Overview
Real-time performance measurement of interstate congestion is critical for successful traffic operations management. Monitoring interstate speeds in real-time provides the basis for operations engineers to assess interstate system performance at a high level. Crowdsourced probe vehicle data are real-time speeds on roadways collected from cell phones, GPS devices, and vehicle telematics that can be turned into useful performance measures. This project involved the development of a real-time dashboard to display graphs to characterize the congestion history of interstate roadways using the number of miles operating below 45 mph. The playback feature allows for review of conditions during an event such as a road closure or ice storm.

Theory
The mobility measure utilized is miles of road operating under a certain speed, 45 mph by default. This gives a quick snapshot of mobility on interstates across a state or district. The data come from crowdsourced probe vehicle data on predefined road segments that are about one mile in length. The raw data are obtained each minute and aggregated every fifteen minutes using the median speed.

The website is comprised of five graphs: three area graphs that show congestion history and two column graphs that give a snapshot of current conditions. Users may specify which roads and districts to view, as well as how much time to cover in the graph, whether to display total miles or percentage of road length, and the speed threshold for congestion. The graphs below are from the week of Jan. 4-10 2015.

Miles operating below 45 mph by district:

Miles operating below 45 mph by road:

Speed profile for all interstates:

Miles operating above and below 45 mph by road at 7:30 on 12/6/2015:

Speed profile by road at 7:30 on 12/6/2015:

Winter Mobility Interstate Performance

November 2014

Weekly total mile-hours of speed <45 mph

December 2014

Weekly total mile-hours of speed <45 mph

January 2015

Weekly total mile-hours of speed <45 mph

February 2015

Weekly total mile-hours of speed <45 mph

Development of a Real-Time Web-Based Dashboard for Interstate Performance Monitoring by Maggie McNamara and Darcy Bullock