost competitive product in local overseas markets
- Is not targeting business growth through exports (out of either Canada or North America) at this time

Barriers that were identified to using the Port of Prince Rupert:

- Perceived competitive rates to move to and from southern Alberta on CN to Prince Rupert (two-line haul vs. perceived rates of a single line haul to Port of Vancouver on CP)
- Perception that less steamships call on Prince Rupert
- Lack of marine container availability in Alberta
- Container stuffing is currently executed in the lower mainland in the Vancouver region
- Lack of knowledge of what the Port of Prince Rupert can offer
- They have just always gone through Vancouver and that seems to have worked for them in the past and they assume that it is the best or only option

Respondents’ indicated support for the potential of having Prince Rupert as second option for shipping exports:

- Having an option for when there are disruptions or delays in the Vancouver region and corridor
- Diversifying their shipments depending on what equipment is available
- Shortening the vessel shipping time to get to final destination
- Avoiding delays due to congestion
- Growing volumes for their products will require more options for shipping

When asked about loading intermodal containers at their locations or in the Alberta region, three companies indicated that they had explored this option but that they experienced certain limitations and restrictions that included:

- Containers (20 foot) can only be partially loaded to about 21 to 22 tonnes for travel by rail through the mountains while the weight restriction for the same container on the sailing vessel is 27 to 28 tonnes. The container assets are not maximized, and shipments of the product will require more containers to carry the same weights as seagoing containers
- Lack of container availability
- There are stuffing facilities in the lower mainland that already can provide this service. Their product is shipped in a rail hopper car to the stuffing facility which allows the shipper to maximize the weight in the container for marine shipment

The producers interviewed were open to the option of using Prince Rupert if there was enough stuffing capacity at the port, with the added advantage of less congestion at the port to get the container on the vessel. Once the container is stuffed in the Vancouver region, it still has to be trucked to the port for loading on the vessel, adding another leg in the transportation chain with potential delays. The development of stuffing capacity in Prince Rupert would expand the opportunity to export pulse grains from Alberta.

Interviews indicated that the pulses are products that can be best moved in containers. These products are generally handled in much smaller quantities than the traditional grains of wheat and barley. Pulses move in rail hopper cars to a location proximate to the port where they are then stuffed in containers, which in turn are moved by truck where they are loaded onto intermodal container ships. If the Port of Prince Rupert can offer this same stuffing service, the consensus from these companies that ship pulse grains is that they will use Prince Rupert in addition to Vancouver.

The traditional grains suppliers of wheat and barley are much less likely to move product by container. They already have efficiencies with moving their product in rail hopper cars directly to the port and transferred into cargo holds on grain ships. While these companies are unlikely to move traditional grains by containers, these companies are open to use the Port of Prince Rupert in addition to Vancouver to ship traditional grains using hopper cars.

Transportation Capabilities & Capacity

To take advantage of the potential increased volumes of pulse products from Southern Alberta, it is recommended that the Port of Prince Rupert establish an efficient container stuffing facility at the port. Due to the lower weight restrictions imposed by the railways on containers moving by rail compared to the weights allowed for the same containers once loaded on ocean vessels, it is unlikely that containers will be stuffed in Alberta to any significant degree. For operational reasons it is unlikely that this restriction on total weight for containers will be relaxed by the railways. As a consequence, rail hopper cars will be required to move the pulse product from the elevators for stuffing at the ports into containers. This constraint should be the subject of a discussion between the railways and the shippers of pulses in southern Alberta. If this constraint could be resolved through operational, equivalent or other technical means, the stuffing of containers at source would create greater efficiencies in the pulse to world market supply chain.

The more conventional grains, such as wheat and barley, are less likely to be transferred into containers either at the source in Alberta or at the port simply based on the economies of scale for moving those grains on ocean vessels. The only way this could change is if the overall cost to move the product from start to finish by container can compete with moving conventional grains in bulk compartments on the vessels. (The respondents contacted did not believe that this could be achieved based on results of their recent cost studies).

Rates and Cycle Times for Prince Rupert Compared to Other Ports

The rail cycle times from Southern Alberta to the Port of Prince Rupert compared to the Port of Vancouver are very similar. In general, railcars arrive in Vancouver from Calgary via CP faster than railcars from Calgary via CN to either Vancouver or Prince Rupert. This is mainly due to the shorter mileage to Vancouver from Calgary on CP (see map below):

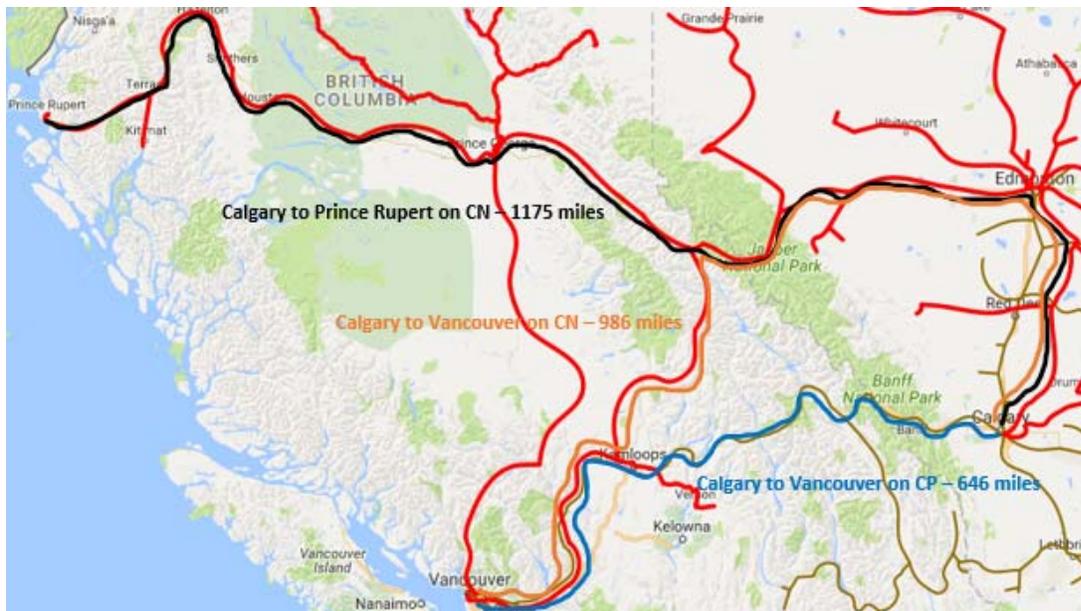


FIGURE 5: MAP OF RAIL LINES BETWEEN WEST COAST AND ALBERTA

The table below shows the average hours from cut off times for four western Canadian cities for intermodal shipments to vessels at selected ports. In-gate to vessel departure times are the times provided by the railroads where the containers have to be in-gated (i.e. arrive for shipment at the intermodal facility with proper billing) for shipment to the port. This arrival time is needed to ensure that the container will make its schedule vessel departure time. The averages are calculated based on the data from CN and CP websites in mid-August 2016.

AVERAGE IN-GATE TO VESSEL DEPARTURE TIMES – CALGARY TO WEST COAST PORTS (HOURS)

	CN	CN - VANCOUVER			CP - VANCOUVER		
	<i>Prince Rupert</i>	<i>Vanterm</i>	<i>Centerm</i>	<i>Roberts Bank</i>	<i>Vanterm</i>	<i>Centerm</i>	<i>Roberts Bank</i>
CALGARY	124	170	191.2	104.2	119.1	124.5	104.7
EDMONTON	84	130	130.6	71.5	135.1	149	130.7
WINNIPEG	119	119	119	94	148	136.2	137.3
SASKATOON/REGINA	133	147	N/A	127.2	151	138.6	140.3

*Saskatoon for CN and Regina for CP

FIGURE 6: MAP OF RAIL LINES BETWEEN WEST COAST AND ALBERTA

	AVERAGE	AVERAGE (NOT INCLUDING P.R)	PRINCE RUPERT VARIANCE (HOURS)
CALGARY	134	135.6	-11.6
EDMONTON	118.7	124.5	-40.5
WINNIPEG	124.6	125.6	-6.6
SASKATOON/REGINA	139.5	140.8	-7.8

FIGURE 7: AVERAGE IN-GATE TO VESSEL DEPARTURE TIMES

With respect to in-gate to vessel departure times, Calgary is competitive with other western Canadian markets for exports via Prince Rupert. Due to its geographic location in relationship to Prince Rupert, Edmonton does have the shortest in-gate to vessel departure time. Saskatoon/Regina has the longest in-gate to vessel departure time due to not having trains originate in those cities and shipments needing to be picked up on already existing trains from the east that have available space.

The Port of Prince Rupert has very comparable in-gate to vessel departure times for the export of intermodal containers for shipments originating in Calgary (124 hours) to a number of the Vancouver Port terminals. Vanterm (104.7 hours) for CP and Roberts Bank (104.2 hours) for CN have earlier in-gate to vessel departure times.

Exports from western Canada via the Northwest Seaport Alliance (Seattle /Tacoma) or the Port of Portland in the USA require an interchange between either CP or CN and US hauler, thereby adding a minimum of an extra day to the transit time. Additionally, the distance is a little further than Vancouver so the in-gate to vessel departure times are going to be significantly longer than each of the locations provided above. A detailed chart of transit and cut off times is displayed below:

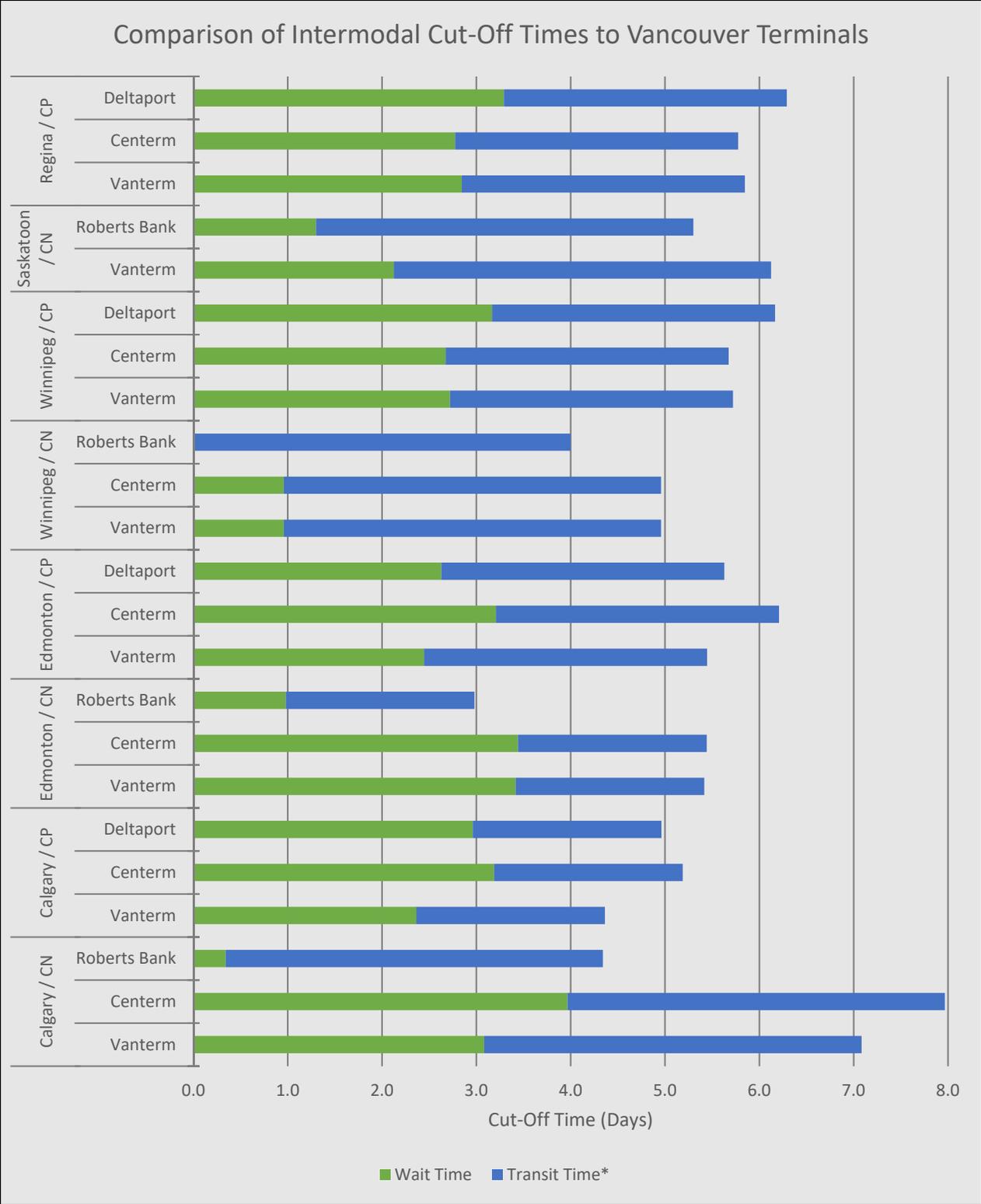


FIGURE 8: COMPARISON OF INTERMODAL CUT-OFF TIMES TO VANCOUVER TERMINALS

* Transit Times estimated to the nearest day. The wait time for Winnipeg to Roberts Bank via CN is less than a full day based on published averages, therefore is not included in this graph.

For products entering Canada through Prince Rupert, Calgary is not at any major disadvantage compared to a similar movement through the Port of Vancouver. The charts below demonstrate that the Port of Prince Rupert is very competitive for shipments destined to both Chicago and Toronto/Mississauga:

TRANSIT TIMES TO CALGARY THROUGH WEST COAST PORTS

NORTH AMERICAN PORT	ORIGIN PORT			DESTINATION CITY	RAILROAD
	<i>Shanghai</i>	<i>Singapore</i>	<i>Busan</i>	<i>Calgary</i>	
PORT OF PRINCE RUPERT	9 days 18 hours	13 days 21 hours	8 days 18 hours	2 – 3 days	CN
PORT OF VANCOUVER (CENTERM OR VANTERM)	10 days 16 hours	14 days 18 hours	9 days 15 hours	3 – 4 days	CN
PORT OF VANCOUVER (DELTAPORT)	10 days 16 hours	14 days 18 hours	9 days 15 hours	2 days	CN
PORT OF VANCOUVER	10 days 16 hours	14 days 18 hours	9 days 15 hours	2 days	CP

FIGURE 9: TRANSIT TIMES TO CALGARY FROM WEST COAST PORTS

The geographic location of the Port of Prince Rupert creates an average of about 21 hours faster transit time from Asian markets to destination than the Port of Vancouver. This results in a faster total transit time (combination vessel and rail), on average to Calgary as compared to the Port of Vancouver.

Pricing from Calgary to West Coast Ports and Beyond

Several sources were approached for pricing of movements of product from Calgary to west coast ports. The pricing received from Cosco, Hanjin and OOCL ranged from \$1600 to \$1900 for a twenty-foot container and from \$2000 to \$2500 for a forty-foot container. Additional fuel surcharges are levied by the railway on top of the container rates quoted by the steamship lines set out above. The fuel surcharge for export through Prince Rupert will be greater since Prince Rupert is further than Vancouver from Calgary.

Potential for Increased Volume of Product for Export

There are definitely some opportunities in southern Alberta for increases in volume for export products. However, given the current volumes for agricultural products (pulses), these rail movements are more likely to occur in regular rail hopper cars to the port for export (where they are stuffed into containers). Based on interviews it is anticipated, that the Pulse Grain Industry will continue to grow with volume expected to double out of Alberta in the next ten years.

Concerns were expressed by some respondents that the Port of Vancouver may not be able to handle increase in volume and consequent increase in traffic, due to congestion as well as the capacity at the current stuffing facilities in the lower mainland. Additionally, more grain hopper cars would be required to move the crops to these stuffing facilities. The Port of Prince Rupert has a large opportunity to

increase hopper car shipments assuming that container stuffing (at high volumes) can be provided on site in the port region.

For 2016, the total pulse production in Alberta was 2,886,500 tonnes which represents 34.2% of Canada's total production⁷. With 85% of Canada's production being exported,⁸ it is estimated that Alberta's export availability for pulses was 2,453,500 tonnes in 2016. In 2016, Alberta accounted for approximately 23.15% of all of the seeded pulse crops in Canada (by hectares)⁹.

An average of 60% of Alberta's production of dry peas was concentrated in the Southern Alberta region, 21% in the Central Alberta region and 19% in the Northern Alberta region over the period 2011-2015. On average over 94% of Alberta's production of lentils occurred in the Southern Alberta region over the same period.

The increased opportunity for stuffing of pulse products containers at west coast ports, depends on a number of factors including:

1. Expected increases realized in the pulse crop markets.
2. Throughput of current and future stuffing facilities at the west coast ports.
3. Business case decision by pulse shippers based on their assessment of 1 and 2 above.

Equipment and Capacity Availability on the Railroads

Currently, there is a massive difference between loaded ocean containers moving from West to East as opposed to East to West in Canada. All of the major shipping companies report that there are more import loaded containers moving inland from the west than export loaded containers from Canada to Asian markets. There are many empty containers that move from locations inland back to west coast ports that are available for loading for export. The CN line from Edmonton to Prince Rupert also has the physical capacity to move more product. In a 2015 study entitled "Capacity and the Future of Rail Infrastructure," Dr. Malcolm Cairns observed that "It is clear that CP and CN have provided sufficient rail capacity to meet the challenge of serving overall demand for several decades". Cairns states that this holds true for both access to Vancouver and Prince Rupert as both CP and CN have "kept pace with the demands of the national economy and matched real GDP growth".¹⁰ Both CP and CN have increased their efficiencies over the past few years leading to enhanced capacity as the velocity of the assets increases. It is difficult to predict the overall system capacity requirements as the market demand for certain commodities could strengthen or weaken. For example, if energy products experienced a sharp increase in traffic to Prince Rupert, this could affect the overall capacity assuming all other commodities remain constant in volumes. The railroads monitor this very closely and respond with capital projects that help accommodate future growth to ensure that they can handle the extra volume.

⁷ <http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=10010>

⁸ <http://www.pulsecanada.com/pulse-industry/market-access>

⁹ <http://www5.statcan.gc.ca/cansim/a26>

¹⁰ https://www.railcan.ca/assets/images/events/RGI_2015/Malcolm_Cairns_Presentation.pdf

Transloading Facilities in Southern Alberta

Research was conducted on transloading facilities in southern Alberta to determine the scope of their current operations and what products they could potentially transload in addition to what commodities they currently handle.

There are several operators that currently transload agricultural products who advise that there are ample opportunities in southern Alberta for stuffing containers, if the producer/shipper can make it work financially as well as efficiently.

Several pulse market shippers currently experience a disadvantage when loading containers to move by rail, due to the operational weight restrictions placed by the railways of 21 – 22 tonnes. (The same container can be loaded closer to the port with 27 – 28 tonnes for marine transportation.) Through discussion between the shipping industries and the railways, a way, perhaps, can be found to resolve this weight restriction through technology, equipment or operational practices. Under such circumstances, there would be a larger potential for containers to be loaded in Alberta for movement on rail for delivery onto the container ships at the west coast ports.

Opportunities

Opportunity Type	Export	Import
Market Growth	A1. Strong growth in Agriculture Exports	B1. Low Volumes of Imported Containerized Products
Market Access	C1. Container stuffing at the West Coast ports to Overcome Weight Restrictions	D1. Container Availability for Export as Alberta is a Net Importer of Intermodal Freight
	C2. Consolidate Shipping for Smaller Shippers	

A1. Strong growth in Agriculture Exports

Growth in Agricultural exports from Alberta is expected to remain strong, increasing demand for freight transportation services and export capacity.

B1. Low Volumes of Imported Containerized Products

Due to the low volumes of imported specialty crops, there are currently few opportunities to expand services for imports.

C1. Container Stuffing at the West Coast Ports to Overcome Weight Restrictions

Due to weight restrictions, loading product in the Calgary region is limited to 22 metric tonnes per container. Container stuffing at the west coast ports would enable shippers to load more product per container, reducing the number of containers required. The research indicates that shippers would be receptive to a choice of ports for export of pulse products to Asian markets.

C2. Consolidate Shipping for Smaller Shippers

Creating a consolidation point in southern Alberta for smaller shippers would enable new entrants into international export markets. This would create additional export volume for the port while increasing Alberta exports to international markets.

D1. Container Availability for Export as Alberta is a Net Importer of Intermodal Freight

Increasing intermodal exports from southern Alberta may help to correct the current imbalance found between exports and imports. As there are currently identified surplus containers for exports, shippers, railways, and the container owners would benefit from more competitive container rates leading to higher export volumes.

Summary

There are many opportunities in the southern Alberta region for moving increased agricultural products through west coast ports. A large volume of product in the pulse markets already exists and continued growth is projected. Wheat and barley will continue to move in rail hopper cars for transfer directly into the holds of ocean vessels. There are potential export customers who see export through the Port of Prince Rupert as a viable opportunity as well as insurance that they are not dependent completely for exports on the Port of Vancouver. Exports of pulses and grains via Prince Rupert face the following hurdles to overcome:

- Changing the perception of Prince Rupert as only a northern gateway for northern Alberta shippers
- Southern Alberta shippers' awareness of Port of Prince Rupert capabilities is low
- Volume or tonnage allowed in containers for maximizing efficiencies
- Capacity to transload in Prince Rupert should products be shipped in conventional rail hoppers
- A competitive overall price to entice shippers to use this alternative

Calgary is a competitive location in Western Canada as far as accessing the west coast ports. Prince Rupert has very competitive in-gate to vessel departure times compared to each of the other terminals in the Port of Vancouver. The Port of Prince Rupert can definitely leverage these advantages when seeking out new business. In addition, Prince Rupert can also point to shorter sailing time as an overall advantage to getting products to destination from Western Canada.

The overall rates (vessel and rail) were found to be comparable whether moving products from southern Alberta to any of the Port of Vancouver terminals compared to Prince Rupert. An analysis of the rates was developed using general market assumptions: the actual rates received by customers may vary based on signed contracts with the steamship lines.

Based on the receptiveness from several shippers, the Port of Prince Rupert should discuss the expansion of container stuffing capacity with potential shippers. To facilitate this, pricing would need to be provided by the railway to ensure that shipping less volume in container by rail can still compete with shipping in conventional rail hoppers. As such, these containers could be stuffed in southern Alberta to provide a back haul option for these otherwise empty containers.

Shippers are advised to refer to the following website to assist with the development of their exports.¹¹ This site can help a company (whether small, medium or large) that is unsure of how to proceed when

¹¹ <http://www.albertacanada.com/business/export-your-products.aspx>

developing a plan to grow their business through exports. This site provides advice as to tariffs, costs, shipper and buyer contacts, freight forwarders, equipment and permits required, etc.

Additionally, it is also recommended that the west coast ports investigate a system of consolidation whereby multiple shippers could share containers moving product to the same Asian markets. This would assist future market access and growth by a number of smaller shippers who may not have the market penetration to initially sell full container loads. A consolidation point could be created in the Conrich region, thereby being very accessible to the CN intermodal yard while at the same time, providing easy access from Southern Alberta and the Calgary region by road for local shippers.

Van Horne Institute

The Van Horne Institute is recognized within Canada and internationally as a leading institute of public policy, education, and research in transportation, supply chain and logistics, regulated industries and Information and Communication. The Institute is incorporated federally as a not-for-profit organization, and is proud to be affiliated with the University of Calgary, The University of Alberta, SAIT Polytechnic, and with Athabasca University. Its Board of Directors bring together the experience and knowledge of a broad group of individuals representing all facets of the transportation industry, government, and the academic community that have an interest in transportation, logistics, and related regulatory issues. For additional research studies, events, courses and education please visit www.vanhorneinstitute.com.

Triskele Logistics Ltd.

Triskele Logistics is a supply chain consulting company that enables its customers to achieve cost reduction and efficiency in their supply chain. In addition, we manage projects and complete supply chain research using our industry knowledge, connections and expertise. Founded in 2013 by Corrie Banks, Triskele applies simple, efficient change methodologies to work with you to achieve your vision and execute your projects. From strategy to project execution to sustainment, Triskele Logistics brings it all together.

For more information on Triskele Logistics please visit www.triskelogi.com

JRSB Logistics Consulting Ltd.

Jim Brown is a private Logistics Consultant. Born and educated in Montreal, Quebec he began his transportation career with C P Rail in Montreal 1969 and transferred to Calgary in 1977 with C P Ships. Joined DB Schenker of Canada Ltd (International Freight Forwarder & Customs Broker) Calgary in 1984 and retired in 2012. An extensive background in Projects for the Oil & Gas Industry, as well as an understanding of the current Geographic constraints of ports and the proposed Port Gateways being considered for future development.