PORTAL: Vehicle Length Data User Manual

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1 Introduction

The purpose of this User Manual is to provide the PORTAL user and other interested parties with:

- Information about vehicle length data available in the Portland Metropolitan Region
- Directions for using the PORTAL User Interface for viewing and downloading that data

We note that a primary purpose of collecting and using vehicle length data is to distinguish freight vehicle traffic from non-freight vehicle traffic; for example, to understand the percentage of freight traffic on the I-5 freeway. Thus, the "vehicle-length" data in PORTAL is sometimes referred to as "freight" data.

The vehicle-length (a.k.a. freight) data sources described in this user manual include:

1. Vehicle length (and speed) classification data from Oregon Department of Transportation
2. Individual vehicle length data from Oregon Department of Transportation
3. Vehicle length (and speed) classification data from Washington County
4. Other freight-related data available in the region

Data source 1 is automatically archived in the PORTAL database and available in PORTAL user interface; data source 2 is available on request through the PORTAL team; a plan for integrating data source 3 into the PORTAL database and User Interface has been created; and samples of the data sources in 4 are available along with contact information for those data sources.

Two visualizations have been developed in the PORTAL User Interface. The visualizations were designed to answer the following two tasks a user may want to accomplish.

Task 1: What percent of traffic at a location is freight vs. non-freight?

Task 2: How has the amount / percent of freight traffic at a location changed over time?

This User Manual has the following sections:

2 Background - Background on using vehicle-length data for vehicle classification
3 Data Sources – Description of vehicle-length / freight data sources
4 Length and Speed Bins – Describes the vehicle length bins used by PORTAL and information about the selection of the Bins.
5 PORTAL User Interface – Description of the PORTAL User Interface for visualizing and downloading freight data

2 Background

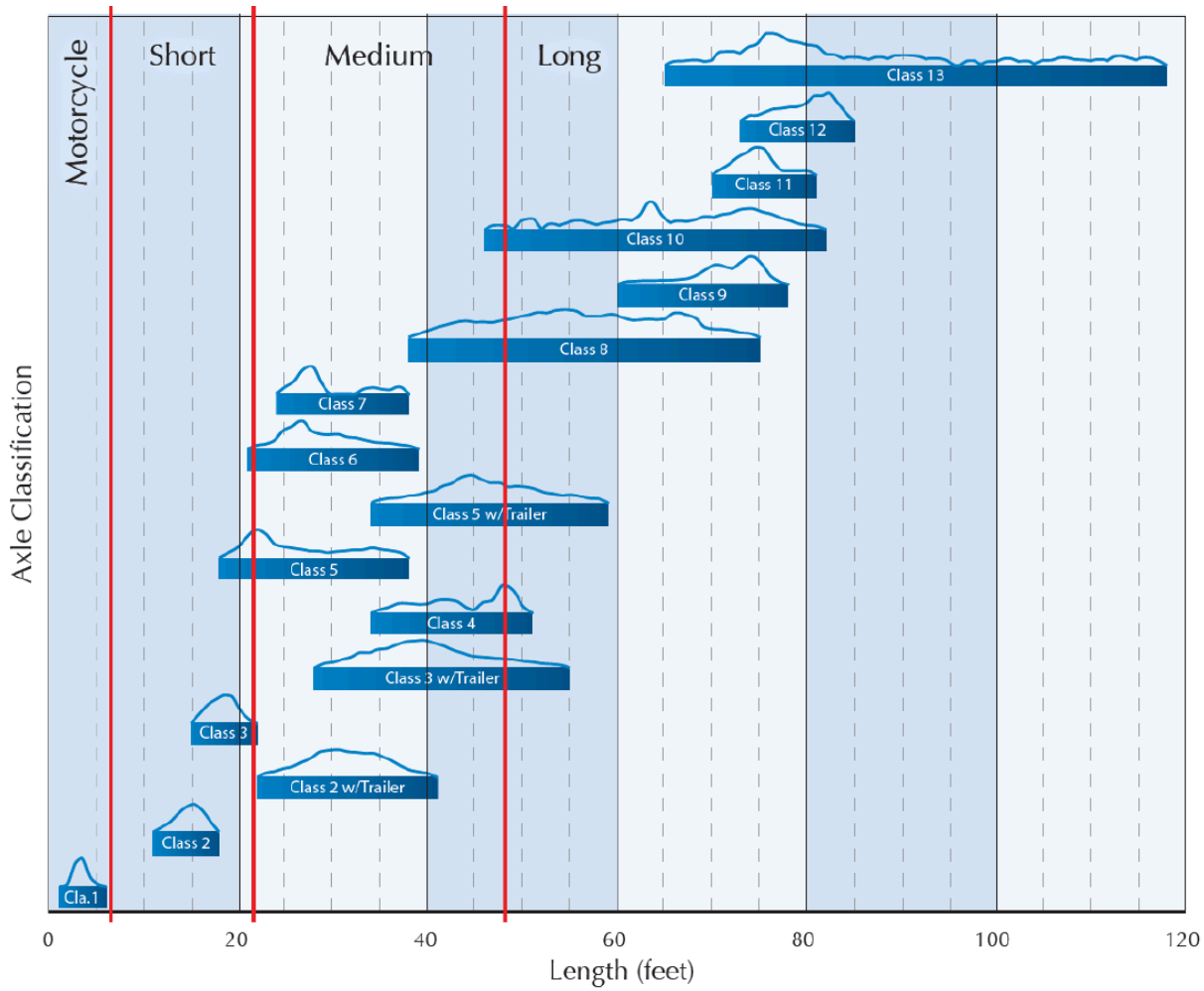
A goal of this project was to collect vehicle length classification data in the PORTAL database and display that data in the PORTAL User interface for the purpose of helping users understand freight traffic. The data collected as part of this project is not vehicle classification data, rather the data collected by this project is vehicle length data collected from devices such as inductive loop detectors and high-definition radar devices. The vehicle-length data can be useful to understanding freight traffic by taking advantage of the fact that longer vehicles are more likely to be freight vehicles, while shorter vehicles are more likely to be passenger vehicles. Collection of vehicle length data for the purposes of understanding freight traffic has become common in practice [1], thus this project aimed to collect and use length-based data for understanding freight traffic in the Portland region.

As discussed above, data collected as part of this project is vehicle-length data which does not directly indicate if a vehicle is a freight vehicle or not. In contrast, Weigh-in-Motion stations typically use piezo-electric sensors to classify vehicles by sensing the number of axles on a vehicle and the spacing between those axles. With this data, vehicles are then classified into vehicle classes – i.e. Passenger Cars, Busses, Five-Axle Single-Trailer Trucks, etc. Note that PORTAL will shortly include data from all WIM stations in Oregon. The closest stations to the Portland metro area are Woodburn on I-5 and Cascade Locks on I-84. The length-based data collected in this project provides only vehicle length and cannot be use to directly classify vehicles. However, there is an association between vehicle length and whether the vehicle is a freight vehicle or not. A pooled-fund study was completed to study best practices for collecting length-based data [1]. That study validated the use of length-based collection methods and provided suggestions on bin lengths. The advantage of length-based data is that the data can be collected from standard inductive loop detectors and radar sensors, the data can be collected at many more locations and at lower cost.

Figure 1 is a figure from the pooled-fund study [1] that provides an illustration of the association between vehicle length and vehicle class. Table 1 lists the class names and is taken from a MAG study [2], which also provides descriptions of the vehicle classes. The vertical red lines in Figure 1 show one potential set of length bins and how those length bins capture different vehicle classes. For example, the "short" bin in this figure will capture all Class 2 vehicles (Passenger Cars), most Class 3 vehicles (Other Two-Axle, Four-Tire Single Unit Vehicles), some Class 5 (Two-Axle, Six-Tire, Single-Unit Trucks) vehicles and a very few Class 6 (Three-Axle Single-Unit Trucks) vehicles.

The length bins selected for use in PORTAL are described in Section 4 and are listed in Table 6.

Note that the classes shown in Figure 1 are sometimes grouped together for analysis. For example, classes 1-3 represent passenger vehicles, classes 4-7 represent single unit trucks, and classes 8-13 represent multi-unit trucks. Class 4 is and may be used differently – if the user is interested in people movement, on might group Class 4 with the lower classes; however, for pavement and bridge operators, Class 4 is usually put with trucks because of the weights involved.



Vehicle Length by Axle Classification

Figure 1 Figure from the MNDOT Pooled Fund Study showing the association between vehicle class and vehicle length

Class	Description
Class 1	Motorcycle
Class 2	Passenger Cars
Class 3	Other Two-Axle, Four-Tire Single Unit Vehicles
Class 4	Buses
Class 5	Two-Axle, Six-Tire, Single-Unit Trucks
Class 6	Three-Axle Single-Unit Trucks
Class 7	Four or More Axle Single-Unit Trucks
Class 8	Four or Fewer Axle Single-Trailer Trucks
Class 9	Five-Axle Single-Trailer Trucks
Class 10	Six or More Axle Single-Trailer Trucks
Class 11	Five or fewer Axle Multi-Trailer Trucks
Class 12	Six-Axle Multi-Trailer Trucks
Class 13	Seven or More Axle Multi-trailer Trucks

Table 1 Class Names and Descriptions from MAG Internal Truck Travel Survey and Truck Model Development Study [2]

3 Data Sources

The data sources identified for this project and described in this section are as below:

1. Vehicle length and speed classification data from Oregon Department of Transportation
2. Individual vehicle length data from Oregon Department of Transportation
3. Vehicle length and speed classification data from Washington County
4. Other freight-related data available in the region

3.1 Vehicle Length and Speed Classification Data from Oregon Department of Transportation

As discussed in the previous section, a primary goal of this project was to collect vehicle classification data from the Oregon Department of Transportation (ODOT) and make that data available to users through the PORTAL database and user interface. In addition to vehicle length classification data, ODOT also made available a feed of vehicle speed classification data. The data feeds for ODOT vehicle length and speed classification are active and this data is being archived in the PORTAL database. This data is retrieved from the ODOT TTIP interface in XML format. The length and speed classification data files contain data at a 20-second granularity and are updated every 20 minutes.

The vehicle length and speed classification data can be divided into three types: vehicle length classification data, vehicle speed classification data and inventory data. Vehicle length classification data and vehicle speed classification data refer to the ongoing feeds of length and speed classification data. Inventory data provides information about the classification bins. The inventory, vehicle length classification and vehicle speed classification data are received in three separate feeds from ODOT and are stored separately in the PORTAL database.

3.1.1 ODOT Vehicle Length Classification Data

Table 2 shows a sample of the ODOT vehicle length classification data as stored in the PORTAL database. At a high level, this data tells how many vehicles in each lane in each length classification bin passed by a particular detection station in a 20-second time period. Table 2 shows all the data collected for station 81 for the 20-second time period starting at 7:00:18 am on 10-11-2016. Taking a specific example, the first non-header row in Table 2 indicates that at station 81, 6 vehicles in length classification bin 1 (0-20 ft) passed by station 81 in lane 1 in the 20-second time period starting at 7:00:18.

This data format is the most detailed data format received and stored by PORTAL. Data in this format, which includes lane-by-lane data, is currently available upon request from the PORTAL team. Data may also be downloaded from the PORTAL UI, however, that data does not currently include lane-by-lane data. The ODOT vehicle length classification data is stored in the table clslengthbindata in the cls schema in the PORTAL database.

stationid	lane	bin_number	bin_count	bin_time
81	1	1	6	2016-10-11 07:00:18-07
81	2	1	9	2016-10-11 07:00:18-07
81	3	1	14	2016-10-11 07:00:18-07

81	1	2	0	2016-10-11 07:00:18-07
81	2	2	1	2016-10-11 07:00:18-07
81	3	2	0	2016-10-11 07:00:18-07
81	1	3	1	2016-10-11 07:00:18-07
81	2	3	0	2016-10-11 07:00:18-07
81	3	3	0	2016-10-11 07:00:18-07
81	1	4	0	2016-10-11 07:00:18-07
81	2	4	0	2016-10-11 07:00:18-07
81	3	4	0	2016-10-11 07:00:18-07

Table 2 Sample of ODOT Vehicle Length Classification Data

Fields in this table are defined below.

stationid: Id of the collection station. For ODOT stations, this stationed is the same as the DAC stationid. For ODOT stations, this is the same stationid as is provided by the DAC.

lane: Lane in which data was collected.

bin_number: Classification bin number; see Table 6 for the length bin definitions.

bin_count: Count of vehicles in that length bin during the 20-second collection period.

bin_time: The timestamp of this data value. 20-second granularity.

3.1.2 ODOT Vehicle Speed Classification Data

Table 3 shows a sample of the ODOT vehicle speed classification data as stored in the PORTAL database. At a high level, this data tells how many vehicles in each lane in each speed classification bin passed by a particular detection station in a 20-second time period. Table 3 shows all the data collected for station 87 for the 20-second time period starting at 7:00:15 am on 10-11-2016. Taking a specific example, the fifth non-header row in Table 3, shaded in light grey, indicates that at station 87, 5 vehicles in speed classification bin 6 (51-60 mph) passed by station 87 in lane 1 in the 20-second time period starting at 7:00:15.

This data format is the most detailed data format received and stored by PORTAL. Data in this format, which includes lane-by-lane data, is currently available upon request from the PORTAL team. Data may also be downloaded from the PORTAL UI, however, that data does not currently include lane-by-lane data. The ODOT vehicle length classification data is stored in the table clsspeedbindata in the cls schema in the PORTAL database.

stationid	lane	bin_number	bin_count	bin_time
87	1	1	0	2016-10-11 07:00:15-07
87	1	2	0	2016-10-11 07:00:15-07
87	1	3	0	2016-10-11 07:00:15-07
87	1	4	0	2016-10-11 07:00:15-07

87	1	5	0	2016-10-11 07:00:15-07
87	1	6	5	2016-10-11 07:00:15-07
87	1	7	0	2016-10-11 07:00:15-07
87	1	8	0	2016-10-11 07:00:15-07
87	1	9	0	2016-10-11 07:00:15-07
87	1	10	0	2016-10-11 07:00:15-07
87	2	1	0	2016-10-11 07:00:15-07
87	2	2	0	2016-10-11 07:00:15-07
87	2	3	0	2016-10-11 07:00:15-07
87	2	4	0	2016-10-11 07:00:15-07
87	2	5	0	2016-10-11 07:00:15-07
87	2	6	9	2016-10-11 07:00:15-07
87	2	7	0	2016-10-11 07:00:15-07
87	2	8	0	2016-10-11 07:00:15-07
87	2	9	0	2016-10-11 07:00:15-07
87	2	10	0	2016-10-11 07:00:15-07
87	3	1	0	2016-10-11 07:00:15-07
87	3	2	0	2016-10-11 07:00:15-07
87	3	3	0	2016-10-11 07:00:15-07
87	3	4	0	2016-10-11 07:00:15-07
87	3	5	0	2016-10-11 07:00:15-07
87	3	6	0	2016-10-11 07:00:15-07
87	3	7	4	2016-10-11 07:00:15-07
87	3	8	0	2016-10-11 07:00:15-07
87	3	9	0	2016-10-11 07:00:15-07
87	3	10	0	2016-10-11 07:00:15-07

Table 3 Sample of ODOT Vehicle Length Classification Data

Fields in this table are defined below.

stationid: Id of the collection station. For ODOT stations, this stationed is the same as the DAC stationid. For ODOT stations, this is the same stationid as is provided by the DAC.

lane: Lane in which data was collected.

bin_number: Classification bin number; see Table 8 for the speed bin definitions.

bin_count: Count of vehicles in that speed bin during the 20-second collection period.

bin_time: The timestamp of this data value. 20-second granularity.

3.1.3 ODOT Bin Inventory Data

In the course of this project an Inventory feed was developed. Table 4 shows a sample of the Inventory feed. The intent of the inventory feed was to provide PORTAL with information about the length and speed bins. It was decided that the length and speed bins should be fixed and so this feed was disabled.

stationid	class_type	bin_number	bin_value	configure_time
87	Length	1	20	2016-06-28 12:42:12.303044-07
87	Length	2	35	2016-06-28 12:42:12.303044-07
87	Length	3	60	2016-06-28 12:42:12.303044-07
87	Length	4	120	2016-06-28 12:42:12.303044-07
87	Speed	1	10	2016-06-28 12:42:12.381044-07
87	Speed	2	20	2016-06-28 12:42:12.381044-07
87	Speed	3	30	2016-06-28 12:42:12.381044-07
87	Speed	4	40	2016-06-28 12:42:12.381044-07
87	Speed	5	50	2016-06-28 12:42:12.381044-07
87	Speed	6	60	2016-06-28 12:42:12.381044-07
87	Speed	7	70	2016-06-28 12:42:12.381044-07
87	Speed	8	80	2016-06-28 12:42:12.381044-07
87	Speed	9	90	2016-06-28 12:42:12.381044-07
87	Speed	10	100	2016-06-28 12:42:12.381044-07

Table 4 Sample of ODOT Inventory Data

Fields in this data are defined below. The

stationid: Id of the collection station. For ODOT stations, this is the same stationid as is provided by the DAC.

class_type: Class type is either Length or Speed.

bin_number: Classification bin number.

bin_value: Maximum length or speed value for that bin. For example, in Table 4, the first non-header row indicates that for stationid 8, bin 1 goes from 0 ft to 20 ft. Length bins are specified in feet, Speed bins are specified in miles per hour.

configure_time: Time of last update of the inventory information.

3.1.4 Data Collection Process

The PORTAL team worked with ODOT to define data feeds for vehicle length and speed classification data and inventory data; all as described above. These feeds are published on TTIP and will be retrieved by the PORTAL system from the ODOT TTIP web site. The data feed is in XML and consists of three files:

1. ClsLengthBinData.xml – Vehicle length classification data as described in Section 3.1.1

2. ClsSpeedBinData.xml – Vehicle speed classification data as described in Section 3.1.2
3. ClsInventory.xml – (Bin) Inventory data as described in Section 3.1.3

The length and speed classification data files will contain data at a 20-second granularity and the files will be updated every 20 minutes.

An example of the length classification data in XML is below.

<CLS Data>
<Table>
<SID>1</SID>
<LN>11</LN>
<BN>1</BN>
<BC>0</BC>
<DT>2015-11-12T09:28:23-08:00</DT>
</Table>
…

Key:
SID: Station Id
LN: Lane
BN: Bin Number
BC: Bin Count
DT: Timestamp

3.2 Individual Vehicle Length Data from Oregon Department of Transportation

ODOT has the capability of collecting individual vehicle data; however, transmitting individual vehicle data for all stations to PSU would overwhelm ODOT's network. Individual vehicle data may be very useful to researchers, therefore, we have developed a process for obtaining that data on a pre-request, as-needed basis. ODOT has the capability of turning the individual vehicle data on and off on a location-by-location basis. If Portland State wants individual vehicle data, Portland State will call ODOT and request that the individual vehicle data be turned on for a set of dates and locations. Portland State must give ODOT notice in advance of the dates for which the data will be collected so that ODOT can turn on the collection. Once the collection is complete, ODOT will send Portland State a CSV. PORTAL users can request individual vehicle length data by giving the PORTAL team notice that they would like the data and the PORTAL team will notify ODOT of the data request.

3.3 Vehicle Length and Speed Classification Data from Washington County

As part of this project, a plan for collecting vehicle length classification data from Washington County was created. The data from Washington County will be received in dis-aggregated format, that is PORTAL will receive per-vehicle data from Washington County. The data format received from Washington County and the collection and aggregation process is described below.

Washington County data is collected through the NW Signal system. The data is planned to be transferred to Portland State approximately every four hours as a comma-separated value (csv) file using the sftp protocol over the ITS Network.

The Washington County vehicle classification data comes in a different format from the ODOT vehicle classification data. As such, additional processing is required on the Washington County data after it is received at Portland State. Table 5 shows an example of the Washington County classification data. This data is reported as individual vehicle data and binning will be done at Portland State. This procedure is in contrast to the ODOT vehicle length classification data which is binned by ODOT and provided to Portland State in binned format. In addition, inventory data for Washington County will not be provided as an automatic feed. The inventory data will be provided through a manual process.

Date	Time	Lane	Phase	Phae Color	Mode	Speed	Length	Lead Det	Lag Det
"07/17/15"	"07:27:43"	"2"	"2"	"0"	"0"	"40"	"15"	"34"	"36"
"07/17/15"	"07:27:48"	"2"	"2"	"0"	"0"	"40"	"13"	"34"	"36"
"07/17/15"	"07:27:49"	"2"	"2"	"0"	"0"	"40"	"13"	"34"	"36"
"07/17/15"	"07:27:50"	"4"	"6"	"0"	"0"	"34"	"23"	"38"	"40"

Table 5 Sample of Washington County Vehicle Classification Data

3.3.1 Plan for importing Washington County Vehicle Classification data into PORTAL

The Washington County data is collected in a different format from the ODOT data, thus this data is imported separately. An inherited table structure is used to manage the station ids for the Washington County data. Station IDs for ODOT data match the ODOT DAC station ids; however, there are not DAC station ids for the Washington County data. The PORTAL team will assign ids for the Washington County vehicle classification collection stations. The import of Washington County data is expected to require minimal modifications to the PORTAL web site code such as an agency selector or breaking up the listing of stations by agency in the dropdown. Import of the Washington County data is expected in 2017.

3.4 Other Freight-related data available in the region

An investigation into additional freight or vehicle length data sources was completed. Potential sources of data identified were Metro, ODOT, the Port of Portland and Washington Department of Transportation in Southwest Washington. Summaries of identified data sources organized by agency are below along with suggested contact information for questions about those data sources and access to the data.

3.4.1 Metro

Metro collects video counts and one radar count. There are approximately a dozen or so locations count in the Metro region. Contacts: Jeremy Murray and Bud Reiff.

3.4.2 ODOT

ODOT WIM data – Data from all ODOT WIM stations are archived in PORTAL. These data are available monthly and provide individual vehicle weights (include axle weights) and classification. A WIM data

page has been developed for PORTAL. The page is currently not visible due to a change in data format; however, the page is expected to available by the end of 2017.

ODOT permanent *counts:* ODOT has two vehicle length classifiers in the Portland area: Stafford AVC #03016 on I-5 about two miles from I-5; AVC #34007 on US 26 about a mile west of Glencoe. These vehicle classifiers produce data continuously. Contact: Don Crownover

ODOT non-permanent counts: ODOT does some short-term counts in the region; typically, such counts are done on weekdays. Contact: Don Crownover

ODOT vehicle data in online GIS: ODOT has vehicle data online in GIS. This source has point locations for vehicle classifications on state and select non-state route. The values are in percent and most recent update is 2013. https://gis.odot.state.or.us/transgis (Use layer tree to turn on AADT under traffic data and click on a point to get the data.)

3.4.3 Port of Portland

The Port of Portland can produce reports for 24/7/365 class counts from their permanent count stations on 82nd between Air Cargo Road and Airport Way and on Airport Way between 82nd and Mt Hood. The Port can also produce counts for Airport Way west of 82nd and on the PDX Terminal Roads; however, those counts will be all autos and busses. In addition, the Port collects annual spring counts at locations around the airport but most are not class counts. Finally, annual fall counts are collected at the Port's marine terminals but similarly most are not class counts. The Port does have classified TMCs at Terminal 6 going back a number of years and a few special class counts for Rivergate and West Hayden Island from random years and various locations. Contact: Phil Healy

3.4.4 Washington Department of Transportation

Washington Department of Transportation in Southwest Washington also collects vehicle length data through their NG system. Vehicle length data is available in a feed from WSDOT. As part of ongoing work on PORTAL, funded by SW Washington Regional Transportation Council, vehicle length data from WSDOT (SW region) is planned to be incorporated into the PORTAL database and into the new PORTAL "Freight" user interface described below. Note that the length bins used by Oregon and WSDOT are slightly different as discussed in Section 4. WSDOT Contact: Scott Langer

4 Length and Speed Bins

As discussed in Section 1, the data collected in this project is vehicle length and speed data. Vehicle length data can be used as a surrogate for vehicle classification data. To use the vehicle-length data as a surrogate for the vehicle classification data, data about vehicle lengths is typically binned into "length bins."

As discussed, vehicle length data is typically classified into bins for the purpose of distinguishing freight traffic from non-freight traffic. Table 6 shows the bins that were selected for use in PORTAL. These bins were selected after regional discussion as described below.

Bin Number	Bin Lengths
1	0-20 ft

2	21-35 ft
3	36-60 ft
4	61-120 ft

Table 6 ODOT / PORTAL Vehicle Length Bins

As part of this project, regional discussions were had both at TransPort and at the VAST TSMO meetings regarding regional coordination on length bins. The basis for this discussion was: 1) a pooled fund study [1] which validated the length-based collection concept and suggested a set of length bins to be used for collecting vehicle lengths from inductive loops and similar devices (i.e. length-based devices and not axle-based devices) was used as a basis for this discussion and 2) prior work on this project [3] reviewed available literature and recommended using the bins suggested by the Pooled fund study

After this discussion and conference with ODOT staff, the bins listed in Table 5 were proposed. The division between the first two bins (0-20 and 21-35) is as currently used by ODOT and is recommended by the national pooled fund study[1]. The rest of the bin lengths are as currently used by ODOT. Having this alignment in length bins is useful so that data from this collection process can be compared with data from ATRs maintained by ODOT. The proposed bins were distributed to a regional list for approval.

As for discussion surrounding the bin lengths. The discussion at TransPort and VAST TSMO centered primarily around the division between Short vehicle and Medium vehicle (20 feet in the list above), as this distinction is a primary distinction can be used to distinguish between freight and non-freight vehicles. Metro also commented that sometimes their contractor has selected 42 feet as one cut-off because of an Oregon statute that says anything over 40 feet is a double or triple trailer. The 2 feet was added as a buffer for error.

Finally, Table 7 shows the vehicle length bins used by WSDOT. Table 8 shows the vehicle speed bins used by PORTAL and ODOT.

Bin Number	**Bin Lengths**
1	0-20 ft
2	21-42 ft
3	42-72 ft
4	72-115 ft

Table 7 WSDOT Vehicle Length Bins

Bin Number	**Bin Speeds**
1	0-10 mph
2	11-20 mph
3	21-30 mph
4	31-40 mph
5	41-50 mph
6	51-60 mph
7	61-70 mph
8	71-80 mph
9	81-90 mph
10	91-100 mph

Table 8 ODOT / PORTAL Vehicle Speed Bins

5 PORTAL User Interface

Two visualizations have been developed in the PORTAL User Interface. The visualizations were designed to answer the following two questions a user might have.

1. What percentage of traffic at a location is freight vs. non-freight?
2. How has the amount / percent of freight traffic at a location changed over time?

5.1 What percentage of traffic at a location is freight vs. non-freight?

The goal of this visualization is to help a user understand what percentage of traffic at a specific location is freight traffic. Figure 2, Figure 3 and Figure 4 show examples of this visualization.

Figure 2 shows this visualization for August 26, 2016 for the Haines to NB I-5 station. In this plot, there are four lines, with each line representative of one bin. For example, the light blue line shows the volume of vehicles in the 0-20ft bin throughout the course of the day. As one can see and as is expected, the majority of vehicles are in the 0-20ft bin. Selection options and other plot features are shown below.

Selection Options: The selection options in this visualization, which appear above the plot itself, are Station, Start and End Date, the type of Measure – Length or. Speed, the Chart Type and the Resolution (15 min, 1hr, 1 day).

Mouse-Over: As shown in Figure 2, the count values are shown when the user “mouses over” the plot.

Legend: The user can turn on and off bins (lines) by clicking on the rows in the plot legend. In Figure 3, the 0-20ft bin is turned off.

Zoom: The user can drag a box on the screen to zoom into portions of the plot. Such an option is more useful for multi-day plots such as shown in Figure 4.

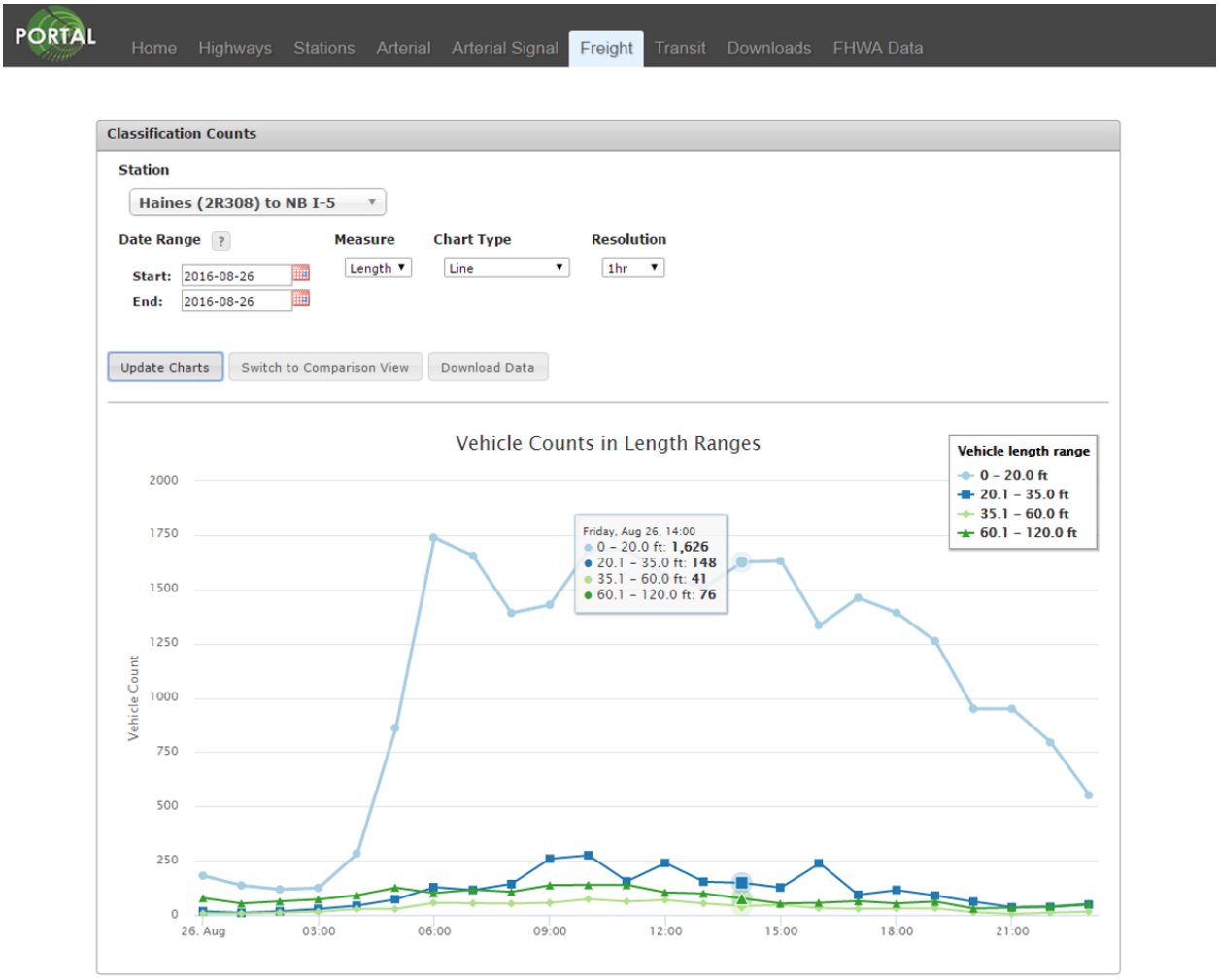


Figure 2 Vehicle Length Classification Plot from the PORTAL User Interface for a single day. Standard View.

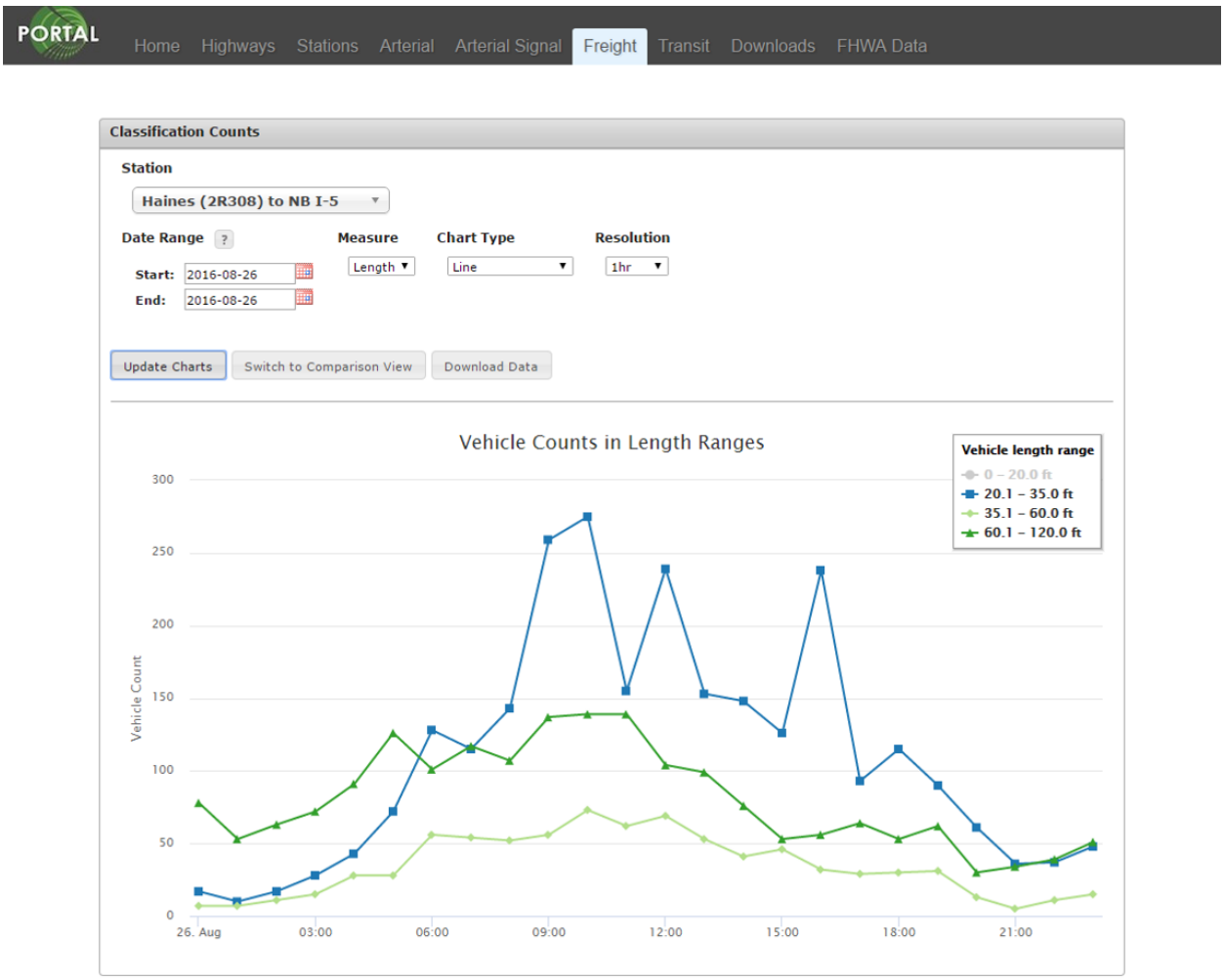


Figure 3 Vehicle Length Classification Plot from the PORTAL User Interface with Bin 1 (0-20 ft) switched off. Standard View.

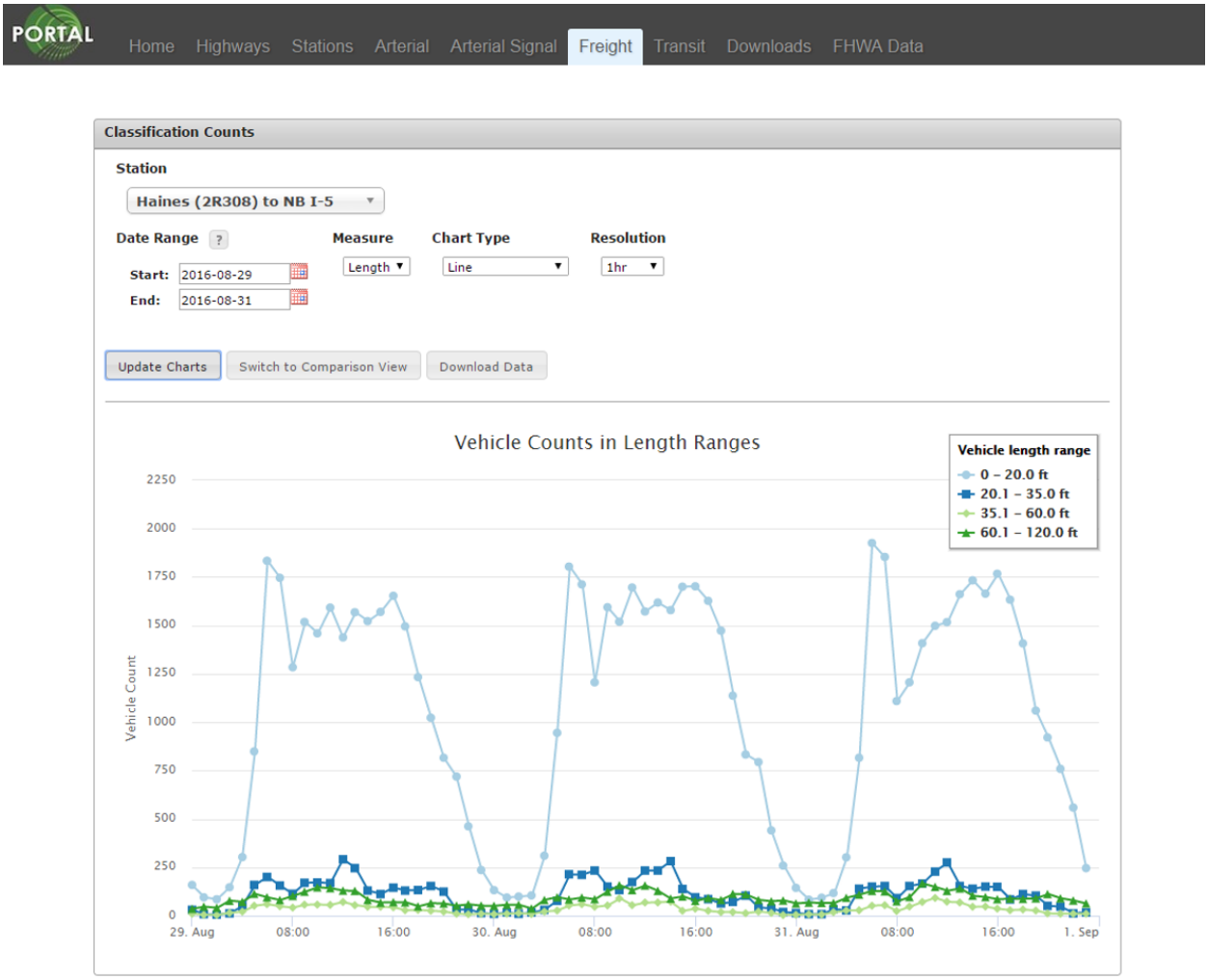


Figure 4 Vehicle Length Classification Plot from the PORTAL User Interface for multiple days. Standard View.

5.2 How has the amount / percent of freight traffic at a location changed over time?

The goal of this visualization is to help a user understand if the percent of freight traffic at a location has changed over time. An example of this visualization is shown in Figure 5.

Figure 5 shows vehicle traffic for the WB Lombard (2R013) station for September 2016. The values in this plot are monthly aggregate volumes. In normal usage, this plot would have multiple lines – with one line for a month so that traffic between months can be compared. Note that the data displayed in this plot is aggregated counts for the entire month.

Selection Options: The selection options in this visualization, which appear above the plot itself, are Station, Start month and End month, the type of Measure – Length or Speed, the Length Ranges, the Chart Type and an option to select Weekdays only. Note that the check box under Length Ranges can be used to turn on and off which bins are included in the plotted values.

As with the previously-described plot, the user can mouse over the plot to see values, can use the legend to turn on and off lines – months in this case – and can click and drag to zoom into sections of the plot.

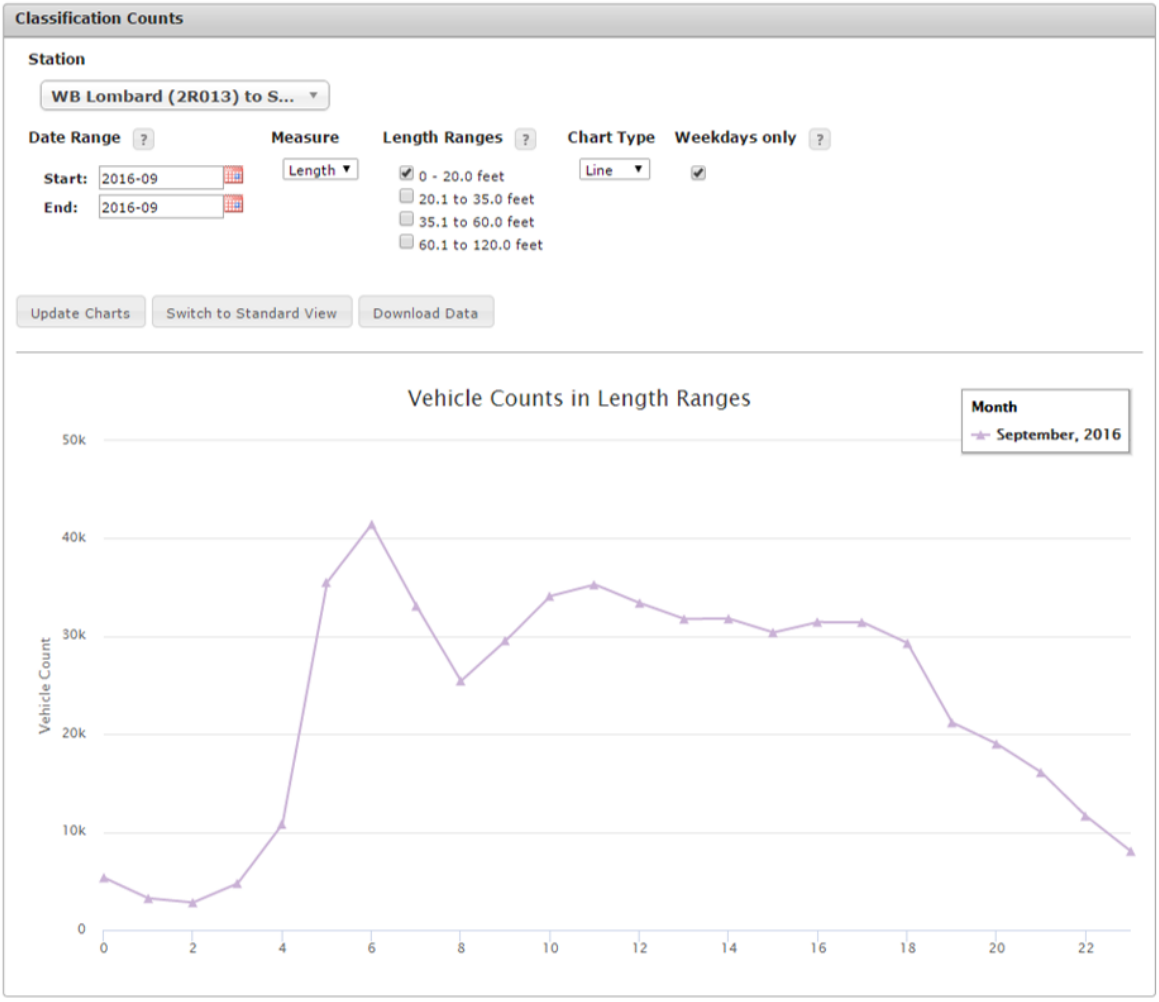


Figure 5 Vehicle Length Classification Plot from the PORTAL User Interface – Comparison View.

5.3 Data Download

Data for both plots is available for download by clicking on the Download Data button on each plot. Larger data downloads, including inventory data, are also available on the PORTAL Downloads page. Table 9 shows a sample of data downloaded from the Standard View. Data in this download has been aggregated across lanes, so that the first non-header row indicates that in the 20-second time period starting at 8/29/2016 7:00:16 there were

Collection Time	0-20 feet	20-35 feet	35-60 feet	60-120 feet
8/29/2016 7:00:18	18	0	0	0
8/29/2016 7:00:38	21	2	0	0

8/29/2016 7:00:58	21	4	2	1
8/29/2016 7:01:18	16	0	0	1
8/29/2016 7:01:38	9	2	0	1
8/29/2016 7:01:59	23	2	0	1
8/29/2016 7:02:19	22	4	1	1
8/29/2016 7:02:39	12	4	0	1
8/29/2016 7:02:59	14	3	0	1

Table 9 Sample of Data Download from the Standard View for Haines (2R308) to NB I-5 for Aug 29, 2016, 7AM

6 References

1. Minnesota Department of Transportation; Research Services. Loop- and Length-Based Vehicle Classification, Federal Highway Administration – Pooled Fund Program. [TPF-5(192)]. Erik Minge, Primary Author. SRF Consulting Group, Inc. Minneapolis, Minnesota. November 2012 (Minge_2012_MNDOT_Length-based_Pooledfund.pdf)
2. MAG Internal Truck Travel Survey and Truck Model Development Study. Appendix A. (https://www.azmag.gov/Documents/TRANS_2011-02-25_Federal-Highway-Administration-Vehicle-Classes-With-Definitions.pdf)
3. Permanent Freight Data Collection Infrastructure and Archive System. Technical Memorandum #1. Portland State University. Oregon State University. January 2013.