



# 2018-19 IMTC

# Passenger Vehicle Intercept Survey

Project Description

April 2019

## 1 INTRODUCTION

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The 2018-19 IMTC Passenger Vehicle Intercept Survey (2019 PVIS) is a multi-week, multi-season data collection effort that captures the travel characteristics of cross-border motorists transiting the Cascade Gateway. The project refreshes data from similarly scoped projects in 2013-14, 2007-8, and 2000.

The Cascade Gateway is a border region encompassing the Lower Mainland of British Columbia, Canada and the upper Puget Sound area of Washington State in the U.S. Data collection occurred at the four main ports-of-entry (POE) along the Whatcom County-British Columbia international border: Peace Arch-Douglas (PA), Pacific Highway (PH), Lynden-Aldergrove (LA), and Sumas-Abbotsford-Huntingdon (SH).

The 2019 PVIS comprises of two seasons of data collection. This report describes both the summer data collection effort, which occurred in June and July of 2018, and the winter effort, which occurred in February and March of 2019. Both seasons of data are joined into a single database, the main deliverable of the 2019 PVIS.

The summer effort also included a 4-day bus survey that was conducted at the Pacific Highway POE. This component of the project is detailed in a separate report.

## 2 PROJECT ORGANIZATION

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### 2.1 SUPPORTING AGENCIES

The 2019 PVIS was jointly funded by the following U.S. and Canadian agencies: U.S. Federal Highway Administration (FHWA), British Columbia Ministry of Transportation and Infrastructure (BC MoTI), Border Policy Research Institute (BPRI) at Western Washington University (WWU), Whatcom Council of Governments (WCOG), Transport Canada (TC).

Critical permissions, data collection coordinating support, and border traffic data were provided by U.S. Customs and Border Protection (US CBP) and Canada Border Services Agency (CBSA).

The project is also advanced by the U.S. and Canadian member organizations that collectively make up the International Mobility and Trade Corridor Program (IMTC).

## 2.2 MANAGING AGENCIES

Staff at BPRI and WCOG jointly managed the data collection and database organization. The project was advanced by WCOG Director of Planning Hugh Conroy, BPRI Director Laurie Trautman, and WCOG planning staff Melissa Fanucci and Jaymes McClain.

The data collection efforts were carried out by a team of BPRI research assistants and student supervisors from WWU. Data collection was managed by Jaymes McClain.

## 3 DATA COLLECTION

### 3.1 METHODOLOGY

Border-crossing motorists were interviewed by project research assistants at each Cascade Gateway POE. When sufficient traffic queues formed leading up to primary inspection, research assistants approached vehicle drivers and administered a 90-second questionnaire to willing respondents, as seen in Photo 1. Intercept stations were set up post-inspection to administer questionnaires to motorists using the NEXUS lane and, when queues were low, to Ready Lane and standard (non-NEXUS or -Ready Lane) motorists, as seen in Photo 2.

Research assistants were trained and certified as Washington State Flaggers to safely conduct traffic-control when necessary. Because of the complex environment at each border facility, research crews administered questionnaires with as little impediment to the border inspection process as possible.

### 3.2 INSTRUMENTS AND EQUIPMENT

The questionnaire was developed using Pendragon Forms and was loaded on to 8-inch Lenovo Tab 4 tablets. The tablets were equipped with hand-strap holders for ease of use in the field.

Several lines of questioning required use of a map so that respondents could point to locations relevant to their cross-border trip. Maps of Whatcom County and the Lower Mainland British Columbia were printed front-and-back on water- and tear-proof polymer sheets that were

## RESEARCHERS IN THE FIELD



Photo 1. Pre-inspection queue interviews in summer 2018



Photo 2. Post-inspection intercept interviews and traffic control in winter 2019



Photo 3. A research assistant using tablet and map in an interview

attached to research assistants by self-retracting Kevlar cords. Photo 3 shows a research assistant using a tablet and map to conduct an interview.

Intercept stations were set up using cones and other traffic control equipment loaned from Whatcom County Public Works, as depicted in Photo 2.

### 3.3 SCHEDULE

Data collection occurred in one direction of travel each day that research assistants were in the field, with the exception of surveying at the Lynden-Aldergrove POE, where the scale of the port allowed for motorists to be

surveyed in both directions of travel during the same day in summer. Each of the four main POEs in the Cascade Gateway were visited at least one weekday and one weekend day in both summer and winter, as shown in Table 1.

Each survey day, two research crews typically conducted questionnaires over combined 14- to 16-hour periods in summer, from 0600 to 0800 until about 2100. Due to shorter days, winter crews combined for 9-hour periods, beginning at 0730-0800 and ending at 1700-1730.

Table 1. Days of week each port-of-entry was visited

PORT-OF-ENTRY	DIRECTION	DAYS OF WEEK - SUMMER	DAYS OF WEEK - WINTER
Peace Arch-Douglas	N	Wed, Sat	Thu, Sat
	S	Thr, Fri, Sun	Thu, Sun
Pacific Highway	N	Wed, Fri, Sat	Tue, Sat, Sun
	S	Thu, Sun	Sat
Lynden-Aldergrove	N	Wed, Thu, Sat, Sun	Tue, Sun
	S	Wed, Thu, Sat, Sun	Thu
Sumas-Abbotsford-Huntingdon	N	Tue, Sat	Thu, Sat
	S	Wed, Sat	Sun

### 3.4 SAMPLE SIZE

Hourly traffic count data for the days that surveying occurred were provided by US CBP and CBSA. These counts are used to calculate the sample rate of the usable records collected (that is, those records where sufficient data was collected to be included in the database).

During data collection, research assistants also recorded the number of instances motorists refused to participate in all or most of the questionnaire. Some observable data can still be extracted from most refusals and used in certain queries.



Photo 4. Student research assistants at Pacific Highway.

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Table 2. Usable records collected in the field, associated traffic volumes that the records represent, sampling and refusal rates by POE and direction of traffic

		PEACE ARCH- DOUGLAS	PACIFIC HIGHWAY	LYNDEN- ALDERGROVE	SUMAS- ABBOTSFORD- HUNTINGDON	TOTAL
NORTHBOUND	Records Collected	3,141	2,154	1,232	1,583	8,110
	Traffic Representing	24,936	15,473	4,764	5,504	50,677
	Sample Rate	13%	14%	26%	29%	<b>16%</b>
	Refusal Rate	11%	27%	17%	11%	16%
SOUTHBOUND	Records Collected	1,733	2,580	1,200	1,652	7,165
	Traffic Representing	17,709	14,307	3,797	6,605	42,418
	Sample Rate	10%	18%	32%	25%	<b>17%</b>
	Refusal Rate	23%	11%	15%	10%	15%
TOTAL	Records Collected	4,874	4,734	2,432	3,235	15,275
	Traffic Representing	42,644	29,780	8,561	12,110	93,095
	Sample Rate	11%	16%	28%	27%	<b>16%</b>
	Refusal Rate	16%	19%	16%	10%	16%

### 3.5 RECORD WEIGHTING

The interview records are only a sample of the travelers that transited the border during the project. The sample is weighted to expand the records to better represent all cross-border travelers, as shown in the *Traffic Representing* columns in Table 2.

The weight equals the amount of vehicles each record represents in the hour-block that the interview occurred. For example, if 10 records were collected in the 0900-1000 hour-block that saw 20 vehicles total transit the border, the weight for each record in the 0900 hour-block is 2, or 20/10. Each sample record collected between 0900 and 1000 represents 2 vehicles

<sup>1</sup> Because of small sample sizes and the extensive use of Ready Lanes by NEXUS card holders, Ready Lane-designated records are included in the NEXUS weights for southbound data.

when weighted. Because of the uniqueness of border inspection lanes in the Cascade Gateway, weights are calculated for NEXUS lane travelers<sup>1</sup> and standard lane travelers separately where possible<sup>2</sup>.

Weights are useful for developing analyses that look at the cross-border traveling populace as a whole.

## 4 ANALYSIS

The main deliverable of the 2019 PVIS is the project database, which contains all usable records collected from the in-field questionnaire, weights, descriptions of the project, and some high-level analyses. The database is housed in Microsoft Access, where queries can be

<sup>2</sup> In instances of low sample sizes, a *total* weight is applied to both NEXUS and standard lane records – that is, all records regardless of inspection lane type are weighted to the total traffic observed for that hour.

easily run in-program. Data may also be exported and used in data analytics programs for further analysis.

WCOG has developed high-level analyses from PVIS data using the program Tableau. These analyses can be viewed on the IMTC’s data webpage at <https://theimtc.com/data/>.

The following analysis descriptions serve as examples of the types of queries one can perform in a data querying or analytics platform. They can help answer questions about the Cascade Gateway border-crossing populace, such as:

- Where do they live?
- Where are they going across the border?
- Why are they crossing?
- What information sources do they use to help them cross the border?

#### 4.1 COUNTRY OF RESIDENCE

Table 3 is an example of analysis that compares the countries of residence of motorists transiting the border. Note that these data do not necessarily indicate citizenship, as motorists were merely asked in what city they lived.

Table 3. Country of residence by port of entry

PORT-OF-ENTRY	CANADA	USA	OTHER COUNTRY
Peace Arch-Douglas Pacific Highway	65%	34%	0.9%
Lynden-Aldergrove	70%	30%	0.3%
Sumas-Abbotsford-Huntingdon	81%	19%	0.5%
<b>Total</b>	<b>71%</b>	<b>29%</b>	<b>0.6%</b>

#### 4.2 TRAVEL DOCUMENT TYPES

Cross-border motorists using standard, non-NEXUS inspection lanes were asked whether or not they ever use a document other than a passport to cross the border with and, if they do, what kind. Table 4 is another example of analysis that compares the document types used by Canadian and American residents transiting the border northbound<sup>3</sup> through standard, non-NEXUS lanes.

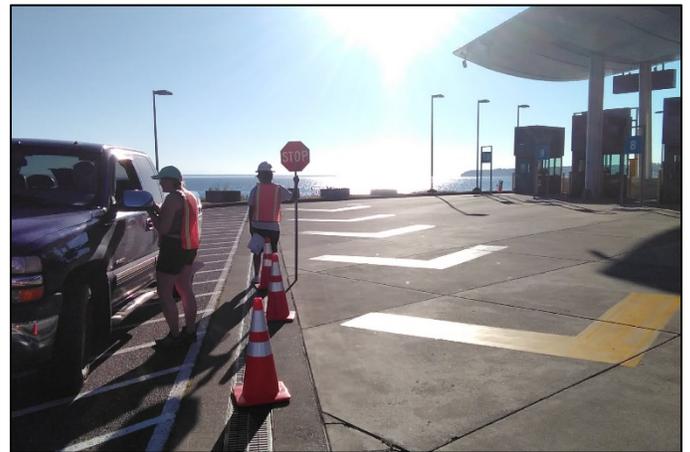


Photo 5. Surveying at Peace Arch.

<sup>3</sup> Because of southbound NEXUS card holders’ propensity to use the Ready Lane in addition to NEXUS lanes, this particular analysis only includes northbound records, where lane choices are simply NEXUS or non-NEXUS.

Table 4. Traveler document usage by country of residence

DOCUMENT TYPE	CANADA	USA
Passport only	75%	60%
Enhanced Driver's License	9%	18%
NEXUS Card	11%	10%
Permanent Resident Card	2%	3%
U.S. Passport Card	1%	4%
Global Entry Card	< 0.5%	3%
Non-Immigrant Visa	< 0.5%	1%
SENTRI Card	< 0.5%	< 0.5%
Other	1%	4%

NEXUS card holders responding to this survey question in standard, non-NEXUS lanes may either be traveling at a time that a POE's NEXUS inspection booth is closed or traveling with a passenger that does not also possess a NEXUS card.

### 4.3 PASSENGERS

The number of passengers in the vehicle, including the driver, was collected at the beginning of each survey interview. Combining the passenger count data with when and at what POE the data was collected, one can determine the patterns in occupancy of cross-border passenger vehicles relative to when and where they are crossing the border.

### 4.4 ORIGIN-DESTINATION Matrices

Research assistants asked drivers the locations they were coming from and going to across the border. Origin-destination (O-D) analyses should begin with the driver's residence as the origin and the location they are ultimately destined for across the border from their residence as their destination. This way, O-D matrices represent full cross-border trip profiles (or tours) rather than smaller, more broken up O-D trips that one might see in a more formal household travel survey or traffic modeling project.

### 4.5 LENGTH OF STAY ACROSS THE BORDER AND FREQUENCY OF TRAVEL

Drivers were also asked for how long they were across the border from their residence (or, if traveling out of their home country, how long they anticipated being in the other country) and how frequently they make cross-border trips.

### 4.6 TRIP PURPOSES

One of the most important elements of a unique travel survey such as the 2019 PVIS, where trips ends are not predominantly tied to work and home as in traditional travel surveys, is understanding why people are making trips to another country, especially when many of the travelers in the Cascade Gateway cross the border frequently. This understanding is furthered by using other data fields in querying trip purpose, such as where travelers live, what cities they are traveling to, and how long and how frequently trips for certain purposes are made.

### 4.7 TECHNOLOGY USED FOR CROSSING THE BORDER

In the 5 years since the last IMTC passenger vehicle study was conducted, technology's role in helping travelers cross the border has evolved. While certain technology has remained constant, such as border wait-time variable message signs on the highway, the 2019 PVIS was designed to capture how people are using new technologies to better their cross-border travel. This is

evident in questions that seek to understand how smartphone apps and routing software are being used by people transiting the border.

## 5 FOR MORE INFORMATION

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To request the full 2018-19 IMTC Passenger Vehicle Intercept Survey database, please contact:

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