

MPO SELF-ASSESSMENT OF CURRENT MODELING CAPACITY AND DATA COLLECTION PROGRAMS

Background

At its February meeting, the RTAC requested information on modeling capabilities and data collection programs currently in use by MPOs around the state. An assessment form was developed and reviewed at the February RTAC Staff Working Group meeting, and subsequently sent out to modeling staff at each MPO. The assessment focused on two general concerns expressed at the SWG meeting:

- 1) Are models reasonably sensitive to key factors and policy variables which are potentially of great interest for target-setting or implementation of SB375?
- 2) Are models comparable in their capabilities across the state? That is, do they provide a "level playing field" for evaluations of land use or transportation policies or factors of interest for target setting or implementation of SB375?

A preliminary version of the assessment was presented at the March RTAC meeting. A limitation of self assessment of complicated modeling systems and data collection programs, which for all sorts of historical, financial, practical, and policy reasons vary widely from MPO to MPO, is that it is difficult to "normalize" the assessment—i.e. ensure that all the respondents assessed themselves using the same definitions and standards. The RTAC commented on this at the March meeting, and an attempt was made to normalize the assessments for modeling capacities by adopting a consistent definition of "reasonable sensitivity".

Reasonable Sensitivity of a Model

For purposes of the assessment of travel demand models and land use models and projections currently in use by MPOs in California, the following definition of "reasonable sensitivity" was used:

"Reasonable sensitivity of a model to a key factor means that variations in the key factor which are used as inputs to or parameters within the model result in variations in model output measures which:

- a) fall within the range of observed variation reported in research literature, academic consensus, or peer consensus;*
- b) match variations in observed travel or land use data within tolerances established for modeling by the MPO and those in published model validation guidelines by state and federal organizations (e.g. FTA New Starts, CTC Guidelines, etc); or*
- c) would be expected based on travel behavior or land economics theory, if a range of observed variation is not known, or no consensus exists as to the acceptable range of observed variation."*

Assessment Categories for Models

The assessment scheme is based on the judgment of the MPO staff as to the applicability or sensitivity of the model to various "key factors" which are known to influence either travel behavior, or the location or quantity of land uses within a region. The assessment scheme for both travel demand models and land use models includes five categories, as follows:

- a) "Factor Not Applicable in Region" such as the ability to model transit in an area with no transit service, or extremely low transit ridership, nor significant plans for any future transit services;*
- b) "No Capacity to Model Factor" indicates that the factor is or will be relevant, but the model has no ability to account for it in forecasting land use or travel behavior.*
- c) "Sensitivity Unknown/Untested" indicates that the factor is accounted for in the model, but has not be rigorously tested, and the model sensitivity is unknown.*
- d) "Limited Sensitivity to Factor" indicates that the model accounts for the factor, but that testing or experience has revealed that the sensitivity of the model to the factor is less than expected based on research or published guidance.*
- e) "Reasonably Sensitive to Factor" indicates that the model sensitivity has been tested, and it falls within expected ranges based on research or published guidance.*

Land Use or Transportation Data Collection and Monitoring Programs

For purposes of this assessment, the following definition of data collection and monitoring program was used:

"A transportation or land use data collection program is an organized effort to directly collect observations of any of the following phenomena: land uses; dwelling units or households; jobs; school enrollments; special or unique land uses of significant size (airports, hospitals, etc.); population and population demographics; transportation facilities and services; or utilization of transportation facilities and services.

A monitoring program is an agency effort to assemble and integrate data from one or more sources, and organize the data in a form useful for describing and quantifying change or variation in observed phenomena. The changes could be changes over time for a known geography (i.e. trends, growth, etc.); differences over space for the same time (e.g. a comprehensive database inventory of dwelling units for a known area, broken down by relatively small geographic units); or variation of demographics for a single point in time (e.g. cross tabulation of numbers of trips by number of persons in a household).

For data collection or monitoring program to be 'adequate to meet expected needs', it must be:

- a) Reliably collected (i.e. collected for known time periods and geographies, and using appropriate and known collection methods);*
- b) Comprehensively collected, assembled or integrated (i.e. either the collected data, or the data when integrated with other sources, is complete to some known geography or time period for the observed phenomena);*

- c) *If used for identifying trends, the data (as collected or as integrated with other sources) from one time period are consistent with and comparable to data collected from another time period; and*
- d) *Level-of-effort scaled appropriately to the policy questions being asked (i.e. if year-over-year changes in transit ridership are sought, data collection methods must be robust enough to capture relatively small changes)."*

By this definition, there exist several data collection efforts undertaken by non-MPO agencies which may be considered a monitoring program by an MPO which assembles, integrates, and uses the collected data. Two examples:

Example 1: The Highway Performance Monitoring System is the most often cited source for area-wide estimates of vehicle miles traveled, as well as many other characteristics of transportation system supply and utilization. The State has been delegated by FHWA the task of organizing data collected primarily by local agencies for purposes of developing area-wide estimates of VMT. The direct data collection, then, is performed by local agencies. The State integrates the raw data, expands the sample to specific jurisdictional geographies, and tabulates these estimates. Many MPOs track VMT data for their jurisdiction as reported in HPMS, and use those estimates for many purposes, including validation of travel demand models, development of VMT trendlines for their jurisdiction, etc. All of these MPO activities which apply HPMS VMT estimates to their jurisdiction constitute a monitoring program, though based entirely on data collected local agencies and integrated by the State.

Example 2: The State conducts decennial household travel surveys throughout California. For many MPOs, these are the only household travel surveys conducted in their jurisdiction, and the State survey data are used for many MPO functions, such as development, calibration, and validation of travel demand models, and establishment of base year external travel demands. Again, no direct data collection is done by the MPO, but the process of extracting records of households within the MPO jurisdiction, tabulating the survey data, and performing descriptive statistical analysis on travel behavior of those households for use in travel demand modeling, constitutes a monitoring program.

Assessment Categories for Data Collection or Monitoring Programs

A five-category assessment scheme was also used for data/monitoring programs, but with different assessments levels than used for models:

- a) *"Data Item Not Relevant to Region" is analogous to the "Factor Not Applicable in Region" for the model assessments—its used for data collection of phenomena which do not occur in a particular region, or are not important for land use and transportation planning decisions.*
- b) *"Data Item Relevant, but Not Monitored" indicates a data item which has some importance to land use or transportation policy discussions or debates in a region, but for which no program exists to collect, assemble, or integrate data.*
- c) *"Current Monitoring Inconsistent—No Plans for Improvement" indicates that the data item is relevant, and data are collected to some extent—however, the data collection is not robust or consistent enough to meet expected needs.*
- d) *"Current Monitoring Non-Existent/Inconsistent—Improvement Planned" indicates that data collection currently is not done, or is done inconsistently, but some plan exists (with or without funding) which would improve the data collection and monitoring to be adequate to expected needs.*
- e) *"Current Monitoring Adequate for Expected Needs" indicates that the data collection and monitoring programs in place are sufficient to support current and expected policy discussions and planning efforts.*

Statewide Travel Demand Models and Data Collection or Monitoring Programs

Questions were also raised at the March RTAC regarding the status of the Statewide travel demand models in this assessment. After conversations with Caltrans staff in the Transportation Systems Information branch, and with other MPO staff, it was decided that the Statewide travel demand models were so much different in their function and purpose than MPO models, that many of the key factors included in the assessment did not relate to the Statewide model. Additionally, the Statewide travel demand models' purposes were intended to focus on some of the exact travel behaviors which the MPO models cannot capture: 1) very long distance, interregional, interstate, and international travel; and 2) other, shorter distance travel which happens to cross one or more MPO jurisdiction boundaries. In fact, instead of representing a new "row" in the assessment tables presented below, the Statewide travel demand model is intended to capture several of the columns in the assessment, especially those related to "external" travel by MPO modeling definitions (i.e. interregional, interstate, and international travel). It is acknowledged by many involved in this assessment that the Statewide travel demand model should be the subject of an assessment of its sensitivity to key factors, but that assessment should be done independent of this one. The key factors in the MPO model assessment tables which are relevant to or dependent on the Statewide travel demand model or State data collection programs are highlighted and annotated in the tables below.

MPO TRAVEL DEMAND MODELS

Sensitivity to Policy Variables and Factors

Figure 1a focuses on policy variables which significantly influence travel in a region, and over which local agencies and system operators have some level of control. Policy variables for which MPOs assessed their travel models were:

- *Macro-level land use characteristics* refer to land uses across relatively large spatial areas, such as traffic analysis zones (TAZ's):
 - o Land use distribution is the spatial distribution of households, population, jobs, and other variables, across TAZ's or other relatively large areas in the region.
 - o Land use mix is the mix and balance of uses across traffic analysis zones in the region. This geographic level of mix accounts for regional or longer-trip factors like jobs/housing balance, as well as some sub-regional or shorter-trip factors like appropriate balance of school-age children (on the household or population side) and school enrollment capacity (on the school side), or the appropriate balance of households or population and retail opportunities (measured by retail jobs, for example).
- *Micro-level land use characteristics* refer to land uses across relatively small spatial areas (e.g. parcels or small grid-cells):
 - o Density is the density profile of land uses in smaller areas, such as neighborhoods or clusters of parcels. Clustering of households or population around high-quality transit stations or stops is one example of micro-level density—in many cases, larger, macro-scale geographic units like traffic analysis zones are too large to capture micro-level clustering and density.
 - o Mix of use includes the balance of uses within smaller geographic areas, such as neighborhoods or clusters of parcels. An example of this sort of mix is the balancing of restaurant/food service or other services within a small employment center. This type of smaller scale mix of use facilitates the use of non-motorized modes by workers for shorter trips during the course of a work day—e.g. walking to a restaurant for lunch rather than driving, or doing an errand like dry cleaning on foot during the course of a workday, rather than by driving to a dry cleaner traveling between home and work.
 - o Pedestrian environment variables include characteristics of smaller geographic areas (e.g. street pattern or presence/absence of pedestrian amenities such as walking paths or sidewalks) which encourage the use of non-motorized modes for shorter trips.
- *Three sorts of highway improvements* were included:
 - o Basic roadway capacity expansion projects (e.g. new roadways or adding of lanes to existing roadways)
 - o Addition of HOV lane or other exclusive use roadway facilities
 - o Implementation of traffic operations improvements which don't include full-lane capacity expansion, such as auxiliary lanes, traffic signal coordination, or geometric improvements at intersections or junctions which improve traffic flow.
- *Four sorts of transit service improvements* were included:
 - o Addition of new transit lines (e.g. a new bus or rail line)
 - o Increasing transit service frequency on existing transit lines
 - o Upgrading services (e.g. implementing bus rapid transit on a corridor served by conventional bus, or replacing commuter bus routes with rail)
 - o Implementing inter-regional transit services, such as longer inter-city rail lines
 - o Improvements to access to or from transit stations or stops and passenger trip origins or destinations (e.g. the journey from home to the first transit station or stop, or the journey from the last transit station or stop to a workplace) in order to increase transit ridership
- *Five sort of pricing improvements* were included:
 - o Development of toll roads, or addition of tolls or congestion pricing to existing road corridors
 - o HOT lanes, which allow non-qualifying vehicles to "buy in" to exclusive facilities such as HOF lanes
 - o Policies aimed at increasing or decreasing the cost of parking to achieve particular goals
 - o Policies which implement pricing based on overall utilization of roadways, such as VMT fees
 - o Policies which increase or decrease the transit fares for different types of passengers to achieve particular goals
- *Transportation demand management (TDM)* policies were unspecified in the assessment, but should include a range of non-capacity or non-pricing policies not mentioned elsewhere: promotion of carpooling, vanpooling, or substitutes for travel (e.g. teleconferencing, telecommuting); promotion of non-motorized travel alternatives (e.g. walking or biking) at workplaces, schools, etc.; and other policies or programs (see Figure 1c). It was noted by SANDAG staff that TDM policies are particularly ambiguous and complex, and the actual definitions used by MPOs in the assessments may not be fully consistent.
- *Goods movement or freight policies* which seek to: improve the efficiency or competitiveness of a region, corridor, or sub-region in terms of movement of goods to, from, or through it; reduce the impact of goods movement or freight on other travelers or residents; or improve the attractiveness of selected roadways for goods movement or freight to achieve some other policy goals, such as reduction of congestion, improvement of safety, etc. (see Figure 1c).
- *Policies related to access to or from an airport* and non-airport trip origins or destinations within the region, such as addition of new transit or shuttle services, streamlining of passenger parking on or off the airport, etc. Policies could address passenger, employee, or freight ground access (see Figure 1c).

General Observations on Sensitivity to Policy Variables:

- Virtually all MPOs reported having models reasonably sensitive to macro-level land use or demographic variables; very few reported reasonable sensitivity to micro-level variables. Given that most MPOs rely on traffic analysis zones as the smallest geographic unit of analysis, this split is not surprising—sensitivity to micro-level land use characteristics requires land use data below traffic analysis zone level.
- Larger MPOs reported having models with reasonable sensitivity to a wider range of policy variables, as well as more plans for model improvements and active development work, than did smaller MPOs.

- Smaller MPOs reported having simpler models, without sensitivity to many policy variables. Very few smaller MPOs have models capable of modeling transit.
- For several policies/key factors, most MPOs reported their models had no capacity, untested capacity, or insensitivity to the factor:
 - o ITS and traffic management
 - o Intercity transit
 - o Pricing policies, especially those for toll roads and HOT lanes
- Only four MPOs (SANDAG, SCAG, STAN COG, and SBCAG) reported the capacity to model TDM strategies.
- Only two MPOs (SANDAG and SCAG) reported some level of capacity to model an array of goods movement policies, such as development of freight corridors, port access and freight facility improvements, truck lanes, and operational improvements focused on goods movement.
- Only three MPOs (SANDAG, SCAG, SACOG) reported some level of sensitivity to transit accessibility.

Sensitivity to Exogenous Factors

Figure 1b focuses on variables which are not directly controlled by local agencies and system operators, but which nonetheless significantly influence travel in a region. Exogenous factors included in the assessment were:

- *Fuel prices or auto operating costs.* Auto operating costs generally include the overall variable or out-of-pocket cost of operating a private automobile, including cost of fuel (and vehicle fuel efficiency), cost of maintenance, and cost of tires. Generally, auto operating costs exclude more fixed cost factors, such as purchase price of the automobile, financing costs, insurance, depreciation, etc.
- *Key demographic variables*, such as:
 - o Age
 - o Income
 - o Household size
 - o Person type
 - o Other factors (household composition, etc.)
- *Characteristics of the vehicle fleet* in a region. EMFAC and other emissions estimation tools account explicitly for vehicle type, but the characteristics of the fleet are attached to the travel model forecasts of motor vehicle activities *post-hoc*. That is, the characteristics of the fleet are generally not directly represented in travel models.
- *External travel*, which for MPO regional travel demand models, includes three components: internal-to-external (“I-X”) travel; external-to-internal (“X-I”) travel; and through (“X-X”) trips. Because these three types have at most one trip end within the MPO region, and the other trip end or both trip ends (for X-X trips) outside the region, and MPO models generally do not truly model travel activities outside their subject MPO region, these travel demands are generally treated as exogenous variables and directly set by the modeler based on an off-model data set or analysis. External travel includes at least two major sub-markets:
 - o Household-generated travel (commute, shop, recreational, social, school trips by residents of a region or those residents immediately outside the region)
 - o Goods movement or freight, much of which is external due to the long length of many freight trips.
 - Special note on external goods movement or freight: the overall level of demand for goods movement or freight travel to or from points outside the region, plus freight traveling through a region, is generally treated as an exogenous variable; policies related to accommodating external freight travel, along with internally-generated freight travel, are listed as policy variables in the above section.

General Observations on Sensitivity to Exogenous Variables:

- Reports of model capabilities mirror those for travel modeling for policy variables:
 - o Larger MPOs reported having models which capture more factors, and had more planned or ongoing improvements
 - o Smaller MPOs reported having models which capture fewer factors, with fewer planned improvements.
- Accounting for characteristics of vehicle fleets (i.e. what sort of vehicles travelers use, in aggregate) or vehicle type was not reported as being accounted for within any travel model.
- Very few MPOs reported any capacity or known sensitivity to external travel, whether it be trucks or household-based trip purposes. External travel is set directly based on off-model data or analysis.
- Only the largest four MPOs (SCAG, MTC/ABAG, SANDAG, SACOG) reported reasonable sensitivity to fuel prices or auto operating costs.
- Only six or seven of the eighteen MPOs reported reasonable sensitivity to age or income, demographic variables known to significantly influence travel behavior.

Key for All Assessments of Travel Models:

KEY	Policy Not Applicable in Region	No Capacity to Model Factor	Sensitivity Unknown/Untested	Limited Sensitivity to Factor	Reasonable Sensitivity to Factor
No Planned Improvement	○	●	●	●	●
Improvement Planned	○	●	●	●	●
Improvement Under Development	○	●	●	●	●

Figure 1a.
SENSITIVITY OF TRAVEL DEMAND MODELS TO POLICY VARIABLES OR FACTORS

MPO (Listed by Population in Descending Order)	MACRO LAND USES		MICRO LEVEL LAND USES (e.g. the "Ds")			ROAD PROJECTS			TRANSIT PROJECTS				PRICING				
	Distribution	Mix	Density	Mix	Pedestrian Environment	Gen'l Purpose	HOV	ITS / Traffic Management	New Lines	Increase Service	Upgrade (e.g. bus > LRT)	Interregional Transit	Tolls/Toll Roads	HOT Lanes	Parking	VMT	Transit Fares
SCAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MTC/ABAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SANDAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SACOG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
FRESNO COG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
KERN COG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
AMBAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SJ COG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
STAN COG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TULARE CAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SBCAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SLO COG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MERCED CAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
BUTTE CAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SHASTA CO. RTPA	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
KING CAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MADERA CTC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TAHOE MPO	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Source: Sacramento Area Council of Governments, May 2009. Based on assessments provided by each MPO.

Note: Bounded in blue is a factor (interregional transit) which MPO models are not capable of forecasting, simply because the scope of the travel is outside the model areas. This is why so many MPO models were assessed as "no capacity" (red ball) for this factor. This factor is currently modeled only by the Statewide Travel Model (or its adaptation for the High Speed Rail Study). Because of its unique function, the Statewide Travel Model should be assessed separately, with a focus on its capabilities to provide credible estimates and forecasts of interregional travel by transit modes, such as the Capitol Corridor, San Joaquin, Pacific Surfliner, and Altamont Commuter Express services, plus other longer distance rail or bus services. In addition, discussions between the State and MPO's regarding how the Statewide Travel Model should be used in a consistent way across the state should take place in the context of the CTC Modeling Guidelines update (starting Summer 2009).

Figure 1b.

SENSITIVITY OF TRAVEL DEMAND MODELS TO EXOGENOUS FACTORS

MPO (Listed by Population in Descending Order)	Gas Prices	Auto Operating Cost	Age	Income	Vehicle Fleet	External Travel— Trucks / Freight	External Travel— Household-Based
SCAG	●	●	●	●	○	●	●
MTC/ABAG	●	●	●	●	●	●	●
SANDAG	●	●	●	●	●	●	●
SACOG	●	●	●	●	●	●	●
FRESNO COG	●	●	●	●	●	●	●
KERN COG	●	●	●	●	●	●	●
AMBAG	●	●	●	●	●	●	●
SJ COG	●	●	●	●	●	●	●
STAN COG	●	●	●	●	●	●	●
TULARE CAG	●	●	●	●	●	●	●
SBCAG	●	●	●	●	●	●	●
SLO COG	●	●	●	●	●	●	●
MERCED CAG	●	●	●	●	●	●	●
BUTTE CAG	●	●	●	●	●	●	●
SHASTA CO. RTPA	●	●	●	●	●	●	●
KING CAG	●	●	●	●	●	●	●
MADERA CTC	●	●	●	●	●	●	●
TAHOE MPO							

Source: Sacramento Area Council of Governments, May 2009. Based on assessments provided by each MPO.

Note:

Bounded in blue are two factors for which the Statewide Travel Models were frequently (though not universally) reported as being a primary source for forecasts by MPOs.

The “unknown sensitivity” (grey ball) or “no capacity” (red ball) reported for these factors by MPOs related in some cases to reliance on the Statewide Travel demand model, which is treated as an exogenous model input.

The Statewide Travel Model (for household-based travel) and the Statewide Freight Model (for goods movement and freight) are fundamentally different tools than MPO models, in that their focus is longer interregional, interstate, and international travel, and they include factors which are NOT directly modeled by most MPOs.

Because of these differences compared to MPO models, they should be assessed separately, with a focus on their capabilities to provide credible estimates and forecasts of interregional and long-distance travel. In addition, discussions between the State and MPOs regarding how the Statewide Travel Models should be used in a consistent way across the state should take place in the context of the CTC Modeling Guidelines update (starting Summer 2009).

Figure 1c.

SENSITIVITY OF TRAVEL DEMAND MODELS TO OTHER FACTORS

MPO (Listed by Population in Descending Order)	TDM Strategies	Goods Movement (e.g. freight corridors, truck lanes, etc.)	Aviation / Airport Ground Access	Other Demographics (e.g. household composition, etc.)	Transit Accessibility
SCAG					
MTC/ABAG					
SANDAG					
SACOG					
FRESNO COG					
KERN COG					
AMBAG					
SJ COG					
STAN COG					
TULARE CAG					
SBCAG					
SLO COG					
MERCED CAG					
BUTTE CAG					
SHASTA CO. RTPA					
KING CAG					
MADERA CTC					
TAHOE MPO					

Source: Sacramento Area Council of Governments, May 2009. Based on assessments provided by each MPO.

MPO LAND USE MODELS

Land use models are used to forecast or project future land use quantities and spatial distributions within a region. The simplest models allocate future growth to areas based on available capacity and forecaster judgment. The most advanced models are based on analysis of economic activities within a region, and include feedback to travel demand models.

Key factors for which MPOs assessed their land use models were:

- *Land use policies*, such as: current zoning and general plan land use designations; ongoing or anticipated amendments to zoning or general plan; studies related to jurisdiction boundaries changes, annexations, and changes to spheres-of-influence; or other anticipated changes to land use policies.
- *Economic factors*, such as: cost and affordability of housing; land costs; and the overall level of regional economic activity and production.
- *Other factors*, such as: historic growth rates and patterns; of State-sanctioned projections of population, which many MPOs use as control totals in their land use forecasting processes.

General Observations:

- The only factors which virtually all MPOs reported reasonable sensitivity to was current land use policies (zoning and general plans), State-sanctioned control totals, and, to a lesser extent, proposed/anticipated changes in zoning or general plans.
- For all other factors, most MPOs reported unknown sensitivity or no capacity.
- As with travel models, larger MPOs reported having land use models with reasonable sensitivity to key factors, as well as more plans for model improvements than do smaller MPOs.
- Very few MPOs have land use models with known sensitivity or capacity to capture key economic factors like housing affordability, factors which influence land development (e.g. land costs, returns-on-investment, etc.) or basic economic production within the region.
 - o The three largest MPOs (SCAG, SANDAG and SACOG) reported active development of an integrated land use/transport model which is intended to capture many economic factors.
 - o Four other MPOs (MTC/ABAG, SBCAG, SLO COG, BUTTE CAG) reported plans to enhance land use modeling capabilities to capture economic factors.

KEY	Policy Not Applicable in Region	No Capacity to Model Factor	Sensitivity Unknown/ Untested	Limited Sensitivity to Factor	Reasonable Sensitivity to Factor
No Planned Improvement					
Improvement Planned					
Improvement Under Development					

Figure 2.
LAND USE MODEL SENSITIVITY TO KEY FACTORS INFLUENCING FUTURE LAND USES

MPO (Listed by Population in Descending Order)	LAND USE POLICY			ECONOMIC FACTORS			OTHER	
	Current Zoning / Gen'l Plans	Planned Changes to Z/GP (E.g. SOI)	Other Land Use Policy Changes	Resid. Location (e.g. Affordability)	Development-Related (e.g. ROI, land cost, etc)	Regional Production	Historic Growth Trends	State-Sanctioned Control Totals
SCAG								
MTC/ABAG								
SANDAG								
SACOG								
FRESNO COG								
KERN COG								
AMBAG								
SJ COG								
STAN COG								
TULARE CAG								
SBCAG								
SLO COG								
MERCED CAG								
BUTTE CAG								
SHASTA CO. RTPA								
KING CAG								
MADERA CTC								
TAHOE MPO								

Source: Sacramento Area Council of Governments, May 2009. Based on assessments provided by each MPO.

MPO DATA COLLECTION / MONITORING PROGRAMS

A transportation or land use data collection program is an organized effort to directly collect observations of any of the following phenomena: land uses; dwelling units or households; jobs; school enrollments; special or unique land uses of significant size (airports, hospitals, etc.); population and population demographics; transportation facilities and services; or utilization of transportation facilities and services.

A monitoring program is an agency effort to assemble and integrate data from one or more sources, and organize the data in a form useful for describing and quantifying change or variation in observed phenomena. The changes could be changes over time for a known geography (i.e. trends, growth, etc.); differences over space for the same time (e.g. a comprehensive database inventory of dwelling units for a known area, broken down by relatively small geographic units); or variations over demographics for a single point in time (e.g. cross tabulation of numbers of trips by number of persons in a household).

For data collection or monitoring program to be 'adequate to meet expected needs', it must be:

- *Reliably collected* (i.e. collected for known time periods and geographies, and using appropriate and known collection methods);
- *Comprehensively collected, assembled or integrated* (i.e. either the collected data, or the data when integrated with other sources, is complete to some known geography or time period for the observed phenomena);
- *Consistently collected*—If used for identifying trends, the data (as collected or as integrated with other sources) from one time period are consistent with and comparable to data collected from another time period; and
- *Appropriate to the policy questions being asked* (i.e. if year-over-year changes in transit ridership are sought, data collection methods must be robust enough to capture relatively small changes).

Four general categories of data collection / monitoring programs were included in the assessment (Figures 3a and 3b):

- Land use
 - o Housing (e.g. dwelling units, households, residentially-zoned lands, etc.)
 - o Jobs or employment (e.g. the number of jobs by sector)
 - o Schools (e.g. K-12 schools, colleges and universities, etc.)
- Demographics—Key demographic data on populations within the MPO using the decennial Census, American Community Survey, California Department of Finance, or other sources. Other population demographic data includes fertility and migration statistics.
- Transportation system utilization
 - o Highway Performance Monitoring System data, especially vehicle miles traveled.
 - o Other VMT data sources (e.g. household travel surveys, periodic odometer readings, etc.)
 - o Traffic counts—counts of vehicles (in total or by vehicle type) in known locations and for known dates and time periods.
 - o Transit boardings—counts of passenger boardings (or alightings) for an operator in total, or broken down by service type or line.
 - o Travel surveys of different types, all of which survey travelers for purposes of characterizing traveler demographics, travel purposes, or times and distributions of travel. These surveys are most often used for developing submodels within a regional travel demand model (e.g. a mode choice submodel, or destination choice submodel).
 - Household travel surveys, which seek to survey a cross-section of a region's residents about travel by all members of the household for all purposes
 - On-board transit surveys—surveys of transit passengers.
 - External travel surveys—surveys of travelers going in or out of a region.
 - Airport ground access surveys—surveys of airport passengers.
- Transportation system supply
 - o Roadway supply data includes alignments, functional class, number of lanes, speed limits or prevailing speeds, slope, and other characteristics of the roadway.
 - o Transit service supply data includes alignments, station or stop locations, service frequencies by different time periods, fares, restrictions on use, etc.
 - o Pedestrian and bike facilities data include alignments, types of facilities (i.e. pedestrian/bike bridge, Class I bike lane, etc.), including presence or absence of sidewalks on roadways.

General Observations:

- Most common assessment reported of all data collection and monitoring programs was "inconsistent..."--that is, data are collected but not on a regular schedule or in a consistent way.
 - o For housing and employment monitoring, two of the most fundamental inputs to travel and land use models—only one MPO gave themselves an "adequate" assessment.
 - o For VMT, only seven of eighteen MPOs assessed their monitoring programs as adequate, and no MPO had any plans for improvement. FYI, the major reason for the poor assessments was that the only source of region-level VMT data is HPMS, which was viewed by most MPOs as a source of unknown quality, and over which the MPO had very little influence or control.
- Decennial census and household travel surveys (normally about every 10 years) were the most often reported as "adequate".
- The American Community Survey (ACS) was reported by several MPOs as "not monitored" because the complete geography, 5-year rolling average sample datasets have not yet been released. Most MPOs indicated that monitoring of ACS would ramp up as the data on the smaller geography areas is released, starting in 2010.
- Only two MPOs (SANDAG, SBCAG) reported monitoring of external travel as anything but "not monitored". Difficulty and cost of doing external travel surveys, plus lack of available funding, were cited as the most common reasons for NOT doing external surveys. Also, many MPOs rely on the Statewide travel survey for data on external travel.
- For transportation supply, monitoring of roadways was generally assessed as adequate; monitoring of transit services and pedestrian or bicycle facilities was often not monitored by smaller MPOs.

Key for Data Collection/Monitoring Program Figures:

KEY	Data Item Not Relevant to Region	Data Item Relevant, but not Monitored	Current Monitoring Inconsistent—No Plans for Improvement	Current Monitoring Inconsistent—Improvement Planned	Current Monitoring Adequate for Expected Needs
No Planned Improvement	○	●	●	●	●

Figure 3a.

MPO DATA COLLECTION / MONITORING PROGRAM ASSESSMENT SUMMARY

MPO (Listed by Population in Descending Order)	LAND USE				DEMO-GRAPHICS		SYSTEM UTILIZATION						TRANSP. SYSTEM SUPPLY			
	Housing	Employment	Schools	Policy (e.g. Zoning)	Decennial Census	Am.Comm. Survey	HPMS (VMT)	Other VMT	Traffic Counts	Transit Bdgs.	On-Bd. Surveys	Household Travel Surveys	External Travel Surveys	Roadways	Transit Service	Ped/Bike Facilities
SCAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MTC/ABAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SANDAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SACOG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
FRESNO COG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
KERN COG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
AMBAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SJ COG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
STAN COG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TULARE CAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SBCAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SLO COG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MERCED CAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
BUTTE CAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SHASTA CO. RTPA	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●
KING CAG	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●
MADERA CTC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TAHOE MPO																

Source: Sacramento Area Council of Governments, May 2009. Based on assessments provided by each MPO.

Note: Regarding "Household Travel Surveys", many of the smaller MPO's rely on the Statewide survey, rather than conducting their own. Regarding "External Travel Surveys", these can be very difficult and expensive to conduct. The need to do separate gateway travel surveys for each MPO may be reduced or eliminated by a combination of: a) structuring the Statewide household travel survey to include and emphasis on longer distance, interregional/interstate/international trips; and b) a coordinated Statewide intercept survey.

Figure 3b.

MPO DATA COLLECTION / MONITORING PROGRAM ASSESSMENT SUMMARY (OTHER ELEMENTS)

MPO (Listed by Population in Descending Order)	DEMOGRAPHICS				SYSTEM UTILIZATION	
	CA Dept. of Finance Estimates	Integrated Data (econdata.net, Claritas)	Migration / Immigration	Fertility / Mortality	Non-Motorized Travel Surveys	Airport Surveys
SCAG	●	●	●	●	●	●
MTC/ABAG		●				
SANDAG	●		●	●	●	●
SACOG	●	●	●	●	●	●
FRESNO COG	●	●	●	●	●	●
KERN COG	●	●	●	●	●	●
AMBAG						
SJ COG	●	●	●	●	●	●
STAN COG	●	●	●	●	●	●
TULARE CAG	●	●	●	●	●	●
SBCAG	●	●	●	●	●	●
SLO COG	●	●	●	●	●	●
MERCED CAG	●	●	●	●	●	●
BUTTE CAG	●	●	●	●	●	●
SHASTA CO. RTPA	●	●	●	●	●	●
KING CAG	●	●	●	●	○	○
MADERA CTC	●	●	●	●	●	●
TAHOE MPO						

Source: Sacramento Area Council of Governments, May 2009. Based on assessments provided by each MPO.