

# 2022 IMTC Commercial Vehicle Operations Study

## Data Collection Report



In Q1 2022 the Whatcom Council of Governments (WCOG) received research funding from the U.S. Federal Highway Administration (FHWA), the B.C. Ministry of Transportation and Infrastructure (BC MoTI), Transport Canada (TC), and the Border Policy Research (BPRI) to plan and execute a commercial vehicle data collection effort based in the Cascade Gateway. Data collection in the field took place in June and July 2022.

U.S. Customs and Border Protection (US CBP) and Canada Border Services Agency (CBSA) contributed invaluable staff hours to help plan and facilitate the study's field work at their respective Cascade Gateway ports-of-entry (POE). The Whatcom Transportation Authority (WTA) assisted in providing a vanpool van for transportation of the survey crew to and from work-site locations. Project managers from WCOG and BPRI also received data and methodology guidance from the regional partner agencies that collectively make up the International Mobility and Trade Corridor Program (IMTC).

The estimated cost of the study is \$150,000.

### The IMTC

[The International Mobility and Trade Corridor Program](#) is a voluntary, binational, and regional coalition of government, business interests, and non-governmental entities established to support the improvement of safe and efficient trade and travel in the Cascade Gateway region – consisting of Western Washington State and Lower Mainland British Columbia that surrounds the western-most portion of the contiguous US-Canada international border.

The goals of the IMTC are to:

- G1. Coordinate planning
  - G2. Improve regional, cross-border trade and transportation data
  - G3. Support infrastructure improvements
  - G4. Support coordinated implementation of U.S. and Canadian border policy
  - G5. Improve operations
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*The Cascade Gateway land border ports of entry, in red*

Since 1997, U.S. and Canadian IMTC participants have together funded projects totaling over \$41 million (USD) for the improvement of Cascade Gateway travel and trade.

The IMTC is managed by the Whatcom Council of Governments.

## Project Scope

Cross-border vehicle studies provide regional cross-border transportation and inspection system operators with enhanced information for planning and investment decisions and support multi-agency collaboration. These studies supplement monthly vehicle count and trade data provided by federal statistics programs. The snapshots of attributes and characteristics of cross-border trade enable regional forecasting, simulation modeling, scenario analysis, operations feasibility studies, communications strategies, and more.

Planners and researchers at WCOG and BPRI, on behalf of the IMTC, have endeavored to record in-field observations of commercial vehicle movements through the Cascade Gateway at least once every 5 to 7 years since the IMTC's formation in 1997. Similar data collection efforts have occurred in 2016, 2009, and 2000.

## Data and Products

The 2022 IMTC Commercial Vehicle Operations Study (CVO), as with the data studies that preceded it, updates sample datasets of border-crossing commercial vehicles, including:

- Trip origins and destinations
- Primary commodities being hauled
- Shares of empty and loaded vehicles
- Commercial vehicle classifications
- Trusted-trader program statuses
- Identification of frequent carrier companies
- Processing durations, such as inspection time and total border wait time

The data collected in the field, along with supporting traffic and trade data from federal agencies, are organized for analysis in a project database to along with this project report documentation.

## Design & Logistics

Data collection occurred at the six main commercial POEs in the Cascade Gateway: three northbound POEs operated by Canada Border Services Agency at (from west to east) Pacific Highway, Aldergrove, and Abbotsford-Huntingdon; and the three southbound POEs operated by US Customs and Border Protection at Pacific Highway, Lynden, and Sumas.

Field data collection was undertaken by student research assistants from Western Washington University (WWU) under the supervision of WCOG and BPRI staff. Research assistants observed commercial vehicle movements at three sequential positions along approach lanes leading to primary inspection. One position included a roadside commercial driver interview, undertaken when time and space permitted. All data was collected using custom form software on handheld smart tablets.

Research Assistant Positions and Associated Data Fields



**Northbound**

- ① Standard Queue End
  - Time of queue-end arrival
- ② FAST Lane Queue End
  - Time of queue-end arrival
- ③ Vehicle Information
  - License plate country
  - Vehicle classification
  - Carrier company name
  - Dangerous goods placard info
  - Primary inspection duration
- ④ Driver Interview
  - Empty/loaded cargo status
  - Origin/destination of current trip
  - Main commodity (or, if empty, what was dropped off or what will be picked up)
  - Less-than-truckload (LTL) status
  - Backhaul status
  - Trusted trader status

**Southbound**

- ① Standard Queue End
  - Time of queue-end arrival
- ② FAST Lane Queue End\*
  - Time of queue-end arrival
- ③ Driver Interview
  - Empty/loaded cargo status
  - Origin/destination of current trip
  - Main commodity (or, if empty, what was dropped off or what will be picked up)
  - Less-than-truckload (LTL) status
  - Backhaul status
  - Trusted trader status
- ④ Vehicle Information
  - CBP fee payment type
  - License plate country
  - Vehicle classification
  - Carrier company name
  - Dangerous goods placard info
  - Primary inspection duration



**Northbound**

- ① Queue End
  - Time of queue-end arrival
- ② Driver Interview
  - Empty/loaded cargo status
  - Origin/destination of current trip
  - Main commodity (or, if empty, what was dropped off or what will be picked up)
  - Less-than-truckload (LTL) status
  - Backhaul status
  - Trusted trader status
- ③ Vehicle Information
  - License plate country
  - Vehicle classification
  - Carrier company name
  - Dangerous goods placard info
  - Primary inspection duration

**Southbound**

- ① Queue End
  - Time of queue-end arrival
- ② Driver Interview
  - Empty/loaded cargo status
  - Origin/destination of current trip
  - Main commodity (or, if empty, what was dropped off or what will be picked up)
  - Less-than-truckload (LTL) status
  - Backhaul status
  - Trusted trader status
  - CBP fee payment type
- ③ Vehicle Information
  - License plate country
  - Vehicle classification
  - Carrier company name
  - Dangerous goods placard info
  - Primary inspection duration

\*Due to deteriorated traffic operations conditions at the Pacific Highway southbound truck staging area, collection of data specific to commercial vehicles using the FAST-program approach lane had to be abandoned for the 2022 effort.

## Schedule

Data was collected in the field from late June to mid-July 2022. Four weekdays of data capture were dedicated to each POE, from 9am to 3pm. Because of their size and close proximity, research assistants collected data at the Canadian (northbound) and U.S. (southbound) POEs at Lynden-Aldergrove and Sumas-Abbotsford/Huntingdon at the same time.

PORT-OF-ENTRY	DIRECTION	SURVEY DAYS	TIME
Pacific Highway	Northbound	M-Th, June 27-30	9:00am – 3pm
Pacific Highway	Southbound	T-F, July 5-8	
Lynden-Aldergrove	Northbound & Southbound	M-Th, July 11-14	
Sumas-Abb./Hunt.	Northbound & Southbound	M-Th, July 18-21	

## Database

The primary product of this effort is a database (in Microsoft Access) consisting of both field-collected data, subsequently applied record-linkages (based on vehicle license plate numbers), categorizations (e.g., commodity codes), calculated fields (inspection times, transit times), and cleaning and standardization of place names, carrier names, and commodity descriptions.

In addition to the summary data reviewed below, and along with provision of the database along with this report, WCOG staff are available to assist IMTC partner agencies with custom queries of the data to provide various cross-tabulations using all of the available data elements – both for current conditions and time-series comparisons.

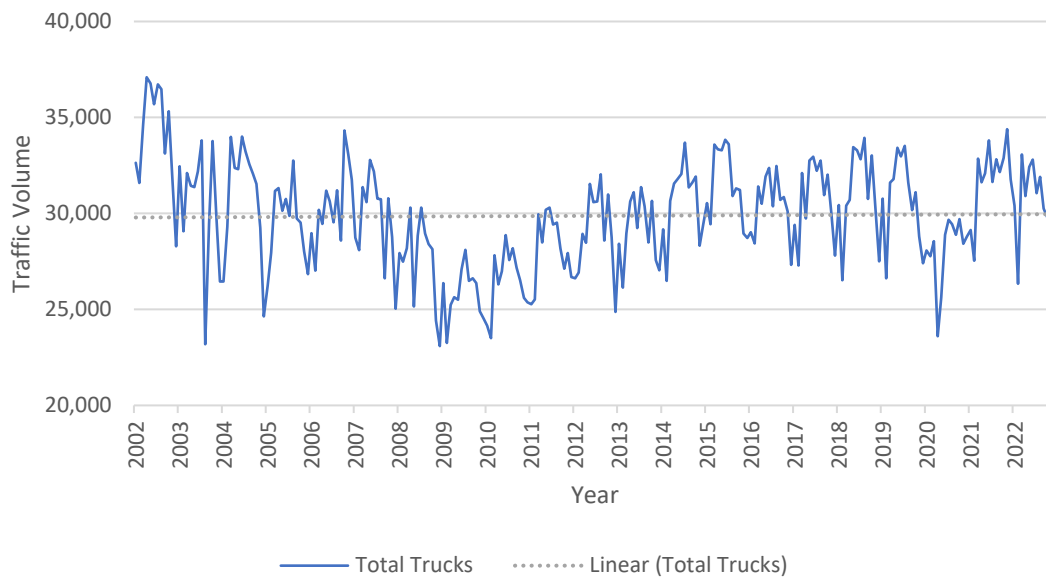
## Data Review

The analyses in this report provide a general review of some of the main data points collected in the field. These figures and more can be replicated and expanded upon by the querying the project database.

### Recent Cross-Border Commercial Traffic Trends

The Cascade Gateway sees cross-border trade moving up and down the I-5 corridor from major international and intermodal trade hubs in Vancouver, BC, Seattle, WA and beyond. The Pacific Highway ports of entry serve the majority of land-based goods movements through the Cascade Gateway – its vehicle volumes can serve as an indicator of overall truck-based trade trends through the region.

Monthly Commercial Vehicle Volume through Pacific Highway POE, Southbound



*Traffic volume data from the U.S. Bureau of Transportation Statistics*

In the chart above, there are marked dips in commercial vehicle volumes through Pacific Highway in the past 20 years: after the recession of 2007-08 and after the start of the COVID-19 pandemic in 2020. Smaller dips indicate seasonal variation. Traffic trends overall over the past 20 years have stayed somewhat consistent, as the linear trend line indicates.

In 2022, the average monthly volume of commercial vehicles crossing southbound through Pacific Highway was 30,214. In 2016, the last time an IMTC commercial vehicle data collection effort occurred, average monthly volumes were 30,457.

**Records Collected**

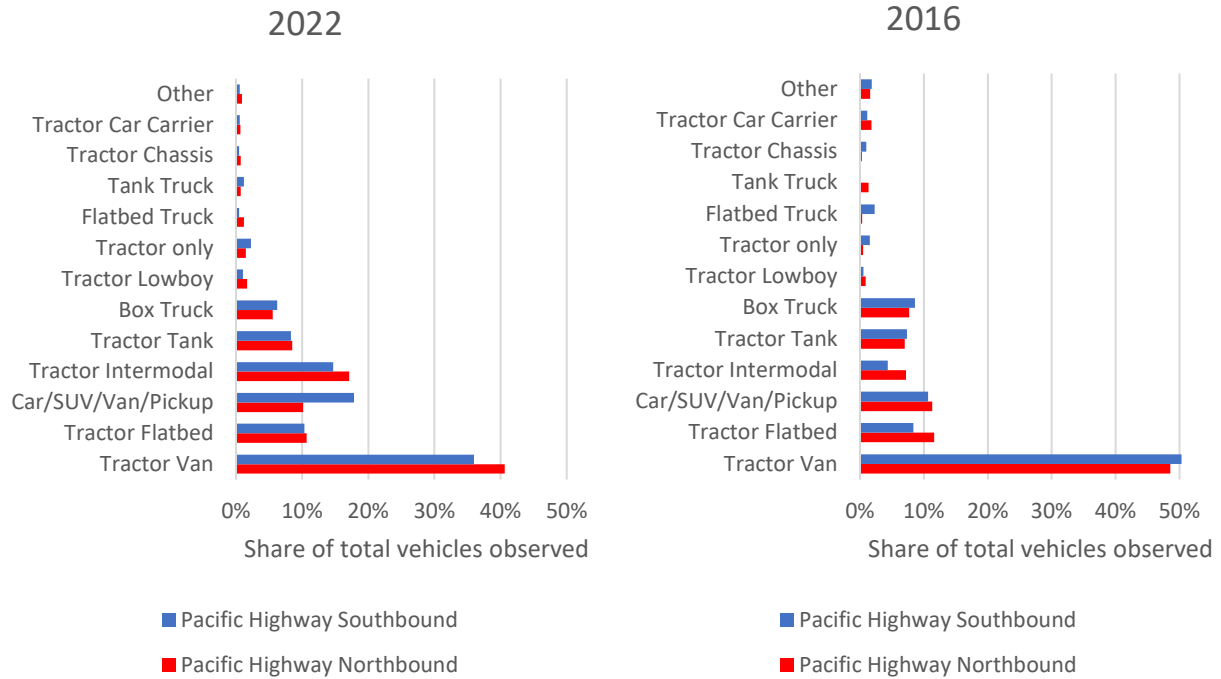
In total, 7,294 commercial vehicle movement records were collected in this effort. Because the Pacific Highway POEs’ location on the primary Highway 99 – I-5 corridor and correspondingly higher truck volumes, the majority of vehicle records were collected there.

	Pacific Highway	Lynden-Aldergrove	Sumas-Abbotsford-Huntingdon	Total
Northbound	2727	360	788	
Southbound	1785	560	1074	
Total	4512	920	1862	7294

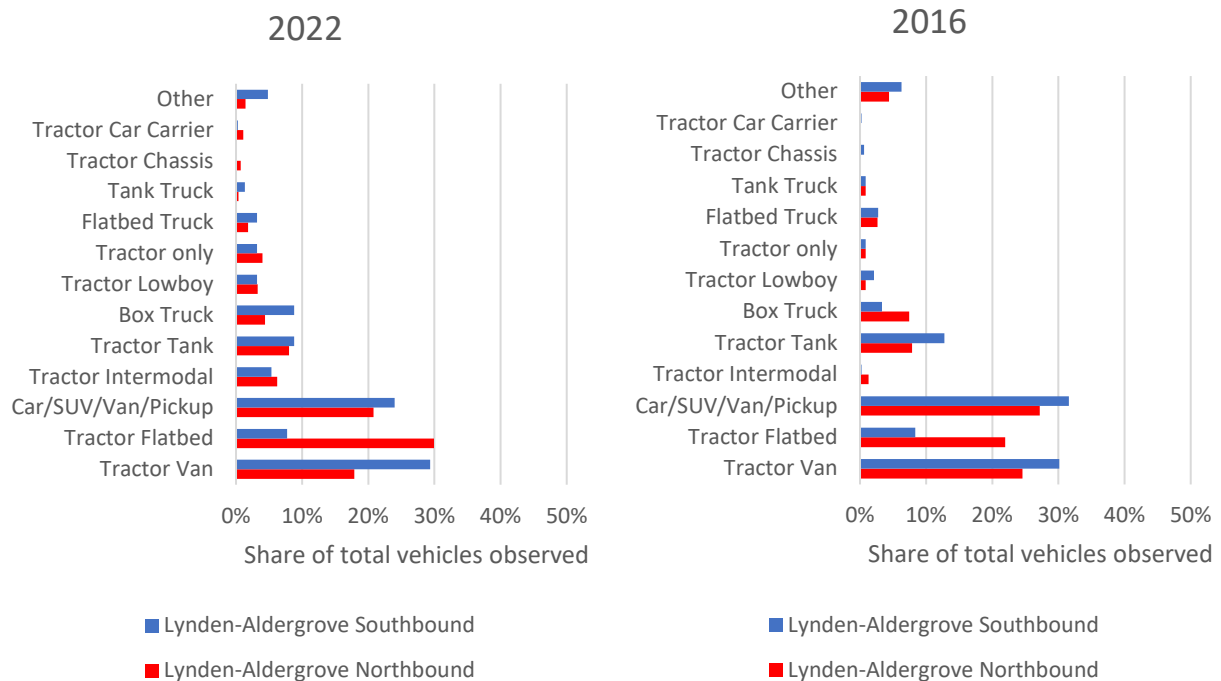
**Vehicle Classification**

Research assistants recorded classifications of commercial vehicles using a picklist of standard vehicle types. The following charts show the share of each vehicle type observed crossing at each POE, with data from 2022 compared to the data from the 2016 effort.

Pacific Highway

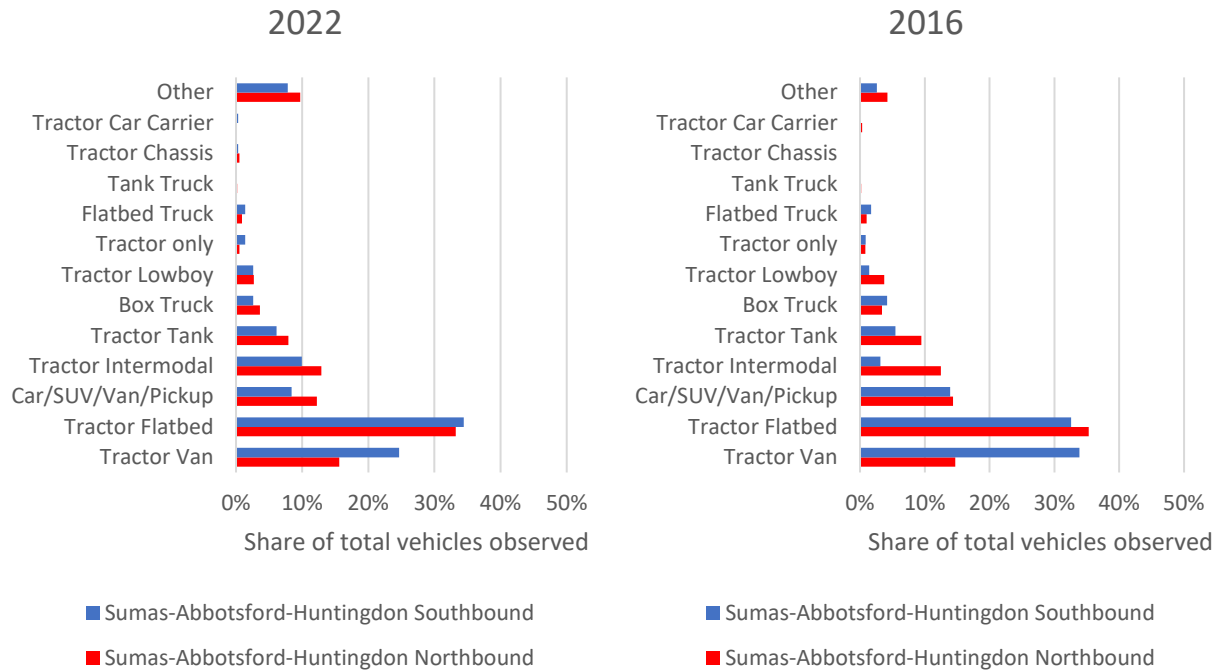


Lynden-Aldergrove





Sumas-Abbotsford/Huntingdon

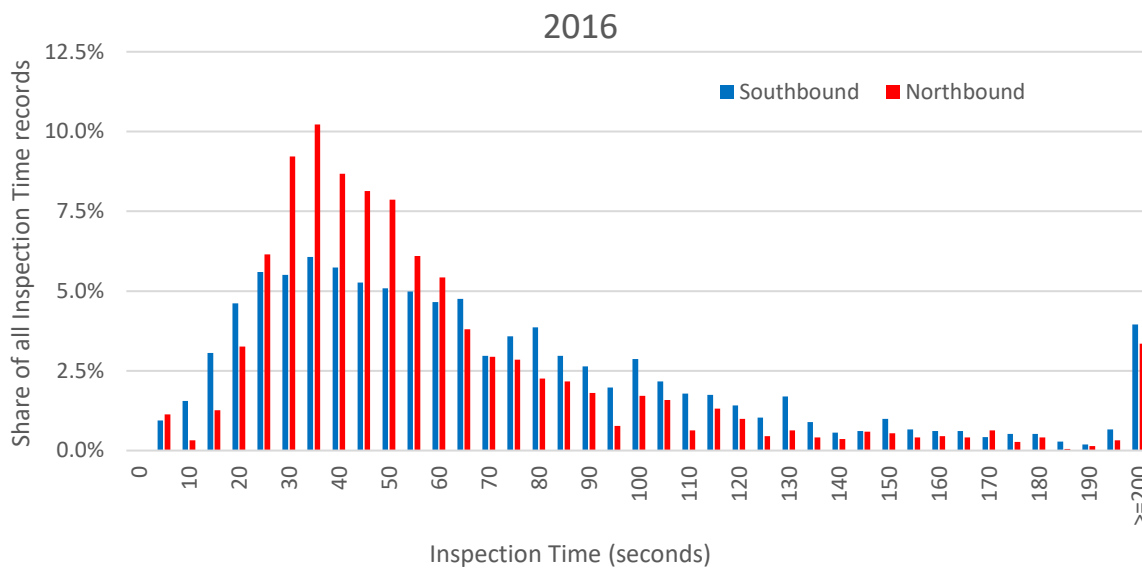
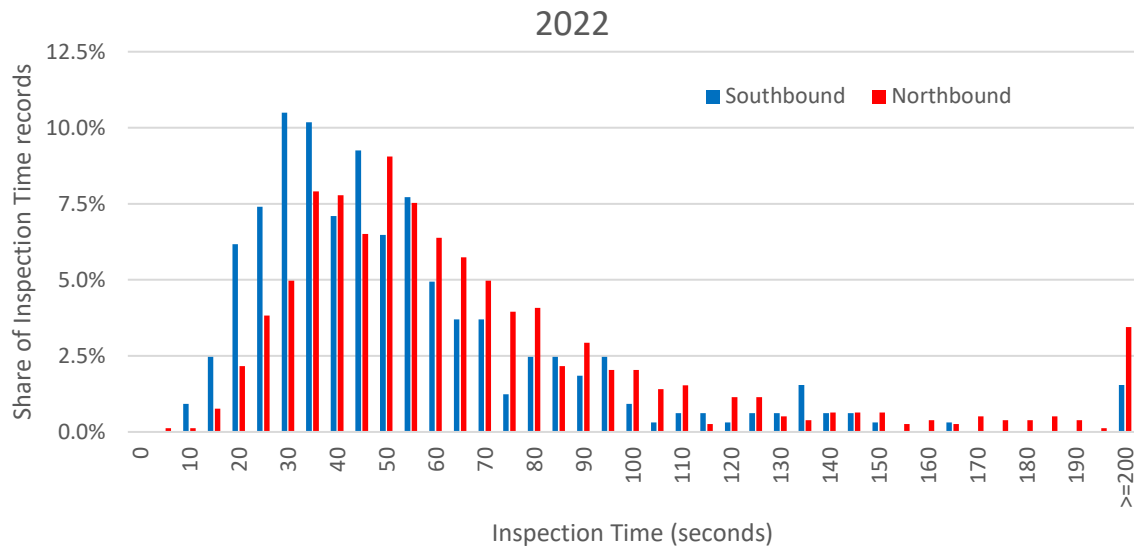


Inspection Times

As commercial vehicles approached primary inspection at each POE, research assistants recorded a timestamp when the vehicle’s wheels stopped (indicating inspection start) and subsequently when they began to roll away (indicating inspection complete). These data points are used to estimate the duration of primary inspection.

The charts below show the distribution of inspection durations of all vehicles observed transiting non-FAST “standard” approach lanes, with durations grouped into 5-second buckets. Data from the 2022 and 2016 efforts are compared.

Inspection Time Distribution by Direction, All Ports and Standard lanes

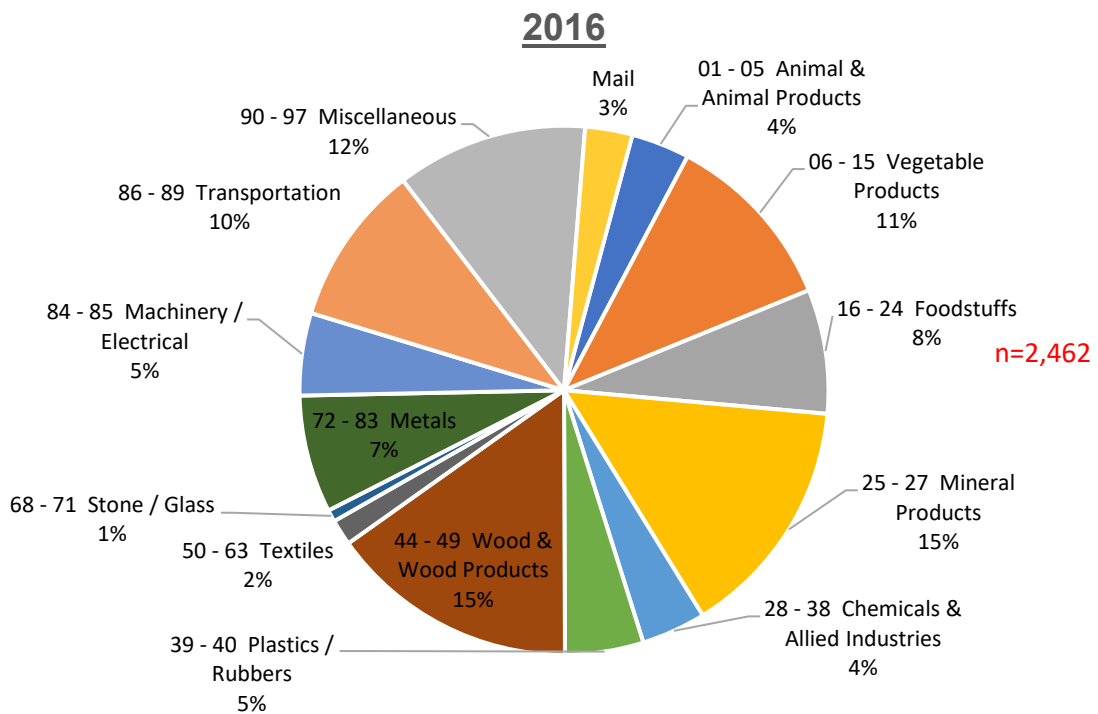
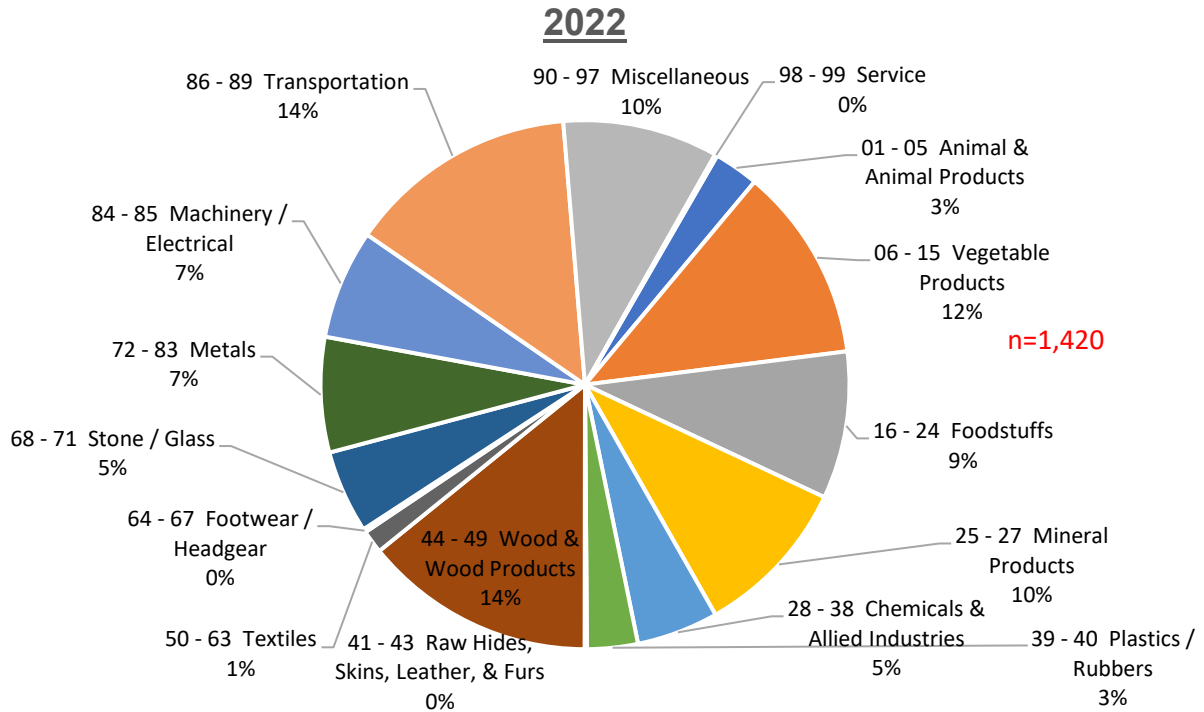


Commodities

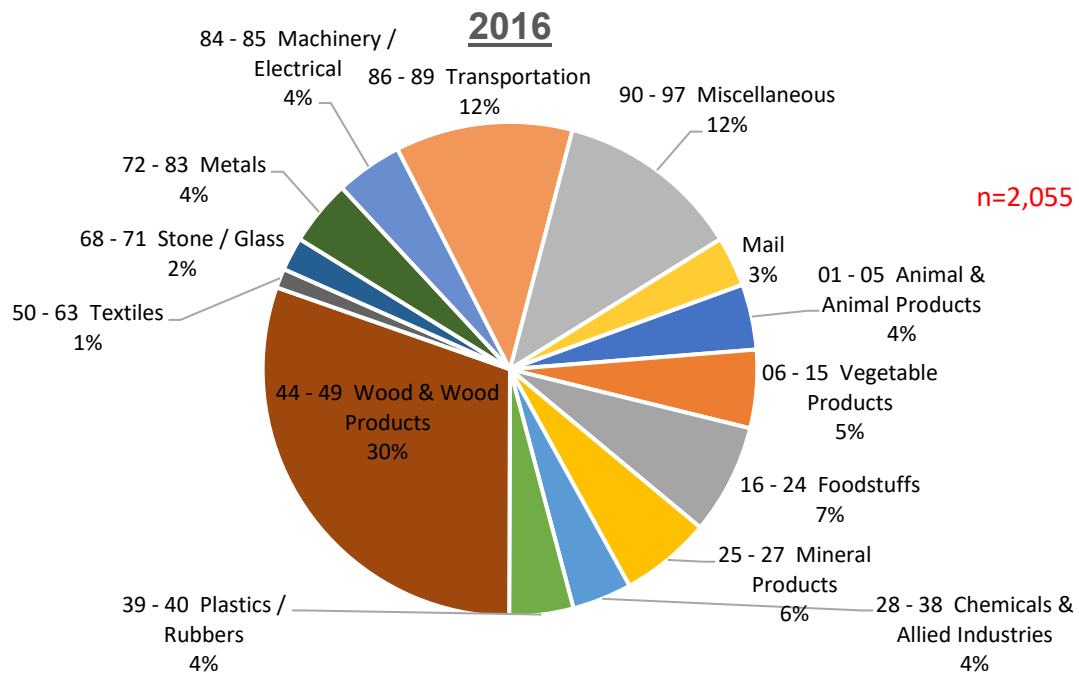
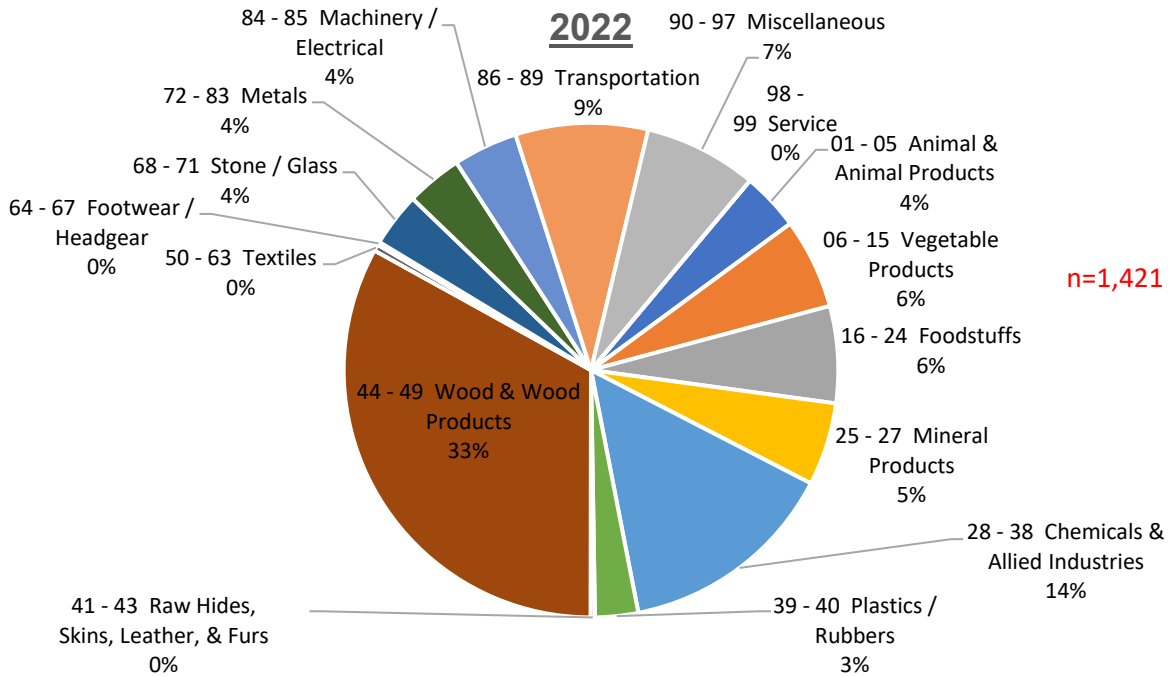
During the driver interviews, research assistants asked what the main commodity was being hauled. For commercial vehicles that were empty at the time of the interview, drivers were asked what commodity they either had just dropped off or were about to pick up. The transcribed data was then sorted into the 99 unique Harmonized Tariff Schedule (HTS) 2-digit code classifications.

In the pie charts below, the HTS-coded commodities are grouped into the 15 unique U.S. Bureau of Transportation Statistics commodity groupings by direction of trade movement (i.e., U.S.-to-Canada or Canada-to-U.S.). Observations from all POEs visited are compared between the 2022 and 2016 data collection efforts.

Cascade Gateway U.S.-to-Canada Truck-borne Trade by of Total Observed Cross-border Conveyances



Cascade Gateway **Canada-to-U.S.** Truck-borne Trade by of Total Observed Cross-border Conveyances

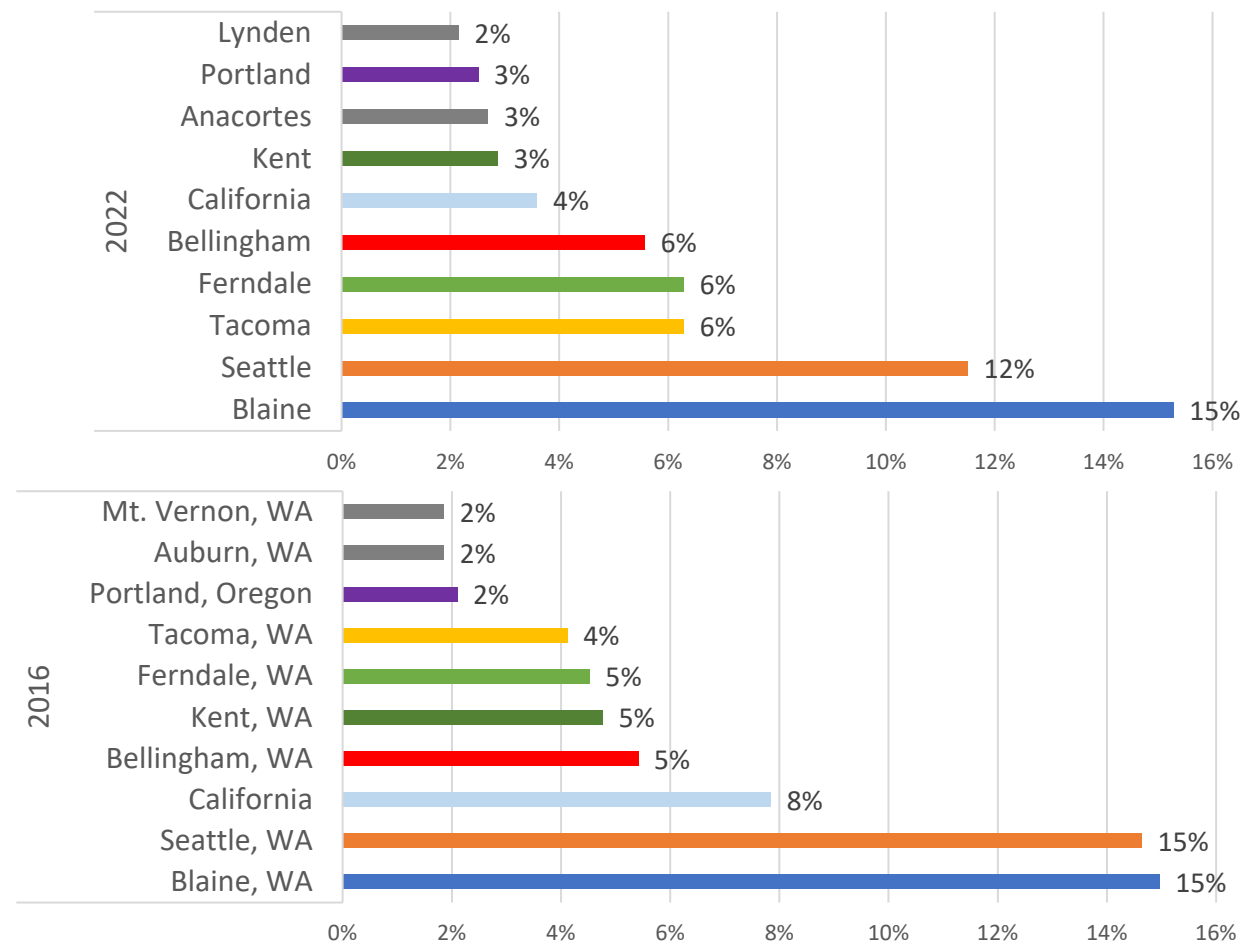


### Location of Commodities Destined for Cross-Border Conveyance

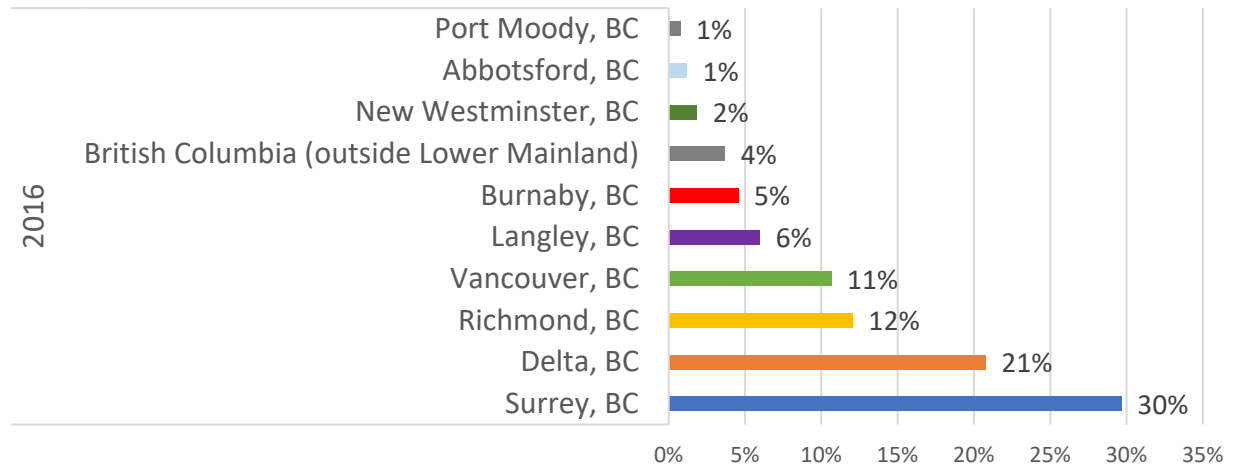
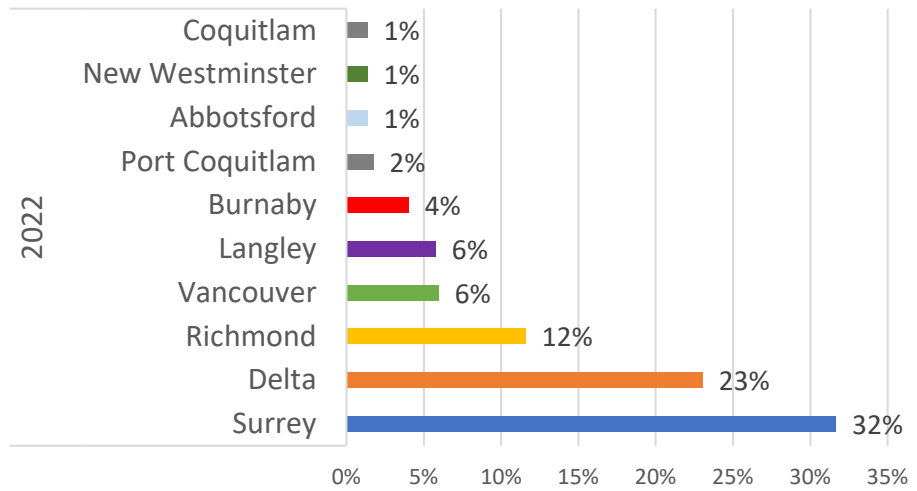
Based on whether the commercial vehicle was empty or loaded and where the driver said they were picking up or dropping off their goods, it can be inferred where goods are originating from (or rather, where their last location was before transiting the border).

The charts below show the top locations of where goods were last picked up before transiting the Pacific Highway POEs. Data from 2022 and 2016 are compared.

Top U.S. Locations of where Cross-Border Goods were picked up, Pacific Highway POE



Top **Canadian** Locations of where Cross-Border Goods were picked up, Pacific Highway POE

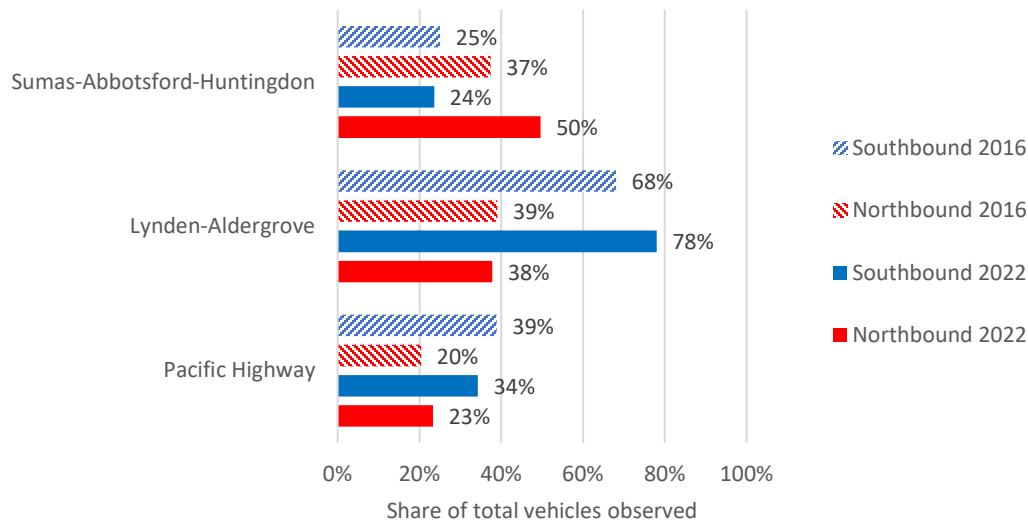


### Empty Status

The first question asked in the driver interview is whether the vehicle is carrying goods or is empty. These data are collected in every IMTC commercial study and are important considerations in the development of strategies to make primary inspection queuing and processing more efficient for all commercial vehicles crossing the border.

The chart below shows the percent of vehicles at each commercial POE that are empty, comparing data from 2022 with data from 2016.

Percentage of Commercial Vehicles Observed to be Empty (by POE and Direction)



### FOR MORE INFORMATION

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