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Cascadia Border Operations, Issues, and Consequences for the Agrifood Market

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Abstract

In this paper we present a profile of US/Canada border operations in the Western Cascadia Region, which lies between the Greater Vancouver and Puget Sound megacities. We show how this border is distinct from the more commonly discussed US/Canada border between New York, Michigan, and Ontario, in that commodities are typically less time sensitive, and a larger proportion of trips are made intra-regionally. Border procedures are described, as well as current programs for expedited crossings. Results from qualitative interviews with shippers are also presented and discussed, which show the supply chain's current responses both to mean border crossing delay and the variability of these crossing times. Finally, we consider the consequences of these responses for the agrifood industry in Cascadia, for whom the consequences of delay and variability of delay are more significant.

Introduction

The U.S. and Canada are each others' largest trading partners, with the value of trade between the two the highest between any two countries worldwide. For the United States, trade with Canada is larger than that of the European Union countries combined (FHWA, 2002). Canada's international trade is strongly biased toward the U.S. which accounts for nearly 75 percent of the former's trade in goods (Ontario Chamber of Commerce (OCC), 2005). The long land border favors surface modes of transport. In terms of total trade (north-bound and south-bound combined), trucking is the most important mode of transport both in terms of tonnage and especially value, with modal shares of truck transportation comprising almost 62 percent of value, with a just over 35 percent share of weight (Bowen & Slack, 2007).

US-Canada trade agreements opened a new era in the way the two countries interact with one another, with cross border regional linkages playing an instrumental role in the process of North American integration. Settlement and development of the U.S. and Canada largely occurred in an east-west direction. The national transportation infrastructure of both countries remained heavily oriented for east to west and west to east movement of goods and people involved in interregional trade and commerce. However, first the FTA, and then, more importantly NAFTA, made a point of reducing tariff barriers and had the effect of creating a set of logistical relationships around border regions and new latitudinal corridors of freight distribution so that a North American economy emerged that is north-south in orientation. The liberalization of cross border trucking began in late 1980s (Woudsma, 1999), which in turn helped make the industry on both sides of the border more efficient. Both trucking and rail freight have been

transformed by 'continentalization' of the North American market (Heaver, 1993). US and Canadian transportation infrastructure was primarily developed for this East-West pattern of trade, and the development of these North-South trade corridors has strained the relatively weak North-South infrastructure corridors and connections.

Background

North American freight distribution systems are adapting to global trends in economics and transport geography that work towards reducing costs and improving efficiency. At the same time, increased growth in trade has placed greater pressure on international gateways. The distribution of U.S. trade with Canada and Mexico and the movement of this freight impact the U.S. transportation network, in particular major border entry points and north-south highway corridors. In 2005, Texas, Michigan, and California were the top three states accounting for nearly 40 percent of the total value of the origin and destination in goods trade, the latter with $80 billion. Two of the four largest U.S. land ports are in Michigan (Detroit and Port Huron). These two ports combined handled over $198 billion of freight in 2005. This activity is larger than the $96 billion of land trade for which Michigan is the origin or destination as these ports serve as trade gateways for all states nationwide (BTS, 2006). Between 1994 and 2000, U.S. trade with Canada grew by 8.9 percent (BTS, 2001). For the U.S. transportation system, the volume of freight has grown substantially in recent decades, and is projected to increase nearly 50 percent between 2005 and 2020 ((FHWA, 2002; Jones, Murray, & Short, 2005)).

At the same time, the liberalization of trade policies, such as NAFTA, internationalization of supply chains, and changes in transportation and information technologies have contributed to this increase in freight movement. North-south traffic between the United States and Canada, fostered by NAFTA, has placed increasing demands on the domestic freight transportation system. U.S.-Canada trade has grown by 152 percent since 1989 (growth in commercial traffic of 122.5 percent) and trucks move just over 70 percent of the value of exports from the U.S. to Canada (BTS, 2001). As a result, the nation's highway and rail networks, initially developed for the traditional east-west trade, are now strained, especially at border crossings such as those between Whatcom County and the Lower Mainland of British Columbia (see Figure 1) which includes the Blaine, WA crossing, the focus area of research.

Figure 1: Border crossings between Whatcom County, Washington and the Lower Mainland of British Columbia (maps.google.com)

Figure 2 shows truck volumes at the 5 US/Canadian crossings with largest annual truck volumes in 2006. Notice the order of magnitude difference between Blaine, the largest western crossing, and the largest crossing overall. Notice also the typical end of the year depression in volumes.

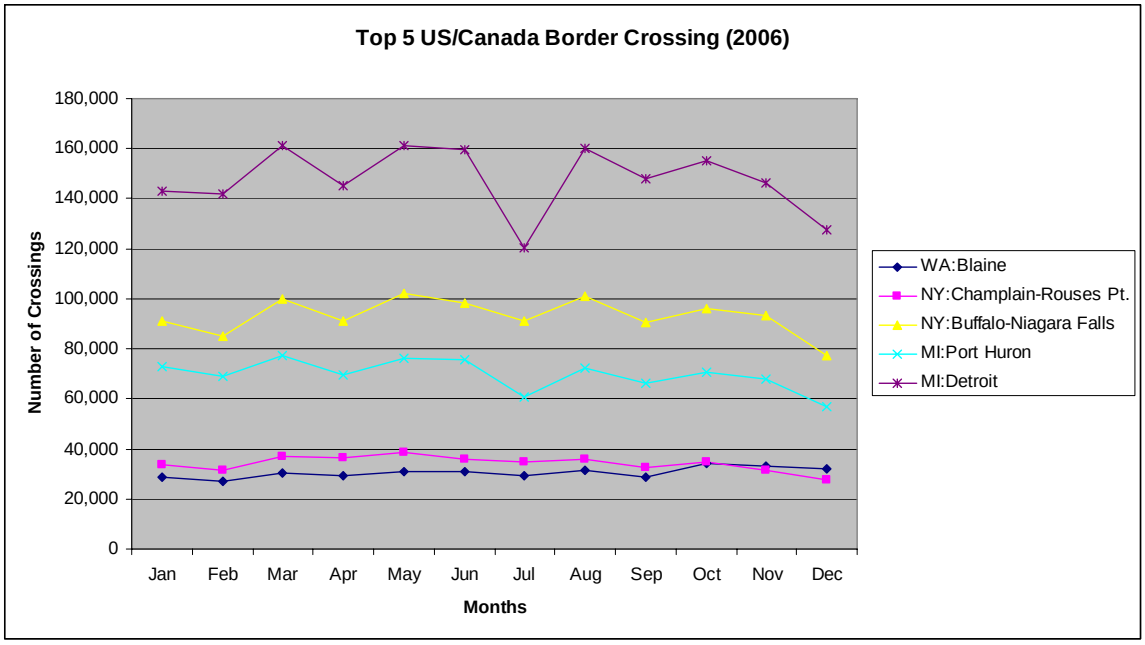

Figure 2: Truck volumes at the Top 5 US/Canadian crossings (BTS & U.S. Department of Transportation, 2006)

These volumes are surprisingly similar to the volumes at the top 5 US/Mexican crossings (shown in Figure 3) for the same year. With Laredo and Detroit having similar volume, and Blaine and Calexico East.

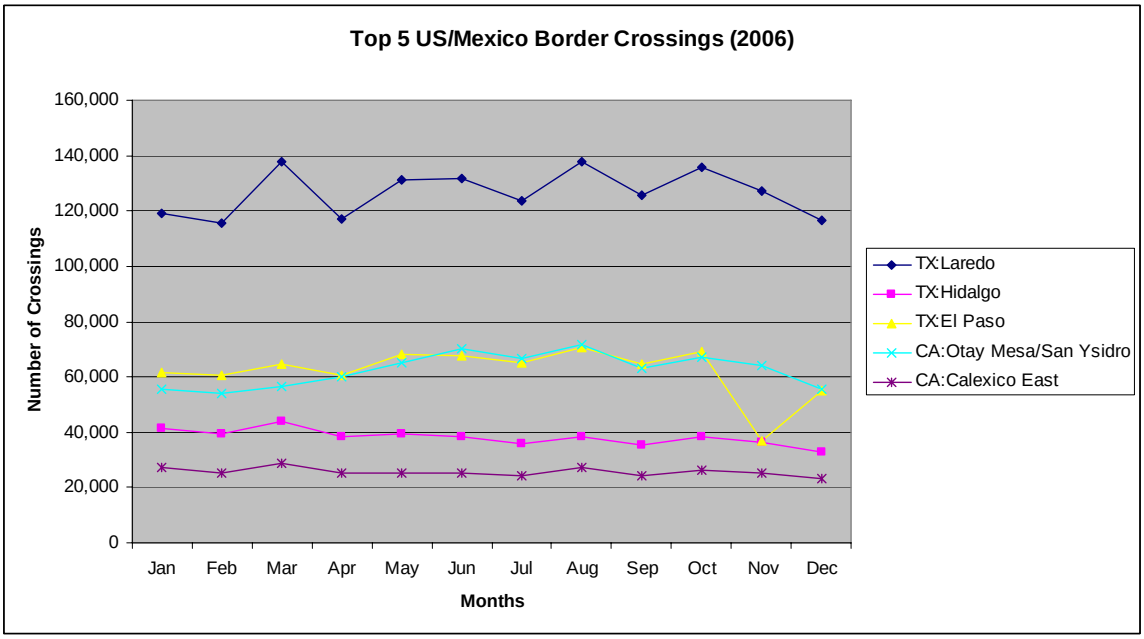

Figure 3: Truck volumes at the Top 5 US/Mexican crossings (BTS & U.S. Department of Transportation, 2006)

Again, these volumes dip in December but also show a stronger late summer/fall peak.

Commodity and Origin/Destination Data

During the week of June 4 through June 10, 2006, all southbound manifests were collected for commercial vehicles crossing the border at Blaine, Washington by the Whatcom Council of Governments (IMTC, 2006). Table 1 and Figure 6: Southbound vehicle commodity data, June 2006 summarize the commodity and origin destination data for this sample of vehicles. This data shows the predominant pattern for southbound vehicles is an origin in the West Lower Mainland (93.2% of vehicles), and a destination in the Western United States (78.2%). Essentially all vehicles originate in the greater Vancouver area. The destination of vehicles is somewhat more dispersed, but approximately 50% of the vehicles are destined for Western Washington, primarily the Puget Sound. The approximate distance between the greater Vancouver region and the Puget Sound is 150 miles, and 300 miles round trip. With current travel speeds, congestion, a drop-off and pick-up, and the border crossing, this trip can be completed by a trucker in full day of work. Most of these regional truckers live regionally and spend the night at their home base.

Destination		Origin							
		West Lower Mainland	*Rest BC*	*Alberta*	*East Lower Mainland*	*Whatcom County*	*West Canada*	*East Canada*	**Total**
	Alaska	0.1%		0.1%					**0.2%**
	East Canada	0.1%							**0.1%**
	Whatcom	10.5%	0.6%	0.2%	0.1%	0.1%		0.1%	**11.6%**
	Puget Sound	34.9%	0.7%	0.8%	0.2%			0.4%	**37.1%**
	West WA	4.4%	0.2%	0.1%					**4.8%**
	East WA	3.2%							**3.2%**
	West USA	28.4%	1.7%	0.7%	0.1%	0.1%	0.1%	0.1%	**31.0%**
	Rest USA	11.6%	0.4%						**12.1%**
	TOTAL	**93.2%**	**3.7%**	**1.9%**	**0.4%**	**0.2%**	**0.1%**	**0.5%**	**0.2%**

Table 1 Southbound vehicle origin and destination data, June 2006 (International Mobility and Trade Corridor Project, 2007)

Figure 6 shows the commodity profile of the southbound vehicles from the same manifest sample. The largest type is empty vehicles. The largest commodity is wood products, then agricultural products and paper products. This is a very different profile from Eastern US/Canada border crossings, due to Pacific Northwest resources, manufacturing base and economy. Although Canada and the U.S. share a long border, trade and trade flows are concentrated at a small number of crossings. Over 60 percent of Canada-US trade occurs at the top three crossings: Windsor, ON-Detroit, Sarnia, ON-Port Huron, and Fort Erie, ON-Buffalo, NY (Transport Canada, 2003). At these largest crossings, the trade is largely described by the collaborative relationship of the complex, cross border production systems. Goods flow across the border, not as finished goods, but part of a continental network of supply chains that cross national borders. For example, a quarter of the more than a billion and a quarter dollars of goods cross the US-Canada-Mexico borders daily is automotive: "we don't sell cars to each other, we build them together" (Blank, 2008). These economies are deeply integrated, and supply chains are bilateral and trilateral in scope and integration:

> "The supply chains that span the U.S.-Canada border are unique in the global context. They are heavily reliant on land transportation that travels primarily through just a handful of key border crossings. Major shipments are routinely timed for delivery within hours, and sometimes to the minute" (Webber, 2005).

The Western Cascadia border, however, presents a different picture, with food, wood, and paper products being the primary commodities. The majority of these are not particularly time sensitive, nor are they moved across the border as unfinished goods, rather the border is crossed with finished goods being delivered to market.

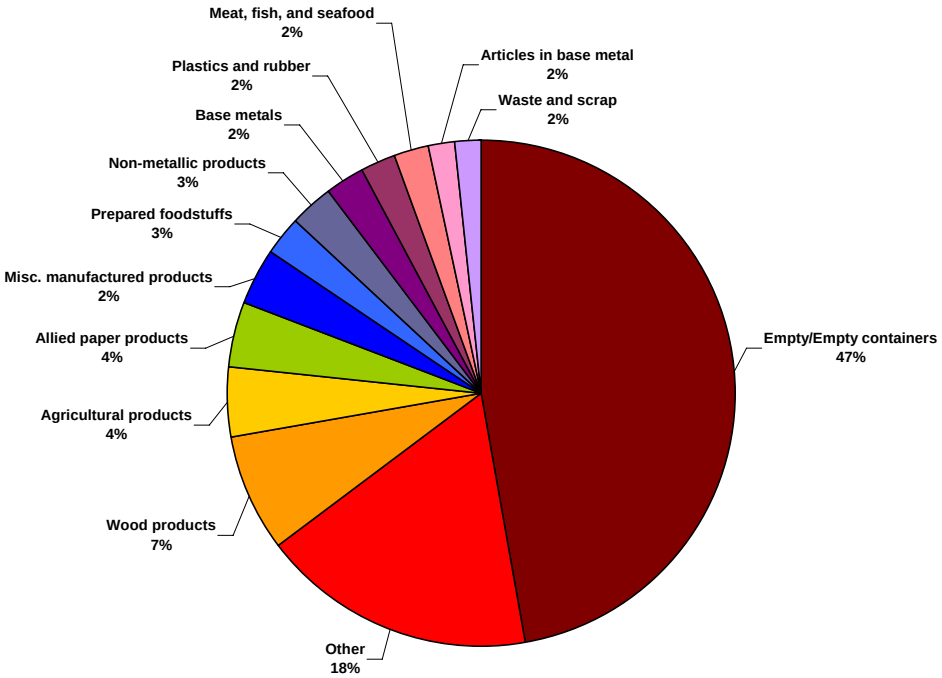

Figure 6: Southbound vehicle commodity data, June 2006 (International Mobility and Trade Corridor Project, 2007)

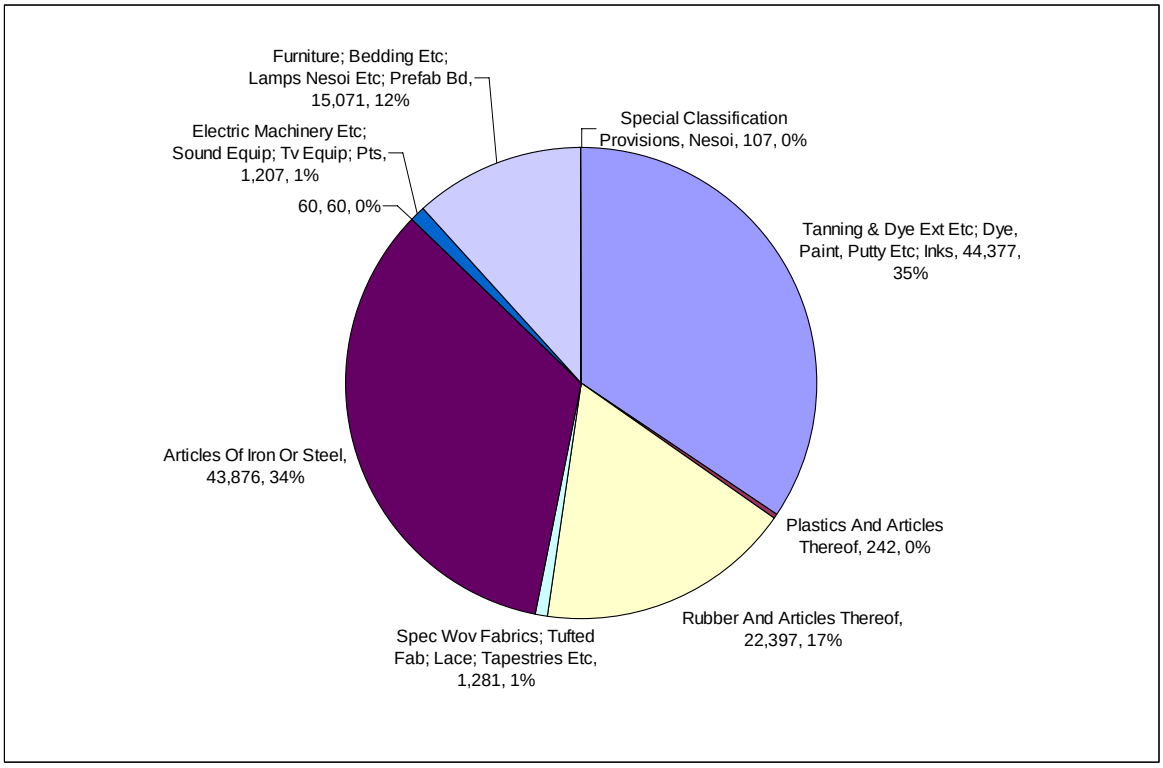

Figure 7: Champlain-Rouses Point, NY Southbound vehicle commodity data (U.S. Census Bureau, 2008)

For comparison, Figure 7 shows the commodity profile for the Champlain-Rouses, NY border crossing. This data excludes empty vehicles. Clearly, the commodity profiles are different, with this crossing primarily moving unfinished manufactured goods.

British Columbia Ministry of Transportation loop detector data is used to understand the rate of truck arrivals at the southbound border crossing at Blaine, Washington (IMTC, BCMoT, & WSDOT, 2008). Figures 8,9,10 show the typical daily arrival pattern southbound at the US/Canada border. This summarizes weekdays between 8:00 and 20:00 for the period of year 2007 and loop detector BC-MoT 15-907 (approximately 6,000 feet north of the border). The number of arrivals is the average number of arrivals observed in each 5 minute interval. Volume typically peaks early in the day with a quiet period after that and a smaller peak in the early afternoon, and a slow decline in volume starting in the late afternoon.

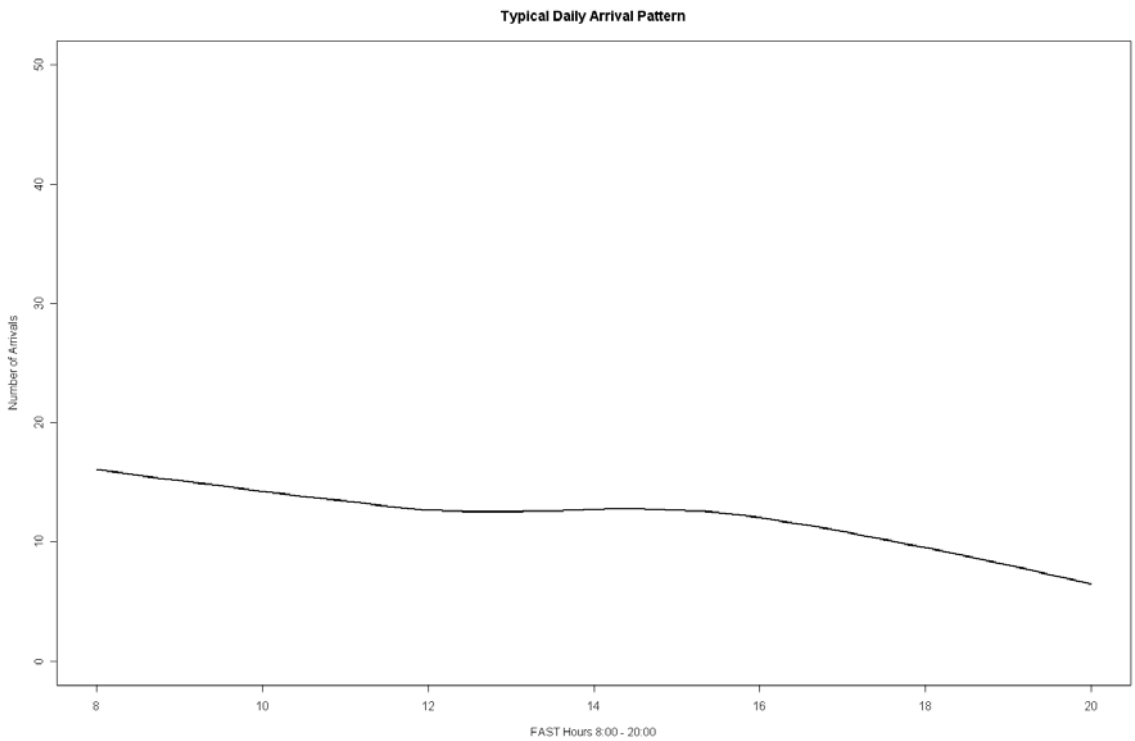

Figure 8: Typical Daily Arrival Pattern during FAST hours

The observed daily variation in arrivals for the same period is shown in Figure 9.

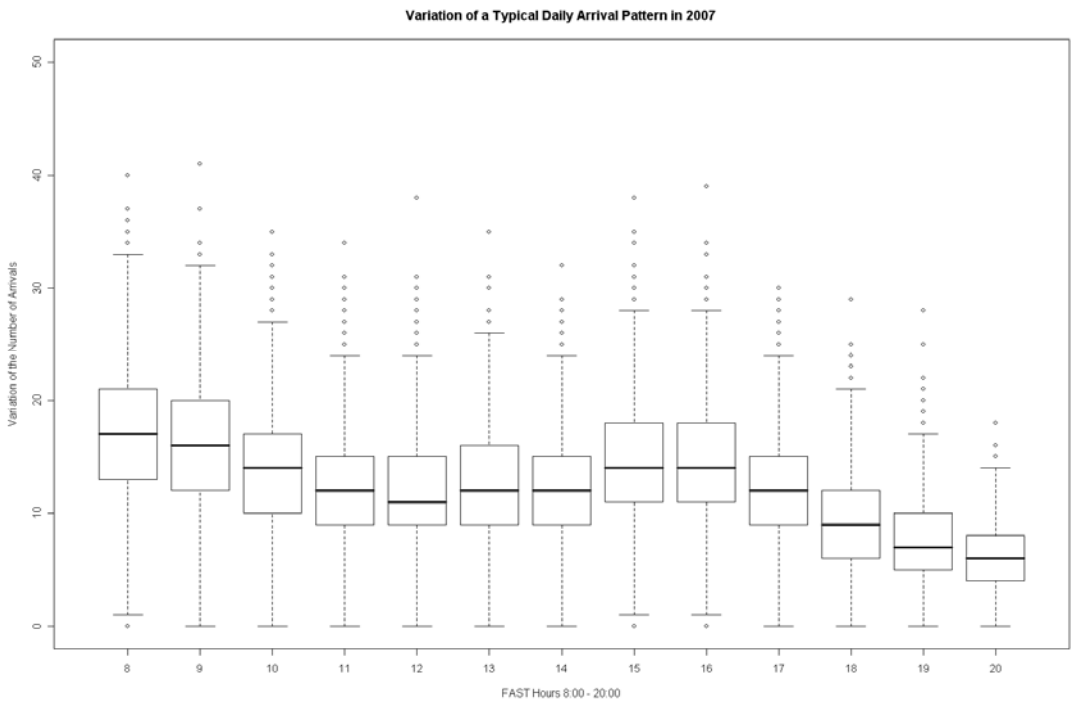

Figure 9: Variation of Hourly Arrival Pattern during FAST hours

Figure 10 shows the observed average and variation by month, again for southbound traffic at the Blaine, WA crossing. We can observe the lower than average volume in January and the spring months, and higher volumes in the summer and fall period due to agricultural productivity and retail shopping season.

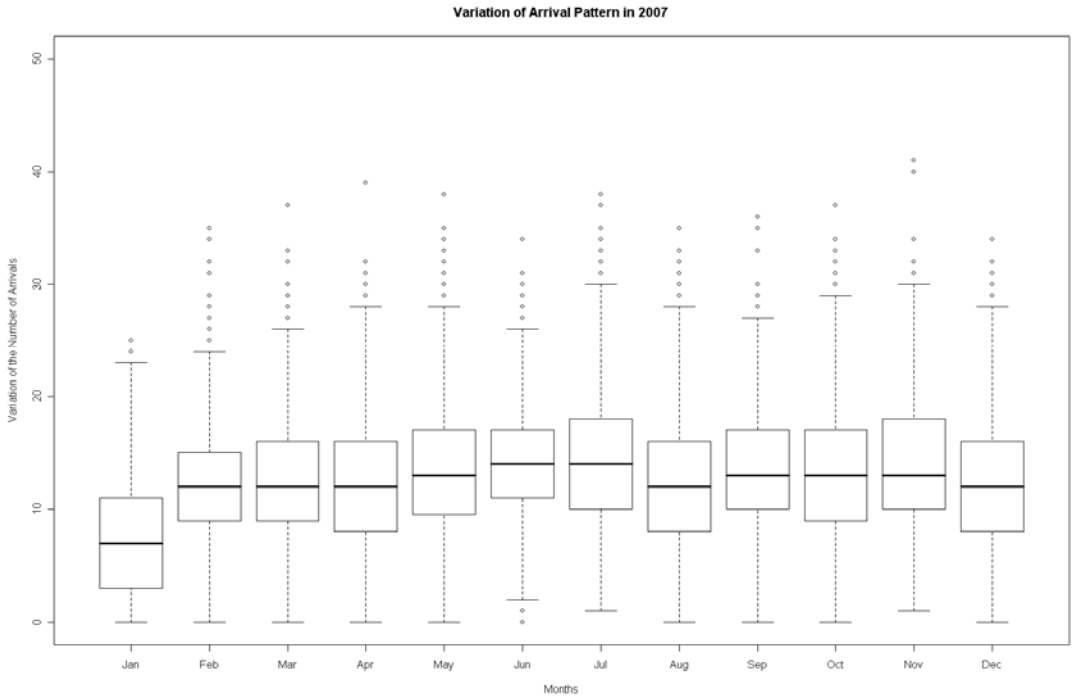

Figure 10: Variation of Monthly Arrival Pattern during FAST hours

Border Operations and Programs

The border crossing process from Canada to the United States at Blaine, Washington is described in the schematic figure below. The northbound crossing, into Canada, is similar, but does not include a radiation and VACIS inspection for all vehicles. In both the northbound and southbound cases there are primary and secondary inspections. All vehicles arrive at the border and first travel through a radiation portal monitor. Prior to this, they may experience some delay. The average and standard deviation are shown for FAST approved and not FAST approved vehicles. The FAST program is described in the box below. Following the RPM vehicles move to primary inspection, where they are reviewed by Customs and Border Protection (CBP), Immigration, the Food and Drug Administration (FDA), and an Agricultural Specialist. All vehicles then travel through the Vehicle and Cargo Inspection System (VACIS). Some vehicles are required to go through a secondary inspection before being released. There are various reasons for secondary inspection, vehicle selection for secondary inspection is at the discretion of any of the regulatory agencies.

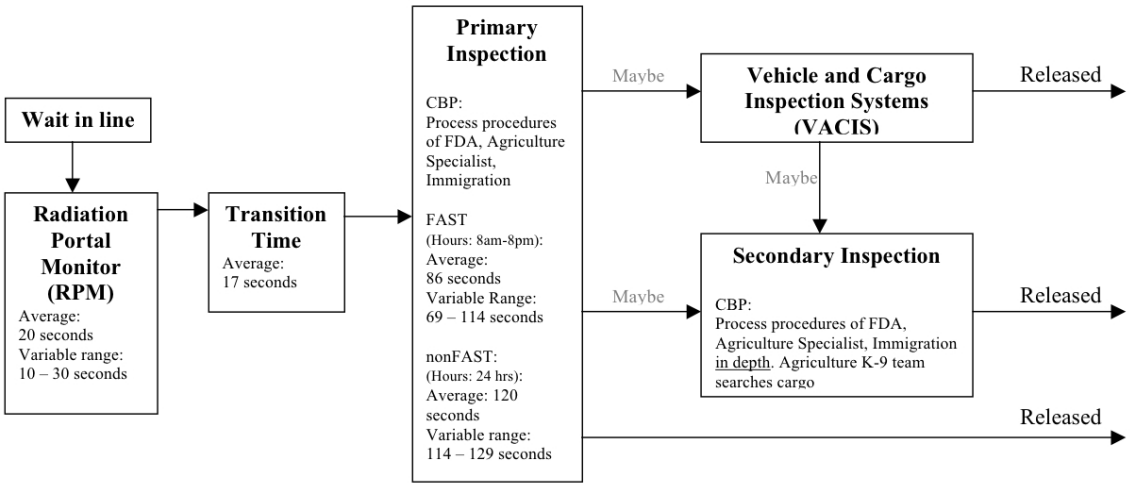

Figure 11: Land Port Border Booth Inspection Procedure[1,2]

While the USDA does not have operations at the Blaine border; the U.S. Customs and Border Protection has an agriculture specialists available 24 hours and seven days a week.

Due to the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, FDA requires prior notice of arrival information to import food into the United States. This advance information will assist FDA to differentiate the types of imported food for evaluation of whether there will need further investigation. Imported food shipments can comply by using CBP's Automated Broker Interface of the Automated Commercial System (ABI/ACS) and prior notice can be submitted either through

[1] (Battelle Memorial Institute, April 2002)

[2] ("U.S. Customs and Border Protection "Assessing the Impact of the ACE Truck e-Manifest System n Trucking Operations.""", ; "U.S. Customs and Border Protection "Customs-Trade Partnership Against Terrorism Cost/Benefit Survey,"; "U.S. Customs and Border Protection Advance Electronic Presentation of Cargo Information,"; "U.S. Customs and Border Protection Free and Secure Trade Program,")

ABI/ACS or FDA's Prior Notice (PN) System Interface. For arrival by land, prior notice must be submitted electronically and confirmed by the FDA no more than 5 days and no fewer than 2 hours upon arrival. Information submitted must consist of the identification of the submitter, transmitter, manufacturer, grower, shipper, importer, carrier; entry type and CBP identifier, the country form which the article of food is shipped, anticipated arrival information, and the FDA country of production. There is available technical assistance between 7:00am – 11:00Ppm U.S. Eastern Time.

There are several programs to provide expedited border processing from Canada into the United States such as the Advance Electronic Presentation of Cargo Information (ACE), Customs Trade Partnership Against Terrorism (C-TPAT), and Free and Secure Trade (FAST). Each program has specific requirements and expected benefits. These are described in the boxes below, as well as any available information regarding program evaluation.

Advance Electronic Presentation of Cargo Information (ACE)

ACE certification requires one to submit an application. The application must include the principal (who is any high ranking officer within the account, i.e. the sole proprietor, a corporate officer, etc.) and the account owner (the person responsible for the daily administration of the account's activities), and list primary business activity as well as other business activities (also known as "account types"). Importers who are self-filers should apply for both their importer and their filer views on one ACE application. ACE filing is now required for all carriers. The benefits of using ACE reduce processing times, there are reduced errors, it is an all in one system for in-bound filings that needs manifest and mandatory advance cargo information. One can electronically store trip information of the shipment, trip, conveyance, crew, and equipment including in-bound cargo movements.

In 2006, case studies and follow-up interviews about ACE revealed that the number of trips in which a tuck is required to have a secondary inspection has decreased by approximately 50%.

Customs Trade Partnership Against Terrorism (C-TPAT)

C-TPAT is a voluntary program. To achieve C-TPAT certification, companies must comply with a variety of security measures, which increase the level of trust between CBP and the carrier. To verify a membership one must be processed through the Status Verification Interface (SVI) for a background check. C-TPAT benefits include a reduced number of CBP inspections (reduced border delay times), and priority processing for CBP inspections (front of the Line processing for inspections when possible.), assignment of a C-TPAT Supply Chain Security Specialist (SCSS) who will work with the company to validate and enhance security throughout the company's international supply chain, potential eligibility for CBP Importer Self-Assessment program (ISA) with an emphasis on self-policing, not CBP audits and eligibility to attend C-TPAT supply chain security training seminars.

In the Figure 12 all C-TPAP participants gave a rating on a four-point scale between 3-4 (4 being the highest) of the 10 potential benefits of joining the program. The highest rated benefit is "reducing the time and cost of getting cargo released by CBP" with an average of 3.78. More than 75% of C-TPAT participants felt it is important "to reduce the time in CBP secondary cargo inspection lines."

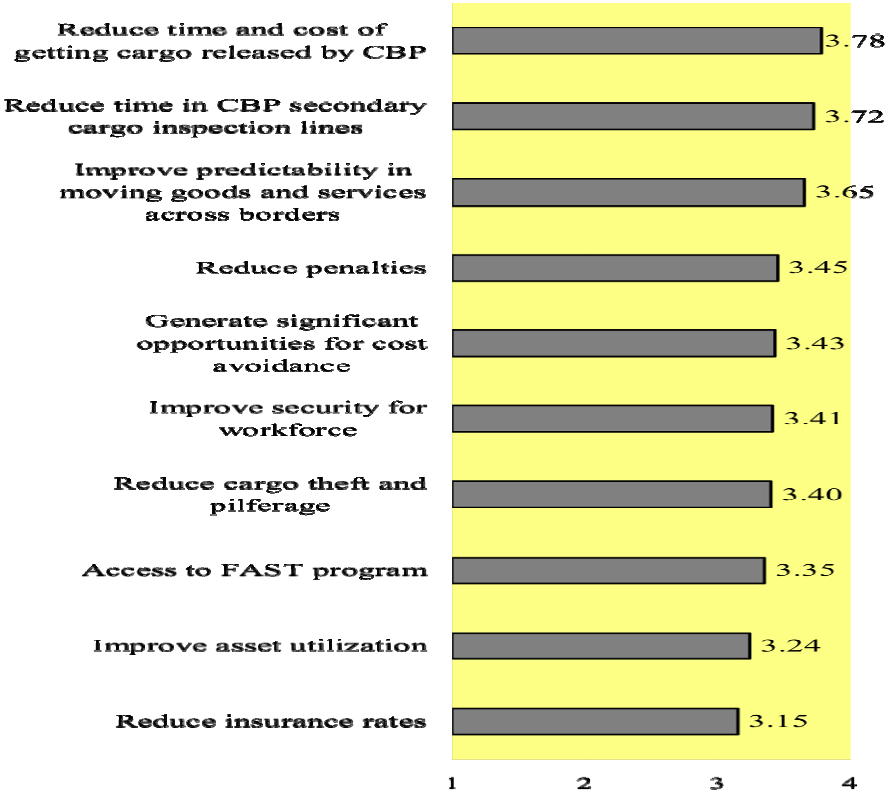

Figure 12: C-TPAT four-point scale of the 10 potential benefits
(DAMF Consultants Inc., 2005; Diop, Hartman, & Rexrode, August 2007)

Free and Secure Trade (FAST)

Requires citizenship or a permanent resident of the United States or Canada who is at least 18 years old with a valid driver's license. Clearance for the FAST lane requires all passengers who hold a FAST permit, the vehicle, goods, and the carrier and importer must all be FAST approved. To be approved, one must be already C-TPAT approved, provide a full set of fingerprints, address history for the last five years, employment history for the last five years, current employer, and a fee payment of CAN$80 or US$50. The program participation will be valid for a five-year period.

If you are approved to participate in the FAST Commercial Driver Program, you will receive a card to use at the border that will allow you to:

- use FAST dedicated lanes in Canada and the United States (where available);
- cross the border with accelerated customs and immigration processing; and,
- transport eligible goods for FAST-approved carriers and importers.

Hours at Blaine,WA Truck Border Crossing: 8am-8pm

According to a Halcrow 2006 study (Halcrow, 2007), the average FAST primary inspection time is approximately 30 seconds per vehicle faster than nonFAST booths. This study also shows a 1 hour reduction in crossing time per vehicle when comparing FAST crossing times to nonFAST crossing times.

Unfortunately, a current practice at Blaine is to use the FAST lane for all traffic when very significant delays to nonFAST vehicles are observed.

Table 2 shows a summary of border crossing times, compiled from a variety of sources. We show average and standard deviation, as well as the 90th percentile travel time. The border crossing time is the sum of all time elements shown in Figure 11, and includes the time spent waiting in queue, being process at primary, secondary, RPM, and VACIS machines, or in transition between these elements. The nonFAST crossing times are substantially longer than FAST crossing times, with about an hour difference for every trip. The standard deviation, however, is consistent between FAST and nonFAST vehicles.

TABLE 2 Descriptive Statistics for Border Crossing Times

Dataset	Observations	Mean	Standard Deviation	90th Percentile	Arrival Rate	Average Service Time
WCOG FAST (Halcrow, 2007)	579	22 minutes	21 minutes		21.5 vehicles per hour	86 seconds
WCOG non-FAST (Halcrow, 2007)	1480	1 hour 23 minutes	26 minutes		21.5 vehicles per hour	119 seconds and 121 seconds
Probe, southbound (FAST) (Goodchild, et al)	5658	23 minutes	24 minutes	50 minutes		
Probe, northbound (non-FAST) (Goodchild et al)	5805	23 minutes	20 minutes	45 minutes		
Probe (overall) (Goodchild et al)	11,463	23 minutes	22 minutes	47 minutes		

Consequences of Delay and Variability of Delay

Through qualitative interviews carried out with frequent border crossing freight carriers we have identified the impact of these delays on border logistics practices. 20 1-1 interviews were conducted with commercial carriers to investigate the responses to international border crossing challenges between 07/06 and 07/07. The interviewees represented firms that engage in “regular cross-border shipments”. Interviewees were company representatives responsible for making strategic transportation decisions, for

example, how frequently to make shipments, and how to route shipments. Of these interviews 13 have been with US firms and 7 with Canadian firms.

Strategy	Motivation	Consequence
Increase buffer times	Address crossing time variability	• Reduces capacity of existing infrastructure or requires additional hires and equipment • Increases transportation and inventory cost • Reduces late arrivals and stock-outs
Increase dwell times at intermediate handling facilities	Address crossing time variability	• Reduces impact of delay on outbound vehicles, particularly relevant for LTL (less than truckload) operations • Increases total transit time and therefore inventory cost
Routing Changes	Address average crossing time	• Reduces the impact of variability on operations
Schedule changes	Address average crossing time	• Reduces the impact of variability on operations
Reduce level of activity in cross-border trade	Address average crossing time and increased documentation requirements	• Reduce impact of variability on operations • Stop providing courier or same day service • Reduce revenue to carrier and level of cross border economic activity
Change transportation mode	Address average crossing time	• Change border procedures which, depending on local circumstances, may improve travel time reliability
Hire full time border logistics staff	Increased documentation requirements	• Primarily Canadian firms • Necessary to meet regulatory requirements

Table 3: Carrier responses to border crossing challenges

Table 3 summarizes their responses, in particular, whether this strategy addresses average delay, variability in delay, or increased documentation requirements, and the consequences of these strategies for the carrier. Each of these strategies is described in more detail in the sections following.

Increase Buffer Times

Although the average crossing time southbound for nonFAST vehicles is about 1 hour and 23 minutes, most carriers leave 2 hours to cross the border. In doing so, they are building in 37 minutes to accommodate longer than average crossing times. This is the most common response to border crossing time variability. FAST approved vehicles typically allow an hour for border crossing (significantly more than the average of approximately 20 minutes). Increasing buffer times reduces the possibility that the driver will arrive late for an appointment. We did not speak to a carrier that incurs specific fees for late arrivals, but there are other significant consequences:

- Customer dissatisfaction with late deliveries leading to loss of business (in one case a carrier operating within a Just-In-Time framework that is contractually obligated to arrive on time at least 94% of the time).

- With LTL carriers the possibility that outbound trucks from a handling facility will be delayed by incoming trucks. Delay to one vehicle can therefore impact many outbound vehicles, and customers whose goods were not delayed in the original shipment. These customers have little sympathy for the delay and will not bear the financial consequences of delay (missed business opportunities, staff overtime, perished goods, etc.).
- Missed appointments at the Port of Vancouver can lead to a loss of future appointment times.
- If outbound rail cars are not filled at a trans-load facility the company is charged demurrage for empty rail cars.
- If trips are particularly long and a driver cannot make the return trip due to hours of service regulations a replacement driver may need to be hired or overnight accommodation expenses may be incurred.

There are also consequences of arriving too early, which happens on the majority of occasions. These are primarily underutilization of the driver and rolling-stock.

Increased Dwell Times at Intermediate Handling Facilities

For a less than truckload firm that uses an intermediate handling facility, longer than expected inbound delays can disrupt outbound trucks. The firms we spoke to have therefore increased the dwell time of goods at the handling facility to reduce the possibility of delay to the outbound trucks. This increases the time between pick-up and delivery, reducing the quality of service offered by the provider.

For carriers with handling facilities where goods are moved between vehicles, in order to minimize the impact of very long delays, it is best to cross the border after handling goods and loading trucks to their final destinations (Figure 14), as opposed to crossing the border before handling goods (Figure 13). For south-bound supply chains this benefits Canadian firms with handling facilities in the Lower Mainland. For north-bound supply chains this benefits US firms with handling facilities in Washington State.

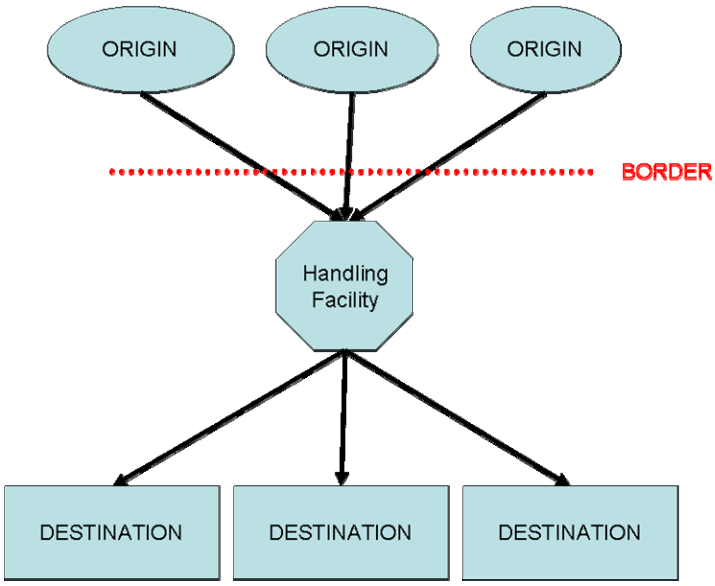

Figure 13: Logistics network where border crossing occurs before handling goods and loading vehicles for their final destinations.

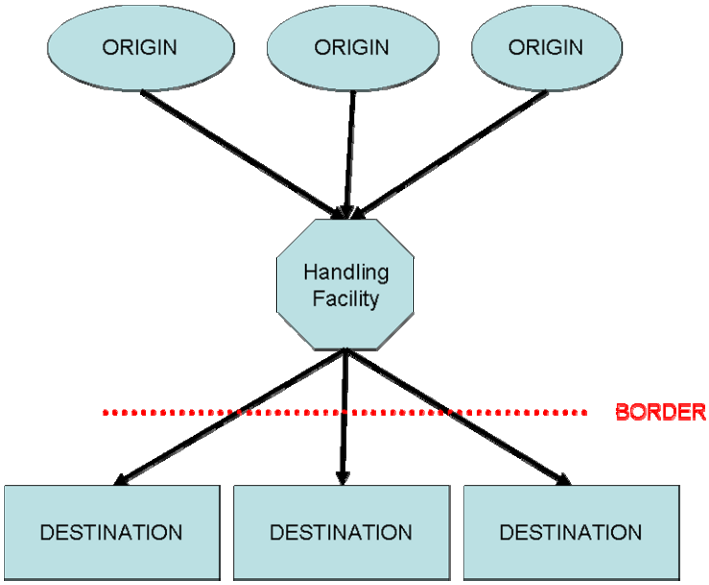

Figure 14: Logistics network where border crossing occurs after handling goods and loading trucks to their final destinations.

Routing Changes

To avoid peak border delays some companies have decided to use border crossings that offer both a more reliable and shorter crossing time. For example, some shippers who primarily use the Blaine, WA crossing might shift to Sumas, WA (see Figure 1). Presumably it was more expensive to use the latter crossing prior to the assumed change in border crossing conditions; otherwise Sumas would have been used in the first place. Average distances traveled between origins and destinations might be longer using Sumas, nevertheless, given a sufficiently large difference between the two crossings it might be economically worthwhile for some shippers to change their routing.

In many cases we observe that these decisions are made real time by companies located very close to the border, creating flexibility within the organization to alter border crossing locations.

To the extent that little to no switching among border crossing locations is observed to take place among shippers, at least two inferences are plausible: 1) that there are few differences in the delay across different border crossing locations, 2) that the improvement in wait time is not of sufficient consequence to warrant incurring the additional expenses associated with altering traditional transportation routes.

Schedule Changes

In addition to making locational changes, we observe some companies making schedule changes, for example delaying or expediting shipments to take advantage of unexpectedly favorable border crossing conditions, or avoiding particularly unfavorable ones. After learning about favorable periods, schedules can be permanently adjusted to cross at favorable times.

When shippers are hauling freight under long-term business arrangements, as opposed to spot contracting, it might be difficult to accelerate shipments in terms of time of delivery, since there may be other capacity constraints in the relevant logistics systems that make it uneconomical to accelerate shipments in order to take advantage of border crossing "windows of opportunity". For example, customers taking delivery of shipments may have warehouse capacity constraints which make it impractical to unload and store expedited shipments on the customer's premises. Nevertheless, regular schedule changes can be made to exploit consistently reliable crossing times.

Customers (or intermediaries such as independent warehouses) could invest in "spare capacity" such that there is always some additional slack to accommodate accelerated shipments between suppliers and customers who do business on something other than a spot contracting basis. Presumably these types of investments would be economical if the risks associated with variable border crossing times were of a significant economic magnitude. In effect, investments in redundant capacity in order to alleviate "bottlenecks" to accelerated shipping enhance the viability of implementing more "real-time" management of the border crossing production function, thereby mitigating the impact of variability of crossing times on the elasticity of border crossings with respect to time.

We observed companies shifting their regular schedules to take advantage of shorter and more reliable crossing periods. For companies that do not shift their schedules, it suggests that increased variability of crossing times had only modest impacts on the elasticity of border crossings with respect to time or that the requisite investments to allow substantially more real time expediting of shipments are prohibitively expensive. Several of our survey participants indicated that they engaged in real time (Internet) monitoring of border crossing conditions and were able (at relatively low cost) to alter shipping times in order to take advantage of "favorable" crossing conditions. While the

ability to engage in real time management of border crossings will not be identical across all shippers, many of our respondents are located relatively close to the British Columbia-Washington State border. Furthermore, all have access to relatively low cost Internet monitoring of border crossing conditions.

Reduce Levels of Activity in Cross Border Trade

We spoke with several Canadian carriers who have decided to exit the business of cross-border trade partially or entirely. Several firms that, two years ago, offered same day courier services between the Lower Mainland of British Columbia and the Puget Sound region of Seattle have discontinued this service due to their inability to reliably deliver and return to British Columbia on the same day. This was primarily due to the magnitude of border delay, but we also got the sense that increased documentation requirements meant higher administrative costs for the firm, and in the short term, lower profits for cross-border trade. We did not sufficiently investigate this phenomenon, however, to report in any detail on the magnitude of this effect. The two companies we spoke to moving containers between the Ports and Rail Yards in Vancouver and destinations in Washington State have moved from doing so within one day to two day operations. Only two years ago it was possible to pick-up containers at the Rail Yards very early in the morning, cross the border, drop-off a container, pick-up a container, and return to Vancouver on the same day, now this trip requires two days, so the rates have increased significantly.

Change Transportation Mode

In the Whatcom County/Lower Mainland region, it may be possible to substitute rail or marine transportation for truck transportation. For example, one fuel company that delivers fuel in trucks from a coastal refinery in Washington State to Vancouver International Airport faces competition from a barge company that can serve the same route but it subject to less average border delay and less variability in travel times.

Hiring Border Logistics Staff

Several of the Canadian firms we spoke to reported hiring an additional staff member to work on documentation for US entry. We interviewed carriers as they were adjusting to ACE requirements, and this hire was seen as temporary, while the companies adjusted to the new system. However, there was also a sense that the post 9-11 security regime required significantly more documentation from Canadian companies moving goods into the US.

Summary and Conclusions

We have described the border crossing process, and the characteristics of the US/Canada border in Western Cascadia. We also describe the current performance of the border, and freight carriers adaptations to the current challenges.

The primary commodities crossing at Blaine are wood, pulp and paper products, food and farm products, metals, and petroleum products. Approximately 15 to 20 % of the trucks crossing are empty vehicles. The majority of these trucks are not operating in a particularly time sensitive environment. However, many of the goods that are operating in a time sensitive environment are agri-food products, particularly fresh seafood.

Delay at the border increases the length of time goods spend moving through the supply chain. Not just by the average delay at the border, but by significantly more time than that. We describe this through investigation of the impact of delay, variability in crossing times, and increased documentation on border logistics. This has a much more significant impact on those industries operating under time pressure, which at the North Western border is more often agribusiness. Not only does this increase total logistics cost, but also the risk of cargo spoilage and food safety.

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