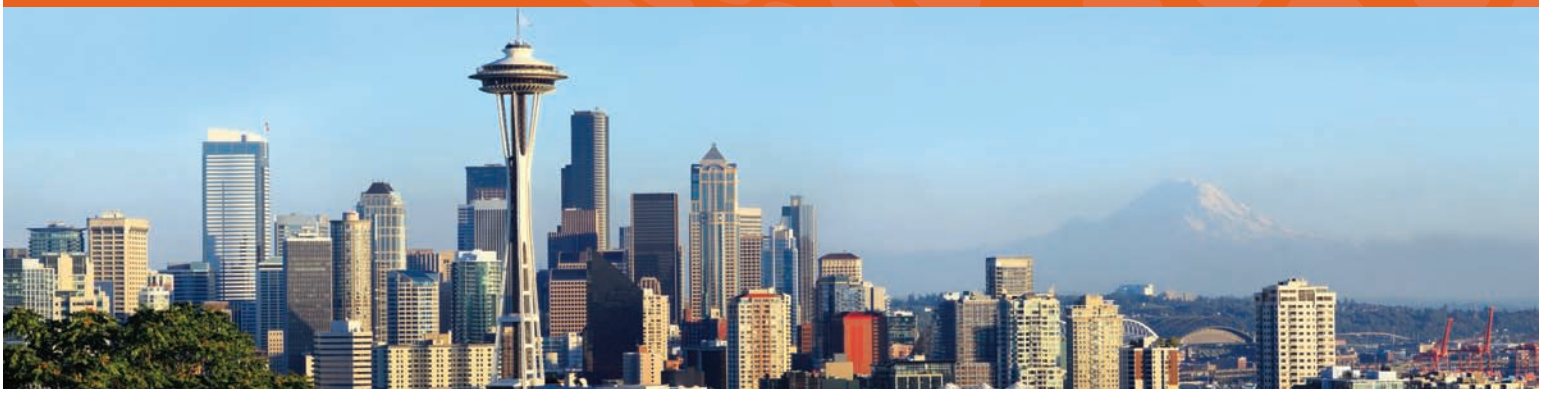
U.S. Department of Transportation
Federal Highway Administration
Federal Transit Administration

Puget Sound Regional Council

December 2010



The Puget Sound Regional Council's (PSRC) Congestion Management Process (CMP) is fully integrated into its overall transportation planning process and is a truly multimodal effort. Although it is an ongoing effort, the region recently reset its CMP with establishment of the SMART Corridors concept during development of the *Transportation 2040 (T2040)* metropolitan transportation plan (MTP). The PSRC planning region was divided into 12 subregions called SMART Corridors, and these corridors are used as the organizing framework for *T2040* and will be the focus of congestion monitoring and improvements in the future. Generally, PSRC's CMP covers the following activities: measuring multimodal transportation system performance, identifying the causes of congestion, developing and evaluating alternatives, selecting solutions, implementing solutions, and monitoring system performance. Because the CMP is so thoroughly integrated in the overall planning process, PSRC staff do not view it as a separate process with distinct steps.

Puget Sound Regional Council

Source: PSRC.

Background on PSRC

PSRC is the metropolitan planning organization (MPO) for regional transportation, land use, and economic development in the central Puget Sound area of Washington State. Encompassing the city of Seattle, the region experiences congestion on a daily basis, a problem that is likely to become even more challenging due to substantial population growth forecasted for the next 35 years. PSRC recently updated its MTP, *T2040*, and adopted it in May 2010.[1]

1 Puget Sound Regional Council, *Transportation 2040*. Available at: http://www.psrc.org/transportation/t2040.

CMP Process Model

The SMART Corridors concept was introduced in the *SMART Corridors/CMP Report* draft of February 2010,[2] and was used as a framework for better understanding the travel experiences of people in the region. The report was renamed to be *Draft T2040 Monitoring: Congestion and Mobility Report, 2010 Existing Conditions* to better reflect the fact that the CMP will serve as part of the congestion and mobility monitoring for *T2040*.

Development of PSRC's *SMART Corridors/CMP Report* represents a resetting and new direction for the CMP in the region. SMART signifies the ideals of sustainable, multimodal, accessible, reliable, and technology. Recent improvements to the CMP included expanding the breadth of what PSRC is monitoring, including greater multimodal and freight coverage. PSRC is looking to put land use data into the CMP. In addition, PSRC has made significant advances in its suite of analysis tools to now include modeling the impacts of congestion pricing and a benefit-cost postprocessing tool to better compare solutions. PSRC staff indicate that the 12 SMART Corridors and associated report could be a useful tool for developing the project prioritization process.

The CMP effort requires most of the work time of the three full-time staff members on the PSRC mobility team and significant contributions from the data systems and analysis team. PSRC staff are continuously feeding the ongoing cycle of the CMP by identifying and discussing new performance measures or data collection efforts, developing new ways to communicate information to decisionmakers, or facilitating discussions among regional stakeholders. Below is a description of the activities associated with the CMP divided into major categories identified by PSRC staff, although staff do not generally view the CMP in distinct steps or activities.

Activity 1 – Measure Multimodal Transportation System Performance

In conjunction with the update to the region's MTP, *Transportation 2040*, PSRC and its member agencies assessed the existing system performance of the region using the SMART Corridors framework. The SMART Corridors effort builds on the definition of the transportation system for PSRC, the Metropolitan Transportation System (MTS), which consists of "regionally significant multimodal transportation facilities and services that are crucial to the mobility needs of the region." The 2-year effort resulting in a report and baseline for future CMP data collection was conducted by gathering extensive input and holding discussions with multi-agency advisory groups in combination with other plan update activities. The report provides a baseline of system conditions, including performance and other relevant attributes. It also identifies the specific routes or pathways the region will use to monitor performance about every 2 years.

PSRC conducted several activities to assess the existing conditions of the region. The agency defined a new way to look at the region—12 SMART Corridors that now serve as the focus of analysis and monitoring for congestion management as well as an organizing framework for the overall plan. PSRC planners report that breaking down the region into smaller geographic subregions has been useful for public understanding, and PSRC committee members seem to have more ownership of the CMP now that they feel it represents their area. It gives stakeholders a place to focus within the larger CMP.

During the 2-year development of the SMART Corridors concept and report, multimodal performance measures were identified and data were compiled for those measures on each of the corridors. The performance measures used in the report represent a realistic picture of the data that PSRC staff can acquire (primarily through member agencies) and analyze. PSRC generally has more raw data than have been visualized in the *SMART Corridors/CMP Report,* but the challenge is finding data that are consistently collected by member agencies for each corridor. The final set of measures is still being finalized at this time.

2 Puget Sound Regional Council, *T2040 Monitoring: Congestion and Mobility Report, 2010 Existing Conditions*. Available at: http://www.psrc.org/transportation/cmp/.

System performance information is included along with other information on the existing conditions and characteristics of the region. High-priority freight corridors and arterials are also identified. Below is a list of the information included in each SMART Corridor description:

- Land Use
- Population
- Employment
- Roadway
- Pavement Conditions
- Ferries
- Transit
- Special Needs Transportation
- Transportation Demand Management (TDM)
- Transportation System Management and Operations (TSM&O)
- Bicycle and Pedestrian
- Freight
- Park and Ride Lots
- Safety
- Security (Transportation Recovery Routes)

For each corridor, the maximum throughput travel-time index (TTI) was used by the Washington State Department of Transportation (WSDOT) to identify "Commonly Congested Commutes." Data from WSDOT's Highway Performance Monitoring System (HPMS) were used to identify "stop-and-go roadway conditions," defined as locations operating at level of service (LOS) E or worse (roughly volume-to-capacity ratio of 0.9 or greater). To help align the CMP with the Washington State Strategic Highway Safety Plan, PSRC also identified locations within each corridor where collisions resulted in serious injury or death.

Working with a group of six transit agencies and the city of Seattle, PSRC identified five performance measures to characterize the aspects of congestion relevant to transit operators. They are:

- General roadway congestion (trapped in general roadway congestion)
- Re-entry congestion (unable to re-enter general travel lanes from station pullouts due to congestion)
- High-volume loading congestion (longer times at stops and stations due to high volume of passenger loading)
- Mobility device loading congestion (loading congestion due to extra time needed for passengers with mobility devices).
- Bus queuing congestion (delays caused by other transit vehicles at stops or stations)

For the February 2010 draft *SMART Corridors/CMP Report* PSRC did not collect data for these performance measures but instead used transit operator input to identify locations of transit improvement as well as transit routes operating on freeways that WSDOT had identified as most congested. PSRC also used an analytical tool, the Transit Competitive Index, to add roads with gaps in existing service to the list of transit-congested corridors.

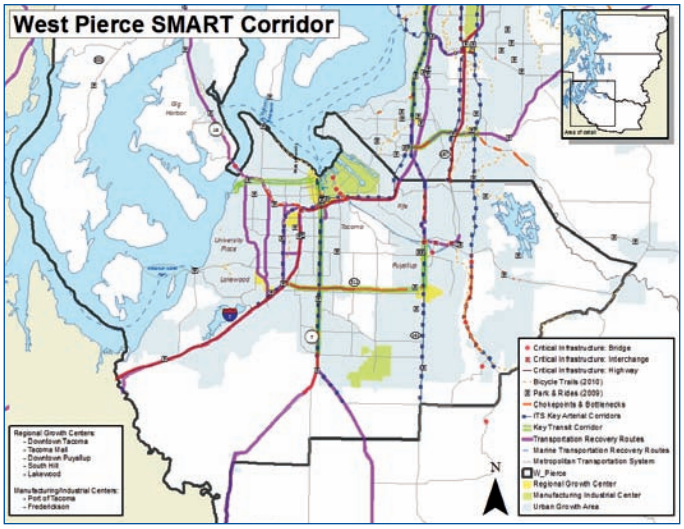
PSRC is working to improve the transit data that it has for the CMP as well as other planning efforts. The transit data section is a work in progress and PSRC is working closely with six transit operators in the region to get data on their physical infrastructure, on-time performance, and boardings. The agency hopes to get data from the ORCA Smart Card system soon. It is currently working with transit operators to obtain information via automatic passenger counters and automatic vehicle locators.

PSRC uses the Washington State Freight and Goods Transportation System to classify freight-significant routes within each SMART Corridor for monitoring purposes. The CMP identifies routes that carry 4 million or more gross tons of freight annually (T1 and T2 routes) as significant.

The Top 25 Signal Coordination/TSP Arterials were identified in the last 2 years by the PSRC Regional Transportation Operations Committee, along with those identified by input from transit, emergency management, and freight stakeholder groups. Criteria for a key arterial designation included volume-to-capacity ratio, redundancy, presence of transit routes and freight routes, and ability to serve as an alternate route to a freeway.

Figure 1 shows one of the maps used to illustrate the existing conditions and significant routes in 1 of 12 SMART Corridors in the *SMART Corridor/CMP Report:*

Figure 1. SMART Corridor map for West Pierce



Source: PSRC, *T2040 Monitoring: Congestion and Mobility Report, 2010 Existing Conditions.*

PSRC spends a lot of resources on compiling and analyzing data. It generally collates data collected by other agencies rather than collect data itself. Beyond the data in the SMART Corridor/CMP Report, PSRC is actively pursuing data for performance monitoring across the region. The agency acquires data at the regional, subarea, and SMART Corridor levels. PSRC created an interagency data group 2 years ago and it is currently being formalized under the technical forum.

WSDOT is a large supplier of data. It has instrumented the highways in the State with loop detectors, and the collected data feed the HPMS to produce information for a variety of performance measures.

PSRC is looking to improve its ability to monitor performance at the arterial level. It currently collates traffic count data from all its member jurisdictions. In addition, PSRC staff have recently reached out to 20–30 member agencies to see where traffic counts are collected and to obtain that data. The arterials identified by the Regional Transportation Operations Committee serve as the geographic foundation for the arterial count data obtained from member agencies. PSRC is working to coordinate data from WSDOT on State routes with data collected from local agencies to find gaps in arterial detection. PSRC is also conducting intensive outreach with local agencies to get bicycle/pedestrian data and updated parking information. Other information that PSRC collects includes ferry ridership, park-and-ride utilization from transit agencies, and vanpool data from WSDOT and transit agencies. PSRC uses much of the data it acquires for model calibration and verification.

Activity 2 – Identify the Causes of Congestion

PSRC looks to its member agencies to identify the causes of congestion through route development and corridor studies. Those studies have been completed on almost every major facility in the region. PSRC aggregates the information on congestion causes identified by the member agencies. To keep the *SMART Corridors/CMP Report* simple and focused, PSRC has not included this detail at the SMART Corridor level in the report.

Activity 3 – Develop and Evaluate Alternatives

This element is performed as part of the MTP development process. PSRC staff worked with multiple subcommittees covering all modes to develop six alternatives (including a baseline or no action alternative) to be considered as part of *Transportation 2040*. The alternatives describe varying levels of roadway/transit capacity enhancements, pricing strategies, operational efficiency strategies, demand management, as well as other transit, bike/pedestrian, and ferry enhancements.

After building the alternatives, PSRC evaluated each one and compared it to the baseline using a system of analysis tools. The alternatives were evaluated for effects at the regional, subarea, and corridor scales using criteria that included mobility, environmental stewardship, and quality of life.

The metrics used to assess an alternative's effect on mobility were:

- Time Savings
- Improved Reliability Benefits
- Vehicle Operating and Ownership
- Benefits
- Other User Benefits

PSRC has recently expanded the capabilities of its analysis tools to support the MTP update process. Two important themes of the new tools are integration and focus on individuals. To provide consistency and improve accuracy, the tools are integrated together rather than just linked or used independently. In addition, the tools allow the modeling of individuals or vehicles instead of groups to enable realistic modeling of mode choices and present results as population distributions. PSRC used an ITS Deployment Analysis System (IDAS) to examine its Intelligent Transportation System (ITS) strategies, and used that information to update the travel time assumptions in the travel demand model.

PSRC used a cost-benefit analysis tool to monetize the benefits of each alternative. In addition, the percentage increase or decrease of travel time for freeway, managed lanes, and transit during the morning and evening commute times was reported for each SMART Corridor. By monetizing many of the effects of the alternatives, the benefits can be compared directly to the costs and reveal the potential economic consequences of an alternative. As a PSRC staff member stated, evaluating the alternatives is a multicriterion problem and monetizing the results helps compare "apples and oranges."

Unfortunately, not all impacts can be monetized, so a description of the costs and benefits was included along with the numerical cost-benefit data for decisionmakers. For example, the cost-benefit analysis did not include travel demand management or many of the nonmotorized operational improvements. This was not a significant issue because most decisionmakers in the region are highly supportive of the kinds of strategies that could not be monetized.

Other noteworthy improvements in analysis tools at PSRC include:

- Improved freight modeling, by which PSRC was able to isolate three different freight user classes
- Improved transit modeling
- New ability to model tolling and pricing
- Inclusion of regional trails in model, with on-road bike lanes to come.
- Assessment of benefits to subareas by examining origins of trips, such that investments in one area can show benefits in another area

Activity 4 – Select Solutions

Selection of congestion management strategies and projects is completely intertwined with selection of the preferred alternative for the MTP. Each alternative included many congestion mitigation strategies. The preferred alternative was selected by the PSRC Executive Board based on the evaluation information provided. Decisionmakers were guided by the priorities developed for the MTP: (1) maintain, preserve, and operate; (2) ensure safety and security; (3) ensure system efficiency; and (4) strategically add capacity.

PSRC recently began revising the current project prioritization process as part of a commitment made in *Transportation 2040*. It is engaging committee members with questions such as "What should the conclusions of the prioritization look like in the plan?" and "What does a local sponsor do to enter a project into the prioritization process?" The prioritization process that will be developed will include guidelines on project admission into the plan, exclusion from the plan, and prioritization. All projects in the new plan will be rescreened based on the new process developed.

Recently, 10 criteria were identified to use as priorities for making decisions in the region. The criteria are fairly subjective, so there is a general push to translate them into specific, measurable criteria, with a weighting system to allow for a transparent and objective project prioritization process.

Activity 5 – Implementing Solutions

Implementing the management strategies occurs when the projects and programs selected in the plan are entered into the TIP, and then carried out by PSRC member agencies. PSRC is currently looking to develop a process for tracking implementation of congestion mitigation strategies, perhaps through a report card that tracks project implementation by SMART Corridor.

Activity 6 – System Performance Monitoring

Performance monitoring is an ongoing process that is highly connected to the first activity (Measure Multimodal Transportation System Performance). PSRC aims to update the *SMART Corridors/CMP Report* with updated performance information every 2 years. PSRC currently covers transportation

performance topics about four times a year in its monthly *Trends* report on regional planning data, developed for the public. PSRC member agencies are involved in assessing the impacts of specific projects and programs. For example, WSDOT conducts project performance evaluations and the city of Seattle monitors the effects of its arterial signal retiming projects. PSRC does not currently have the resources available to perform before-and-after studies on individual projects.

Integration With Other Processes

One of the achievements of PSRC's CMP is that it has become fully integrated into the transportation planning process. This is seen throughout the activities described above. For example, congestion is 1 of the 10 criteria that will be used to guide project decisions. PSRC staff report that the CMP is now relevant to the public and member agencies because it is part of the MTP development process and is now tied to funding. Mainstreaming the CMP has given it better shape and direction, PSRC staff say.

Lessons Learned and Challenges

PSRC staff have found that managing congestion in the region is a responsibility that must be distributed across many agencies. This is seen in the CMP where local agencies supply data to PSRC for monitoring congestion, assist in identifying congestion mitigation strategies, implement those strategies, and evaluate their effectiveness.

Because it is difficult to dictate actions to local jurisdictions from the regional level, PSRC's goal with the CMP is to agree on a regional framework for managing congestion, and on metrics that all the parties in the region will use. Within the region there are many different priorities and values related to congestion and providing mobility. For example, there is not necessarily agreement on what the correct threshold should be for identifying a congested roadway.

With the SMART Corridors effort, PSRC has learned to make use of the institutional knowledge of experts at transit agencies and local road agencies when observed data are not available. The effort relies on experts in the region to identify congested routes and arterials.

PSRC is also making progress in establishing more "give and take" with local agencies to achieve mutual goals regarding data. The challenge for PSRC is establishing consistency in the data from a variety of local sources. That has been difficult because local agencies collect data for different purposes and have different needs.

The SMART Corridors effort has helped connect the CMP to livability in the region. Because the CMP now focuses on 12 smaller scale regions (the SMART Corridors), PSRC can better understand congestion in the context of greater detail and land use. In addition, the CMP considers bicycle and pedestrian facilities and includes five aspects of transit congestion. The CMP's SMART Corridors framework has been extended to planning for special needs transit as well. Planners looked at medical destinations and other destinations of interest to people with special needs, and evaluated how to give all people more choices in travel.