Detailed Description for the Freight Layers

Data source, collection and analysis method

Except the AADT Truck percentage, WSDOT Freight and Goods, and AADT layers, all the rest data layers under "Freight" Tab were developed based on the truck GPS data.

The truck GPS data was collected as a part of WSDOT Truck Performance Measurement Program. One year's data (September 2010 to September 2011) obtained from about 6,000 GPS-equipped trucks traveling daily on Washington state network was used for performance analysis. The commercial in-vehicle GPS devices report, via cellular technology, both at preset intervals (every 10 to 15 minutes) and when the trucks stop. The resulting GPS data set includes reads for individual truck's longitude and latitude, the truck's ID (scrambled for privacy), spot (instantaneous) speeds, and a date and time stamp.

Utilizing geographical information system (GIS) techniques, the state's roadway network was partitioned into individual segments at following locations: access ramps, changes in posted speed limit, county boundaries, urban/rural area boundaries, and signalized intersection. Then the truck GPS data was assigned to these segments to evaluate the roadway performance. The performance analysis was only conducted for the segments with enough GPS truck data reads for a valid analysis—a minimum of a 200 trucks per segment. Two performance measures were adopted:

- **Average speed:** this measure calculates the average speed for trucks based on the truck spot speeds collected over each freeway segment.
- **Percentage of trucks traveling below 60 percent of posted speed:** this measure calculates the percentage of trucks traveling at a speed below 60 percent of the posted speed limit. 60 percent of posted speed was selected as the threshold because it is used in WSDOT congestion report as the speed threshold for evaluating whether the freeways are experiencing severe congestion.

The data collection is an on-going process and these layers are updated regularly when new GPS data becomes available. Please check http://www.wsdot.wa.gov/NR/rdonlyres/B7A5D60C-BF99-412F-9444-BA513768DC93/0/TPMFinalreportver2_17June2011.pdf for detailed information about Truck Performance Measure Project.

Definition and Symbology of Freight Data Layers

AADT Truck Percentage: this layer displays the truck percentage of Annual Average Daily Traffic volumes collected by WSDOT Statewide Travel and Collision Data Office for the State Highway System.

Truck percentage is represented with graduated colors on the map and grouped into three classes: truck percentage under 10%, between 10% to 20%, and truck percentage over 20%.

Average Speed: this layer displays the average truck speed calculated from truck GPS data. Average speed is calculated based on the truck spot speeds collected over each freeway segments from 6 am to 7 pm during weekdays (night data collected from 7 pm to 6 am were excluded for analysis).

Average speed is represented with graduated colors on the map and grouped into seven classes. The class is equal sized and each represents a range of 10 mph.

Locations with very slow Truck Speed Performance: this layer displays the highway segments with poor speed performance, which is defined as 50% of all the trucks traveling at a speed below the 60% posted speed. Sub layers were created for the T-1 freight corridors and T-2 freight corridors.

Locations with very slow truck speed performance are represented by red on the map.

% of Trucks Traveling below 60% of Posted Speed: this layer displays the percentage of trucks traveling at a speed below 60 percent of the posted speed. Night data (7pm to 6 am) was excluded to calculate this measure.

Percentage of truck speed below 60% of posted speed is represented with graduated colors and grouped into five classes. The classes have equal intervals and each represents a range of 20%.

WSDOT Freight and Goods: this layer displays the classification of state highways, county roads, and city streets according to the average annual gross tonnage they carry in 2010. The roadways are classified into five different categories:

- T-1 (more than 10 million tons per year)
- T-2 (4 million to 10 million tons per year)
- T-3 (300,000 to 4 million tons per year)
- T-4 (100,000 to 300,000 tons per year)
- T-5 (at least 20,000 tons in 60 days)

Such classification is the same as FGTS classification system adopted by FMSIB.

FGTS corridors are represented with graduated colors and each category is represented by a unique color.

AADT: this layer displays Annual Average Daily Traffic volumes collected and maintained by WSDOT Statewide Travel & Collision Data Office for the State Highway System.

AADT is represented with graduated symbol size and color. AADT on different types of highways (US, IS, SR) is represented by varying line thickness and the volume of AADT is represented by varying the line color.