

Freight Analysis Framework 3



User Guide



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This guide provides basic instructions on how to use FAF data, products, and the web-based tabulation tool. Grey shaded words within this document indicate a mouseover with additional information or background on the term or phrase.

1.0 What is the FAF

The Freight Analysis Framework (FAF) is a compilation of data and products that provides estimates of freight shipped to (*imports*), from (*exports*), and within (*domestic*) the United States. It consists of: (1) downloadable data sets; (2) a web-based tabulation tool which allows you to extract, view, and download the specific information you are interested in; and (3) several data products. This user guide was written and released in conjunction with FAF version 3.3, however the majority of its contents are applicable to all versions of FAF3.

1.1 What is in FAF3

Estimates of freight measures available in FAF3 include *value*, *tons*, and domestic *ton-miles*:

- By [mode of transportation](#)
- For [type of commodity](#)
- Between and within states or the [123 domestic FAF regions](#), and to and from [8 foreign regions](#) for exports and imports
- For 2007 (the most recent Economic Census year), a [provisional](#) estimate for the [most recent year](#), and forecasts for 2015, 2020, 2025, 2030, 2035, and 2040.

In addition, FAF3 includes estimates for *value*, *tons*, and domestic *ton-miles* for 1997 and 2002 at the [state level only](#) using FAF3 methodology.

For 2007 and 2040, FAF3 includes estimates for *trucks* and *tons* on the highway network.

Currently available FAF3 products include [FAF3 Origin-Destination Data](#), [FAF3 Summary Statistics and Other Products](#), and [FAF3 Network Data](#).

1.2 What FAF Does and Does Not Do

Purpose. The FAF has been created to help users understand how the movement of freight affects the transportation system and where problems with the transportation system could affect the flow of freight. By combining FAF estimates with other data and models, analysts and planners can examine relationships between freight movement and congestion, economic activity, infrastructure wear, safety risk exposure, energy consumption, and environmental issues.

What FAF does. The FAF provides a comprehensive national picture of freight flows, trends, and a baseline forecast to support policy studies. The FAF informs States and localities about their major trading partners and the volumes and sources of traffic passing through their jurisdictions at the corridor level.

What the FAF does NOT do. The FAF does not provide local detail or temporal (seasonal, daily, or hourly) variation in freight flows that are typically necessary to support project planning. While statistical methods exist that allow analysts to disaggregate FAF data from FAF regions to counties or smaller areas, FHWA has not measured any of these methods to establish estimates of reliability or



accuracy. FAF estimates of truck tonnage and number of trucks on the network, particularly in regions with multiple routes or significant local traffic between major centers of freight activity, should be supplemented with local data to support local applications.

Using FAF for trends. FAF forecasts are a reasonable extrapolation of current trends, but do not reflect major shifts in the national economy, future capacity limitations, or changes in transportation costs and technology. An extensive system of economic models is used to convert national consumption patterns and foreign trade into purchases among industries and then into volumes of commodities reflected in those purchases. Current percentages carried by each mode for each commodity are then applied to the forecasted mix of commodities to obtain future modal shares of freight movement. To evaluate how freight movement might be affected by changes in costs or other aspects of or to the transportation system, the FAF3 benchmark forecast would need to be supplemented by other models

1.3 FAF Evolution

New versions of the FAF are created after each 5-year Economic Census, which includes the Commodity Flow Survey.

- FAF Version 1 was based on the 1997 Economic Census, included longer distance freight movements for 1998, 2010 and 2020 by all modes except pipeline, and was limited by the use of proprietary data in both publicly available geographic detail and transparency of estimation methods.
- Version 2 was based primarily on data from the 2002 Economic Census, and provided details on freight movement for 2002, forecasts through 2035, included pipelines, removed proprietary restrictions, and was not limited to longer distance movements.
- Version 3 is based primarily on data from the 2007 Economic Census, is the first to include estimates of domestic ton-miles, and adds reprocessed 1997 and 2002 Economic Census data. A brief summary of changes to FAF3 is available under [Version Descriptions](#).

1.4 Comparison between FAF1, FAF2, and FAF3

Because methods and data sources have changed with each version, results from FAF1 and FAF2 should not be compared to each other or to FAF3. To support trend analysis, FAF3 now includes estimates for 1997 and 2002 at the state level based on comparable estimation methods. Although the methodology is now consistent between these years and 2007, many of the original data sources remain the same, which, in some cases, can result in values that are not adequate for trend analysis and should be used with care.

2.0 Basic Definitions

The FAF is built primarily on the [Commodity Flow Survey](#) and uses the modes, commodity classification, and geography developed for that survey.

Measures that are provided as part of the current release of FAF3 include:

- *Value* in 2007 chained (constant) dollars to adjust for inflation, except where noted
- *Tons* in short tons (also referred to as *Weight* in this document)



- *Ton-miles* as the product of tons and the weighted average distance by mode of shipments moving on the corresponding transportation network between or within FAF regions.

2.1 Mode of Transportation

FAF3 includes the seven modes of transportation from the Commodity Flow Survey plus an extra category involving imports. [Table 1](#) provides a summary and brief description of each mode. FAF3 also provides *value*, *tons*, and domestic *ton-miles* by Domestic Mode and *value* and *tons* by Foreign Mode.

- *Domestic Modes* are the modes used between domestic origins and destinations for domestic trade, modes used between zones of entry and domestic destination for imports, and modes used between domestic origins and zones of exit for exports.
- *Foreign Modes* comprise the mode of arrival to zones of entry for imports or mode of departure from zones of exit for exports; they do not include modes used in foreign countries to and from foreign ports and airports.

Note about *Multiple Modes and Mail*: FAF3 and the Commodity Flow Survey use *Multiple Modes and Mail* rather than *intermodal* to represent commodities that move by more than one mode. *Intermodal* typically refers to containerized cargo that moves between ship and surface modes or between truck and rail, and repeated efforts to identify containerized cargo in the Commodity Flow Survey have proved unsuccessful. Shipments reported as *Multiple Modes* can include anything from containerized cargo to coal moving from mine to railhead by truck and rail to harbor. The “Mail” component recognizes that shippers who use parcel delivery services typically do not know what modes were involved after the shipment was picked up.

2.2 Type of Commodity

Commodities are classified at the 2-digit level of the [Standard Classification of Transported Goods](#), which is summarized in [Table 2](#). A [complete description](#) of these categories and their constituent parts is published by the Bureau of Transportation Statistics.

2.3 Geography

To minimize potential confusion between geography-related terms, the following convention is used in this document.

- *Origin* - *The beginning of a freight movement regardless of geography*
- *Domestic Origin*
 - *For domestic freight movement, the FAF region or state where a freight movement begins*
 - *For imports, the FAF region or state where a freight movement begins the domestic portion of the trip (see Zone of Entry)*
 - *For exports, the FAF region or state where a freight movement begins the domestic portion of the trip*
- *Foreign Origin* - *For imports, the foreign region where a freight movement begins*



- *Destination - The ending of a freight movement regardless of geography*
- *Domestic Destination*
 - *For domestic freight movements, the FAF region or state where a freight movement ends*
 - *For imports, the FAF region or state where a freight movement ends the domestic portion of the trip*
 - *For exports, the FAF region or state where a freight movement ends the domestic portion of the trip (see Zone of Exit)*
- *Foreign Destination - For exports, the foreign region where a freight movement ends*
- *FAF Region - The 123 domestic regions defined below*
- *State - The 50 States and Washington, D.C.*
- *Foreign Region - The 8 international regions used for imports and exports*
- *Zone of Entry - The FAF region or state where an import enters the United States. This term refers to the entire region or state and does not limit the entry to any single location. This replaces the term “international gateway” used previously*
- *Zone of Exit - The FAF region or state where an export leaves the United States. This term refers to the entire region or state and does not limit the exit to any single location. This replaces the term “international gateway”*
- *International gateway - This term has been replaced by Zone of Entry and Zone of Exit to explicitly reflect whether it is part of an import or export.*

FAF3 data sets are available at the FAF3 domestic region level and at the state level.

FAF Regions. FAF3 domestic region level datasets and products provide information for states, state portions of large metropolitan areas, and remainders of states as listed in [Table 3](#). Metropolitan areas consist of Metropolitan Statistical Areas or Consolidated Statistical Areas as defined by the Office of Management and Budget. When a metropolitan area is entirely within a state or when a state’s portion of a multi-state metropolitan area is large enough to support the sampling procedures in the Commodity Flow Survey, the area becomes a separate FAF region. Small single-state metropolitan areas and small portions of a multi-state metropolitan area are part of the State or Remainder of State. FAF has two metropolitan areas that are each divided into three FAF regions, four that are each divided into two FAF regions, and several that have small pieces combined with States or Remainders of States.

States. The state-level datasets and products include information for the 50 States and the District of Columbia.

Foreign Regions. For imports and exports, FAF3 uses the foreign regions listed in [Table 4](#), which are defined by the [United Nations Statistics Division](#). Specific countries included in each region can be found at the United Nations site.

2.4 Network

The Network that is currently available in FAF3 is a GIS-based centerline representation of the highway network in the United States. It was developed from the National Highway Planning



Network (NHPN) and has been modified to meet the needs of the FAF. It consists of approximately 171,000 links representing nearly 448,000 miles of roads and is used to develop highway ton-miles and to provide an estimate of tons and trucks by highway segment. A detailed discussion of the network and how tons and trucks are assigned is available in the [FAF3 Freight Traffic Analysis](#) documentation.

Note about Networks: The Network available as part of FAF3 is only for highways. Ton-miles across other modes are estimated using a series of models and mode specific networks.

3.0 Accessing FAF3

FAF3 data and products are available at: http://www.ops.fhwa.dot.gov/freight/freight_analysis/faf/.

The FAF3 site can also be reached by clicking “Freight Analysis Framework” on freight.dot.gov.

FAF1 and FAF2 data have been archived and removed from the site. As noted previously, these versions are not comparable with FAF3 or with each other. However, in response to user requests, FAF3 now includes estimates for the earlier Economic Census years of 1997 and 2002 in the current state-level dataset.

3.1 Origin-Destination Data

FAF3 Origin-Destination Data access is provided through a web-based tabulation tool, further described in section 3.1.1, as well as by downloading the complete regional and state-level datasets. The tabulation tool allows you to specify the data you are interested in while the complete data sets are available to those who want to perform more complex analyses or need individual data elements for model building, analysis, or display.

Units of measure for 2007 and 2015 through 2040 data are thousands of tons for *weight*, millions for *ton-miles*, and millions of 2007 dollars for *value*. Provisional Annual Data for **the most recent year** are presented in both millions of 2007 dollars and millions of current dollars (Current M\$) for *value*.

3.1.1 FAF Tabulation Tool

The [FAF Tabulation Tool](#) is a web-based interface that allows you to select the categories you want through easy-to-use pull-down menus. You can select one or more elements from each category to generate a customized data set that is displayed on the screen. You can then download the resulting output as a CSV (comma separated values) file for further analysis.

Note: The headings displayed on the screen above the search results are “active,” meaning if you click on one, the information shown will be ordered alphabetically or in descending order using that column. If you click again, it will be shown in reverse order.

The first option that you must select is the **Type of Trade** you want to tabulate. Options include [Total Flows](#), [Domestic Flows](#), [Import Flows](#), and [Export Flows](#). The tool interface adjusts according to your selection so that appropriate options are available for tabulating the desired results.



Interfaces for each type of flow are presented in the following subsections and include a description of each pull-down menu.

3.1.1.1 Total Flows

Total Flows tabulates freight moved between domestic origins and domestic destinations and includes both domestic and foreign shipments. For import shipments, the *origin* of the flow is zone of entry (the FAF region or state of entry), and for export shipments, the *destination* of the flow is zone of exit (the FAF region or state of exit). Mode of transportation for Total Flows is the mode used within domestic regions or states.

Tabulation categories are:

- **Years:** You can select one or more years. Results will be provided for each year selected.
- **Origin:** You can select Combine National Total, Origin State-Specific info, or Origin FAF Region-Specific info.
 - *Combine National Total* is not origin specific and gives you the total freight flowing to, from, and within the United States. [See cautionary note below about flows within region/states.](#)
 - *Origin State-Specific info* changes the options in the pull down menu to the 50 States and Washington, D.C. You can then select All, one, or multiple States.
 - *Origin FAF Region-Specific info* changes the options in the pull down menu to the 123 FAF regions. You can then select All, one, or multiple regions.
- **Destination:** As with Origin, you can select Combine National Total, Destination State-Specific info, or Destination FAF Region-Specific info.
 - *Combine National Total* is not destination specific and gives you the total freight flowing to, from and within the United States. [See cautionary note below about flows within region/states.](#)
 - *Destination State-Specific info* changes the options in the pull down menu to the 50 States and Washington, D.C. You can then select All, one, or multiple States.
 - *Destination FAF Region-Specific info* changes the options in the pull down menu to the 123 FAF regions. You can then select All, one, or multiple regions.
- **Measure:** You can Select All, Tons, Ton-miles, or Values.
- **Commodity:** You can select Combine Total, Select All, or one or multiple individual commodities.
 - *Combine Total* is not commodity specific and provides total freight moved.
 - *All* provides tabulations for each commodity individually.
- **Domestic Mode:** You can select Combine Total, Select All or one or multiple individual modes.
 - *Combine Total* is not mode specific and provides total freight moved by all modes.
 - *All* provides tabulations for freight moved by each mode individually.

Once you have completed your selections, click the **Submit** button and the results will be provided on the screen with an option to download to a CSV file.



3.1.1.2 Domestic Flows

Domestic Flows tabulates freight moved between domestic origins and destinations. No foreign trade flows are included and the mode of transportation is the mode used within and between domestic regions or states. Tabulation categories are similar to Total Flows and include:

- **Years:** You can select one or more years. Results will be provided for each year selected.
- **Origin:** You can select Combine National Total, Origin State-Specific info, or Origin FAF Region-Specific info.
 - *Combine National Total* is not origin specific and gives you the total freight flowing within the United States. [See cautionary note below about flows within region/states.](#)
 - *Origin State-Specific info* changes the options in the pull down menu to the 50 States and Washington, D.C. You can then select All, one, or multiple States.
 - *Origin FAF Region-Specific info* changes the options in the pull down menu to the 123 FAF regions. You can then select All, one, or multiple regions.
- **Destination:** As with Origin, you can select Combine National Total, Destination State-Specific info, or Destination FAF Region-Specific info.
 - *Combine National Total* is not destination specific and gives you the total freight flowing within the United States. [See cautionary note below about flows within regions/states.](#)
 - *Destination State-Specific info* changes the options in the pull down menu to the 50 States and Washington, D.C. You can then select All, one, or multiple States.
 - *Destination FAF Region-Specific info* changes the options in the pull down menu to the 123 FAF regions. You can then select All, one, or multiple regions.
- **Measure:** You can Select All, Tons, Ton-miles, or Values.
- **Commodity:** You can select Combine Total, Select All, or one or multiple individual commodities.
 - *Combine Total* is not commodity specific and provides total freight moved.
 - *Select All* provides tabulations for each commodity individually.
- **Mode:** You can select Combine Total, Select All or one or multiple individual modes
 - *Combine Total* is not mode specific and provides total freight moved by all modes.
 - *Select All* provides tabulations for freight moved by each mode individually.

Once you have completed your selections, click the **Submit** button and the results will be provided on the screen with an option to download to a CSV file.

3.1.1.3 Import Flows

Import Flows tabulates freight moved from foreign origins to domestic destinations. Geographies for this type of flow tabulation include Foreign Origin, Zone of Entry, and Domestic Destination. Mode of transportation provided in this option consists of two types: foreign mode used between a foreign origin and zone of entry and domestic mode used between a zone of entry and domestic destination. Tabulation categories include:



- **Years:** You can select one or more years. Results will be provided for each year selected.
- **Foreign Origin:** You can select Combine Total, Select All, or one or multiple foreign origins.
 - *Combine Total* is not origin specific and gives you total freight entering the United States.
 - *Select All* provides tabulations for each foreign region individually.
- **Domestic Zone of Entry:** You can select Combine National Total, State-Specific Zone, or FAF Region-Specific Zone.
 - *Combine National Total* is not zone specific and gives you total freight entering the United States. [See cautionary note below about flows within regions/states.](#)
 - *State Specific-Zone* changes the options in the pull down menu to the 50 States and Washington, D.C. You can then select All, one, or multiple States.
 - *FAF Region-Specific Zone* changes the options in the pull down menu to the 123 FAF Regions. You can then select All, one, or multiple regions.
- **Foreign Mode:** You can select Combine Total, Select All or one or multiple individual modes.
 - *Combine Total* is not mode specific and provides total freight moved by all modes from the selected Foreign Origin to the selected Zone of Entry.
 - *Select All* provides tabulations for freight moved by each mode individually.
- **Measure:** You can Select All, Tons, Ton-miles, or Values.
- **Domestic Destination:** You can select Combine National Total, State-Specific info, or FAF Region-Specific info.
 - *Combine National Total* is not destination specific and gives you the total freight entering the United States. [See cautionary note below about flows within regions/states.](#)
 - *State-Specific info* changes the options in the pull down menu to the 50 States and Washington, DC. You can then select All, one, or multiple States.
 - *FAF Region-Specific info* changes the options in the pull down menu to the 123 FAF Regions. You can then select All, one, or multiple regions.
- **Commodity:** You can select Combine Total, Select All, or one or multiple individual commodities.
 - *Combine Total* is not commodity specific and provides total freight moved.
 - *Select All* provides tabulations for each commodity individually.
- **Domestic Mode:** You can select Combine Total, Select All or one or multiple individual modes
 - *Combine Total* is not mode specific and provides total freight moved by all modes.
 - *Select All* provides tabulations for freight moved by each mode individually.

Once you have completed your selections, click the **Submit** button and the results will be provided on the screen with an option to download to a CSV file.

3.1.1.4 Export Flows

Export Flows tabulates freight moved from domestic origins to foreign destinations. Geographies for this type of flow tabulation include Domestic Origin, Domestic Zone of Exit, and Foreign Destination.



Mode of transportation provided in this option consists of two types, domestic mode (used between a domestic origin and zone of exit) and foreign mode (used between a zone of exit and foreign destination). Tabulation categories are:

- **Years:** You can select one or more years. Results will be provided for each year selected.
- **Measure:** You can Select All, Tons, Ton-miles, or Values.
- **Domestic Origin:** You can select Combine National Total, State-Specific info, or FAF Region-Specific info.
 - *Combine National Total* is not origin specific and gives you the total freight leaving the United States. [See cautionary note below about within region/state flows.](#)
 - *State-Specific info* changes the options in the pull down menu to the 50 States and Washington, D.C. You can then select All, one, or multiple States.
 - *FAF Region-Specific info* changes the options in the pull down menu to the 123 FAF Regions. You can then select All, one, or multiple regions.
- **Domestic Zone of Exit:** You can select Combine National Total, State-Specific, or FAF Region-Specific.
 - *Combine National Total* is not zone specific and gives you the total freight leaving the United States. [See cautionary note below about within region/state flows.](#)
 - *State-Specific Zone* changes the options in the pull down menu to the 50 States and Washington, D.C. You can then select All, one, or multiple States.
 - *FAF Region-Specific Zone* changes the options in the pull down to the 123 FAF Regions. You can then select All, one, or multiple regions.
- **Domestic Mode:** You can select Combine Total, Select All or one or multiple individual modes
 - *Combine Total* is not mode specific and provides total freight moved by all modes.
 - *Select All* provides tabulations for freight moved by each mode individually.
- **Foreign Destination:** You can select Combine Total, Select All, or one or multiple foreign destinations.
 - *Combine Total* is not destination specific and gives total freight leaving the United States.
 - *Select All* provides tabulations for each foreign region individually.
- **Commodity:** You can select Combine Total, Select All, or one or multiple individual commodities.
 - *Combine Total* is not commodity specific and provides total freight moved.
 - *Select All* provides tabulations for each commodity individually.
- **Foreign Mode:** You can select Combine Total, Select All or one or multiple individual modes.
 - *Combine Total* is not mode specific and provides total freight moved by all modes from the selected Zone of Exit to the selected Foreign Destination.
 - *Select All* provides tabulations for freight moved by each mode individually.

Once you have completed your selections, click the **Submit** button and the results will be provided on the screen with an option to download to a CSV file.



A NOTE OF CAUTION about determining value, tons, or ton-miles for an individual region or state:

When you select *Combine Total* for a domestic origin or destination, the results will include freight that is moving within the region or state (i.e. Kansas to Kansas) as well as all freight entering or leaving the region or state. Therefore, if you want to identify only the freight that is moving into and/or out of a specific region or state, you will need to perform a separate tabulation selecting the region or state of interest as both the origin and destination and then subtract those results from the total results obtained in the initial tabulation.

3.1.2 FAF3 Regional Datasets

For users that require the complete database of regional flows by origin, destination, commodity and mode, FAF3 provides three zipped files for download:

- FAF³ Regional Database for 2007 with forecasts through 2040, and 2010 Provisional Data in zipped Microsoft Access format [[faf3_3_access03.zip](#), 122MB]. Tables in this database include:
 - faf33_data - 2007 and 2015 through 2040 forecasts
 - faf33_prov - 2010 provisional estimates
 - Commodity - Lookup table for commodity codes
 - iZone - Lookup table for international zones
 - izezone_long - Lookup table for international zones
 - Mode - Lookup table for modes
 - State - Lookup table for states and Washington, D.C. (not needed)
 - Trade - Lookup table for type of Trade
 - Zone - Lookup table for FAF3 Zones: short description
 - Zone_Long - Lookup table for FAF3 Zones: long description
- FAF³ Regional Database for 2007 with forecasts through 2040 in zipped CSV format [[faf3_3.zip](#), 95MB]
- FAF³ Provisional Annual Data for 2010 in zipped CSV format [[faf3_3_prov2010.zip](#), 22MB]

The CSV files do not include lookup tables so you will need the Data Dictionary in [Table 5](#) to interpret the codes. The Data Dictionary also provides the meaning of the field headings used in all three files.

Be aware that these databases are extremely large, involving 3 measures across 8 different years for 123 regions that serve as domestic origins, destinations, and zones of entry/exit, 8 foreign regions, 43 commodity classes, and 8 modes of transportation which, in combination, result in approximately 1.72 million records.

3.1.3 FAF3 State-Level Datasets

The state version of the FAF regional dataset aggregates domestic origins, destinations and zones of entry/exit, to the 50 States plus the District of Columbia. In addition, reprocessed flows for 1997 and 2002 are included at the state level. These historic files are provided for the first time in FAF3.3, and although flows have been reprocessed with FAF3 methodology, many of the source data sets



are unchanged, which may result in some values that are not adequate for trend or other analysis. As you use these data, please provide feedback to the [FAF team](#).

The state-level databases include:

- FAF³ State Database for 2007 with forecasts through 2040, 2010 Provisional Data, and Reprocessed State Annual Data for 1997 and 2002 in zipped Microsoft Access format [[faf3_3_access03state.zip](#), 77MB]. Tables in this database include:
 - faf33_stateOD - 2007 and 2015 through 2040 forecasts
 - faf33_prov - 2010 provisional estimates
 - faf33_02rep - 2002 reprocessed state annual data
 - faf33_97rep - 1997 reprocessed state annual data
 - Commodity - Lookup table for commodity codes
 - iZone - Lookup table for international zones
 - izeone_long - Lookup table for international zones
 - Mode - Lookup table for modes
 - State - Lookup table for states and Washington, D.C.
 - Trade - Lookup table for type of Trade
- FAF³ State Database for 2007 with forecasts through 2040 in zipped CSV format [[faf3_3_state.zip](#), 49MB]
- FAF³ State Provisional Annual Data for 2010 in zipped CSV format [[faf3_3_prov2010state.zip](#), 8MB]
- FAF³ Reprocessed State Annual Data for 1997 in zipped CSV format [[faf3_3_1997_state.zip](#), 10MB]
- FAF³ Reprocessed State Annual Data for 2002 in zipped CSV format [[faf3_3_2002_state.zip](#), 7MB]

The CSV files do not include lookup tables so you will need the Data Dictionary in [Table 5](#) to interpret the codes. The data dictionary also provides the meaning of the field headings used in all five files.

Although not as large as the regional databases, the state-level databases are still very large with approximately 500,000 records.

3.2 Summary Statistics and Other Products

FAF3 includes several pre-generated data products providing commonly used statistics and maps related to the movement of goods. Statistics reports are typically Excel spread sheets which can be opened, viewed, and saved or downloaded for later processing. Maps are provided in jpg or pdf format and can be viewed and/or downloaded.

[State Profile Tables](#). A series of Excel worksheets were generated using total flows that moved between domestic origins and destinations, including both domestic and foreign shipments. The foreign shipments represent flows between the region of entry and destination state for imported shipments and flows between the origin state and region of exit for exported shipments. Modes of



transportation provided in these tables are the modes used within domestic regions. A total of 20 worksheets are available, one each for 1997, 2002, 2007, the most recent year, and 2040 of the following:

- Shipments within, from, and to state by mode by value/weight/ton-miles
- Shipments within, from and to state by commodity by value/weight/ton-miles
- Top ten commodities shipped within, from, and to state by value/weight/ton-miles
- Top trade partners by state by value/weight/ton-miles

The worksheets contain a spreadsheet for each measure and its corresponding percentage of the total measure which is accessed by clicking on the appropriate tab at the bottom of the Excel worksheet, where md (Million Dollars) is *value*, kt (kilotons) is *weight*, and tm (ton-miles) is *ton-miles*. The worksheet for the most recent year contains a spreadsheet for each measure and also includes a separate spreadsheet which provides current value (\$current).

Pivot Tables. These worksheets contain pivot tables that filter and format FAF data into easily readable and printable tables. When a worksheet is first opened, it defaults to the *value* spreadsheet for Alabama. Any table heading that has a small icon to the right of it has a filter that allows you to change what is displayed by clicking on the icon and checking the desired box(s) in the drop-down menu. You should be aware that these filters do not carry over from spreadsheet to spreadsheet and you will need to enter them for each one.

Note: the Trade Partners worksheet initially displays the top six partners (To State) of the selected state(s) (From State) in descending order of *value*, *weight*, or *ton-miles*. You can explicitly select any trade partners to be displayed by using the corresponding filters.

Freight Maps. A series of maps that appear in FHWA's Office of Freight Management and Operations publications can be viewed and saved in high-resolution JPEG format and in resolution-independent PDF format. These are available under the heading **National Freight Transportation Maps** on the [National Statistics and Maps](#) web page.

3.3 Network Data

The Freight Analysis Framework estimates commodity movements by *truck* and *weight* for truck-only moves over a modified National Highway Planning Network (NHPN). Models are used to disaggregate interregional flows from the Origin-Destination Database into flows between localities and to assign these flows to individual highways using average payloads per truck and truck counts on individual highway segments. Using route number and milepost, functional classification of the highway, number of lanes, and other highway characteristics for individual highway links, truck tonnage is assigned to the network segments. Models used to disaggregate flows are based on geographic distributions of economic activity rather than a detailed understanding of local conditions, and the resulting network flows should not be used as a substitute for local data to support local planning and project development.



The resulting data are available in three formats: two for use in commonly available Geographic Information Systems (GIS) software ([ESRI's ArcGIS](#) and [Caliper's TransCAD](#)) and one that can be loaded into any database software. The following zipped files are available for download from the [Highway Network Data](#) page:

- GIS Network layers
 - ESRI's ArcGIS Format [[faf3_1_1_esri_rv.zip](#), 49MB]
 - TransCAD Format [[faf3_1_1_transcad_rv.zip](#), 26MB]
 - Metadata [[HTML](#), [PDF](#) 39KB]
- FAF³ Regions GIS Boundary Layer
 - ESRI's ArcGIS Format [[faf3_zone_esri.zip](#), 25MB]
 - TransCAD Format [[faf3_zone_transcad.zip](#), 12MB]
- FAF Output (for use in non-GIS applications)
 - [faf3_1_1_data_rv.dbf](#) [38MB]
 - Data Dictionary [[HTML](#), [PDF](#) 15KB]

GIS Layers and Data. To use the GIS datasets, you need either ArcGIS or TransCAD (or a GIS package that can import ESRI's shapefile format) and are expected to know how to use the software. The two network GIS datasets are arc or link layers with the truck and weight information included as attributes associated with each arc/link in the layer. [Table 6](#) provides the data dictionary for these layers. FAF region boundary layers are made available in each format for your convenience to assist in further geospatial analysis and creating maps but do not include any attributes other than **zone ID** and abbreviated name. These are GIS layers and, as such, each zip file contains multiple files that must remain together to be accessible by the corresponding GIS software.

FAF Output File. The FAF Output file that is available under the Network Data section is a standard DBF file that can be imported into any database software and most spreadsheets and modeling tools. It does not include geospatial location information, but does include unique route identifiers with beginning and ending mileposts for each link, which allows it to be used with tools and software that support linear referencing.

4.0 Relationship of FAF to Other Data Sources

The FAF combines information from the Commodity Flow Survey and a variety of other sources to estimate the weight and value of freight shipped by mode. These estimates are different than estimates based on freight carried by each mode. Each mode carries shipments that may start or end on another mode. All freight carried by rail is counted in the Rail Waybill Sample, including shipments that complete their journey on water and are counted in Waterborne Commerce Statistics. FAF freight by rail is rail only, water is water only, and shipments by rail and water are in multiple modes and mail. The total freight carried should equal the total freight shipped to, from, and within the United States plus freight that moves through the United States moving between foreign countries.



Commodity Flow Survey. The majority of freight estimated in the FAF is measured in the Commodity Flow Survey. The Commodity Flow Survey includes shipments from mines, manufacturing facilities, warehousing establishments, and selected other industries. The FAF uses a variety of data and models to estimate shipments that are out of scope for the Commodity Flow Survey, such as imports, crude petroleum by pipeline, and shipments from farms. As a consequence, FAF estimates are higher than estimates from the Commodity Flow Survey. While not as complete as the FAF, the Commodity Flow Survey has greater commodity detail, identifies hazardous cargo, and relates commodities to industries.

Rail Waybill Sample and Waterborne Commerce Statistics. The FAF uses both Rail Waybill Sample and Waterborne Commerce Statistics. However, modal totals are very different between these datasets and the FAF. Specific examples of this difference include the following. (1) While the FAF measures freight *shipped* (excluding multiple modes from rail and water), the Rail Waybill and Waterborne Commerce measure freight *carried* (including all single- and multiple-moves by rail and by water). (2) The Rail Waybill and Waterborne Commerce can also count tonnage multiple times when the movement involves either multiple railroads for the Waybill or a combination of deep sea, inland water, and intra-harbor moves for the Waterborne Commerce data. These moves are only measured once in the FAF. (3) Puerto Rico is counted with domestic flows in Waterborne Commerce and as part of Rest of the Americas in the FAF.

Gross Domestic Product. The most notable difference between the FAF and other data sources is that the value of freight reported in the FAF exceeds Gross Domestic Product (GDP). The FAF counts each commodity move during the year, such as grain from farm to grain elevator which then moves from elevator to flour mill which then becomes flour moving from mill to bakery which becomes bread worth \$2,000 from the bakery to the retail store. GDP counts net value: the value of bread consumed by households during the year plus the value of grain and flour still in storage and bread still on the shelves at the end of the year. The FAF counts transactions throughout the year while GDP measures value at the end of the day.



5.0 Where to Go for More Information and Help

FAF3 data, documentation, and related material are posted at:

http://www.ops.fhwa.dot.gov/freight/freight_analysis/faf/

FAF quality depends on customer feedback. The databases are huge, and unexpected results do not always appear until users dig into the details. Most unexpected freight flows have plausible explanations, but some appear to be improperly assigned among modes or commodities.

Corrections are made and documented with each release. You are encouraged to provide [feedback](#) as you identify values that appear to be unusual, anomalous, or incorrect.

Questions and comments should be directed to faf@dot.gov.



Table 1: FAF Modes

Code	Mode	Description
1	Truck	Includes private and for-hire truck. Does not include truck that is part of Multiple Modes and Mail or truck moves in conjunction with domestic air cargo.
2	Rail	Includes any common carrier or private railroad. Does not include rail that is part of Multiple Modes and Mail .
3	Water	Includes shallow draft, deep draft, Great Lakes and intra-port shipments. Does not include water that is part of Multiple Modes and Mail .
4	Air (includes truck-air)	Includes shipments typically weighing more than 100 pounds that move by air or a combination of truck and air in commercial or private aircraft. Includes air freight and air express. Does not include shipments weighing 100 pounds or less which are typically classified with Multiple Modes and Mail . In the case of imports and exports by air, domestic moves by ground to and from the port of entry or exit are categorized with Truck .
5	Multiple Modes and Mail	Includes shipments by multiple modes and by parcel delivery services, U.S. Postal Service, or couriers. This category is not limited to containerized or trailer-on-flatcar shipments.
6	Pipeline	Includes crude petroleum, natural gas, and product pipelines. Note: Does include flows from offshore wells to land which are counted as Water moves by the U.S. Army Corps of Engineers. Does not include pipeline that is part of Multiple Modes and Mail .
7	Other and Unknown	Includes movements not elsewhere classified such as flyaway aircraft, and shipments for which the mode cannot be determined.
8	No Domestic Mode	Includes shipments that have an international mode but no domestic mode and is limited to import shipments of crude petroleum transferred directly from inbound ships to a U.S. refinery at the zone of entry. This is done to ensure a proper accounting of import flows, while avoiding assigning flows to the domestic transportation network that do not use it.



Table 2: FAF Commodity Codes

Code	Commodity Description
01	Live animals and live fish
02	Cereal grains
03	Other agricultural products
04	Animal feed and products of animal origin, n.e.c.*
05	Meat, fish, seafood, and their preparations
06	Milled grain products and preparations, bakery products
07	Other prepared foodstuffs and fats and oils
08	Alcoholic beverages
09	Tobacco products
10	Monumental or building stone
11	Natural sands
12	Gravel and crushed stone
13	Nonmetallic minerals n.e.c.*
14	Metallic ores and concentrates
15	Coal
16	Crude petroleum
17	Gasoline and aviation turbine fuel
18	Fuel oils
19	Coal and petroleum products, n.e.c.* (includes Natural gas)
20	Basic chemicals
21	Pharmaceutical products
22	Fertilizers
23	Chemical products and preparations, n.e.c.*
24	Plastics and rubber
25	Logs and other wood in the rough
26	Wood products
27	Pulp, newsprint, paper, and paperboard
28	Paper or paperboard articles
29	Printed products
30	Textiles, leather, and articles of textiles or leather
31	Nonmetallic mineral products
32	Base metal in primary or semi-finished forms and in finished basic shapes
33	Articles of base metal
34	Machinery
35	Electronic and other electrical equipment and components and office equipment
36	Motorized and other vehicles (including parts)
37	Transportation equipment, n.e.c.*
38	Precision instruments and apparatus
39	Furniture, mattresses and mattress supports, lamps, lighting fittings, and illuminated signs
40	Miscellaneous manufactured products
41	Waste and scrap
43	Mixed freight
99	Commodity unknown

* n.e.c = not elsewhere classified



Table 3: FAF Domestic Regions

Code	FAF Regions*	State of FAF Region	State/Remainder of State which includes Part of this CMA*	Type of Region**
019	Alabama, Remainder of State	AL		RoS
020	Alaska	AK		State
361	Albany	NY		CMA
049	Arizona, Remainder of State	AZ		RoS
050	Arkansas	AR		State
131	Atlanta	GA	AL	CMA
481	Austin	TX		MSA
241	Baltimore	MD		Partial CMA
221	Baton Rouge	LA		CMA
482	Beaumont	TX		MSA
011	Birmingham	AL		CMA
251	Boston	MA	NH	CMA
362	Buffalo	NY		CMA
069	California, Remainder of State	CA		RoS
451	Charleston	SC		MSA
371	Charlotte	NC	SC	MSA
171	Chicago	IL	WI	CMA
181	Chicago	IN		
391	Cincinnati	OH	IN, KY	CMA
392	Cleveland	OH		CMA
089	Colorado, Remainder of State	CO		RoS
393	Columbus	OH		CMA
099	Connecticut, Remainder of State	CT		RoS
483	Corpus Christi	TX		CMA
484	Dallas	TX		CMA
394	Dayton	OH		CMA
100	Delaware	DE		State
081	Denver	CO		CMA
261	Detroit	MI		CMA
485	El Paso	TX		MSA
129	Florida, Remainder of State	FL		RoS
139	Georgia, Remainder of State	GA		RoS



Code	FAF Regions*	State of FAF Region	State/Remainder of State which includes Part of this CMA*	Type of Region**
262	Grand Rapids	MI		CMA
372	Greensboro-Winston-Salem-High Point	NC		CMA
452	Greenville-Spartanburg	SC		CMA
091	Hartford	CT		CMA
159	Hawaii, Remainder of State	HI		RoS
151	Honolulu	HI		MSA
486	Houston	TX		CMA
160	Idaho	ID		State
179	Illinois, Remainder of State	IL		RoS
189	Indiana, Remainder of State	IN		RoS
182	Indianapolis	IN		CMA
190	Iowa	IA		State
121	Jacksonville	FL		MSA
209	Kansas, Remainder of State	KS		RoS
201	Kansas City	KS		CMA
291	Kansas City	MO		
219	Kentucky, Remainder of State	KY		RoS
222	Lake Charles	LA		CMA
487	Laredo	TX		MSA
321	Las Vegas	NV		CMA
061	Los Angeles	CA		CMA
229	Louisiana	LA		State
211	Louisville	KY	IN	CMA
230	Maine	ME		State
249	Maryland, Remainder of State	MD		RoS
259	Massachusetts, Remainder of State	MA		RoS
471	Memphis	TN	AR, MS	MSA
122	Miami	FL		MSA
269	Michigan, Remainder of State	MI		RoS
551	Milwaukee	WI		CMA
271	Minneapolis	MN	WI	CMA
279	Minnesota, Remainder of State	MN		RoS
280	Mississippi	MS		State



Code	FAF Regions*	State of FAF Region	State/Remainder of State which includes Part of this CMA*	Type of Region**
299	Missouri, Remainder of State	MO		RoS
012	Mobile	AL		CMA
300	Montana	MT		State
472	Nashville	TN		CMA
310	Nebraska	NE		State
329	Nevada, Remainder of State	NV		RoS
330	New Hampshire	NH		State
349	New Jersey, Remainder of State	NJ		RoS
350	New Mexico	NM		State
223	New Orleans	LA		CMA
092	New York	CT	PA	CMA
341	New York	NJ		
363	New York	NY		
369	New York, Remainder of State	NY		RoS
512	Norfolk	VA	NC	MSA
379	North Carolina, Remainder of State	NC		RoS
380	North Dakota	ND		State
399	Ohio, Remainder of State	OH		RoS
409	Oklahoma, Remainder of State	OK		RoS
401	Oklahoma City	OK		CMA
419	Oregon, Remainder of State	OR		RoS
123	Orlando	FL		CMA
429	Pennsylvania, Remainder of State	PA		RoS
342	Philadelphia	NJ	DE, MD	CMA
421	Philadelphia	PA		
041	Phoenix	AZ		MSA
422	Pittsburgh	PA		CMA
411	Portland	OR	WA	MSA
373	Raleigh-Durham	NC		CMA
440	Rhode Island***	RI		State
511	Richmond	VA		MSA
364	Rochester	NY		CMA
062	Sacramento	CA	NV	CMA



Code	FAF Regions*	State of FAF Region	State/Remainder of State which includes Part of this CMA*	Type of Region**
491	Salt Lake City	UT		CMA
488	San Antonio	TX		MSA
063	San Diego	CA		MSA
064	San Francisco	CA		CMA
132	Savannah	GA		CMA
531	Seattle	WA		CMA
459	South Carolina, Remainder of State	SC		RoS
460	South Dakota	SD		State
172	St. Louis	IL		CMA
292	St. Louis	MO		
124	Tampa	FL		MSA
479	Tennessee, Remainder of State	TN		RoS
489	Texas, Remainder of State	TX		RoS
042	Tucson	AZ		MSA
402	Tulsa	OK		CMA
499	Utah, Remainder of State	UT		RoS
500	Vermont	VT		State
519	Virginia, Remainder of State	VA		RoS
539	Washington, Remainder of State	WA		RoS
513	Washington	VA	WV	CMA
111	Washington	DC		
242	Washington	MD		
540	West Virginia	WV		State
559	Wisconsin, Remainder of State	WI		RoS
560	Wyoming	WY		State

* Many CMA boundaries cross more than one state . Major subareas of a CMA are defined as separate FAF regions, one for each state. Small subareas of a CMA are included with the State or Rest of State region identified in this field.

****Type of Region codes**

CMA: Census defined Consolidated Statistical Region

MSA: Census defined Metropolitan Statistical Area

RoS: Rest of State-everything in a state that is not included in a CMA or MSA

State: State that does not include a CMA or MSA

*** Rhode Island state is also Providence CMA



Table 4: FAF Foreign Regions

Code	FAF Region
801	Canada
802	Mexico
803	Rest of Americas
804	Europe
805	Africa
806	SW & Central Asia
807	Eastern Asia
808	SE Asia & Oceania



Table 5. Data Dictionary for FAF Datasets

Field	Description	Codes	Comment
fr_orig	Foreign region origin	Table 4	Imports: Foreign origin
dms_org	Domestic region origin	Table 3	Domestic: Origin Imports: Zone of entry Exports: Origin
dms_orgst	Domestic state origin	FIPS code	Domestic: Origin Imports: Zone of entry Exports: Origin
dms_dest	Domestic region destination	Table 3	Domestic: Destination Imports: Destination Exports: Zone of exit
dms_destst	Domestic state destination	FIPS code	Domestic: Destination Imports: Destination Exports: Zone of exit
fr_dest	Foreign region destination	Table 4	Exports: Foreign destination
fr_inmode	Foreign inbound mode	Table 1	Imports: Mode from foreign origin to zone of entry
dms_mode	Domestic mode	Table 1	Domestic: Mode Imports: Mode from Zone of entry to destination Exports: Mode from origin to zone of exit
fr_outmode	Foreign outbound mode	Table 1	Exports: Mode from zone of exit to foreign destination
sctg2	Commodity	Table 2	
trade_type	Type of trade	1 Domestic Only 2 Import 3 Export 4 In transit (<i>not currently used</i>)	
value_*	Value in \$million		* Year = 2007, 2010, 2015, 2020, 2025, 2030, 2035, 2040 also 1997, 2002 in State-level database <i>Value in 2007 dollars</i>
curval_2010	Value in \$million		For Provisional estimates only <i>Value in current dollars</i>



tons_*	Weight in thousand tons		* Year = 2007, 2010, 2015, 2020, 2025, 2030, 2035, 2040 * Year also 1997, 2002 in State-level database
tmiles_*	Ton-miles in million ton-miles		* Year = 2007, 2010, 2015, 2020, 2025, 2030, 2035, 2040 * Year also 1997, 2002 in State-level database

Table 6. Data Dictionary for FAF Network GIS Layer and FAF Output File (indicated as FOF)

Field	FAF output file	Description
ID		Unique Identifier
LENGTH		GIS calculated length of segment
DIR		One-way indicator: 1 – One way in direction segment created 0 – Two-way segment -1 – One way in opposite direction segment created
DATA		Unique ID that links to FOF ID
RECTYPE		Record Type: L = US highway link, null = Non-US highway link
NETVERSION		Version of the FAF Highway Network
STATE		State
STFIPS		State FIPS code
CTFIPS		County FIPS code
SIGN1		Primary sign route
SIGNT1		Primary sign route type
SIGNN1		Primary sign route number
SIGNQ1		Primary sign route qualifier
SIGN2		Secondary sign route
SIGNT2		Secondary sign route type
SIGNN2		Secondary sign route number
SIGNQ2		Secondary sign route qualifier
SIGN3		Tertiary sign route
SIGNT3		Tertiary sign route type
SIGNN3		Tertiary sign route number
SIGNQ3		Tertiary sign route qualifier



Field	FAF output file	Description
LNAME		Local street name
MILES		Length of the segment in miles
KM		Length of the segment in kilometers
FCLASS		FHWA functional classification
RUCODE		Indicator for rural or urban segment
STATUS		Operational status of segment
NHS		Indicator for whether the segment is part of the National Highway System
NN		National network
TRK_TYPE		Truck Route Type: 1 – State truck route 2 – NN 3 – LCV route 5 – Restricted route 6 – Low clearance 8 – NN and low clearance 9 – NN and restricted 11 – Hazmat restricted
LCV_TYPE		Commercial Vehicle Type : 1 – Double less than 100’ 3 – Doubles up to and over 100’ 5 – Doubles less than 100’ and triples
USLRS_KEY	FOF	Unique state route identifier for linear referencing
BEG_MP	FOF	Beginning mile post value of segment
END_MP	FOF	Ending mile post file of segment
FAFVERSION	FOF	FAF version
AADT07	FOF	Average Annual daily traffic for 2007: derived from 2008 HPMS (Volume/day/route)
AADTT07	FOF	Average Annual daily truck traffic for 2007: derived from 2008 HPMS, state truck percentage and functional class specific defaults. (Volume/day/route)
FAF07	FOF	FAF3.1 truck volume estimated based on the FAF3.1 Origin-Destination truck-only tonnage and includes empty trucks. (Volume/day/route)
NONFAF07	FOF	Local truck traffic that is not part of FAF3.1 truck estimates. (Volume/day/route)
AADT40	FOF	Local truck traffic that is not part of FAF 3.11 O-D database. Volume/day/route
AADTT40	FOF	Year 2040 forecast Annual Average Traffic Volume estimated using the HPMS 20 years growth factors and projected to future using linear growth. Volume/day/route
FAF40	FOF	Forecast Annual Average Truck Volume estimated using the HPMS 20 years growth factors and projected to future using linear growth. Volume/day/route



Field	FAF output file	Description
NONFAF40	FOF	Year 2040 FAF 3.1 long distance truck volume estimated based on the forecasted FAF 3.1 Origin-Destination truck tonnage and includes empty trucks. Volume/day/route
CAP07	FOF	Year 2040 Local truck traffic that is not part of FAF 3.11 O-D database. Volume/day/route
SF07	FOF	Link specific peak capacity estimated using the procedures outlined in HCM 2000 and the arc geometry provided in 2008 HPMS database. Volume/hour/route
VCR07	FOF	Estimated service flow using the procedures outlined in HCM 2000 and arc geometry, FAF truck, non-FAF truck and passenger volume. Volume/hour/route
SPEED07	FOF	2007 estimated volume to capacity ratio, estimated by dividing SF07 with CAP07. Unit less
DELAY07	FOF	2007 estimated peak period link speed, estimated using the procedures outlined in HCM 2000 and the arc geometry provided in 2008 HPMS database. miles/hour
CAP40	FOF	2007 estimated peak period link delay, estimated using the procedures outlined in HCM 2000 and the arc geometry provided in 2008 HPMS database. In hours
SF40	FOF	Link specific peak capacity estimated using the procedures outlined in HCM 2000. Volume/hour/route
VCR40	FOF	2040 estimated volume to capacity ratio, estimated by dividing SF40 with CAP40. Unit less
SPEED40	FOF	2040 estimated peak period link speed, estimated using the procedures outlined in HCM 2000. Miles/hour
DELAY40	FOF	2040 estimated peak period link delay, estimated using the procedures outlined in HCM 2000. In hours
TONS_07	FOF	Daily FAF truck Tonnage on the link 2007
TONS_40	FOF	Daily FAF truck Tonnage on the link 2040



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