The Relationship between Congestion Management and the Planning Process

- Using Data to Make the Case
- Prioritizing Projects for Better Regional Planning
- Stakeholder Communications for Effective Planning

Congestion Management Systems (CMS) have been required for Metropolitan Planning Organizations (MPOs) designated as Transportation Management Areas (TMAs) since 1991, when the Intermodal Surface Transportation Efficiency Act was passed. This case study featuring the work of three MPOs investigates best practices of how congestion management processes (CMP), formerly known as CMS, are related to the transportation planning process. The perspectives of the planning process explored in this case study are data presentation, project prioritization, and stakeholder involvement.

Using Data to Make the Case

Puget Sound Regional Council

The concepts of traffic congestion and transportation system efficiency are very complex, and people who use a congested roadway system on a daily basis often do not understand the intricacies of traffic flow. How does a MPO effectively communicate to stakeholders the scale of congestion, the transportation system needs, deficiencies, and problem locations, the potential solutions that meet the needs and deficiencies, and the potential impacts of various solutions?

Presenting data using innovative visual approaches has proved an effective tactic for PSRC

Presenting data using innovative visual approaches has proved an effective tactic for the Puget Sound Regional Council (PSRC). The agency also has leveraged its relationships with the Washington State Transportation Center (TRAC) at the University of Washington and the Washington State Department of Transportation (WSDOT), which have helped develop some of the newer presentation methods.

PSRC serves as the Federally designated MPO and coordinates regional transportation, economic and growth planning for the central Puget Sound region in Washington State. The planning area encompasses four counties, 82 cities, and three ports.

Performance Measures and Data Sources

PSRC uses a wide range of performance measures to monitor system performance. The primary measures the agency uses are level of service (LOS), delay,

volume-to-capacity (V/C) ratios, and travel time between centers. The principal data sources used to develop these measures are travel demand model runs, population and travel behavior data from the Census, travel behavior data from regional household surveys, loop speed and volume data, and state and local traffic studies. In order to measure transit performance, PSRC uses bus and ferry ridership, transit frequencies, and transit occupancy load factors from a variety of local agency sources.

PSRC receives much of its data from WSDOT, which provides loop detector data including travel speeds, times, volumes, and lane occupancy. Loop detectors are on the highways primarily in King County with some extensions northward. This includes I-5, I-405, SR 167, SR 520, and I-90. As HOV lanes are constructed loop detectors are included with the construction. This is taking place moving southward on I-5 into Pierce County. The agency also conducts a traffic count program every two years at a cost of approximately $30,000. The traffic count program is to used for the validation of the regional travel demand model and to fill in gaps where traffic data is difficult to obtain, particularly on arterials throughout the region and roadways in Pierce and Kitsap Counties.

The CMP system is defined by the Metropolitan Transportation System (MTS), described in PSRC's long-range plan. MTS facilities are defined both functionally and geographically. A facility is part of the MTS if it provides access to any activities crucial to the social or economic health of the central Puget Sound region. Facilities that connect counties or cities and links that access major regional activity centers are considered critical elements of the MTS.

Additional data sources include the household travel survey (last conducted in 1999 and to be updated in 2006), which costs $1 million, and a longitudinal travel panel survey that was last conducted in 2002 for $200,000. PSRC dedicates approximately one and one-half staff to these data collection activities.

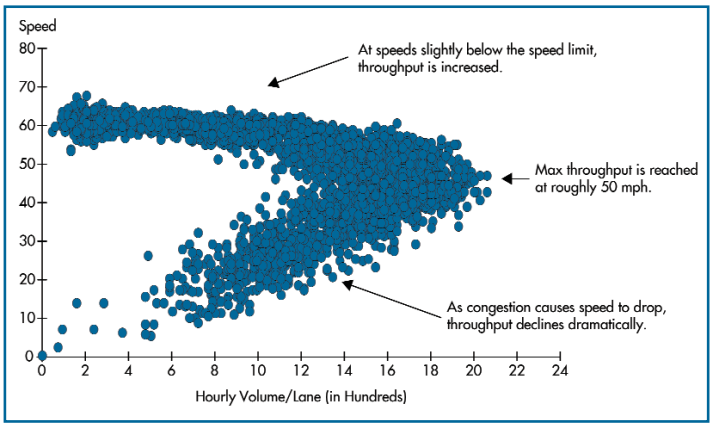
PSRC has clear ideas about its desired direction for tracking of system performance and future congestion management. At the top of the list is better origin and destination data. While the agency has been working on presenting data on travel markets using data from WSDOT corridor projects or from the model, to really understand the movements among travel markets PSRC would like to obtain data for all users, including transit users. Ultimately, PSRC would like to use person throughput as a major measure – so that the efficiency of the system can be tracked for users of all modes. A second area where data is deficient is with freight movement; PSRC would like to be able to calculate the impact of delay on freight. Finally, an overall calculation of how the system is performing in terms of delay on an annual or bi-annual basis would also be beneficial, as such an index is relatively easy for stakeholders to understand.

Data Display

The raw data described above, however, require a significant amount of data processing and careful handling to make them understandable and useful for both CMP and transportation planning. For the past few years PSRC has applied several creative visual methods to communicate the impacts of these traffic flows to both agency stakeholders and users of the region's transportation system. PSRC has found that an effective visual for communicating the relationship between traffic speed and volume is the "boomerang chart" developed by WSDOT that shows the level of delay at various points on the system (Figure 1). The chart shows the relationship between average speed and total volume, displaying real-time 24-hour loop data at five minute increments. In order to create the "boomerang chart", data is imported into a spreadsheet program and a scattergram is created. While the chart is relatively simple to create, the most challenging aspect of communicating and presenting this type of data is having a good set of continuous data. In Washington this data is available for the Puget Sound area only, where fairly extensive detection loops are in place and active.

FIGURE 1 – VOLUME AND SPEED RELATIONSHIP

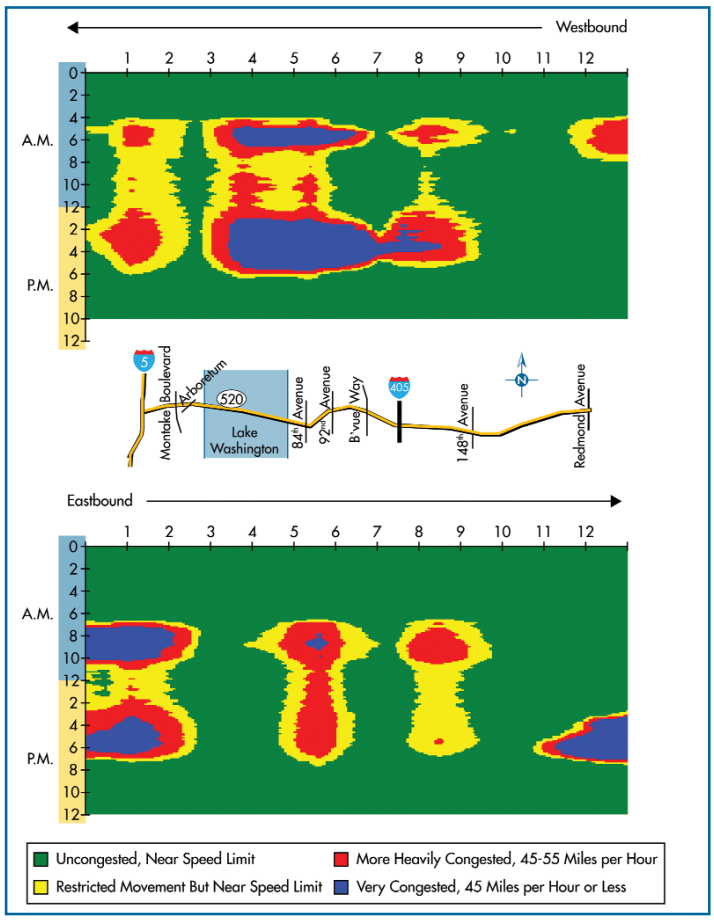
I-405 North Bound at 24th North East, Weekdays in May, 2001



The messages that are communicated to explain the data in the chart are just as important as the visual tool itself. The "boomerang chart" is used to explain that once a certain threshold is reached on a roadway seg-

Figure 2 – "Brain Scan"

Contour Map Showing Traffic Congestion



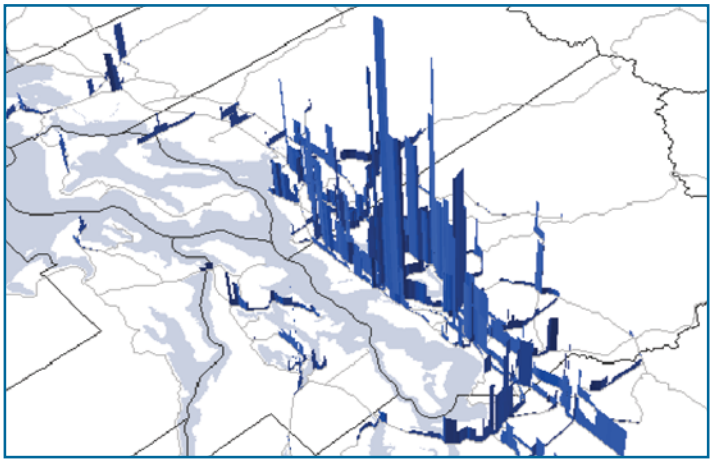
ment, speeds drop and then volumes drop. PSRC explains that congestion not only causes delay but makes the system less efficient at moving vehicles. The "boomerang chart" can also be used to show the amount of vehicle throughput and the changes in delay over time. When throughput is compared at a location one or two years apart, the increase in delay over time can also be demonstrated. This type of chart does not need to be updated very often as the congestion patterns are relatively consistent over the short-term, and the messages remain the same. WSDOT updates the scattergrams and provides them electronically to PSRC. The agency makes frequent use of the scattergrams with a range of stakeholder audiences via its ongoing education and outreach programs.

A second visual that has been effective for PSRC in communicating with stakeholders is the "brain scan" contour map created by the University of Washington's TRAC, which are shown in Figure 2. Data used to create the "brain scan" contains 5-minute raw traffic data that includes traffic volumes and lane occupancy percentage, which provides a density measure. This data is continuous, encompassing 24 hours per day and seven days per week.

In order to create the "brain scan" map, TRAC creates an Excel spreadsheet in which each cell represents the average lane occupancy value for a five-minute time period for every half mile of roadway. If loops are not positioned every half mile on a given roadway, interpolation is done to make each cell represent a half-mile length. TRAC runs an Excel macro that creates a graphic, so that each cell in the graphic is colored based on the occupancy value in a cell in the spreadsheet. This is done once for each direction of travel. The resulting image is then pasted into a graphics program or PowerPoint for display. The TRAC website presents options for requesting this data for areas throughout the region in a range of different forms.[1] The brain scans show the level of congestion at various times of the day at specific locations on a corridor, with each contour map showing one direction of traffic flow. WSDOT has also used the "brain scan" visual to demonstrate forecasted reductions in congestion with planned improvements.

Internally, PSRC has been working with geographic information systems (GIS) and the ESRI 3D Analyst module on a third type of presentation method. The agency is developing three-dimensional maps of travel markets and delay at the regional level, as shown in Figure 3. The highest elevations on the map represent the greatest level of delay. This tool is being used to present a regional picture of congestion. PSRC has found that these visual tools are understandable to stakeholders when accompanied by some explanation. They are especially effective when depicting the situation in an area that stakeholders know.

Figure 3 – Regional Travel Markets and Travel Delay



Source: 2002 WSDOT HPMS Data.

[1] Available at: http://depts.washington.edu/hov/

Development of Data Visualization Methods

As part of its communications efforts, PSRC has experimented with new methods and tested them with the public to determine the best methods for presentation. The public's expectations are getting higher and higher given the quality of visuals presented in the media on a daily basis. In addition to the approaches contributed by TRAC and WSDOT, PSRC has two graphic artists in its communications department that have developed ideas on how to display data creatively. The agency has also worked with consultants, partnered with other state agencies, and learned from peers at conferences to best refine both the methods for presentation and communication. PSRC recognizes that data visualization techniques are required in SAFETEA-LU and this type of work is taking the agency in this direction.

Benefits of Visual Tools

PSRC has found that good communication through visual aids has helped with stakeholders' understanding the complexity of the congestion problem. PSRC emphasizes that education needs to go beyond a discussion of volume-to-capacity (V/C) ratios at the peak hour, which do not represent the full congestion situation; new projects can result in improvements in delay overall that are not reflected in the peak V/C ratio. These communication methods also help stakeholders understand the benefits of the full range of potential improvements.

PSRC's presentation of data has been found so compelling that the agency has been receiving requests for presentations on the state of congestion by stakeholders, including elected officials and transit agencies. PSRC uses the presentation visuals to communicate the congestion problem as well as the potential solutions and expected impacts. For example, for the Kirkland Nickel Improvement Project on I-405, the addition of one new general purpose lane will increase capacity by one-third. The impact of this improvement on travel speed was demonstrated by the visuals developed by the WDOT in Figure 4.

One of the key benefits of using compelling visuals is that stakeholders throughout the region are borrowing them and helping PSRC expand its reach. The "boomerang charts", "brain scans", and three-dimensional delay visuals have been used in presentations at a number of meetings and conferences, including by people working in other related industries. The reinforcement of the message by others is helping to build an understanding of the region's transportation policy related to CMP and transportation planning, and of maximizing system efficiency. PSRC is now regularly receiving questions by both stakeholders and the general public concerned about congestion in the region. Elected officials have found the brain scans particularly useful because they show how a project is focused on the most congested locations. These tools have helped stakeholders prioritize projects within a corridor given fiscal limitations and competing fiscal demands of multiple jurisdictions.

Challenges

PSRC faces several challenges using this data to support both CMP and transportation planning:

- The data PSRC receives is primarily developed by WSDOT for transportation operations purposes and comes to them as a byproduct.
- PSRC often does not have the chance to specifically request data and often has to fit this available data into its analysis framework.
- PSRC lacks data on its arterial system, which would provide a much more complete picture of the regional situation.

While PSRC applies its regional travel model for assessing the transportation and congestion impacts associated with different travel markets, they have indicated that they need better data on regional origins and destinations of travel demand. In order to determine strategies for specific travel markets that may help to reduce congestion, PSRC emphasizes that knowledge of where people are actually driving to and from (origins and destinations) is critical.

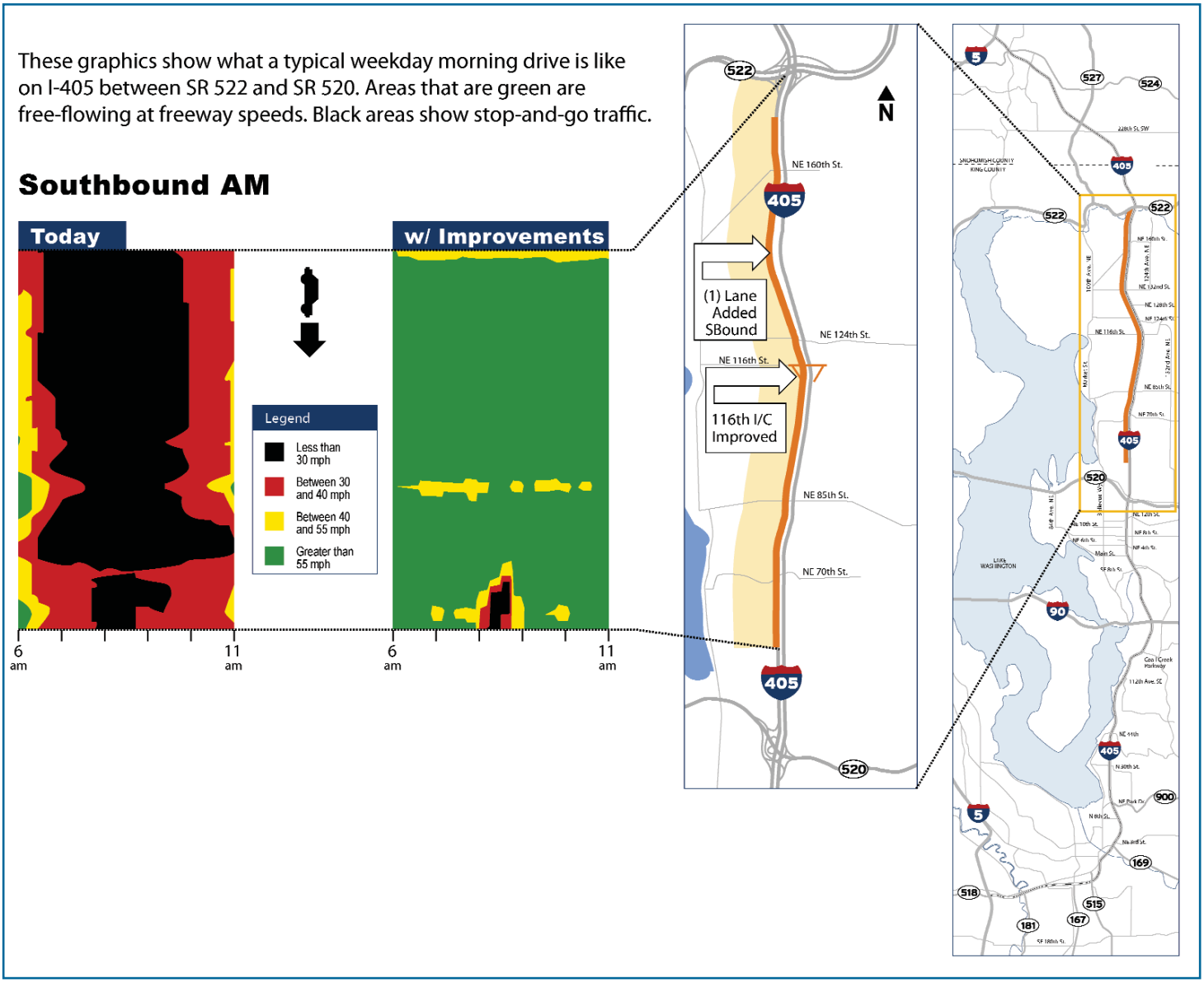
Development of the Congestion Management Process

PSRC is currently developing a new CMP document. A CMP Advisory Group has been created to guide the development of the CMP, which will utilize visual tools to help quantify congestion in the region. The advisory group is comprised of staff from WSDOT, transit agencies, the University of Washington, and local governments. Ultimately the agency will develop a separate CMP document.

The CMP process will be linked with the LRTP by developing recommended ways to improve efficiency that are then incorporated into strategies, projects, and programs in the LRTP. The CMP report will occur every two years while updates of LRTP are scheduled every four years. Measurement of effectiveness of implemented CMP projects occurs on a case-by-case basis when funding is available.

Figure 4 – Forecasted Impact of I-405 Improvements on Travel Speed

These graphics show what a typical weekday morning drive is like on I-405 between SR 522 and SR 520. Areas that are green are free-flowing at freeway speeds. Black areas show stop-and-go traffic.



Lessons Learned

Compelling visuals have helped PSRC communicate to elected officials, the media, and the public complex information about the transportation system and congestion. While sometimes experimentation is required to determine the methods that are most effective, the results of improved stakeholder understanding are very beneficial. When the presentation of data is appealing, dissemination of the message may be increased as stakeholders use the graphics in their communications.

Prioritizing Projects for Better Regional Planning

Southeast Michigan Council of Governments

Congestion management documents prepared by the Southeast Michigan Council of Governments (SEMCOG) detail how the transportation system is performing with respect to traffic congestion and often list recommended projects to mitigate regional congestion. However, other planning processes such as the agency's Long Range Transportation Plan also identify projects that meet regional needs. What is an effective method for reconciling these two processes and ensuring the congestion management projects are implemented? SEMCOG has developed an effective process for using congestion management as a method for prioritizing projects through its long-range planning process and ensuring that congestion management projects are implemented. The SEMCOG planning area includes seven counties in the greater Detroit area, and the agency has 154 member jurisdictions.

Performance Measures

SEMCOG's 2004 Congestion Management System Plan for Southeast Michigan identifies current and future congestion locations, relying largely on its travel demand forecasting model. The performance measures it uses to define congested locations are V/C ratio, LOS, speed, and density. Congested segments can be prioritized based upon the results of the performance measure calculations. However, once calculations are performed for each segment and they are compared to the thresholds for congestion as determined by the region, those corridors determined to be congested are from that point considered equal in that they fall into the category of congested corridors.

Congestion Mitigation Strategies

The SEMCOG CMP lists six congestion mitigation strategies in its toolbox:

1. existing study project;

2. transportation systems management;

3. transportation demand management;

4. access management;

5. public transportation systems management; and

6. single occupant vehicle/capacity widening.

SEMCOG is developing a land use model (UrbanSim) that will assist in determining if changes in land use will mitigate congestion. Transit mitigation strategies are assigned to a corridor with currently available fixed route transit services or for those corridors in the vicinity of roadways with planned transit service.

SEMCOG's CMP does not have a hierarchy for congestion mitigation strategies. Each strategy is considered as part of a toolbox of potential project improvements. However, SEMCOG's CMP policy does require cost-effective demand and systems management elements as a first component of all congestion reduction strategies. This policy also permits regionally significant roadway capacity projects only if the CMP strategies fail to reduce congestion to acceptable levels. The CMP then identifies proposed mitigation strategies, their expected impact in terms of reducing congestion, and estimated costs for implementation.

Linking CMP to RTP

In order for any of the congestion management strategies to be implemented, they must become part of the region's regional transportation plan (RTP). During development of the 2030 RTP, SEMCOG provided congestion analysis results and the mitigation strategy recommendations to state and local agencies. This information, along with additional public input, was used by state and local road and transit agencies to propose projects for inclusion in the 2030 RTP. SEMCOG reviews the projects submitted for the RTP with those identified through the CMP process, and generally they match up. In cases where a submitted project is not in the CMP, the submitting agency makes a case (i.e., safety) for including the project. To date, SEMCOG has not denied inclusion of any projects in the RTP that are not in the CMP.

The linkage between the CMP and RTP also provides insight into how SEMCOG uses the two plans to prioritize projects. For example, several of the goals and corresponding objectives in the RTP relate directly to those of the CMP, such as:

- Enhance accessibility and mobility for all people (reduce time spent traveling, increase access to public transportation, increase connectivity of transportation services, and provide multimodal access to major land uses).
- Enhance accessibility and mobility for freight while maintaining community integrity (improve freight movement, improve intermodal operations).
- Strategically improve the transportation infrastructure to enhance community and economic vitality

TABLE 1

Factor	Weight	Description
Bridge	0-3	Deficient bridges per mile scaled to a maximum of three.
Safety	0-3	High-crash intersections per miles scaled to a maximum of three.
Congestion	0-3	Percent congestion scaled to a maximum of three.
Pavement	1-3	One for collectors. Two for nontrunk line arterials. Two for trunk lines (freeways and arterials). Three for trunk lines currently in poor condition.
Freight	0-3	One for corridors designed as truck routes. One for corridors connecting to ports, airports, or intermodal facilities. One for corridors serving high-priority regional freight movements.
Transit	0-3	Transit ridership by category 1: 1-4,999 riders per day; 2: 5,000-9,999 riders per day; and 3: 10,000 or more riders per day.
Nonmotorized	0-3	Nonmotorized weight scaled to a maximum of three (based on accessibility, volume, traffic crashes, connectivity, shoulder width, and bicyclist preference).
Volume	1-3	Volume by category 1: 0-9,999 vehicles per day; 2: 10,000-29,999 vehicles per day; and 3: 30,000 or more vehicles per day.
Density	0/3	Three for corridors intersecting traffic analysis zones with HH density > 3.0 or job density >4.0.

Source: SEMCOG.

(preserve existing system, prioritize maintenance before expansion, improve efficiency and effectiveness of the transportation system).

- Promote a safe and secure transportation system (improve identification and clearance of roadway incidents).
- Protect the environment, both natural and built (minimize air and water pollution, link transportation decisions with land use decisions).

The analysis from the SEMCOG CMP document is also referenced in detail in the agency's RTP.

RTP Project Prioritization

In the RTP, SEMCOG uses a weighting process to prioritize regional corridors. SEMCOG developed an RTP Priority Corridor process for the 2030 RTP to ensure that project investments occur in the corridors and areas that meet the highest needs regionally. As shown in Table 1, one of the eleven factors shown to weight corridors in the RTP prioritization process is congestion. The weighting factor for congestion was calculated by assigning a congestion value to each segment of roadway within a corridor and determining the percentage of the entire corridor considered congested. The resulting percentage congested was then related to the 0 to 3 points rating (i.e., if 50 percent of a corridor was congested, it received 1.5 points out of 3). A number of other factors also have congestion implications, including reductions in crashes at intersections, improvements to corridors with high transit ridership, and non-motorized transportation.

Most of the data for performance measures used to prioritize projects and strategies is readily available to SEMCOG, including crashes, traffic counts, land use, socioeconomic, pavement, bridge, travel demand, and other data. If there is a need to collect additional data, SEMCOG budgets the appropriate resources (both financial and staff) in its work program. SEMCOG is currently pursuing the collection of real-time data, including travel time, traffic counts, and speeds, in order to expand upon the analyses already being performed using modeled data.

Project Implementation

When developing the Transportation Improvement Program (TIP) that will ultimately result in project implementation, SEMCOG incorporates projects from

those identified in the RTP. In SEMCOG's process (as defined previously above), CMP projects are regularly assessed and prioritized in the RTP and then programmed in the TIP. Of 1,487 projects included in SEMCOG's latest RTP, 15.7 percent were intended to address congestion through capacity increases and 10.6 percent were intended to address congestion through non-capacity increasing means.

SEMCOG does not prioritize the RTP projects as part of a process for inclusion in the TIP. However the projects and their deficiencies are categorized using the RTP Priority Corridors process identified to assist local agencies when selecting projects for the TIP. Generally the local agencies propose projects for the TIP using their own processes, which might include local TIP development committees or status of other variables such as matching funds, obtained right-of-way, or NEPA requirements.

SEMCOG uses two processes within the TIP to provide some project prioritization. These include yearly Calls for Safety and Congestion Mitigation Air Quality projects. Both of these processes use criteria developed by SEMCOG's Regional TIP Development Committee to evaluate projects against one another for receiving these two types of funding sources. A benefit/cost analysis is used for the safety projects, and a weighted factoring analysis is used for CMAQ projects.

Benefits of Prioritization Process

The benefits of SEMCOG's corridor prioritization process include:

- It is integrated with the CMP and RTP planning processes;
- It is analytically driven;
- It provides a mix of mitigation strategies; and
- It focuses on efficiency and reliability (operations).

SEMCOG has developed a process that clearly prioritizes improvements to the transportation system based upon a number of factors, including some that are not strictly transportation related, e.g., environmental justice, land use, and socioeconomic factors. Local agencies use SEMCOG's data and analysis to assist with their project selection and submittal process for the RTP and TIP. Some of the prioritization processes have been incorporated into funding application processes, including safety and CMAQ.

The data-driven process for developing the RTP and TIP provides a useful analytical tool for decision makers to make sound transportation decisions designed to best benefit their region. While political considerations will always factor into the selection of projects in this (and most other) regions, these analytical tools provide the foundation for making these important decisions. SEMCOG feels that using the above processes, they are successful in addressing the corridors of regional significance, which can be attributed both to the CMP and the diligence of the local agencies.

Challenges

The region lacks some data that would enable the computation of additional useful measures, such as travel time. SEMCOG feels that some current analyses could be improved, such as congestion severity and duration. Additionally, SEMCOG wants to improve their stakeholder and public outreach efforts to ensure that the messages they develop are understandable to all users and are useful in the continuing education of stakeholders.

Lessons Learned

SEMCOG has found that providing stakeholders with a strong set of congestion data via its CMP process has largely resulted in the selection of TIP projects that address the corridors with the greatest need. This approach has helped to minimize transportation decisions based on political agendas.

Stakeholder Communications for Effective Planning

North Central Texas Council of Governments (NCTCOG)

Working with stakeholders is a necessary process for conducting regional planning. Effective stakeholder involvement can be the key to regional understanding of congestion issues, support of mitigation strategies, and project implementation. In a region the scale of the North Central Texas Council of Governments (NCTCOG), with a metropolitan planning area including 5 counties, portions of four other contiguous counties, and over 60 local governments in the greater Dallas/Fort Worth area, effective stakeholder involvement is critical to the success and implementation of congestion management strategies and projects. NCTCOG has had great success in working with stakeholders by developing an inclusive process that helps the agency staff of member jurisdictions understand the state of congestion in the region, determine priorities, and collaborate on solutions.

Transportation Committees

The primary decision-making committees within the NCTCOG structure are the Regional Transportation Council (RTC), which oversees the metropolitan transportation planning process, and the Surface Transportation Technical Committee (STTC), which reviews, comments on, and prepares recommendations regarding surface transportation planning and the funding of transportation improvements. The 40 members of the RTC include 25 local city representatives, nine local county representatives, two Texas Department of Transportation (TxDOT) Districts (Fort Worth and Dallas), policy representatives from the three transit agencies (Dallas Area Rapid Transit, Fort Worth Transportation Authority, and Denton County Transportation Authority), one policy representative from the toll authority (North Texas Toll Authority), and one policy representative from Dallas/Fort Worth International Airport. The 69 members of the STTC include agency staff nominated by their respective jurisdiction or agency and include at least one member from each jurisdiction and agency represented on the RTC.

These committees are responsible for adopting and approving the Long Range Transportation Plan (LRTP), Transportation Improvement Program (TIP), Congestion Management Process (CMP), and annual Unified Planning Work Program (UPWP).

NCTCOG convenes a range of stakeholder groups to address other transportation topics. These coalitions are more fluid and membership is more informal. The Travel Demand Management/Congestion Management System task force focuses on the CMP, major investment studies, and travel demand management strategies. Comprised of 30 to 40 members, the task force functions similarly to a technical committee; its work includes employer trip reduction programs and work with the vanpool operators at transit agencies. A regional ITS steering committee comprised of local agencies also is convened by the agency. NCTCOG's Surface Transportation Technical Committee addresses CMP issues as well as the Regional Transportation Council and the Regional ITS Steering Committee. The role of the TDM/CMS task force and Regional ITS task force is to develop and analyze ideas and strategies to take to the STTC and the RTC for policy level guidance.

The Bicycle and Pedestrian Transportation Task Force meets semi-annually or as needed. At one point, two steering committees were in place for bicycle and pedestrian issues, but the members met too infrequently and not enough action items were identified to sustain interest. NCTCOG has established a process to convene task force meetings when a topic requires discussion or when a funding initiative is being considered. Transportation committees are also in place that address photochemical modeling, alternative fuels, and air quality modeling.

NCTCOG interacts with the general public through the use of public meetings for each of the four major work products (LRTP, TIP, CMP, UPWP). However, NCTCOG does not have a public task force or committee. Generally, meetings with are held quarterly. The resources required to support this level of interaction with stakeholders are mainly staff time. The CMP group is comprised of four staff that spend half their time working on congestion management. A total of ten staff are required to coordinate stakeholders in the region including one person dedicated to public outreach for all four work products.

Congestion Management Process

NCTCOG's current CMP is part of the RTP. The 2004 RTP update addressed congestion first through strategies to improve efficiency of the existing system via transportation systems management and travel demand management to reduce single-occupancy vehicle trips. With these strategies assumed, new rail, HOV, and managed facilities were evaluated. For demand that could not be accommodated via these measures, single-occupancy vehicle capacity was considered for congested corridors.

Future versions of the CMP will be separate from the RTP because the section on congestion was not emphasized adequately in the RTP and was overshadowed by the other plan elements. Another rationale for developing a separate document is that the CMP looks at both the short- and long-term needs and solutions while the long-range plan focuses only on long-term solutions. By separating the two, NCTCOG can place a higher emphasis on short-term strategies that can be implemented quickly.

The direction of the new CMP is to continue to approach congestion with "management solutions" by directing resources to operations and travel demand reduction strategies. Strategies for congestion mitigation are developed at the system level (Metropolitan Transportation Plan), on the corridor level (in Major Investment Studies), and on the project level (in the TIP). While CMP strategies will be implemented across the entire area, more intensive data collection and monitoring will be conducted in congested corridors.

NCTCOG's RTP includes current and future congestion information. As NCTCOG prepares separate RTP and CMP documents, the RTP will reference components of the CMP, such as innovative strategies that may be implemented in the long-term. NCTCOG will make sure the two plans are integrated and consistent in terms of performance measures and data.

The TDM/CMS task force is managed by NCTCOG staff. The committee meets at least once per year, but usually more frequently. The chairperson of the committee is usually NCTCOG staff. Decisions are made with a simple majority vote. NCTCOG plans to engage the committee more often during the process of updating the CMP. In order to obtain buy-in on CMP strategies and projects so that stakeholders will be advocates for implementation, the task force participants range in staff level. For example, higher level staff educate policymakers and lower level staff educate their managers.

Performance Measures and Data

NCTCOG uses performance measures to track congestion on the system including 650 centerline miles of freeways, 50 miles of tollways, 31 miles of HOV lanes, 1600 miles of regional arterials, 44 miles of light rail transit, and 35 miles of commuter rail transit. These measures include:

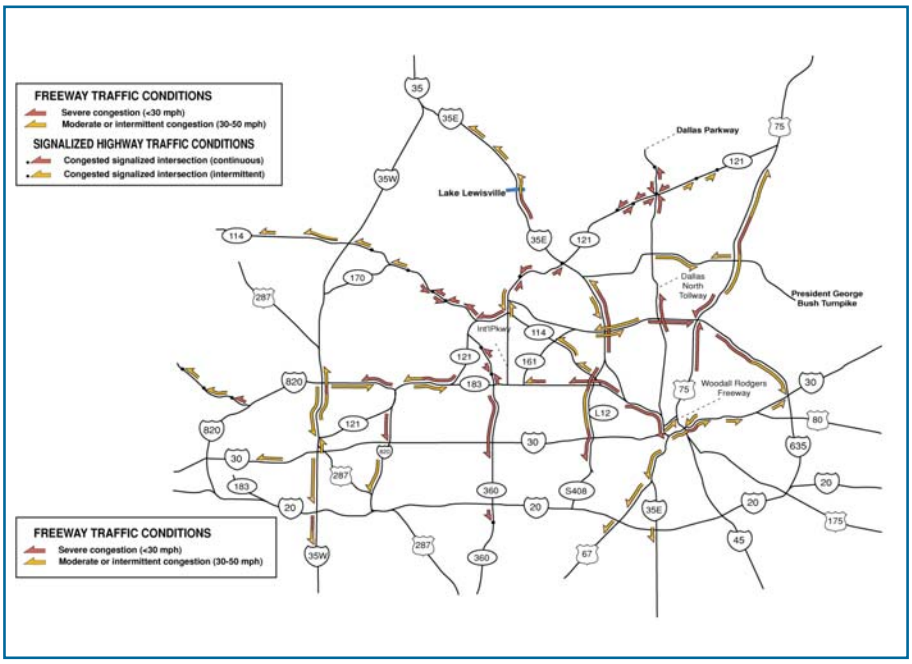
- reduction in delay;
- travel time savings;
- vehicle trips reduced;
- volume to capacity ratio;
- Level of Service (LOS);
- ridership; and
- system reliability.

Data for these measures include tube counts from TxDOT and travel time runs conducted by NCTCOG on 700 of the region's 1,600 miles of arterials. The data collection cost for regional aerial photography showing performance for the entire system (835 centerline miles) was $300,000 in 2003. NCTCOG spent $30,000 for travel time runs on arterials via its Thoroughfare Assessment Program. In the future, the agency is exploring the use of ITS technology and vehicle detectors along state highways to collect volumes and speeds and do more frequent travel time runs.

Stakeholder Communications Tools

In order to communicate the system performance to stakeholders, NCTCOG uses tools such as maps with colored arrows at the corridor level showing the severity of congestion as defined by travel speeds (Figure 5) and aerial photography showing levels of congestion. The RTP section on system performance includes very simplified maps of current and forecasted congestion based on results from the NCTCOG regional travel demand model (Figure 6). For the past two years NCTCOG has been communicating system performance via an annual Transportation State of the Region report detailing the system usage and congestion levels. This document is distributed widely, including to elected officials.

FIGURE 5 – 2004 EVENING CONGESTION



Funding and Implementation

NCTCOG has had success in securing resource contributions from stakeholders toward regional congestion management improvements. For some programs with funding initiatives, such as vanpool and interchange bottlenecks, NCTCOG requires a 50/50 split to make the funds go further than an 80/20 match. For vanpool, HOV, and interchange programs, the local match is provided by TxDOT and local transit agencies. One example of stakeholders partnering on funding was for an ITS communications system project through TxDOT, for which seven agencies each contributed $10,000 for implementation.

Benefits of Stakeholder Approach

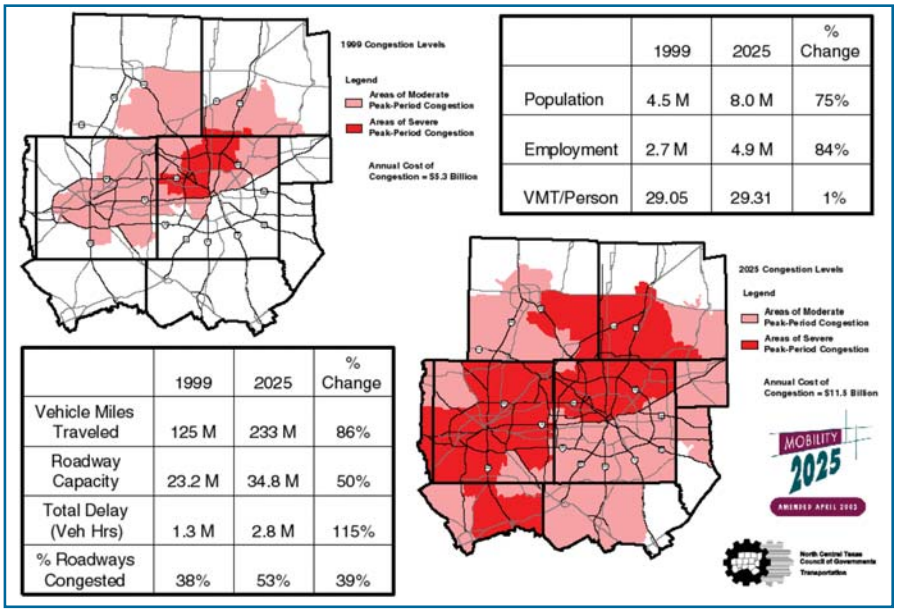
While the time commitment is significant to manage these large stakeholder groups, NCTCOG has found great benefits in having a wide range of representatives involved in the RTP process. It is possible to obtain regional consensus on issues and projects when all areas are able to provide input, and the result is ultimately a better product.

The approach of involving a large cross-section of stakeholders has helped to foster an atmosphere of shared responsibility for the region's transportation network and congestion management. Stakeholders have gained an understanding of how their individual priorities fit in relative to regional transportation needs. Initially, each stakeholder group sees its project as being the most important in the region. Once all stakeholders on a committee or task force gather together to look at the volumes on other corridors, they realize where the greatest deficiencies really are and how their needs fit in with the rest of the region.

NCTCOG also involves stakeholders in the process of looking at the raw transportation data. Stakeholders work with consultants and provide input into analysis tools and methodology. The result of stakeholders' participation in the process, instead of simply being provided with data as a finished product, is greater buy-in on where problems exist. As appropriate and if possible, NCTCOG tries to build on planning work that has already been done in the region. This approach results in linking plans together and helps obtain support from stakeholders.

FIGURE 6 – MOBILITY 2025

The Metropolitan Transportation Plan, Amended April 2005



	1999	2025	% Change
Population	4.5 M	8.0 M	75%
Employment	2.7 M	4.9 M	84%
VMT/Person	29.05	29.31	1%

	1999	2025	% Change
Vehicle Miles Traveled	125 M	233 M	86%
Roadway Capacity	23.2 M	34.8 M	50%
Total Delay (Veh Hrs)	1.3 M	2.8 M	115%
% Roadways Congested	38%	53%	39%

CMP Project benefits

An example of a CMP project implemented in North Central Texas that generated user benefits is the Thoroughfare Assessment Program east pilot project. This project was implemented on a grid of corridors consisting of 29 intersections along Frankford Road, Trinity Mills Road, Marsh Lane and Midway Road in the vicinity of the Dallas North Tollway. These are multi-jurisdictional corridors, which are operated and maintained by the City of Dallas and the City of Carrollton and are located in Dallas, Denton and Collin Counties. As a result of implementing the new optimized signal timing and recommended low-cost operational improvements along these corridors, the following benefits were quantified:

- 16 to 31 percent decrease in the travel time;
- 42 to 67 percent decrease in delay;
- 30 to 58 percent decrease in the number of stops;
- 24 percent increase in the average speed; and
- 9 percent reduction in VOC emissions and 3 percent reduction in NOx emissions.

Stakeholder Challenges

The primary challenge and limitation of working with such a large number of stakeholders is that the period to reach approval can be lengthy. Projects need to be taken to committees for information and for action, and many rounds of presentations are required before approval. NCTCOG also holds workshops prior to committee meetings to brief committee members on specific issues or projects. This results in NCTCOG obtaining more comments on proposals, resulting in a more complex process to resolving opposing comments. However, the workshops provide all participants with a greater understanding of the issues and ample opportunity to provide comments.

Lessons Learned

NCTCOG has learned that involving a large group of stakeholders early in the process is the most effective way to gain understanding of the location of the most pressing congestion problems and to gain consensus on the best solutions for the region. Ongoing involvement throughout the entire planning process is also a critical element of keeping stakeholders informed, and results in a better transportation planning product.