FINAL

California Rural Counties Task Force

PERFORMANCE MONITORING INDICATORS FOR RURAL AND SMALL URBAN TRANSPORTATION PLANNING

September 2015

Prepared for:

Nevada County Transportation Commission
101 Providence Mine Road, Suite 102
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on behalf of:
California Rural Counties Task Force

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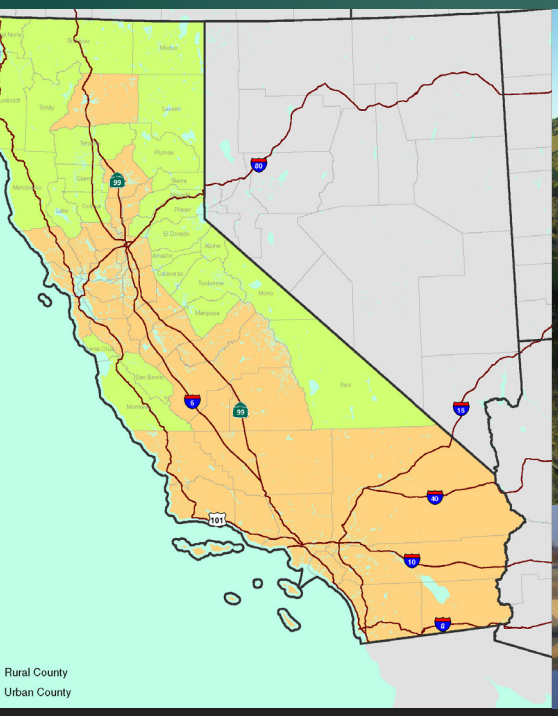

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

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Transportation Performance Measures for Rural Counties in California

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1 EXECUTIVE SUMMARY

1.1 INTRODUCTION

The Rural Counties Task Force (RCTF) commissioned this study on behalf of the 26 Regional Transportation Planning Agencies (RTPAs) that comprise the RCTF to evaluate the use of performance monitoring measures in rural and small urban areas. The purpose of the study was to:

1) evaluate the set of performance monitoring metrics documented in the Strategic Growth Council funded study: Statewide Performance Monitoring Indicators for Transportation Planning, San Diego Association of Governments (SANDAG), June 2013 (referred herein as the SANDAG Study) for their applicability to rural and small urban areas;
2) emulate the SANDAG Study approach of the 18 Metropolitan Planning Agencies (MPOs) in California to include the rural 26 RTPAs and 4 small MPOs that requested to participate in this study; and,
3) identify metrics that are appropriate for rural and small urban areas for incorporation into the California Transportation Commission's (CTC) 2016 State Transportation Improvement Program (STIP) Guidelines.

This study identifies seven performance measures that more closely address the transportation goals and objectives of rural RTPAs and that take into account the limited availability of resources for performance monitoring in these RTPAs. The RCTF worked with the CTC to amend the rural performance measures identified in this report into the 2016 STIP Guidelines. These measures are applicable to the rural county RTPAs and are provided as an option to small Metropolitan Planning Agencies (MPOs). The 2016 STIP Guidelines were adopted by the CTC on August 27, 2015.

1.2 APPROACH

The following are the elements of the approach to this study:

1. Review existing performance measures for their applicability to rural counties.
2. Review the current state of performance measures among rural counties in California by conducting an on-line survey of rural county transportation planning agencies and interviewing with staff of these agencies.
3. Develop criteria for performance monitoring measures appropriate to rural county transportation agencies.
4. Develop performance monitoring measures for rural county transportation agencies according to these criteria and determine the required resources to carry out these performance measures.
5. Examine potential future performance monitoring measures and assess their applicability to rural county transportation agencies.

1.3 CURRENT STATUS OF PERFORMANCE MEASURES

The performance measures recommended by the SANDAG study were based solely on recommendations from the 18 metropolitan planning organizations (MPOs) in California. Rural Regional Transportation Planning Agencies (RTPAs) were not participants in this study. Hence, the performance measures recommended by the SANDAG study were geared exclusively toward the planning issues and data resources available to MPOs.

This study found that the performance measures recommended by the SANDAG study had limited applicability to rural RTPAs. For example:

- Performance measures recommended by the SANDAG study relied extensively on data sources that were much less available to rural areas. For instance, Caltrans Performance Measurement System (PeMS) coverage is 52% of freeways for urban areas, but only 5% for rural areas. Similarly, other Federal and State data collection efforts focus on urban versus rural areas.
- Performance measures based on population or population density have an urban bias over rural areas. For example, mode share for work travel tends to be much higher in urban areas than in rural areas because of the greater existing transit capital/infrastructure investment coupled with higher population and employment densities in urban areas.
- Transportation issues in rural areas are significantly different from those in urban areas. Rural and small urban regions are generally more concerned with infrastructure condition and safety and less concerned with mode split and congestion.
- RTPAs in rural areas have far fewer resources available for performance monitoring.

1.4 REVIEW OF PERFORMANCE MEASUREMENT IN RURAL COUNTIES

The online survey and staff interviews of rural RTPAs revealed the following:

- **All rural county agencies have performance measures in place.** These performance measures reflect the main transportation concerns of the agencies.
- **The main transportation issues in rural and small urban regions differ significantly from those in urban counties.** Review of rural and small urban regions revealed that issues such as safety and pavement management consistently rank toward the top whereas urban counties are primarily concerned with issues such as congestion, air quality, and travel time reliability.
- **Practices vary widely among agencies.** Some agencies tie performance measures to specific goals or objectives, while for other agencies the goals and objectives appear to be implicit in the performance measures.
- **Goals, objectives, and performance measures are different among agencies.** Although some measures are common across most or all agencies – e.g., accident rates, required performance measures for TDA audits – some agencies go into great depth and detail in performance measures, particularly those related to environment and quality of life.
- **Data availability and staff resources are the main barriers to maintaining performance measures in rural and small urban regions. These inequities are exacerbated by current federal and state**

data collection practices, which favor urban counties. Many data sources that are available for urban areas in California are either not available or severely diminished for rural and small urban regions: e.g., PeMS, HPMS, ACS, employment data, and journey-to-work data.

- **Population-based performance measures can be biased against lower population counties.** Performance measures such as person-hours of delay or number of crashes will inherently favor areas with higher traffic volumes.
- **The current set of recommended performance measures does not account for significantly different definitions of user population between rural and urban counties.** Tourist population accounts for a much greater share of traffic in many rural and small urban regions than in urban counties. Hence, for rural and small urban regions the benefits of transportation investments accrue in much greater proportion to travelers who do not reside within these counties.
- **Current performance measures do not take into account the value provided by rural and small urban regions to the State of California as a whole.** Rural and small urban regions that are tourist attractions provide facilities and services that make the State of California more economically attractive to businesses. Similarly, agricultural counties provide agricultural products to the Californians at lower cost than to other states because of their proximity to markets. Current performance measures do not take these benefits into account.
- **Rural counties have limited staff availability for data collection.** Rural counties have limited staff availability for data collection. A previous Caltrans study of staff resources found that only one of the rural counties surveyed has more than two Full Time Equivalent (FTE) staff available for data collection; many counties have less than one FTE or no staff availability for data collection.

1.5 CRITERIA FOR PERFORMANCE MEASURES

Based on the findings of the review of current practice among rural RTPAs, the following criteria were developed to select among potential performance measures:

1. **Performance measures should align with California state transportation goals and objectives.**
2. **Performance measures should continue to inform current goals and objectives of each rural and small urban RTPA.**
3. **Performance measures should be applicable to all rural and small urban regions.**
4. **Performance measures should be capable of being linked to specific decisions on transportation investments.**
5. **Performance measures should not impose substantial resource requirements on rural and small urban RTPAs.**
6. **Performance measures for rural and small urban regions should be normalized to provide equitable comparisons to urban regions.**

1.6 RECOMMENDED PERFORMANCE MEASURES FOR RURAL COUNTIES

Table 1.1 summarizes the recommended performance measures based on the selected criteria. Web links to access the data to inform the recommended performance measures are provided in Appendix A.

1.7 POTENTIAL FUTURE PERFORMANCE MEASURES

Performance measures that might be incorporated into future planning efforts by rural county RTPAs include the following:

- Benefit-cost analysis
- Complete streets analysis
- Land use measures

These measures offer potential benefits for rural county RTPAs by providing a more complete picture of transportation system performance. Benefit-cost analysis, in particular, offers a systematic way of comparing different types of transportation investment alternatives. It is recommended that in the future these potential be considered on a county-by-county basis for their applicability to individual county performance monitoring needs.

Table 1-1– Summary of recommended performance monitoring performance measures

Performance measures	Data sources	Estimated resource requirements
I. Congestion/Delay/Vehicle Miles of Travel		
VMT: • Per capita • By locality (city) • By facility ownership • Local vs. tourist	• HPMS • Caltrans Vehicle Volumes • Dept. of Finance annual population estimates	Minimal. Less than one person-day of staff time to look up published data.
Peak V/C ratio or thresholds	• Caltrans Vehicle volumes (average, peak traffic; K & D factors) • HCM 2010 threshold volumes • Highway geometrics (number of lanes, lane widths)	Moderate. Depends on number of state highway segments.
II. Mode Share/Split		
• Journey to work mode share	• Triennial American Community Survey estimates of work mode shares by county	Minimal. Less than one person-day to look up data.
III. Safety		
Total accident cost: • Per VMT • Per capita	• SWITRS/TIMS (accidents by type) • Same data as for VMT • NHTSA data on cost by accident type	Minimal. Less than one person-day to look up data and compute measures.
IV. Transit		
Transit: operating cost per revenue mile	• Annual transit agency reports	Minimal. Less than one person-day to look up data and compute measures.
V. Transportation System Investment/Preservation/Service/Fuel Use		
Distressed lane miles • Total and % of total • By jurisdiction • By facility type	• Regional or local pavement management system	Depends on size of road system in county.
Pavement condition index (PCI) for local roads	• Regional or local pavement management system	Minimal additional effort assuming done in coordination with local roadway needs report.
VII. Land Use		
Land use efficiency	• Farmland Mapping and Monitoring Program (FMMP) • DOF Annual population estimates	Minimal. Less than one person-day to look up data and record measures.

2 INTRODUCTION

2.1 USE OF TRANSPORTATION PERFORMANCE MEASURES IN RUAL AREAS

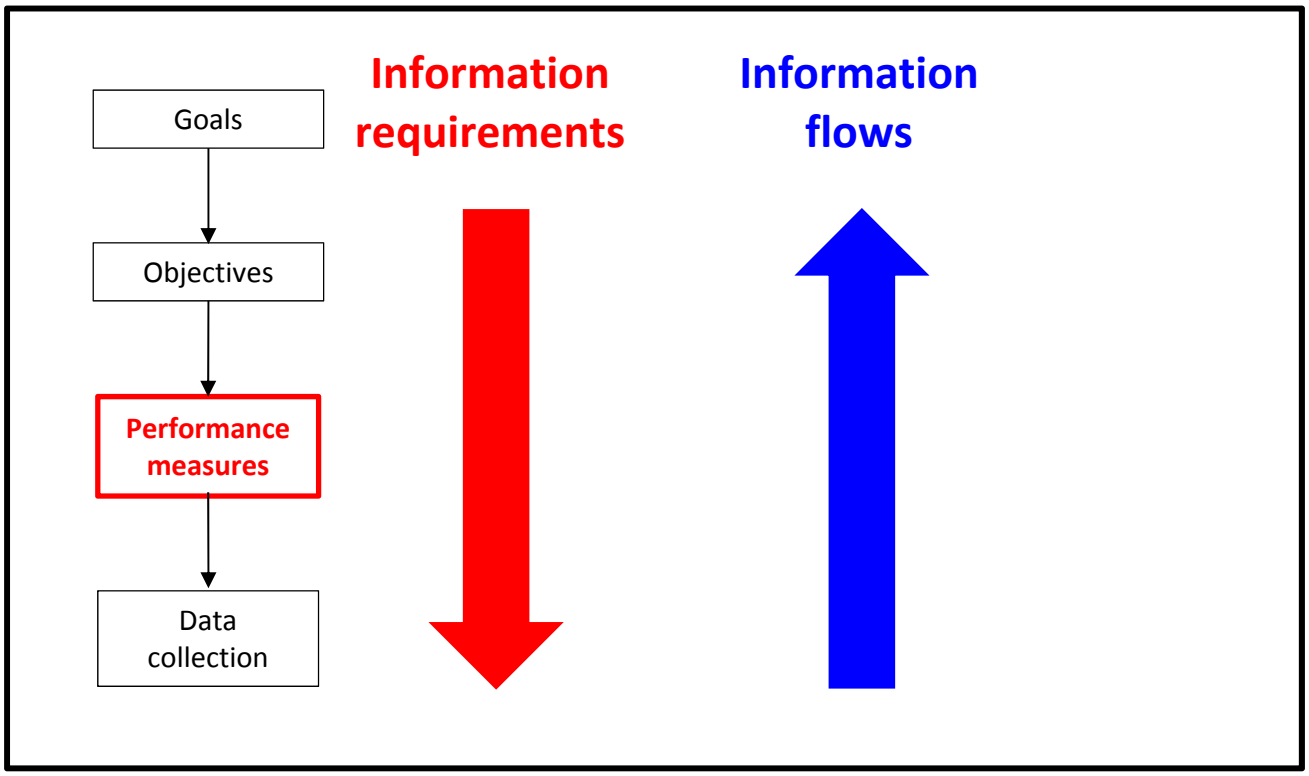
Regional Transportation Planning Agencies (RTPA) have been developing metrics to inform and track implementation of regional plans well before previous efforts of rural Blueprint Plans and, more recently, Sustainable Communities Strategies (SCS) required by SB 375 for MPOs. The emphasis for performance measurement in the regional planning process has been confirmed through many Federal and State initiatives (e.g., MAP 21 and legacy bills SAFETY-LU, TEA-21 and ISTEA, Caltrans "new" Mission and Vision Statements). The most recent rendition of performance monitoring guidance is in the "2010 California Regional Transportation Plan Guidelines" and the 2014 STIP Guidelines, both published by the California Transportation Commission (CTC). These guidelines provided latitude and flexibility for developing performance measures in recognition of the differences in environmental conditions, data availability, modeling capability and regional socio-economic characteristics among MPOs/RTPAs throughout the state. As such, rural areas have a history of adopting metrics that reflect their unique circumstances and that are appropriate to their resources and capacities.

2.2 PURPOSE OF TRANSPORTATION PERFORMANCE MEASURES

The purpose of transportation performance measures is to monitor how well the transportation system is meeting the goals and objectives of the agency responsible for planning, programming, and funding the transportation system. This is illustrated in Figure 2-1 below. While goals and objectives establish benchmarks for the intended operation of the transportation system, performance measures and data are used to track progress in reaching these benchmarks.

- **Goals** define the overall transportation aims of the region: e.g., "provide a transportation system that is safe, reliable, and efficient."
- **Objectives** are measurable embodiment of the goals: e.g., "reduce the total cost of accidents in the region."
- **Performance measures** are the "yardsticks" by which an agency can determine how well the objectives are being met: e.g., "number of accidents by severity", "total cost of accidents".
- **Data collection** is determined by the performance measures, and provides the information for these measures.

Figure 2-1– Performance Measures in the Planning Process



2.3 MONITORING-BASED VS. MODEL-BASED PERFORMANCE MEASURES

There are two classifications of performance measures typically used by transportation agencies: monitoring-based and model-based. Monitoring-based performance measures are determined empirically by direct measurement in the field (e.g., traffic volumes, accidents by type) are monitoring-based measures. They allow agencies to track success in achieving goals and objectives based on real outcomes. Model-based performance measures are estimated by analytical tools or models (e.g., travel demand models). They are typically used to evaluate various alternatives under future year conditions (e.g., evaluate plan alternatives) and are not based on real outcomes.

This study exclusively addresses monitoring-based performance measures for the following reasons:

- Model-based performance measures depend on the capabilities of the model being used and the assumptions that go into building the model. Only partial validation is possible (e.g., comparing ground counts to model results at the screenline level).
- Monitoring-based performance measures provide “ground-truth” data for tracking the accuracy of measures that have been projected using models. They are used to answer, “Are we trending in the right direction to achieve our goals and objectives?”
- Monitoring-based performance measures can be directly traced to valid data sources that can be tracked and compared over time. They are used to answer, “What is actually happening as we implement our goals and objectives?”.

3 CURRENT GUIDELINES ON PERFORMANCE MEASURES

3.1 SANDAG STUDY

The SANDAG Study was the source for the performance measures submitted to the California Transportation Commission (CTC) in June 2013 for consideration and amendment to the 2016 State Transportation Improvement Program (STIP) Guidelines. The goal of the SANDAG Study was to develop a standardized set of performance indicators, using existing data sources, to be used by all MPOs and state agencies. The SANDAG Study recommendations were based exclusively on examination and input from the state's 18 MPOs. The predominantly rural Regional Transportation Planning Agencies (RTPAs) did not participate in the SANDAG study; hence, in some cases the recommendations are less applicable to rural and small urban counties. For example:

- For several Congestion Relief and System Reliability Measures, the SANDAG Study proposed performance measures that rely primarily on accessibility to Caltrans Performance Measurement System PeMS data. PeMS data can be accessed directly online or through publications, such as the Caltrans Mobility Performance Reports and Texas Transportation Institute Urban Mobility Reports. As shown in Table 3-1, the percent of total Freeway and Principal Arterial centerline miles with PeMS field deployment is 73% for the "Big Four" MPO regions (SANDAG, SCAG, MTC and SACOG); 52% for all urban regions (including the "Big Four" regions); and just 12% for the state's rural and small urban regions. Across the entire state highway system, the percent of PeMS coverage falls to less than 5% in rural and small urban regions. Although coverage is expected to gradually increase over time with new field deployment, the degree of additional coverage needed in rural and small urban regions suggests that PeMS will not be meaningful for informing the recommended monitoring metrics in these areas for some time.

Table 3-1– PeMS Statewide PeMS Coverage (as of 2013)

County Type	2013 PeMS Centerline mi.	HPMS 2013 Total FWY+PA mi.	PeMS % Coverage	2013 Total SHS mi.	PeMS % Coverage
All Counties	3,136.87	7,496.87	41.84%	15,147.12	20.71%
Urban Counties	2,917.43	5,620.58	51.91%	10,635.33	27.43%
Big Four MPO Counties	2,418.66	3,327.30	72.69%	5,840.05	41.42%
Rural Counties*	219.44	1,876.30	11.70%	4,511.79	4.86%

* See list of included urban and rural counties in Appendix B.

- State and Federal sample-based data collection efforts favor urban over rural areas. Data sources, such as Public Use Micro-data Sample (PUMS), American Community Survey (ACS), the California Statewide Household Travel Survey (CSHTS), the National Household Transportation Survey (NHTS), employment data and HPMS estimates of vehicle miles of travel are available at much greater accuracy and level of detail in urban areas.

- Given differences in population densities, some measures are biased in favor of urban counties. For example, one measure from the SANDAG Study under the Congestion Relief category is mode share for work travel. Urbanized areas have the population, employment base, densities and transit infrastructure to support transit and active transportation choices that can allow these areas to improve non-auto mode share by greater investments in transit and active transportation modes. Conversely, in rural and small urban regions the ability to significantly increase non-auto mode shares is severely limited given lower population and employment densities. Furthermore, the market for transit service in urban areas contains a significant proportion of choice riders (i.e., transit riders who could use auto) while in rural areas the transit market consists predominantly of transit-dependents.
- Transportation issues in rural and small urban regions are generally significantly different from those in urban regions. Rural and small urban regions will likely be more interested in infrastructure condition and safety and perhaps less concerned with mode split and congestion. System reliability in rural and small urban regions is primarily concerned with non-recurrent events (e.g., peak weekend tourist events, construction activities, incidents, weather events, natural events such as floods, wildfires, landslides) and community isolation during disaster evacuation events. Reliability in urban areas is primarily concerned with normal AM/PM weekday recurrent congestion as well as non-recurrent congestion.
- Collecting and analyzing data to measure performance of the transportation system is challenging in some categories for rural and small urban RTPAs. Data collection must be recognized as a valuable asset for small agencies that have limited staff resources.
- The scale of the data values in the majority of existing performance metrics benefits quantity over the value of a project. Two programs that highlight this are the Highway Safety Improvement Program (HSIP) and the Active Transportation Program (ATP). For example:
    - The HSIP benefit-cost requirement rewards projects that have high accident quantities. Rural areas have plenty of accidents per capita that warrant HSIP funding but have trouble competing in the cost benefit ratio outcome required by the HSIP program guidelines.
    - The ATP program rewards projects that prove to have high quantities of existing bicycle and pedestrian users. On the surface, this makes sense, but no mechanism exists to account for smaller population centers that also have critical projects with the same ATP program goal intent. This is despite having a programmatic rural set aside.

The SANDAG Study noted that further discussion was needed to continue addressing variations among diverse California regions, the need for flexibility, and future performance monitoring, which could be both quantitative and qualitative assessments and data availability. This RCTF study continues this discussion by augmenting the SANDAG Study with a recommended approach to rural and small urban counties.

3.2 STIP GUIDELINES

In preparation for the 2016 STIP, the CTC in cooperation with regional partners began developing the 2016 STIP Guidelines in May 2014. Though discussion at the federal and state level regarding performance measures was ongoing, no substantial modifications to the previously adopted performance measure requirements were being discussed that addressed the unique needs of rural counties (most recent adopted guidelines were adopted in August 2013). In 2015, the RCTF commissioned this study and worked with the CTC to include the outcomes of this report into the 2016 STIP Guidelines. The 2016 STIP Guidelines were adopted on August 27, 2015 and included the option for regional agencies to use the rural performance measures identified in this report as a platform to satisfy the statutory requirements and to move toward a more realistic and meaningful monitoring program for rural agencies.

3.3 FEDERAL AND STATE GUIDANCE ON PERFORMANCE MEASURES

Per MAP-21 and the incorporation of statewide performance monitoring indicators in the 2016 STIP guidelines by the CTC, the emphasis on statewide standardization on performance-based planning/programming is clear. Caltrans is reinforcing this direction through development of several performance analysis tools to facilitate and inform transportation investment decisions. These include the following:

- Cal B/C (Caltrans benefit cost analysis tool);
- Highway Safety Improvement Program (HSIP) benefit-cost calculator; and,
- Active Transportation Program (ATP) benefit-cost calculator.

Preliminary review of these tools indicates the following:

- By and large, these tools are not consistent with each other;
- They are difficult to understand and use;
- They do not provide a convenient side-by-side comparison of the benefits and costs of different alternatives; and,
- Given like inputs they tend to generate outcomes that favor urbanized area applications over rural applications.

Current performance measure tools tend to bias or favor areas with higher population. For example, the Annual Average Daily Traffic (AADT) on US 101 near the Los Angeles/Ventura county line is 174,000 vehicles whereas on US 101 near the Humboldt/Del Norte county line it is 2,800 vehicles. A similar reduction in delay of five minutes at each site would show a user benefit for the urban crossing approximately 50 times greater than the more rural crossing.

Another example of bias is in how collision data is treated. The number of collisions in urban areas is much higher than in rural areas, but rural areas tend to have a higher percentage of fatal crashes in proportion to their population. The table below illustrates this: the average collision cost for rural counties is about 5% higher than that for urban counties; the collision cost per capita is about 16 times higher for rural counties than for urban counties.

Table 3-2– Crashes by severity by area type, 2012

Area type	Percentage of Total Collisions by Type						Average Collision Cost	
	Fatal	Injury			PDO	Total	Per crash ($000)	Per 1000 capita
		Severe	Moderate	Minor				
Rural	1.11	3.86	13.17	18.40	63.47	100.00	$206	$97.76
Urban	0.66	2.25	12.46	26.04	58.59	100.00	$196	$5.57
Total	0.70	2.37	12.51	25.45	58.97	100.00	$197	$5.28

These results indicate the importance of normalizing performance measures on a per-capita or per-VMT basis in order to avoid some of the biases introduced by absolute, non-normalized measures.

4 REVIEW OF CURRENT RURAL COUNTY RTPA PERFORMANCE MONITORING PRACTICES

4.1 SURVEY OF PRACTICES

This section examines the differences among current performance monitoring practices for urban regions and rural and small urban regions of the state. Although not members of the RCTF, four "small" MPOs — San Louis Obispo Council of Governments (SLOCOG), Butte County Association of Governments (BCAG), Tahoe Metropolitan Planning Organization (TMPO), and Shasta Regional Transportation Association (SRTA) — requested to participate in this study due to their close relation to rural communities and to their having rural areas under their jurisdiction. These agency practices were reviewed in the same way as the RCTF member agencies for a total of 30 participating agencies.

The following approaches were taken to document the performance monitoring activities of the rural and small urban regions:

- **Review Regional Transportation Plans (RTP) and Overall Work Programs (OWP).** RTPs and, in some cases, OWPs were reviewed to identify performance measures and data sources used to report on performance measures. If draft RTPs were available, these took precedence over currently adopted plans. This review addresses all 30 participating agencies.
- **Web-based survey.** A web-based survey was made available to participating agency staffs. The survey sought input on: major transportation issues, current use of performance measures (including benefit-cost, if applicable), issues in identifying and reporting on performance measures, and data sources used to track and report on performance measures. Of the 30 participating agencies, 26 agencies responded to the survey.
- **Agency interviews.** Where possible, face-to-face or telephone interviews were performed with participating agencies' staffs to gather more in-depth information on the subjects in the web-based survey. Of the 30 participating agencies, 19 agencies were directly interviewed.

The information gathered from these efforts was used to develop a Rural County RTPA Performance Measure Matrix. To facilitate side by side comparisons, the Rural County RTPA Performance Matrix was developed using the same structure and format as the MPO Performance Matrix presented in the SANDAG Study.

Figure 4-1 and Figure 4-2 highlight the differences between MPOs and the more rural and small urban RTPAs with respect to performance measurement practices. In particular, a far greater percentage of MPOs are monitoring metrics related to land use, economics and the environment which is indicative of the new MPO requirements resulting from SB 375 and their development of their Sustainable Communities Strategy (SCS). When it comes to transportation system monitoring, a far greater percentage of MPOs relative to the rural and small urban RTPAs are monitoring metrics related to Congestion/Delay/VMT, Mode Share and Travel Time/Distance. Safety performance monitoring is performed by a vast majority of both MPOs and RTPAs.

Figure 4-1 – Performance Monitoring Activity by Type (RCTF vs. MPOs)

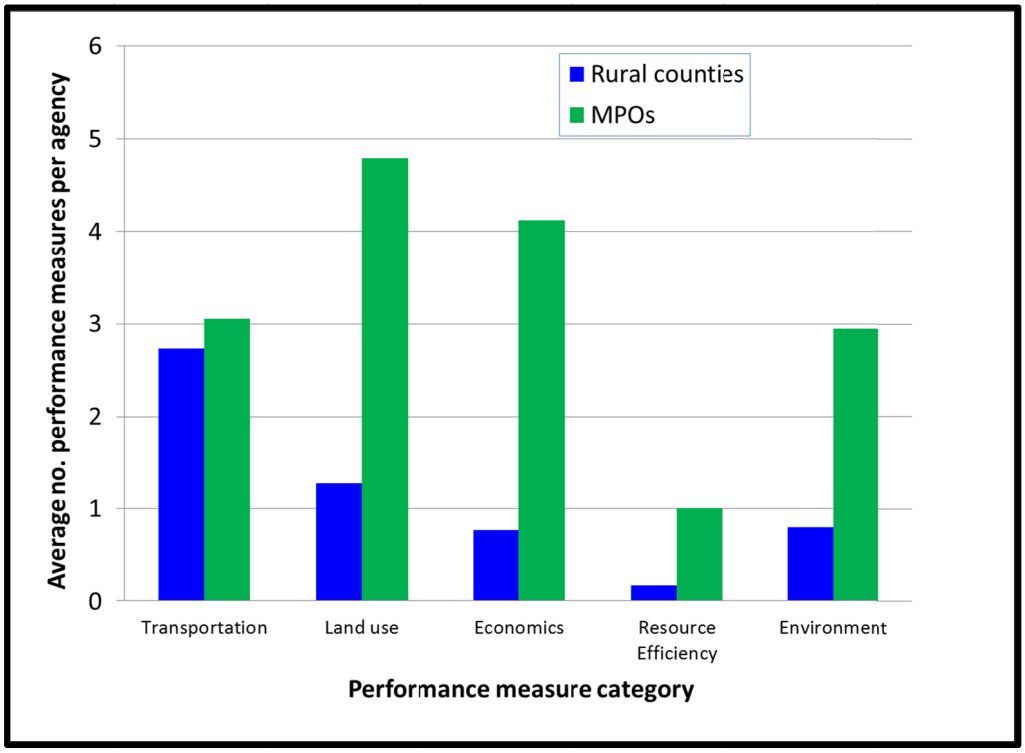
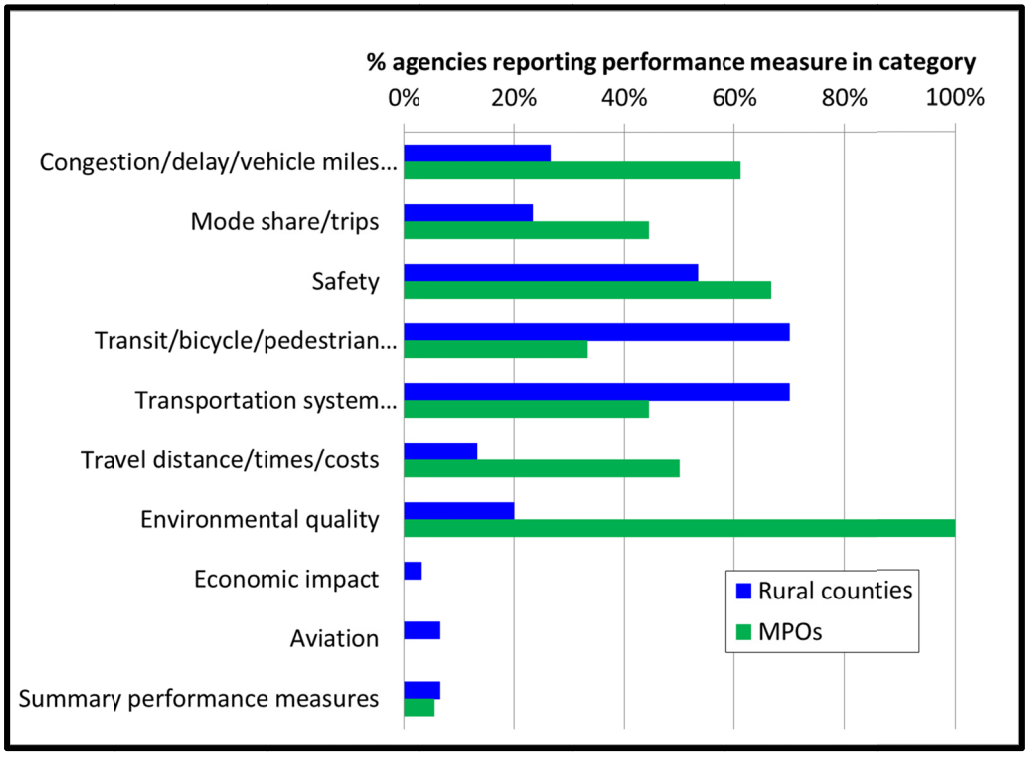


Figure 4-2 – Transportation System Monitoring Activity by Performance Category (RCTF vs. MPOs)

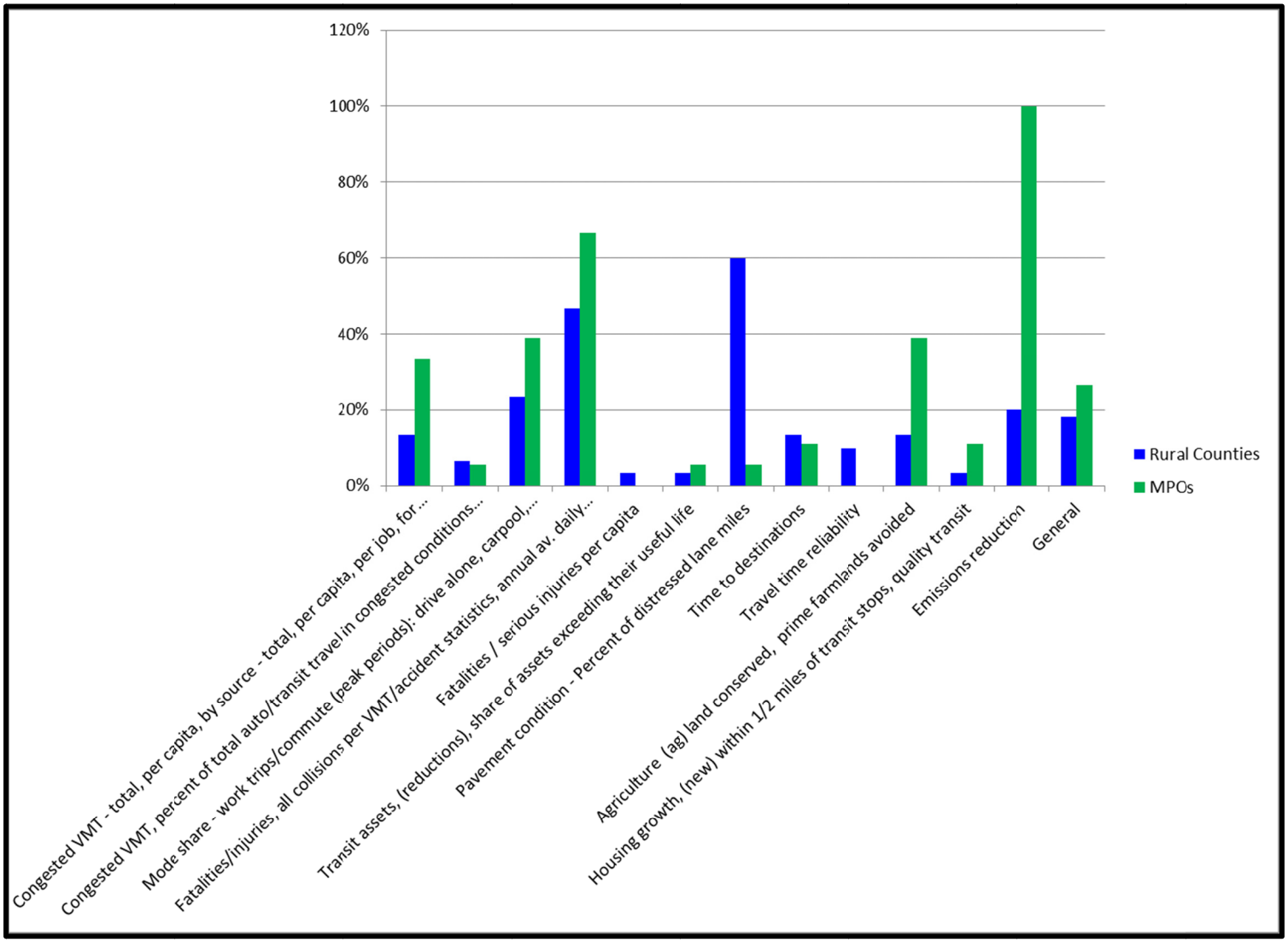


Conversely, the rural or small urban RTPAs are monitoring to a greater degree than MPOs metrics for System Preservation and Alternative Transportation. The Alternative Transportation result is counter intuitive but is influenced by the fact that many RTPAs also serve as transit providers and therefore are more directly involved in developing the system-wide performance information required during the triennial Transportation Development Act (TDA) performance audit process. A side by side comparison of the RCTF and MPO Performance Matrices is provided in Attachment B.

Figure 4-3 and Figure 4-4 show the percent of RCTF and MPO agencies implementing the performance measures recommended in the SANDAG Study and Caltrans' study of Performance Measures for Rural Transportation Systems (Caltrans, 2006) respectively. These figures highlight the degree of rural and small urban area applicability of the recommended performance measures from these two studies.

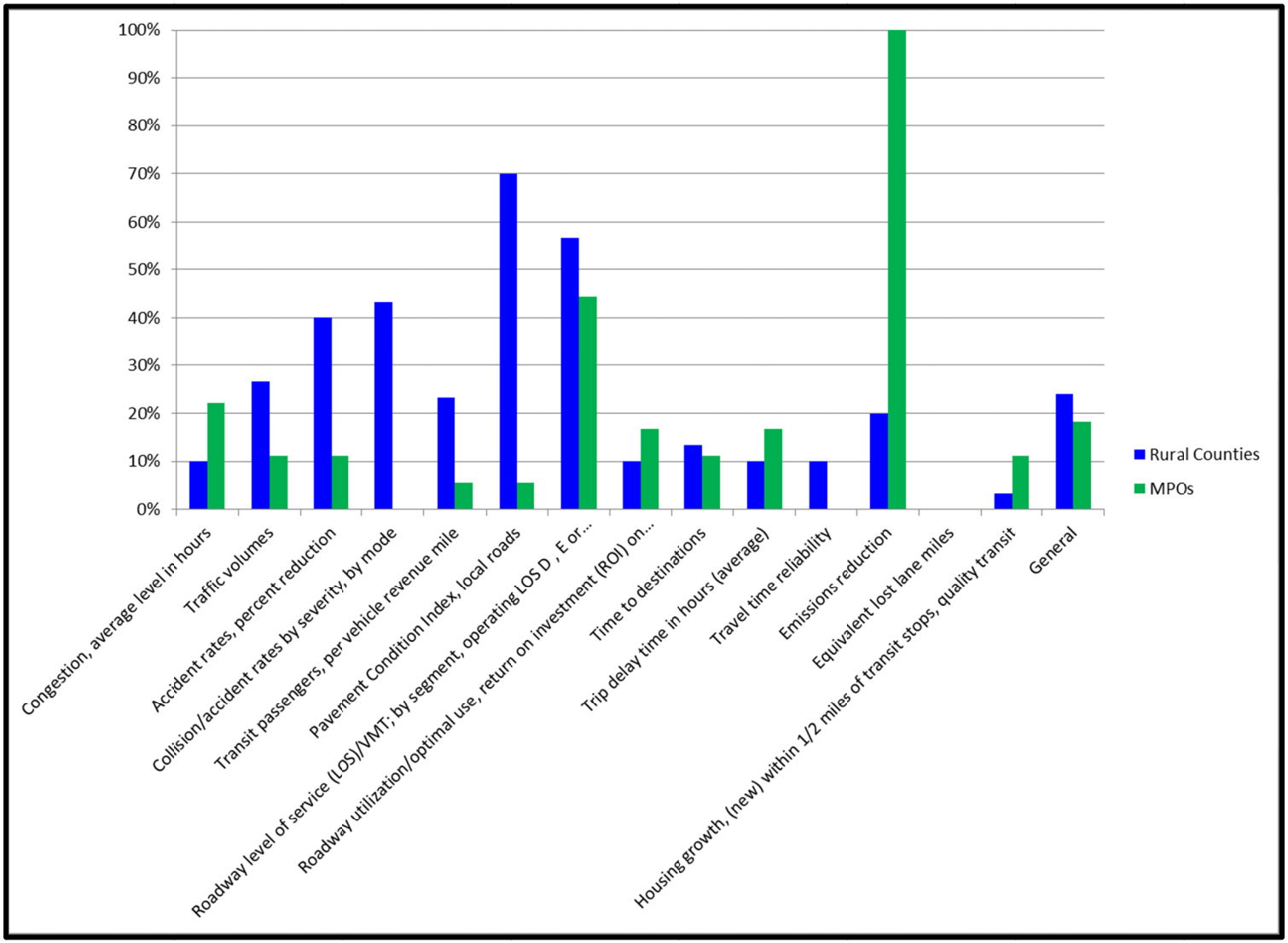
Figure 4-5 – Figure 4-8 summarize some results from the web-based survey. A more complete discussion is provided in Appendix C. The figures highlight the primary categories of performance measurement performed by rural and small urban areas, barriers to further implementation of performance monitoring, sources of performance measures used by rural and small urban areas and the number agencies who are monitoring performance measures by performance measure type or category (e.g., Safety, Transit, Congestion relief).

Figure 4-3 – Percent of Agencies implementing the SANDAG Study Performance Measures



Note: Travel time reliability was not included in the SANDAG Study – resulting in the no MPO response

Figure 4-4 – Percent of Agencies implementing the Caltrans PMRTS Performance Measures



Note: Travel time reliability was not included in the SANDAG Study – resulting in the no MPO response.

Figure 4-5 – Priorities for managing transportation infrastructure (% of the 30 participating agencies)

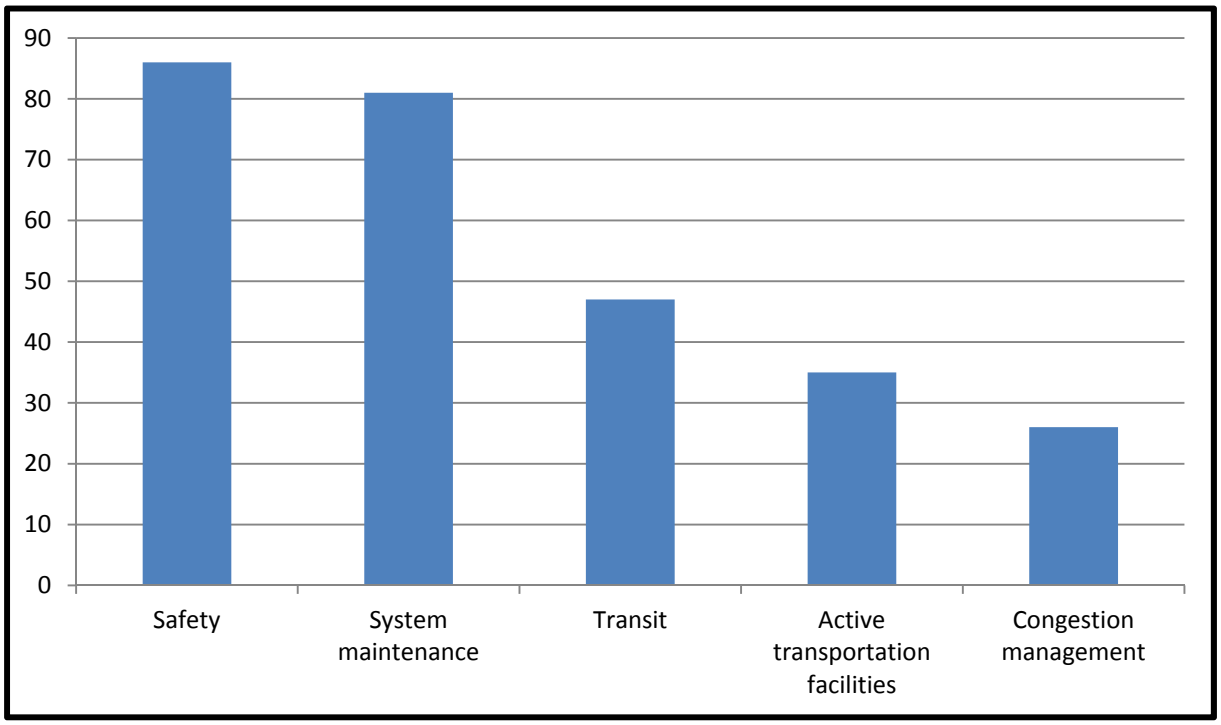


Figure 4-6 – Barriers to implementing performance measurement (% of the 30 participating agencies)

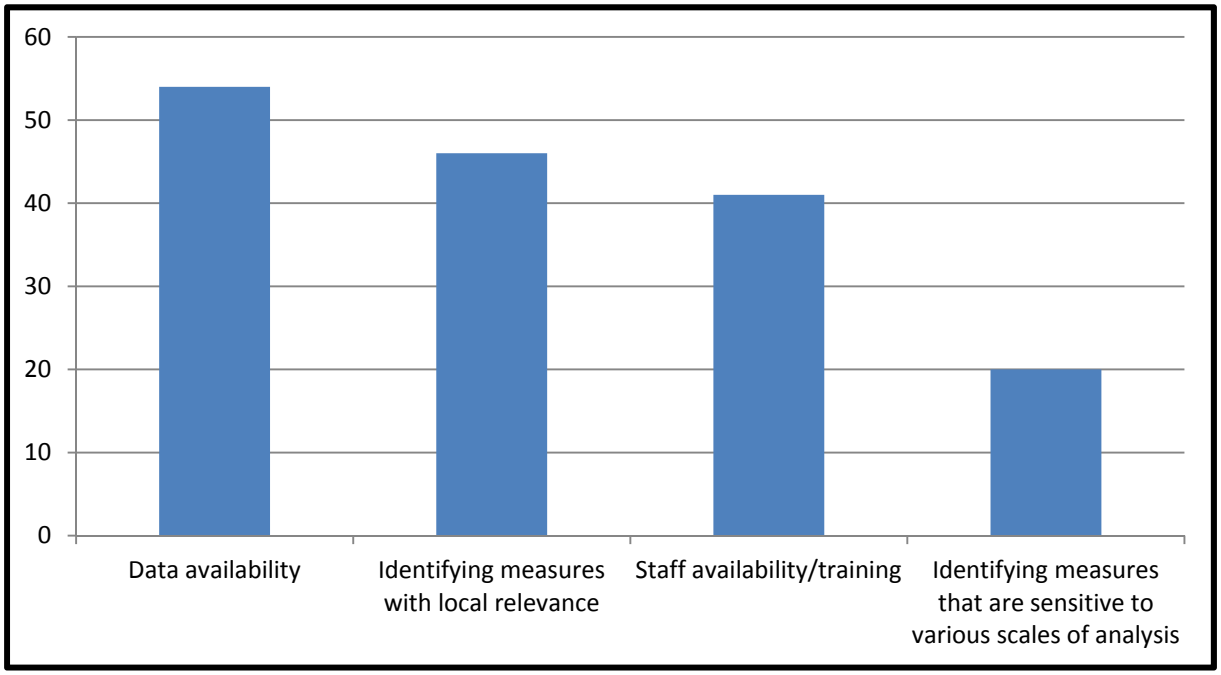


Figure 4-7 – Sources of performance measures (# of the 30 participating agencies)

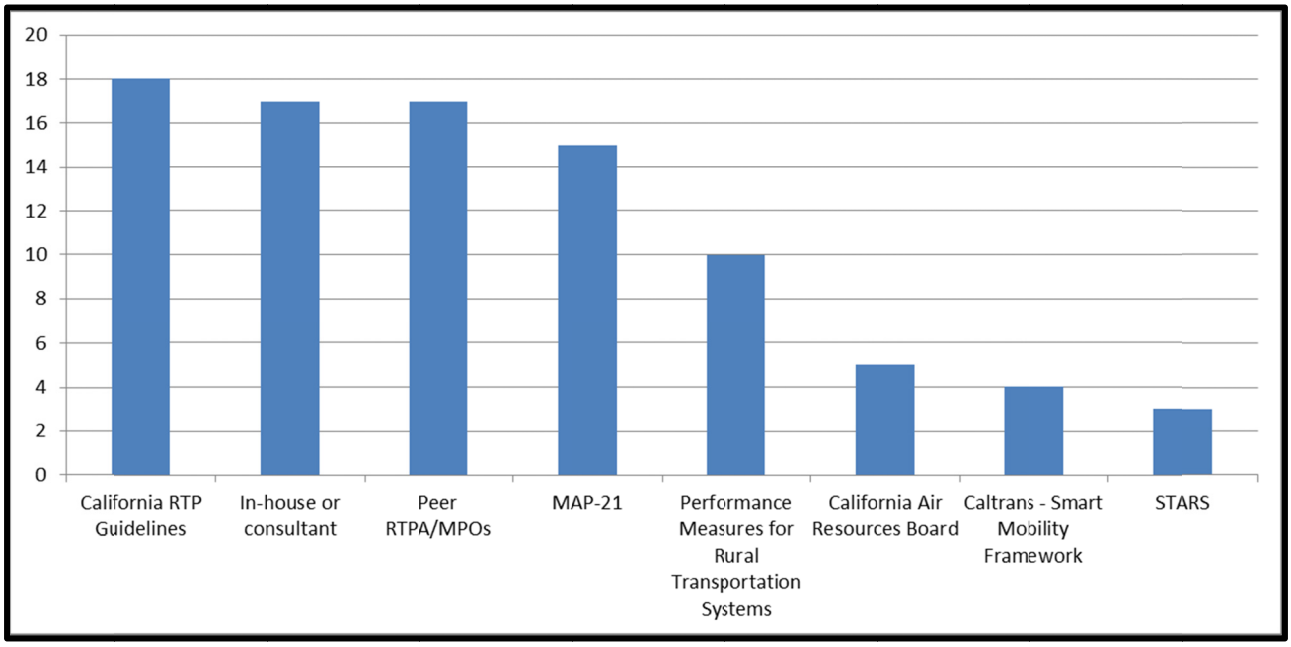
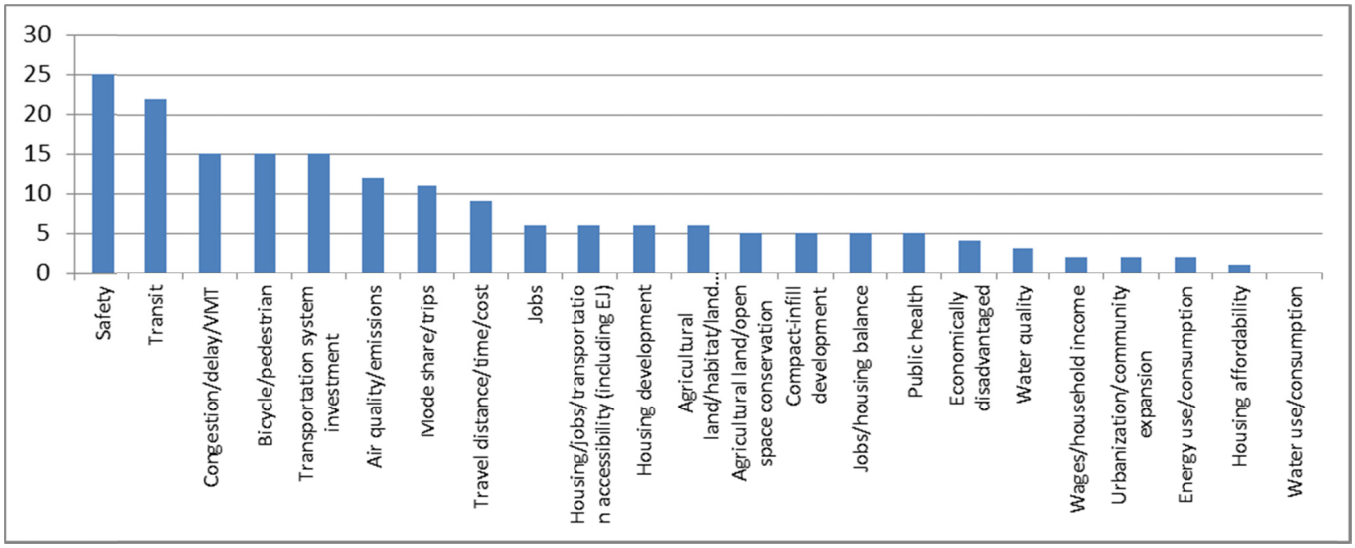


Figure 4-8 – Performance measures currently used by agencies (# of the 30 participating agencies)



4.2 RESOURCE AVAILABILITY FOR RURAL COUNTIES

This section discusses current resource availability for counties to conduct performance measurements. The results of this section are based on a previous Caltrans study of rural performance measures [10].

4.2.1 County classifications and planning assistance

Caltrans has classified counties into eight categories based on population, population growth, and seasonal traffic [10]:

1. High population, high growth
2. High population, low growth
3. Moderate population, high growth
4. Moderate population, low growth
5. Low population, high growth
6. Low population, moderate growth
7. Low population, low growth, high seasonal traffic
8. Low population, low growth, low seasonal traffic

Table 4-1 lists the rural counties according to these categories along with the estimated FY 2015/2016 rural planning assistance grant amounts for each. Figure 4-9 shows the average allocation of these funds by county category.

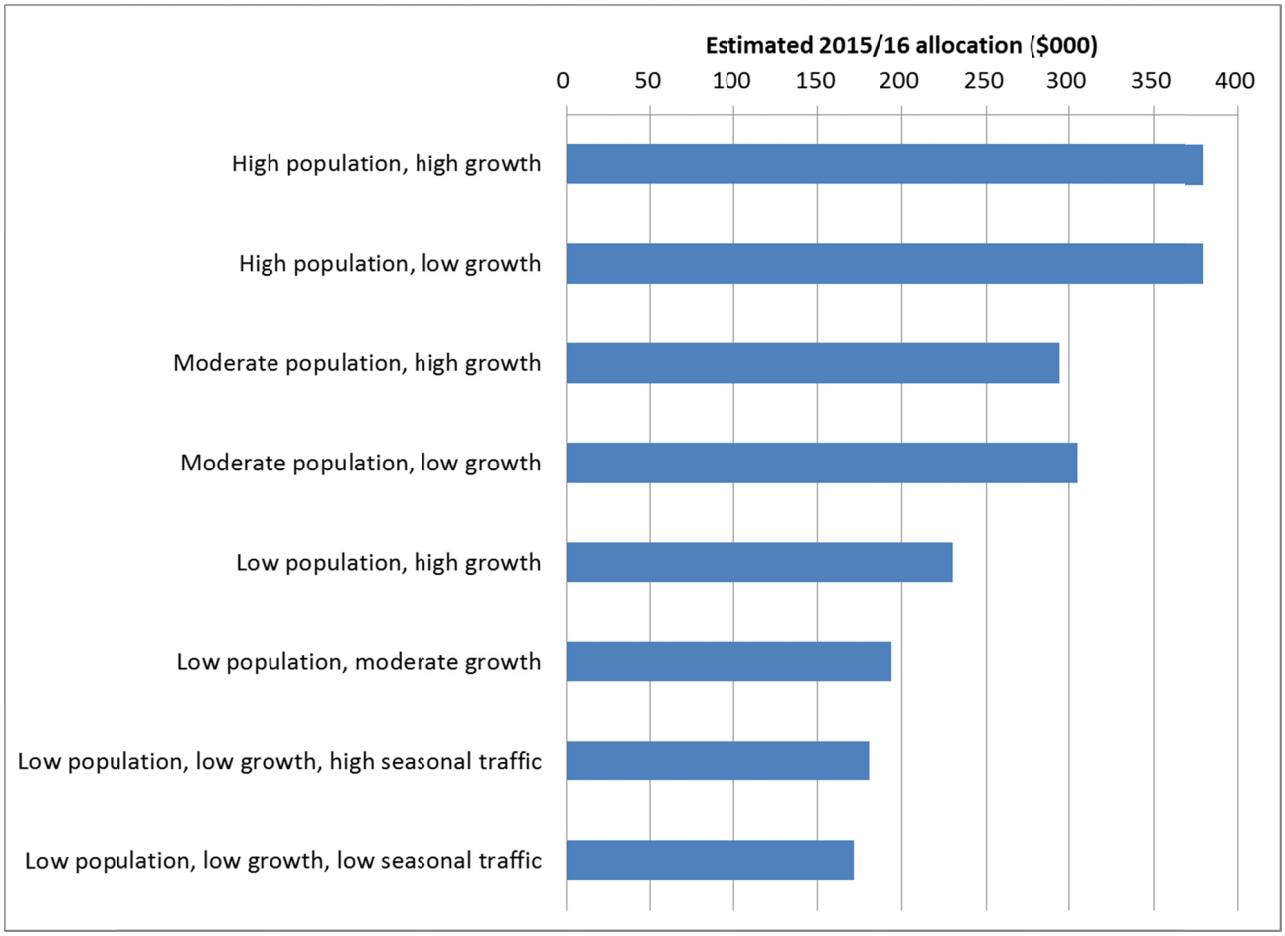
Table 4-1– Caltrans rural county categories and estimated rural planning assistance allocations for FY 2015/2016

Population	Growth	Seasonal Traffic	Counties	Est. 2015/2016 Allocation
High	High		Placer	$ 422,000
			El Dorado	$ 337,000
	Low		Monterey	$ 422,000
			Santa Cruz	$ 337,000
Moderate	High		Lake	$ 294,000
			Nevada	$ 294,000
			San Benito	n/a
	Low		Humboldt	$ 337,000
			Mendocino	$ 294,000
			Tehama	$ 294,000
			Tuolumne	$ 294,000
Low	High		Calaveras	$ 230,000
			Lassen	$ 230,000
			Mono*	$ 230,000
	Moderate		Amador	$ 230,000
			Colusa	$ 158,000
			Del Norte*	$ 230,000
			Mariposa	$ 158,000
	Low	High	Alpine*	$ 125,500
			Inyo*	$ 230,000
			Plumas*	$ 158,000
			Siskiyou*	$ 230,000
			Trinity*	$ 158,000
		Low	Glenn	$ 230,000
			Modoc	$ 158,000
			Sierra	$ 125,500

* Counties classified by Caltrans as having high seasonal traffic: peak ADT to AADT ratio at county borders is ≥ 1.3 (2001 values).

Source: County classifications from Caltrans [10]. Allocation amounts from Caltrans.

Figure 4-9. Average FY 2015/2016 rural planning assistance allocation by Caltrans county category



4.2.2 Resources available for data collection

Caltrans conducted a survey of rural counties to determine staff availability for data collection. The results are presented in Table 4-2. Of the 18 counties for which data were available, 11 had less than one full-time equivalent staff availability for data collection.

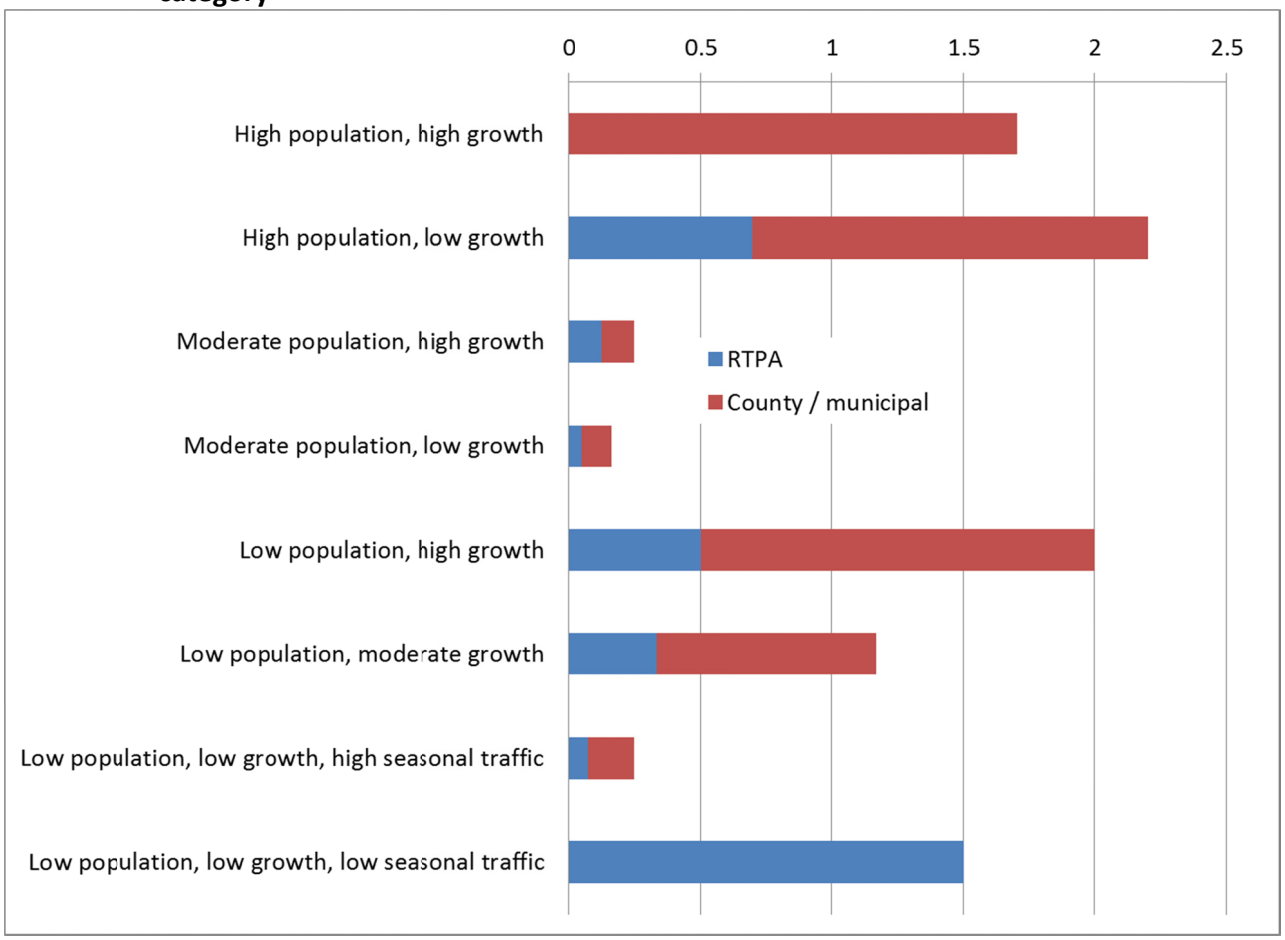
Table 4-2– Estimated full-time equivalent staff available for data collection

	FTE available for data collection				
	RTPA		County/municipal		Total FTE
	Transit	Traffic	Transit	Traffic	
Alpine	n/a	n/a	n/a	n/a	n/a
Amador	1.00	0.00	1.00	1.00	2.00
Calaveras	0.00	0.00	1.00	1.00	2.00
Colusa	0.00	0.00	0.00	0.00	0.00
Del Norte	0.00	0.00	0.50	0.00	0.50
El Dorado	0.00	0.00	1.25	0.00	1.25
Glenn	1.00	0.50	0.00	0.00	1.50
Humboldt	0.00	0.00	0.00	0.00	0.00
Inyo	n/a	n/a	0.30	n/a	n/a
Lake	0.00	0.00	0.00	0.00	0.00
Lassen	0.50	0.50	0.50	0.50	2.00
Mariposa	n/a	n/a	n/a	n/a	n/a
Mendocino	0.00	0.00	0.00	0.00	0.00
Modoc	n/a	n/a	n/a	n/a	n/a
Mono	n/a	0.00	0.30	0.02	n/a
Monterey	0.70	0.20	n/a	n/a	n/a
Nevada	0.25	0.00	0.25	0.00	0.50
Placer	0.00	0.00	1.50	0.65	2.15
Plumas	0.00	0.02	0.16	0.02	0.20
San Benito	n/a	n/a	n/a	0.25	n/a
Santa Cruz	0.00	0.50	1.00	0.50	2.00
Sierra	n/a	n/a	n/a	n/a	n/a
Siskiyou	0.10	0.10	0.25	0.10	0.55
Tehama	0.10	0.10	0.10	0.10	0.40
Trinity	0.00	0.00	0.00	0.00	0.00
Tuolumne	0.00	0.00	0.00	0.25	0.25

Source: Caltrans [10]

Figure 4-10 shows the distribution of staff availability for data collection by county category. For counties in the low growth, low population, low seasonal traffic category, all of the staff availability for data collection is from the RTPA; in the remaining categories, the majority of staff availability for data collection is from the county and municipal agencies.

Figure 4-10 Estimated full-time equivalent staff available for data collection by Caltrans rural county category



Source: Caltrans [10]

4.3 SUMMARY

Review of these agencies reveals the following:

- **All rural county agencies have performance measures in place.** These performance measures reflect the main transportation concerns of the agencies.
- **The main transportation issues in rural and small urban regions differ significantly from those in urban counties.** Review of rural and small urban regions reveals that issues such as safety and pavement management consistently rank highest; urban counties are primarily concerned with issues such as congestion, air quality, and travel time reliability.
- **Practices vary widely among agencies.** Some agencies tie performance measures to specific goals or objectives, while for other agencies the goals and objectives appear to be implicit in the performance measures.
- **Goals, objectives, and performance measures are different among agencies.** Although some measures are common across most or all agencies – e.g., accident rates, required performance measures for TDA audits – some agencies go into great depth and detail in performance measures, particularly those related to environment and quality of life.
- **Data availability and staff resources are the main barriers to maintaining performance measures in rural and small urban regions. These inequities are exacerbated by current federal and state data collection practices, which favor urban counties.** Many data sources that are available for urban areas in California are either not available or severely diminished for rural and small urban regions: e.g., PeMS, HPMS, ACS, employment data, and journey-to-work.
- **Population-based performance measures can be biased against lower population counties.** Performance measures such as person-hours of delay or number of crashes will inherently favor areas with higher traffic volumes.
- **The current set of recommended performance measures does not account for significantly different definitions of user population between rural and urban counties.** Tourist population accounts for a much greater share of traffic in many rural and small urban regions than in urban counties. Hence, for rural and small urban regions benefits due to transportation investments accrue in much greater proportion to travelers who do not reside within these counties.
- **Current performance measures do not take into account the value provided by rural and small urban regions to the State of California as a whole.** Rural and small urban regions that are tourist attractions provide facilities and services that make the State of California more economically attractive to businesses. Similarly, agricultural counties provide agricultural products to the Californians at lower cost than to other states because of their proximity to markets. Current performance measures do not take these benefits into account.
- **Rural counties have limited staff availability for data collection.** As noted in Section 4.2.2, rural counties have limited staff availability for data collection. Of the rural counties surveyed, only one has more than two FTE available for data collection; many counties have less than one FTE or no staff availability for data collection.

5 REQUIREMENTS FOR RURAL COUNTY PERFORMANCE MEASURES

The SANDAG study contains over 202 different possible performance measures. As high a number as this may seem, these measures do not exhaust the total possible number of potential metrics that are or could be used by transportation agencies. The following principles for selecting among different possible performance measures were exercised as part of this study.

1. **Performance measures must reflect the goals and objectives of the agency.** Performance measures are the yardsticks for measuring how well a particular transportation alternative meets the goals and objectives of the agency. Hence, any suggested performance measure must be capable of being tied to one or more agency goals or objectives.
2. **The purpose of performance measures is to inform decisions.** Performance measures are useful only to the extent that they can inform policy, planning, programming, budgeting, or management decisions.
3. **Performance measures should enable decision makers to identify tradeoffs between potentially conflicting goals or objectives.** Consider a hypothetical case of trying to "maximize mobility at the minimum cost." It is impossible to simultaneously optimize over more than one measure. In this case, it would require performance measures for both cost and mobility to enable decision makers to identify the tradeoffs among alternatives between cost and mobility; i.e., answering the question "how much mobility are we buying at what cost?"

These principles in turn suggest several others:

4. **Performance measures should ideally be as commensurate as possible.** Metrics that are measurable across all regions and/or applicable to differing scales of analysis allows for an "apples-to-apples" comparison and makes for better statewide or regional decision making (for funding or comparing progress). When a number of performance measures are used to evaluate transportation alternatives, decision makers should make tradeoffs between these measures in a consistent manner. This is the main rationale for benefit-cost analysis, where market values are used to identify tradeoffs between measures such as cost, travel time, reliability, safety, and environmental effects.
5. **Performance measures should be easily understood by decision makers and the general public.** Concepts such as cost and accident totals are easily communicated to decision makers and the general public, whereas technical concepts such as "buffer index", as a measure of travel time reliability, may require detailed explanation to be fully understood.
6. **The number of performance measures should be as few in number as possible.** A common maxim among political scientists who study policymaking is that a decision maker can simultaneously consider only seven "plus or minus" factors at one time. Hence, too many performance measures will confuse rather than inform.

Based on the aforementioned principles and the findings in Section 4, the following criteria were used to select performance monitoring measures for rural and small urban areas:

1. **Performance measures should align with California state transportation goals and objectives.**
2. **Performance measures should continue to inform current goals and objectives of each rural and small urban RTPA.**
3. **Performance measures should be applicable to all rural and small urban regions.**
4. **Performance measures should be capable of being linked to specific decisions on transportation investments.**
5. **Performance measures should not impose substantial resource requirements on rural and small urban RTPAs.**
6. **Performance measures for should be normalized to provide equitable comparisons among all regions.**

6 RECOMMENDED PERFORMANCE MEASURES FOR RURAL COUNTIES

6.1 INTRODUCTION

This section presents the recommended performance measures for rural counties. The following information is presented for each performance measure:

- Relation to SANDAG performance indicators
- Definition of the measure
- How to report the measure
- Applicable modes
- Level of reporting (e.g., countywide, regional, jurisdiction, corridor, facility type, road segment, mode, transit operator)
- Recommended monitoring frequency
- Level of resources required (Low, Moderate, High, Varies/Depends)
- Data sources

The RCTF Performance Monitoring Indicator recommendations by Performance Measure Category (as defined in the SANDAG Study) are as follows:

I. Congestion/Delay/Vehicle Miles Travelled
- Vehicle Miles Travelled
- Peak Volume/Capacity Ratio or Thresholds

II. Mode Share/Split
- Journey to Work Mode Share

III. Safety
- Total Accident Cost

IV. Transit
- Total Operating Cost Per Revenue Mile

V. Transportation System Investment/Preservation/Service/Fuel Use
- Distressed Lane Miles (total and/or percent)
- Pavement Condition Index

VI. Travel Distance/Time/Cost (None selected at this time - cost prohibitive)

VII. Land Use
- Land Use Efficiency (total developed land in acres / population)

VIII. Economic Development & Opportunity (Not selected at this time – cost prohibitive)

IV. Resource Efficiency & Conservation (Not selected at this time – Land Use Efficiency as surrogate)

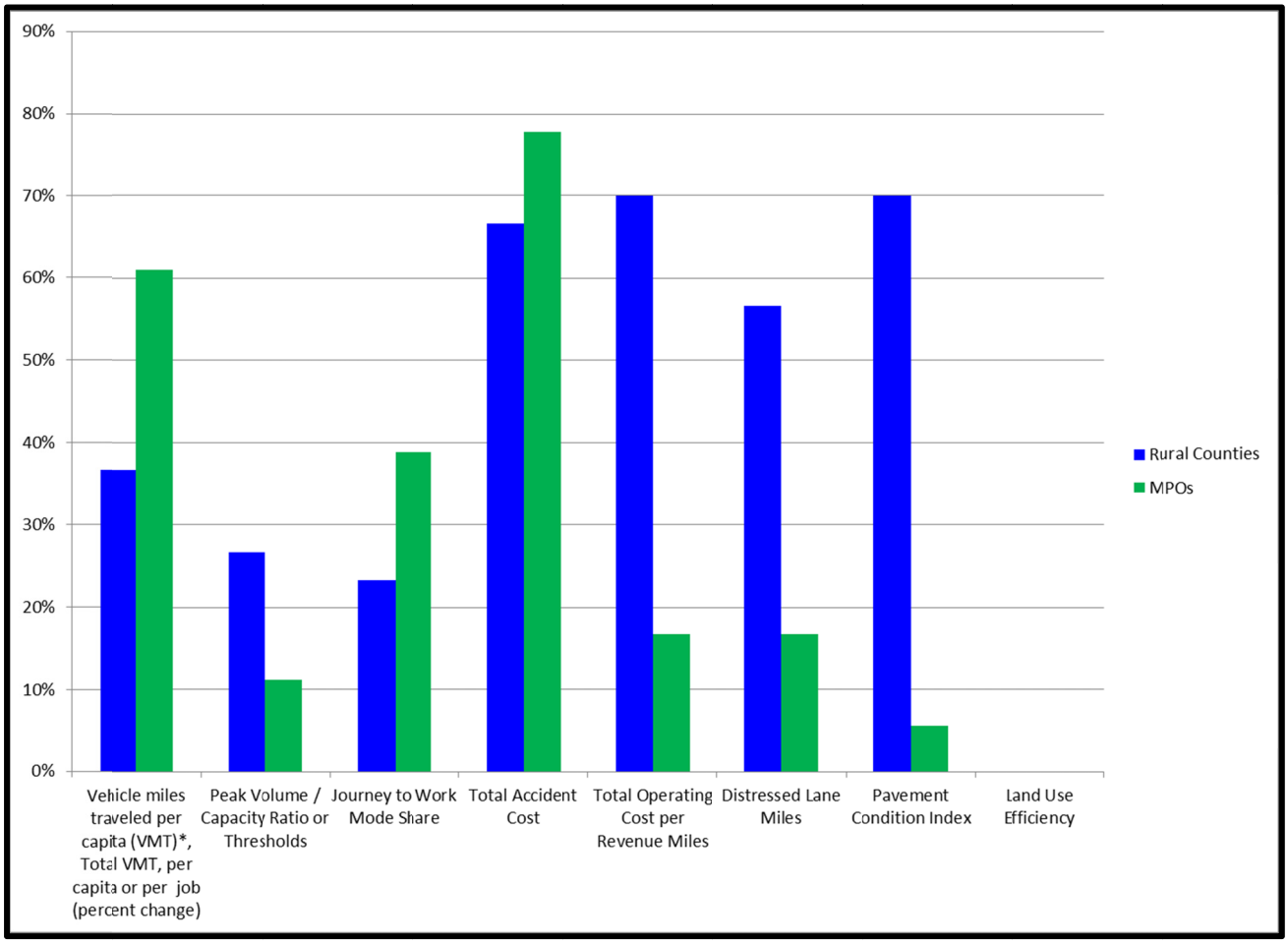
V. Environment & Public Health (Not selected at this time - VMT as surrogate)

Each recommended performance monitoring indicator is common to all rural and small urban areas, informs the goals and objectives of the 26 rural transportation agencies, and is within the capacity of rural agencies to monitor and analyze. Furthermore, except for peak volume/capacity and transit, all measures can be normalized for population. Table 6-1 summarizes the data sources and resource requirements for each measure. Figure 6-1 shows the percent of rural and small urban RTPAs and MPOs currently implementing the above recommended performance monitoring measures. Each measure is described in greater detail in this section.

Table 6-1 – Summary of recommended performance monitoring performance measures

Performance measures	Data sources	Estimated resource requirements
I. Congestion/Delay/Vehicle Miles of Travel		
VMT: • Per capita • By locality (city) • By facility ownership • Local vs. tourist	• HPMS • Caltrans Vehicle Volumes • Dept. of Finance annual population estimates	Minimal. Less than one person-day of staff time to look up published data.
Peak V/C ratio or thresholds	• Caltrans Vehicle volumes (average, peak traffic; K & D factors) • HCM 2010 threshold volumes • Highway geometrics (number of lanes, lane widths)	Moderate. Depends on number of state highway segments.
II. Mode Share/Split		
Journey to work mode share	• Triennial American Community Survey estimates of work mode shares by county	Minimal. Less than one person-day to look up data.
III. Safety		
Total accident cost: • Per VMT • Per capita	• SWITRS/TIMS (accidents by type) • Same data as for VMT • NHTSA data on cost by accident type	Minimal. Less than one person-day to look up data and compute measures.
IV. Transit		
Transit: operating cost per revenue mile	• Annual transit agency reports	Minimal. Less than one person-day to look up data and compute measures.
V. Transportation System Investment/Preservation/Service/Fuel Use		
Distressed lane miles • Total and % of total • By jurisdiction • By facility type	• Regional or local pavement management system	Depends on size of road system in county.
Pavement condition index (PCI) for local roads	• Regional or local pavement management system	Minimal additional effort assuming done in coordination with local roadway needs report.
VII. Land Use		
Land use efficiency	• Farmland Mapping and Monitoring Program (FMMP) • DOF Annual population estimates	Minimal. Less than one person-day to look up data and record measures.

Figure 6-1 – Percent of agencies that currently implement RCTF recommended performance measures



Note: Land Use Efficiency is a new measure; no rural agency is currently tracking this metric.

6.2 VEHICLE MILES OF TRAVEL

Vehicle miles of travel (VMT) is a general but robust measure of vehicle activity. It is not a good indicator of congestion, identifying bottlenecks or high delay "hotspot" locations. VMT can be applied to any scale (region, sub-region, corridor) and is computed by multiplying traffic volume by segment length. It is commonly applied on a per household or per capita basis and is a primary input for regional air quality analyses and for developing VMT rates for safety analysis.

VMT data are readily available and is developed by Caltrans on an annual basis but publications typically lag by approximately two years (2013 VMT estimates were released in November 2014). VMT data are annually reported as part of the Federal Highway Performance Monitoring System (HPMS). The HPMS program uses a sample based method that combines traffic counts stratified by functional classification of roadways by volume groups to produce sample based geographic estimates of VMT. HPMS VMT estimates are considered "ground truth" by the 1990 Federal Clean Act Amendments (November 15, 1990). HPMS VMT estimates are used to validate baseline travel demand models and to track modeled VMT forecasts over time. HPMS VMT

estimates are reported for each county by local jurisdiction, state highway use, and other state/federal land roadways e.g., State Parks, US Bureau of Land Management, US Forest Service, US Fish and Wildlife Service.

HPMS VMT estimates are sample based. Due to smaller sampling requirements at the sub-county level of geography and in federal air quality attainment areas, desired 90/10 confidence level estimates of VMT are typically not attained in more rural areas of the state.

Published traffic volumes on state highway facilities can be used directly to generate segment specific VMT estimates (e.g., AADT x Segment Length in miles). Department of Finance population estimates can be applied to regional HPMS VMT estimates to generate per capita metrics.

Table 6-2 – Performance measure summary: VMT

Indicator Category (Source: SANDAG Study)	Congestion/Delay/Vehicle Miles Travelled
Measure	Vehicle miles travelled (Performance Matrix: A8) • Per capita • Area (countywide; jurisdiction; sub-region) • By facility ownership (state highways, local, state/federal land roads) • Local vs Interregional
Reporting	Current year data Trend over time from 2000 (year of HPMS sample enhancements)
Mode	☒-Roadway ☐Transit ☐People ☐Trucks ☐Aviation
Level of Reporting	• Regional • By locality (city) • By facility jurisdiction (e.g., state, county, federal agency)
Monitoring frequency:	Annual
Resource requirements	Depends on level of detail required. Minimum
Data sources	Highway Performance Monitoring System (HPMS) Caltrans Vehicle Volumes Department of Finance Annual Population
Data source update frequency:	Annual
Accuracy	Varies depending on number of sampling locations. Better accuracy and confidence in non-attainment areas. Less accuracy for sub-county geographic regions
Usable for benefit-cost analysis?	Possibly as an aid to calculating measures such as greenhouse gas emissions

1. Which State goals and objectives does this measure address?
    a. Measure of overall vehicle activity and use of the roadway network
    b. Input to Maintenance and System Preservation
    c. Input to Safety
    d. Input Health Based Pollutant Reduction
    e. Input GHG reduction
    f. CEQA metric (per SB 743)
2. Is the measure common to all rural and small urban regions?

   a. Yes-Available on an annual basis.
3. Does this measure inform the goals and objectives of the 26 rural transportation agencies?
   a. Yes
4. Is it within the capacity of all rural transportation agencies to collect and analyze this data?
   a. Yes
5. Can this measure be normalized for population?
   a. Yes

http://www.dot.ca.gov/hq/tsip/hpms/

6.3 PEAK HOUR VOLUME/CAPACITY

RTPAs desire to have a measure of congestion that is convenient to quantify and report. Caltrans published vehicle volumes also contain K and D factors that allow estimation of average weekday, weekend or peak month peak-hour directional traffic volumes on state highway facilities, which, in combination with road capacity data, can be used to estimate V/C. This, in combination with Highway Capacity Manual (HCM) 2010 peak hour volume thresholds, provides a means of identifying congestion "hot spots" on state highway facilities. Caltrans maintain traffic data on line [11.]

Non-state highway applications of peak volume/capacity metrics will be contingent on local efforts to collect data.

Table 6-3 – Performance measure summary: peak V/C

Indicator Category (Source: SANDAG Study)	Congestion/Delay/Vehicle Miles Travelled
Measure	Peak volume/capacity ratio or thresholds • Peak Hour Directional/Bi-directional Volume • Average Weekday Peak Hour Directional/Bi-directional Volume • Peak Month Peak Hour Directional/Bi-directional Volume • K (% of peak hour to ADT); D (peak direction %) factors • Threshold volumes based on HCM 2010
Reporting	Current year data Trend over time from 2000
Mode	☒-Roadway ☐Transit ☐People ☐Trucks ☐Aviation
Level of Reporting	• Regional • Corridor • Road segment
Monitoring frequency:	Annual
Resource requirements	Depends on coverage. State highway data require minimum effort. Broader coverage requires effort by county, localities to conduct periodic traffic counts
Data sources	Caltrans Vehicle Volumes Roadway capacities Local traffic counts
Data source update frequency	Annual for Caltrans Vehicle Volumes. Note that not all locations in Caltrans Vehicle Volumes reports are counted annually; hence, published counts for individual locations may be up to three years out of date. Capacity data require updating at locations where significant roadway improvements or land developments occur.
Accuracy	Reasonably accurate for most locations.
Usable for benefit-cost analysis?	Possibly, with additional calculations: travel time/delay as function of V/C.

1. Which State goals and objectives does this measure address?
    a. Measure of overall vehicle activity and use of the roadway network
    b. Input to Maintenance and System Preservation
    c. Input to Safety
    d. Input Health Based Pollutant Reduction
    e. Input GHG reduction
    f. CEQA metric
2. Is the measure common to all rural and small urban regions?
    a. Yes-Available on an annual basis.
3. Does this measure inform the goals and objectives of the 26 rural transportation agencies?
    a. Yes
4. Is it within the capacity of all rural transportation agencies to collect and analyze this data?
    a. Yes
5. Can this measure be normalized for population?
    a. No

6.4 MODE SHARE

Mode share is a common performance measure throughout California. Data on work trip mode shares are collected reported by American Community Survey at the county and place level on a three year basis. Statistics on work trip mode shares provide a proxy for general trends in mode use.

Mode share estimation for non-work trips is not possible other than through direct survey methods such as the California Household Travel Survey. Because this survey is conducted only every ten years, non-work trip mode share estimates are likely to be out of date most of the time.

Table 6-4 – Performance measure summary: mode share

Indicator Category (Source: SANDAG Study)	II. Mode Share/Split
Measure	Journey to work mode share work trips/commute (peak periods): drive alone, carpool, transit, bike/walk (A18)
Reporting	Trend over time from 2000
Mode	☒-Roadway ☐Transit ☐People ☐Trucks ☐Aviation
Level of Reporting	☒Regional ☐Corridor ☒ Mode
Monitoring frequency:	Triennial
Resource requirements	Low. Rely on secondary data sources.
Data sources:	American Community Survey Caltrans Household Travel Survey
Data source update frequency:	American Community Survey (3 years) Caltrans Household Travel Survey (10 years)
Accuracy	Reasonable only at county level. Less accurate for smaller counties due to lower populations (i.e., smaller sample sizes).
Usable for benefit-cost analysis?	No

1. Which State goals and objectives does this measure address?
    a. Multimodal
    b. Efficiency
    c. GHG
2. Is the measure common to all rural and small urban regions?
    a. Yes (data are available)
3. Does this measure inform the goals and objectives of the 26 rural transportation agencies?
    a. Yes
4. Is it within the capacity of all rural transportation agencies to collect and analyze this data?
    a. Yes (but only through triennial American Community Survey tabulations)
5. Can this measure be normalized for population?
    a. No

6.5 SAFETY

Current safety statistics are reported in a number of ways: e.g., absolute number of incidents by severity, total accidents, and accidents per million VMT.

Total collision cost is a simple way of summarizing the total economic cost of accidents. It also provides a means of judging the cost-effectiveness of proposed safety improvements. Costs of accidents by severity can be obtained from a standard source such as the National Highway Traffic Safety Administration. Normalizing total accident cost on a per-capita basis will provide a more level playing field between rural and urban counties, especially because fatality accidents, which have much higher costs than other accident types, are relatively more common in rural areas.

Table 6-5 – Performance measure summary: safety

Indicator Category (Source: SANDAG Study)	III. Safety
Measure	Total accident cost (A37, 38, 39 combined) • per Capita • per VMT Total accident cost computed using SWITRS/TIMS data on number of accidents by severity in combination with published data on economic costs of accidents by severity.
Reporting	Annual data.
Mode	☒-Roadway ☐Transit ☐People ☐Trucks ☐Aviation
Level of Reporting	☒Regional ☐Corridor ☒ Mode
Monitoring frequency:	Annual
Resource requirements	Moderate. Some staff time required to access secondary data sources.
Data sources:	SWITRS (TIMS, CHP) TASAS (Caltrans, Table B or C) Local agency Department of Finance population estimates National Highway Traffic Safety Administration data on cost by accident type
Data source update frequency:	SWITRS (TIMS, CHP) (annually; two year lag) TASAS (Caltrans, Table B or C) (annually; two year lag) Local Agency (monthly to date) DOF (annual)
Accuracy	Reasonable, depending on timeliness of accident data
Usable for benefit-cost analysis?	Yes, directly

1. Which State goals and objectives does this measure address?
    a. Safety
2. Is the measure common to all rural and small urban regions?
    a. Yes
3. Does this measure inform the goals and objectives of the 26 rural transportation agencies?
    a. Yes

4. Is it within the capacity of all rural transportation agencies to collect and analyze this data?
    a. Yes
5. Can this measure be normalized for population?
    a. Yes

Measure is amenable to benefit / cost analysis and can be normalized by including VMT.

6.6 TRANSIT OPERATING COST

There are a number of candidate measures for looking at transit service productivity: e.g., farebox recovery ratio, cost per revenue vehicle service hour, cost per passenger. Farebox recovery ratio does not appear to be a very good productivity measure for rural areas because it can vary significantly with the number of riders in special fare groups such as elderly and handicapped. Cost per revenue vehicle service hour is a commonly used performance measure, but this does not reflect the differences in service characteristics of rural and small urban regions, where the transit service population is much more dispersed.

A more appropriate measure of how much transit service is being delivered in rural and small urban regions is the number of revenue vehicle miles. This reflects that route distances in rural areas tend to be longer. Hence, cost per revenue service mile is considered an appropriate indicator of how much service is being delivered per dollar of expenditure.

Table 6-6 – Performance measure summary: transit operating cost

Indicator Category (Source: SANDAG Study)	IV. Transit
Measure	Total transit operating cost per revenue mile
Reporting	☒Regional ☒Corridor ☒ Mode
Mode	☒-Roadway ☐Transit ☐People ☐Trucks ☐Aviation
Level of Reporting	Region Transit operator
Monitoring frequency:	Annual
Resource requirements	Low
Data sources:	Transit agency short range transit plan Transit tri-annual performance audit
Data source update frequency:	Transit agency short range transit plan (variable) Transit tri-annual performance audit (every 3 years)
Accuracy	Some agencies do not separate out demand-responsive service from fixed-route service, which may bias this measure upward for those agencies. Trend comparisons must be normalized based on Consumer Price Index.
Usable for benefit-cost analysis?	Transit operating cost is a possible input to some benefit-cost analyses. The measure itself is not usable for benefit cost analysis.

1. Which State goals and objectives does this measure address?
    a. Productivity
    b. Efficiency

2. Is the measure common to all rural and small urban regions?
    a. Yes
3. Does this measure inform the goals and objectives of the 26 rural transportation agencies?
    a. Yes
4. Is it within the capacity of all rural transportation agencies to collect and analyze this data?
    a. Yes
5. Can this measure be normalized for population?
    a. No

6.7 DISTRESSED LANE MILES

The distressed lane miles measurement can be derived from the existing pavement management system data and be used as a comparative analysis over-time tool.

The 26 rural counties included in this study own and maintain over 24,000 centerline miles of local roads and streets, and over 5,000 centerline miles of unpaved roads. They cover 41.5 percent of the total land area and maintain approximately 14.2 percent of the total lane-miles of the local road network. However, they contain only 5.6 percent of the state's population and have 9.4 percent of the available funding for pavement expenditures. Based on these data it can be concluded that:

- Residents in rural counties have to maintain almost three times as many lane-miles as urban residents.
- Pavement funding per mile available to rural counties is approximately 40 percent lower than the rest of California.

Clearly, this reflects a disproportionate burden that is being shouldered by the rural counties as compared to the rest of California.

Currently, the average Pavement Condition Index (PCI) for rural roads is only 58, significantly lower than the statewide average of 66. It will require more than $9.8 billion over the next 20 years to make all necessary repairs and bring the rural local road condition to what is considered to be best management practices. In addition, the portion of the state highway system in the 26 rural counties will require an additional $732 million over the next ten years. However, the existing funding available to the rural counties is only $3.08 billion over the next 20 years for local roads. Of this, more than 50 percent comes from the gas tax, which is a decreasing revenue source. In order for all 26 counties to reach their target PCIs (average of 68), a total of $7.3 billion will be required for local roads alone. This results in a funding shortfall of $4.2 billion.

Table 6-7 – Performance measure summary: distressed lane miles

Indicator	V. Transportation System Investment/Preservation/Service/Fuel Use
Measure	Distressed lane miles, (total and percent), by jurisdiction (A55)
Reporting	Current
Mode	☒Roadway ☐ Transit ☐ People ☐Trucks ☐Aviation
Level of Reporting	Regional Facility type Jurisdiction
Monitoring Frequency:	Tri-annually
Resource Requirements	Varies depending on existing pavement monitoring program.
Data Source (s):	California Statewide Local Streets and Roads Needs Assessment Regional or local pavement management system
Data Source Update Frequency:	Biennial Tri-annually
Accuracy	High level of accuracy
Usable for benefit-cost analysis?	Indirectly. Can be used when estimating costs of bringing all roadways up to minimum acceptable condition.

1. Which State goals and objectives does this measure address?
    a. Recommended performance measure Distressed Lane Miles supports 6 of the 7 performance categories defined in the Performance Measures for Rural Transportation Systems including: Safety, System Preservation, Accessibility, Reliability, Productivity, and Return on Investment.
2. Is the measure common to all rural and small urban regions?
    a. Yes
3. Does this measure inform the goals and objectives of the 26 rural transportation agencies?
    a. Yes
4. Is it within the capacity of all rural transportation agencies to collect and analyze this data?
    a. Yes. Most agencies already collect this data. For those that don't, this measure will require staffing and resources.
5. Can this measure be normalized for population?
    a. Yes

6.8 PAVEMENT CONDITION

Pavement Condition Index (PCI), an ASTM D6433 standard, is the accepted performance measurement used by local agencies to measure the structural condition of pavement and to make planning and funding decisions. PCI is a readily available metric that measures system preservation on local roads. The data are readily collected, current (3 years), resource light, and is comparable across local, regional and statewide jurisdictions.

Currently, PCI is used as a performance measure by the majority (70%) of the regions included in this study. The 2014 Statewide Local Streets and Roads Needs Assessment derived that 85% of agencies responding to requests statewide had a pavement management system in place. These numbers are assumed to be low and indicate the existing collection of roadway pavement condition and use of PCI is prevalent.

Pavement management systems in California, which as indicated above typically use PCI, is widely encouraged by FHWA and Caltrans. Additionally, agencies with projects programmed in the State Transportation Improvement Program (STIP) must certify that they have a pavement management system in place with every allocation request sent to the California Transportation Commission (LAPG Section 23.2; Exhibit 23-L). [12]

FHWA recently issued a Notice of Proposed Rule Making (NRPM) on assessing pavement condition [15, 17]. In this NPRM, FHWA advocates the use of the International Roughness Index (IRI) as the preferred measure over PCI for local roadways. Unreliable IRI data collection technology as applied to low speed facilities, prohibitive cost/training for IRI data collection technology, and the lack of clarification on measurement units for certain types of distressed pavements, are several reasons collectively cited by the RCTF for its lack of support for switching to IRI measurements. Instead, the RCTF advocates local flexibility in the choice of pavement condition measurement types and application of Pavement Condition Rating Equivalencies that allow the results of the various methods used in practice to be easily converted to IRI.

Table 6-8 – Performance measure summary: pavement condition

Indicator Category (Source: SANDAG Study)	V. Transportation System Investment/Preservation/Service/Fuel Use
Measure	Pavement condition index, local roads (A61)
Reporting	Current Point-in-Time
Mode	☒Roadway ☐Transit ☐People ☒Trucks ☐Aviation
Level of Reporting	Region Local
Monitoring frequency	2 Years (aligns with local roadway needs report)
Resource requirements	Varies. Depends on level of existing pavement monitoring program.
Data sources	California Statewide Local Streets and Roads Needs Assessment Pavement Management System
Data source update frequency	Biennial Tri-annually
Accuracy	High level of accuracy
Usable for benefit-cost analysis?	Indirectly. Can be used when estimating costs of bringing all roadways up to minimum acceptable condition.

1. Which State goals and objectives does this measure address?
    a. Recommended performance measure A61 supports six of the seven performance categories defined in the Performance Measures for Rural Transportation Systems including: Safety, System Preservation, Accessibility, Reliability, Productivity, and Return on Investment.
2. Is the measure common to all rural and small urban regions?

   a. Yes
3. Does this measure inform the goals and objectives of the 26 rural transportation agencies?
   a. yes
4. Is it within the capacity of all rural transportation agencies to collect and analyze this data?
   a. Yes
5. Can this measure be normalized for population?
   a. Yes

6.9 LAND USE EFFICIENCY

The land use efficiency indicator measures the amount and rate of urbanization within a region. Land is a finite resource. In most regions in the states, most undeveloped land area is agricultural land or open space/habitat lands. As growth and development occurs, the amount of land converted to urban uses influences the number of needed improvements and the overall efficiency of the transportation system.

More efficient land use patterns (i.e., those that require less land to accommodate development) can rely upon existing roads, require fewer new lane miles, and lower overall operation and maintenance costs. They can make transit more efficient and cost effective by reducing the distance between riders. And, they can support the development of bicycle and pedestrian facilities that serve more cohesive communities. Transportation improvements and investments can also influence land use efficiency. New and expanded roadways that provide access and capacity to undeveloped areas can induce growth and development thereby increasing pressure to convert agricultural and open space lands to urban uses.

While land use efficiency is a useful indicator for regional transportation planning, it is important to note that regional transportation planning agencies and metropolitan planning organizations do not have land use authority. Cities and counties are responsible for planning and approving new development.

The proposed land use efficiency performance measure represents the ratio of urbanized acres to population and the rate of urbanization over time. RCTF agencies can rely upon the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP) and the California Department of Finance (DOF) population estimates to measure land use efficiency. The FMMP reports biannually on the rate of urbanization in each county in the state. These data are presented in both tabular and geographically (GIS mapping layers). It also includes details on conversion of prime farmland. DOF reports population estimates by county and city annually.

Table 6-9 - Performance measure summary: land use efficiency

Indicator	VII. Land Use
Measure	Land Use Efficiency
Reporting	Over time (since 2000)
Mode	☐ Roadway ☐ Transit ☒ People ☐ Trucks ☐ Aviation
Level	☒ Regional ☐ Corridor ☐ Mode
Monitoring frequency	2 Years
Resource requirements	Low
Data sources	DOF Annual population estimates Farmland Mapping and Monitoring Program (FMMP)
Data source update frequency	Farmland Mapping and Monitoring Program (FMMP) (2 years) DOF Annual population estimates
Accuracy	High level of accuracy
Usable for benefit-cost analysis?	No

1. Which State goals and objectives does this measure address?
    a. Land use efficiency
2. Is the measure common to all rural and small urban regions?
    a. Yes
3. Does this measure inform the goals and objectives of the 26 rural transportation agencies?
    a. Yes
4. Is it within the capacity of all rural transportation agencies to collect and analyze this data?
    a. Yes
5. Can this measure be normalized for population?
    a. Yes

6.10 OTHER PERFORMANCE MEASURES

The following performance measures were considered but not included in the final recommendation

- VI. Travel Distance/Time/Cost (No metric selected at this time due to being resource intensive. Preferred metric is travel time reliability (see discussion below).
- VIII. Economic Development & Opportunity (Not selected at this time – cost prohibitive)
- IV. Resource Efficiency & Conservation (Not selected at this time – Land Use Efficiency as surrogate)
- V. Environment & Public Health (Not selected at this time - VMT as surrogate)

VMT is being proposed as the preferred metric for environmental quality assessments under California Environmental Quality Act (per SB 743). VMT is an assumed surrogate for air quality (i.e., VMT decreases results in an air quality improvement). However, this can be an erroneous assumption when one accounts for vehicle speed to vehicle emission profiles.

The science of vehicle emission speed profiles is well understood; it is based on over 35 plus years of testing of vehicle types, technology groups over a multitude of drive cycles by both Environmental Protection Agency (EPA) and the California Air Resources Board (CARB). CARB emission factors are trip-based (use speed corrected base emission rates and idle emissions). The EPA MOVES model is modal based which specifically reflects the vehicle emission profiles of modal emissions (i.e., hard acceleration events, dithering, cruise etc.). VMT metrics that only reflect trips and trip length while not accounting for vehicle speeds, completely ignores the fact that as much as 30%+ of regional vehicle emissions is affected by speed and operating conditions. All health based criteria pollutants as well as well as climate change pollutants show significantly greater emissions at idle or low speeds. Specifically, idle to hard acceleration events cause the greatest vehicular emissions. These modal events are linked directly with vehicular delay on roadways and intersections. Due to advancements in vehicle emission control technology the market penetration of newer/cleaner vehicles, emission to speed curves have shifted downward (lower emissions are emitted) but the shape of these curves have not dramatically changed (with significantly greater emissions being emitted under idle, hard acceleration or deceleration events, and very low speeds).

For these reasons, the RCTF continues to have significant concerns about the applicability of VMT as a surrogate for Environment & Public Health. These concerns also apply to the proposed California Environmental Quality Act (CEQA) streamlining provisions under SB 743.

7 EXAMPLE CALCULATIONS OF RECOMMENDED PERFORMANCE MEASURES

7.1 INTRODUCTION

This section provides examples of how several recommended performance measures can be easily calculated.

7.2 ROAD MILEAGE

Table 7.1 shows maintained miles of public roads by type for each of the rural counties. These figures were taken directly from the Caltrans report on public roads derived from HPMS [6].

7.3 VMT MEASURES

Per capita VMT are calculated by taking the VMT estimates from the Caltrans public roads report and dividing by population estimates from the Department of Finance [3]. The results are presented in Table 7-2.

Some counties show considerably higher VMT per capita than others. The differences are likely because of a combination of a high proportion of interregional (or through) traffic or high seasonal traffic due to tourist visitation. A comparison of average vs. peak daily VMT on state highways in rural counties is presented in Table 7-3. These numbers were calculated from the Caltrans traffic count data [11] as follows:

1. Calculate the average and peak daily VMT on each segment by multiplying the average and peak ADT by the segment length. Segment length is calculated using the postmile data in the Caltrans traffic count spreadsheet.
2. Sum up the average and peak daily VMT for each county.
3. Compute the ratio of peak to average daily VMT by county.

There are some potential issues that may slightly distort some of the estimates. Counts are not taken every year at each site and postmiles of locations may be recalculated due to changes in a particular route. Hence, VMT estimates for an individual segment or even a complete route may be somewhat in error. Nonetheless, the method described here can provide estimates of peak to average VMT that are reasonably reliable for planning purposes.

Table 7-1 – Maintained miles of public roads by type, 2013

County	City	County	State highway	Federal agencies	Other state agencies	Other agencies	Total
Amador	72.26	398.99	125.71	71.84	1.15	0.30	670.25
Calaveras	32.21	762.27	151.36	92.37	59.25		1,097.46
Colusa	43.39	718.51	114.78	31.88	1.81		910.37
Del Norte	22.15	301.21	92.07	317.39	47.22	2.40	782.44
El Dorado	169.57	1,060.82	172.12	26.46	176.44		1,605.42
Glenn	71.56	867.37	110.25	81.26			1,130.43
Humboldt	281.80	1,210.09	338.01	788.27	96.86	311.50	3,026.54
Inyo	16.63	1,064.22	424.34	59.96			1,565.14
Lake	183.62	609.82	135.75	64.02	45.19		1,038.39
Lassen	53.31	881.54	303.42	607.39		0.20	1,845.86
Mariposa	443.35	117.10	261.38				821.83
Mendocino	104.60	1,013.24	382.51	104.93	208.00	3.30	1,816.58
Modoc	36.11	991.02	177.59	491.29		5.00	1,701.00
Mono	44.93	662.30	314.87	132.23	9.30		1,163.64
Monterey	723.97	1,245.17	287.58	404.89	38.72		2,700.33
Nevada	240.90	568.43	128.79	143.24	44.40		1,125.76
Placer	919.31	1,050.76	154.48	263.93	9.10		2,397.57
Plumas	21.56	682.32	182.33	544.87	15.80	1.50	1,448.37
San Benito	108.97	386.14	92.35	45.20	306.40		939.06
Santa Cruz	291.97	593.80	123.52	0.36	121.49	2.71	1,133.85
Sierra	6.72	392.06	97.58	650.28			1,146.64
Siskiyou	166.82	1,366.21	349.52	1,369.61		0.10	3,252.26
Tehama	108.29	1,089.31	206.13	258.44	2.13	0.60	1,664.90
Trinity		692.30	200.93	811.35	0.13		1,704.71
Tuolumne	26.40	603.42	151.73	308.38	2.16		1,092.09

Source: Caltrans [6]

Table 7-2– Annual VMT for rural counties, 2013

County	Annual VMT (million)						Population	Annual VMT / capita (thousand)
	City	County	State highways	US Forest Service	Other	Total		
Alpine	--	12.7	47.0	0.5	0.2	60.3	1,112	54.2
Amador	16.0	73.5	287.7	0.8	0.0	378.0	36,028	10.5
Calaveras	5.0	136.8	286.9	0.9	2.3	432.0	44,852	9.6
Colusa	10.6	113.3	463.7	0.2	0.4	588.3	21,665	27.2
Del Norte	15.1	57.1	156.2	1.9	5.2	235.5	28,225	8.3
El Dorado	112.9	593.5	863.4	0.3	5.8	1,576.0	182,958	8.6
Glenn	30.1	111.6	332.1	0.7	2.6	477.1	28,628	16.7
Humboldt	228.4	266.0	707.8	3.9	19.0	1,225.1	134,698	9.1
Inyo	5.0	88.3	383.8	0.3	0.7	478.1	18,584	25.7
Lake	80.6	164.9	377.7	0.7	0.9	624.7	64,209	9.7
Lassen	30.8	195.2	253.0	3.7	6.2	488.9	33,686	14.5
Mariposa	--	42.3	107.1	0.3	5.9	155.7	17,890	8.7
Mendocino	80.0	347.7	702.3	0.7	3.6	1,134.4	88,281	12.9
Modoc	6.8	101.2	73.5	4.4	0.7	186.6	9,485	19.7
Mono	9.8	48.1	252.1	1.4	0.3	311.8	14,477	21.5
Monterey	870.2	660.5	2077.7	0.5	83.9	3,692.9	423,943	8.7
Nevada	140.0	306.3	723.2	1.5	1.6	1,172.5	97,808	12.0
Placer	1245.6	504.1	1827.4	2.9	0.3	3,580.2	364,724	9.8
Plumas	6.3	144.7	148.3	6.0	0.6	305.8	19,792	15.5
San Benito	64.0	95.7	351.0	--	10.2	520.9	57,146	9.1
Santa Cruz	444.8	481.7	974.4	--	15.8	1,916.7	270,734	7.1
Sierra	0.9	38.8	59.9	7.1	--	106.7	3,114	34.3
Siskiyou	74.3	214.2	578.2	13.6	1.9	882.2	45,308	19.5
Tehama	79.0	229.3	569.4	2.8	0.1	880.7	64,114	13.7
Trinity	--	46.3	111.0	8.9	0.0	166.2	13,459	12.4
Tuolumne	24.3	249.6	309.1	3.1	0.2	586.3	54,118	10.8

Source: VMT from Caltrans [6]; population from California Department of Finance [3]

Table 7-3– Average and peak daily VMT on state highways by county

County	Daily VMT		Ratio peak/avg	Factor avg/peak
	Avg	Peak		
Alpine	118,496	168,415	1.42	.706
Amador	738,881	865,660	1.17	.855
Butte	1,810,742	1,949,891	1.08	.926
Calaveras	697,429	864,055	1.24	.806
Colusa	1,242,937	1,504,172	1.21	.826
Del Norte	402,859	564,431	1.40	.714
El Dorado	2,386,450	2,780,056	1.16	.862
Glenn	930,550	1,132,622	1.22	.820
Humboldt	1,987,115	2,367,444	1.19	.840
Inyo	1,043,100	1,393,368	1.34	.746
Lake	1,040,685	1,133,716	1.09	.917
Lassen	675,451	897,878	1.33	.752
Mariposa	297,409	382,555	1.29	.775
Mendocino	1,946,778	2,316,531	1.19	.840
Modoc	211,242	270,744	1.28	.781
Mono	701,656	1,085,414	1.55	.645
Monterey	5,597,360	6,514,047	1.16	.862
Nevada	1,809,097	2,146,762	1.19	.840
Placer	5,140,264	5,841,966	1.14	.877
Plumas	387,017	533,125	1.38	.725
San Benito	853,095	990,738	1.16	.862
San Luis Obispo	5,009,764	5,586,025	1.12	.893
Santa Cruz	2,662,190	2,910,703	1.09	.917
Shasta	2,933,451	3,451,433	1.18	.847
Sierra	163,654	237,857	1.45	.690
Siskiyou	1,551,230	1,945,409	1.25	.800
Tehama	1,635,143	1,923,425	1.18	.847
Trinity	315,068	367,513	1.17	.855
Tuolumne	807,521	1,056,036	1.31	.763

Source: Caltrans [11]

As shown in the table, several counties have peak to average daily VMT ratios that exceed 1.3. It can be seen by comparing Table 7-3 to Table 7-2 that the counties that have higher peak to average VMT ratios tend to have higher per-capita VMT.

To better control for the influence of interregional travel, the following equation can be computed to provide an alternative Indigenous VMT per capita metric:

Indigenous VMT per capita = Total VMT * (Peak ADT to Average ADT Factor) / Population

Nevada County Indigenous VMT: 1,172,500 * .840 / 97,808 = 10.07

7.4 SAFETY MEASURES

The recommended safety measures can be calculated using crash records from the California Highway Patrol Statewide Integrated Traffic Records System (SWITRS) and valuations of crashes using national or state values. Table 7-4 and Table 7-5 show national values for crashes by two different types of crash classifications.

Table 7-4– Crash costs – KABCO system

K - Fatality	$ 9,200,000
A - Severe injury	$ 440,125
B - Moderate injury	$ 120,167
C - Minor injury	$ 62,114
O - No injury	$ 6,734

Source: USDOT [15]

Table 7-5– Crash costs – Fatality, injury, PDO

Fatality	$ 9,200,000
Injury	$ 167,264
Property damage only	$ 6,734

Source: USDOT [15

Table 7-6 shows examples of crash costs calculated for rural counties for the years 2010, 2011, and 2012.[1]

[1] At the time of this writing 2012 was the last year for which SWITRs data on crashes were available statewide.

Table 7-6– Crashes by type and total crash valuations for rural counties

County	2010 crashes						2011 crashes						2012 crashes					
	Fatal	Injury			Property damage only	Total value (million)	Fatal	Injury			Property damage only	Total value ($ million)	Fatal	Injury			Property damage only	Total value ($ million)
		Severe	Moderate	Minor				Severe	Moderate	Minor				Severe	Moderate	Minor		
Alpine	1	5	14	14	51	$ 14.3	2	5	23	7	41	$ 24.1	1	7	11	6	40	$ 14.2
Amador	6	28	105	109	266	$ 88.7	11	28	90	101	249	$ 132.3	6	26	77	105	240	$ 84.0
Butte	38	86	330	531	1,029	$ 467.0	19	87	278	432	977	$ 279.9	23	98	296	471	1,034	$ 326.5
Calaveras	11	33	120	111	290	$ 139.0	8	24	111	90	271	$ 104.9	9	20	106	103	242	$ 112.4
Colusa	6	11	40	55	198	$ 69.6	7	15	49	60	210	$ 82.0	4	14	59	38	191	$ 53.7
Del Norte	6	20	74	72	214	$ 78.8	11	20	67	62	179	$ 123.1	7	14	60	49	177	$ 82.0
El Dorado	16	67	275	325	986	$ 236.6	18	58	208	255	814	$ 237.4	19	57	238	312	981	$ 254.5
Glenn	7	12	47	47	200	$ 79.6	3	9	37	52	202	$ 40.6	4	10	37	61	158	$ 50.5
Humboldt	16	66	239	334	1,317	$ 234.6	26	66	252	345	1,306	$ 328.8	28	68	261	351	1,399	$ 350.1
Inyo	6	34	60	41	181	$ 81.1	7	19	40	38	177	$ 81.1	6	23	51	42	178	$ 75.3
Lake	15	38	95	133	357	$ 176.8	15	32	111	113	346	$ 174.8	13	35	112	135	319	$ 159.0
Lassen	9	14	60	55	289	$ 101.5	7	25	70	49	275	$ 88.7	8	18	54	49	231	$ 92.6
Mariposa	4	16	47	27	145	$ 52.1	3	14	41	24	138	$ 41.1	5	17	42	19	143	$ 60.7
Mendocino	19	44	157	212	692	$ 230.9	17	61	176	157	708	$ 218.9	19	65	163	209	766	$ 241.1
Modoc	1	6	25	18	83	$ 16.5	5	8	11	17	78	$ 52.4	1	7	18	13	59	$ 15.6
Mono	5	16	31	37	187	$ 60.3	1	13	24	33	225	$ 21.4	5	8	34	17	220	$ 56.1
Monterey	33	111	446	882	4,029	$ 488.0	46	98	442	833	3,579	$ 595.3	26	115	434	822	3,273	$ 415.1
Nevada	10	36	156	221	832	$ 145.9	6	43	164	186	732	$ 110.3	17	44	153	192	753	$ 211.1
Placer	23	82	424	890	2,671	$ 371.9	24	96	424	923	2,478	$ 388.0	27	79	329	647	1,920	$ 375.8
Plumas	4	23	42	27	145	$ 54.6	9	20	43	35	142	$ 99.9	8	25	39	31	130	$ 92.1
San Benito	4	15	73	98	348	$ 60.6	5	32	72	104	377	$ 77.7	9	26	67	105	293	$ 110.8
San Luis Obispo	17	68	353	562	2,295	$ 279.1	21	85	411	537	2,183	$ 328.1	27	95	395	501	2,153	$ 383.3
Santa Cruz	10	119	388	613	2,263	$ 244.3	8	107	401	625	2,139	$ 222.1	11	116	405	661	2,115	$ 256.2
Shasta	19	75	317	530	1,448	$ 288.6	25	76	258	474	1,377	$ 333.2	25	74	247	313	1,070	$ 318.9
Sierra	3	10	9	14	40	$ 34.2	2	6	4	14	33	$ 22.6	3	4	12	16	33	$ 32.0
Siskiyou	8	27	92	84	318	$ 103.9	12	40	86	83	312	$ 145.6	13	28	78	77	337	$ 148.3
Tehama	12	30	102	140	432	$ 147.5	13	29	126	107	433	$ 157.1	10	31	109	118	459	$ 129.2
Trinity	7	23	30	33	95	$ 80.8	5	22	47	28	118	$ 63.9	1	12	39	24	70	$ 21.1
Tuolumne	7	19	120	151	461	$ 99.7	9	44	91	144	429	$ 124.9	6	45	106	146	451	$ 99.8

Source: Caltrans SWITRS database

8 RESOURCE REQUIREMENTS FOR RECOMMENDED RURAL COUNTY PERFORMANCE MEASURES

An important objective in recommending performance measures for rural counties was to minimize the additional effort required to collect the necessary data and carry out the analyses. Table 8-1 shows the recommended performance measures, data sources, and a qualitative assessment of the resource requirements for collecting the data and calculating the performance measures.

Table 8-1– Estimated resource requirements for recommended rural performance measures

Performance measures	Data sources	Estimated resource requirements
• VMT: • Per capita • By locality (city) • By facility ownership • Local vs. tourist	• HPMS • Caltrans Vehicle Volumes • DOF population estimates	
• Peak V/C ratio or thresholds	• Caltrans Vehicle volumes • HCM 2010 thresholds • Highway geometrics	. 
• Journey to work mode share	• ACS JTW	
• Total accident cost: • Per VMT • Per capita	• SWITRS/TIMS • Same data as for VMT • NHTSA accident costs	
• Transit: operating cost per revenue mile	• Transit agency reports	
• Distressed lane miles • Total and % of total • By jurisdiction • By facility type	• Regional or local pavement management system • Triennial surveys	
• Pavement condition index (PCI) for local roads	• Regional or local pavement management system	
• Land use efficiency	• FMMP • DOF population estimates	

 = minimal (< 1 day)  = moderate (1 – 2 days)  = major study

9 POTENTIAL FUTURE PERFORMANCE MEASURES

9.1 INTRODUCTION

Future planning issues, as well as new federal and state reporting requirements, are likely to require new performance measures. This section discusses potential future performance measures that may be desirable to implement in the future.

9.2 TRANSPORTATION MEASURES

9.2.1 Benefit-cost Analysis

MAP-21 calls for the eventual use of benefit-cost methods to evaluate transportation investment alternatives. Several tools are available to assist in carrying out benefit-cost analysis for transportation including the AASHTO "Red Book" [1], the Caltrans Cal B-C model [4], and the forthcoming NCHRP life cycle cost estimation tool for evaluating intersection treatments [12]; a separate tool, TIMS, is available for calculating benefits and costs of safety projects [14].

Benefit-cost analysis is fairly straightforward in practice. It consists of the following steps:

1. Choose a base alternative. This is usually a "do-nothing" alternative, or an alternative that includes already programmed projects. The base alternative is a "reference alternative" that is used as a baseline for comparing against costs and benefits of other alternative.
2. For each alternative, determine benefits and costs for each year over the lifetime of the alternative.
3. Calculate the *net present value* of benefits and costs of each alternative using a discount factor.[2] This step converts benefits and costs into their value in the current year.
4. Compare investment alternatives based on net present value of benefits and costs. This may be done in several ways, including the following:
    a. Total net benefits
    b. Total cost (whence the term "least-cost planning")
    c. Benefit/cost ratio

Although many tools are available for benefit-cost analysis, some may not be useful for one or more reasons, including being difficult to use, lack of transparency in the assumptions used, or unclear presentation of results. For these and other reasons it is advised that those who are considering using a benefit-cost analysis tool to carefully assess whether or not it meets their needs. Once the basic principles of

[2] The discount factor is typically set to the average *real* (i.e., excluding inflation) long-term return on capital investments in the U.S. plus a factor for risk. A reasonable discount rate for long-term transportation investments is 4%.

benefit-cost analysis are understood, it is fairly straightforward to carry out benefit-cost calculations using a simple spreadsheet.

The following are some things to note about benefit-cost analysis:

- Costs include the following:
  - Planning costs for the project
  - Capital costs (materials, construction, etc.)
  - Ongoing operating and maintenance costs
- Benefits are computed relative to the base alternative; e.g., travel time benefits of an alternative are calculated as the cost of travel time for the alternative minus the cost of travel time for the base case. Benefits include the following:
  - User travel time or delay costs
  - Costs of travel time reliability
  - Safety costs (total value of crashes)
  - Air pollution costs
  - Greenhouse gas costs
  - Health improvements due to greater use of pedestrian and bicycle modes
- Benefit-cost analysis requires staff time to provide the necessary inputs and to carry out the analysis. User benefits such as travel time or delay are almost always carried out as part of an engineering analysis for a project, and are therefore readily available for the analysis. Other potential inputs such as safety costs may require additional staff effort to estimate. Operating and maintenance costs are typically the most difficult to estimate, as there is no standard procedure for estimating them; and these costs will vary by agency depending primarily on individual maintenance policies.
- No planning agency has the resources to calculate benefits for each year over the lifetime of the project. Typically what is done is to calculate benefits for the opening year and an "end year" at the end of the project lifetime. Benefits for intermediate years are estimated by interpolating between end year and opening year benefits.
- Some benefits may be *de minimis* or may not differ significantly between alternatives; e.g., air pollution emissions or travel time reliability may not be significant in some rural areas. In such cases these may be safely excluded from the analysis.

Benefit-cost analysis offers some significant advantages over other evaluation methods such as scoring, including the following.

- It provides consistency to an evaluation. All benefits and costs are calculated the same way.
- By bringing all benefits and costs to a present value, benefit-cost analysis allows comparisons between projects with different time horizons.
- Although benefit-cost analysis may not be the sole criterion for decision-making on transportation investments, experience has shown that it can be highly useful in separating out projects that perform well from those that perform poorly.

9.2.2 Complete Streets

Complete streets analysis has recently become a significant planning initiative given the passage of AB 1358 (Complete Streets Act). The typical rural application is when a state highway serves as the "Main Street" for a small city or unincorporated community. The concept behind complete streets analysis is that a roadway should be evaluated for all modes that share the right-of-way: automobiles, transit riders, pedestrians, and bicyclists. It can be performed at the both the roadway section and intersection scales. Complete streets analysis is now included in the Highway Capacity Manual as multimodal level of service analysis. Caltrans now provides guidance for complete streets analysis [7].

A complete streets analysis is carried out at the individual street level. Data required for a complete streets analysis typically includes geometric characteristics of streets and sidewalks, intersection characteristics, and traffic volumes. Given that most of the required data relates to the physical characteristics of the roadway profile, much of the data can be acquired using Google Earth. Given that these data do not significantly vary over time – traffic volume data is typically the only data item that requires updating. Hence, significant amounts of staff time beyond the initial set up is not typically required. Although application of complete streets multi-modal level of service analysis is appropriate and feasible in rural areas for small corridors or single spot locations, it is unlikely that rural counties would have the resources to carry out a county-wide complete streets analysis.

9.3 LAND USE MEASURES

9.3.1 Compact Development/Housing Density

Compact development and higher housing densities are an indicator of clustered development patterns, which can help lower community infrastructure costs, enable a variety of transportation choices, promote healthier lifestyle choices (e.g., active transportation), and protect natural resources and farmland. Compact development patterns typically have a high quality pedestrian and bike networks and a variety of land uses within walking distance of each other. They can allow residents to easily access services and jobs or allow drivers to park once and take care of many errands and activities without getting in their cars again. As a result, compact development patterns can help reduce greenhouse gas emissions, congestion, roadway impacts, and vehicular safety hazards.

Rural and small regions can measure compact development by calculating and comparing over time the ratio of acres developed and the number of dwelling units constructed for a given time period. A gross calculation of compact development could be quickly generated by comparing California Department of Conservation Farmland Mapping and Monitoring Program data, which provides acres of land converted to urban uses, with California Department of Finance housing estimates. A more detailed analysis could also be conducted using building permit data from local agencies within a jurisdiction. The frequency of updates to FFMP and DOF data would allow rural and small regions to track compact development trends every two years. Using local data, regions could track compact data as frequently as desired.

9.3.2 Housing Efficiency

Housing efficiency is a subset of Land Use Efficiency and Compact Development, but provides more insights about how different housing types are shaping urbanized areas and how conducive they are to promoting transit use and active transportation. While detached single family dwellings in a rural or suburban setting typically spread residents across a greater geographic area, attached unit types and multifamily dwellings can increase population densities. Concentrations of housing and residents can provide greater support for commercial activities, which serve nearby residents. As housing types become more compact and densities increase, there are greater opportunities for residents to walk or bike to shopping, services, and jobs.

Rural and small regions could measure housing efficiency by tracking the percentage of residential uses by type and location. The California Department of Finance annually releases housing unit estimates for each county and city within the state. This data is broken down by unit type, including: total units, single detached, single attached, two- to four, five plus, and mobile homes. It also includes an estimate of persons per household. The frequency of updates to this data would allow rural and small regions to track changes in housing efficiency annually.

9.3.3 Employment/Housing Ratio

A workforce that lives near jobs can help reduce trip lengths and vehicle miles traveled and provide opportunities for active transportation and transit use. Typically, regions use a ratio of jobs to housing as a measure of the effectiveness of land use patterns to achieve the aforementioned outcomes. However, jobs/housing ratios require access to jobs data. As an alternative, regions can track the employment to housing ratio to measure the effectiveness of land use patterns to provide local employment opportunities to residents living in a given area. Areas with an optimal ratio of employed residents to housing units (typically estimated at 1.0 to 1.5) would indicate that there are sufficient jobs to meet local workforce needs. However, high unemployment or a low employment/housing ratio could indicate that additional job opportunities are needed to reduce residents need to travel further to find work. Conversely, if the employment housing ratio is high, there may be a need for additional housing options in an area.

Rural and small regions could measure the ratio of employed and unemployed residents to housing units by location. The California Department of Finance annually releases housing unit estimates for each county and city within the state. The California Employment Development Department monthly releases labor force and employment data for most counties, cities, and census designated places within the state. The frequency of updates to this data would allow rural and small regions to track changes in employed and unemployed residents to housing annually.

9.3.4 Agricultural Land/Open Space Conversion

Agricultural lands and open space areas are finite resources. Rarely do areas developed for urban uses return to a natural state or to active farmland. Development patterns and the transportation systems that serve developed areas have a direct impact on how quickly agricultural and open space lands are converted to urban uses. Lower density development and growth-inducing transportation improvements can

accelerate the loss of farmland and open space, while more compact forms of development and alternative transportation improvements can limit farmland and open space conversion.

Rural and small regions could measure agricultural land and open space conversion by calculating and tracking the number of acres of agricultural lands and open space converted to urban uses. The California Department of Conservation biannually publishes data on the number of acres of agricultural and open space lands developed for each county in the state through the Farmland Mapping and Monitoring Program. Data is produced in both tabular form and as a geographic information system shapefile. The frequency of updates to this data would allow rural and small regions to track farmland and open space losses biannually.

10 POTENTIAL COOPERATIVE EFFORTS AMONG RURAL COUNTIES

The Rural Counties Task Force, as a group, or a small number of Regional Transportation Planning Agencies (RTPA) partnering together could jointly pursue opportunities to fund performance monitoring, data collection or planning studies to enhance performance monitoring across the rural counties. This approach could be of benefit to all participating rural counties and assist smaller RTPAs that might not have the available resources to pay for these activities. Some examples of potential data collections or studies include the following:

- Traffic counts on roads that cross county borders, paid for by adjacent counties
- Pavement monitoring on roads that cross county borders
- Development of analysis tools
- Planning studies for projects that affect adjacent counties
- Planning studies for the Rural County Task Force as a whole, such as:
    - Ways to improve data collection efficiency
    - How to carry out benefit-cost analyses that meet the special needs of rural counties
    - Developing project selection methods for safety improvements for rural counties that account for the special nature of safety issues in these counties
    - Developing spreadsheet tools to facilitate data collection and analysis for performance measures

Although any combination of RCTF member agencies can independently collaborate to pool resources for a joint effort, the RCTF provides an established and convenient forum to discuss and examine such opportunities. In some cases, a particular planning need in one or more rural counties may have broader interest among the RCTF as a whole. This could provide an opportunity for greater sharing of resources with potential benefits to the RCTF member agencies as a whole. It is recommended that the RCTF and its member agencies continue to use the RCTF as a collaborative vehicle for identifying joint efforts that could yield wider benefits and more effective expenditure of limited planning resources.

11 SUMMARY AND RECOMMENDATIONS

11.1 INTRODUCTION

This study was commissioned in response to a set of performance measures developed for the CTC by the SANDAG Study. The SANDAG Study performance measures were developed solely for urban areas; rural county RTPAs did not participate in the development process. Hence, the performance measures developed by SANDAG almost exclusively address the needs of urban areas.

From the standpoint of the rural county RTPAs, the performance measures recommended by SANDAG raise several important issues:

- Rural counties in general have far less access to the data sources on which the performance measures recommended by the SANDAG are based.
- Performance measures based on population or population density tend to favor urban over rural areas.
- Transportation issues in rural areas are significantly different from those in urban areas, and therefore require different performance measures to address them.
- RTPAs in rural areas have far fewer resources available for performance monitoring.

RCTF commissioned this study to develop a set of recommended performance measures that specifically take into account the information needs and resource constraints of the needs of rural county RTPAs in California.

11.2 CURRENT PERFORMANCE MEASUREMENT PRACTICE IN RURAL COUNTIES

Our review of current performance measurement practice among rural counties revealed the following:

- All rural county agencies have performance measures in place.
- The main transportation issues in rural and small urban regions differ significantly from those in urban counties.
- Practices vary widely among rural RTPAs.
- Goals, objectives, and performance measures are different among different RTPAs.
- Data availability and staff resources are the main barriers to maintaining performance measures in rural and small urban regions.
- Population-based performance measures can be biased against lower population counties.
- The current set of recommended performance measures does not account for significantly different definitions of user population between rural and urban counties, in particular, tourist visitation and through traffic.
- Current performance measures do not take into account the value provided by rural and small urban regions to the State of California as a whole, particularly providing facilities and services that make the State of California more economically attractive to businesses.

11.3 PERFORMANCE MEASURES

The recommended performance measures were developed according to the following criteria:

1. Measurement-based rather than model-based
2. Alignment with California state transportation goals and objectives
3. Capability of informing current goals and objectives of each rural and small urban RTPA
4. Applicability across all rural and small urban regions
5. Capability of being linked to specific decisions on transportation investments
6. Minimize resource requirements on rural and small urban RTPAs
7. Normalized for population to provide equitable comparisons to urban regions

The following is a summary of the recommend performance measures for rural county RTPAs:

Measure	Source	Website
Vehicle Miles Traveled (VMT) Per Capita By Locality By Facility Ownership Local vs. Tourist	Mobility Reporting	http://www.dot.ca.gov/hq/traffops/sysmgtpl/MPR/index.htm
	California DOF	http://www.dof.ca.gov/research/demographic/reports/estimates/e-2/view.php
	HPMS	http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/prd/2013prd/2013PRD-revised.pdf
Peak V/C Ratio or Thresholds	Traffic Counts: K and D Factors	http://traffic-counts.dot.ca.gov/
Journey to Work Mode Share	American Community Survey	http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml
Total Accident Cost Per VMT Per Capita	Transportation Injury Mapping System	http://tims.berkeley.edu/login.php?next=/tools/bc/main1.php#
	SWITRS TASAS	http://iswitrs.chp.ca.gov/Reports/jsp/userLogin.jsp Caltrans Public Information Request Form
Transit Operating Cost per Revenue Mile	Local Transit Providers	
Distressed Lane Miles Total and % Total By Jurisdiction By Facility Type	Federal Highway Administration	http://www.fhwa.dot.gov/tpm/rule/pmfactsheet.pdf
	Regional or local pavement management system	https://www.federalregister.gov/articles/2015/01/05/2014-30085/national-performance-management-measures-assessing-pavement-condition-for-the-national-highway
Pavement Condition Index (PCI) for Local Roads	Regional or local pavement management system	
Land Use Efficiency	Farmland Mapping and Monitoring Program (FMMP) DOF Annual population estimates	http://www.conservation.ca.gov/dlrp/fmmp

Each of these performance measures can be calculated from readily available resources. None require a significant amount of staff time to develop.

11.4 POTENTIAL FUTURE PERFORMANCE MEASURES

Future needs of rural county RTPAs or new federal and state requirements performance measures that might be incorporated into future planning efforts by rural county RTPAs include the following:

- Benefit-cost analysis
- Complete streets analysis
- Land use measures

These measures offer potential benefits for rural county RTPAs by providing a more complete picture of transportation system performance. Benefit-cost analysis, in particular, offers a systematic way of comparing different types of transportation investment alternatives. It is recommended that in the future these performance measures be considered on a county-by-county basis for their applicability to individual county performance monitoring needs (see also Section 9).

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APPENDIX A – PERFORMANCE MEASURE FACT SHEET

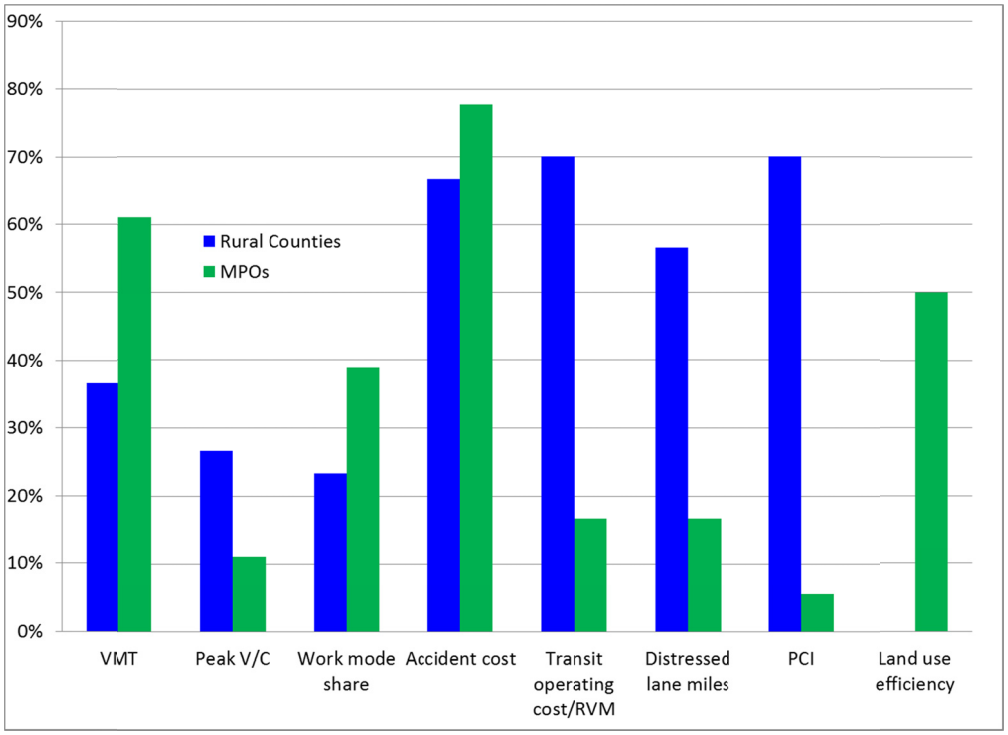
WHY HAVE PERFORMANCE MEASURES?

- Provide a "report card" on transportation system performance
- Help identify potential actions by planning agency
- Inform decisions on transportation system: management, operations, investment

THEREFORE, PERFORMANCE MEASURES SHOULD …

- Align with federal and state goals and objectives
- Inform local agency goals and objectives
- Provide information for local agency decision making
- Be feasible: within bounds of resource capabilities of agency
- Avoid bias

RURAL RTPAS CURRENTLY USE PERFORMANCE MEASURES



RURAL AND URBAN AREAS NEED DIFFERENCE PERFORMANCE MEASURES

- Rural areas have different priorities, primarily:
  - System maintenance and connectivity
  - Safety
  - Maintaining lifeline transit service
- Urban areas are mainly concerned with
  - Air pollution
  - Congestion
  - Reliability
  - Transit for choice riders

- Congestion and reliability
  - Primarily a concern in urban areas
  - Benefit-cost ratios higher in urban areas because of higher traffic densities
- Safety
  - Strict benefit-cost measures favor urban areas because of higher traffic volumes
  - Per-capita cost of accidents takes into account higher proportion of fatal crashes in rural counties
- Traditional performance measures do not recognize added value provided by rural areas
  - Recreational services for urban dwellers
  - Agriculture – food supply – for urban areas
  - Vital trucking links to get freight to urban areas
- Urban areas have greater access to data sources: PeMS, HPMS
- Urban areas have larger budget and staffing for maintaining performance measures

Summary of recommended performance monitoring performance measures

Performance measures	**Data sources**	**Estimated resource require-ments**
VMT: • Per capita • By locality (city) • By facility ownership • Local vs. tourist	• HPMS • Caltrans Vehicle Volumes • DOF population estimates	
Peak V/C ratio or thresholds	• Caltrans Vehicle volumes • HCM 2010 thresholds • Highway geometrics	. 
Journey to work mode share	• ACS JTW	
Total accident cost: • Per VMT • Per capita	• SWITRS/TIMS • Same data as for VMT • NHTSA accident costs	
Transit: operating cost per reve-nue mile	• Transit agency reports	
Distressed lane miles • Total and % of total • By jurisdiction • By facility type	• Regional or local pavement management system • Triennial surveys	
Pavement condition index (PCI) for local roads	• Regional or local pavement management system	
Land use efficiency	• FMMP • DOF population estimates	

 = minimal (< 1 day)  = moderate (1 – 2 days)  = major study

RCTF – Performance Measures Fact Sheet

Measure	Source	Website
Vehicle Miles Traveled (VMT) Per Capita By Locality By Facility Ownership Local vs. Tourist	Mobility Reporting	http://www.dot.ca.gov/hq/traffops/sysmgtpl/MPR/index.htm
	California DOF	http://www.dof.ca.gov/research/demographic/reports/estimates/e-2/view.php
	HPMS	http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/prd/2013prd/2013PRD-revised.pdf
Peak V/C Ratio or Thresholds	Traffic Counts: K and D Factors	http://traffic-counts.dot.ca.gov/
Journey to Work Mode Share	American Community Survey	http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml
Total Accident Cost Per VMT Per Capita	Transportation Injury Mapping System	http://tims.berkeley.edu/login.php?next=/tools/bc/main1.php#
	SWITRS TASAS	http://iswitrs.chp.ca.gov/Reports/jsp/userLogin.jsp Caltrans Public Information Request Form
Transit Operating Cost per Revenue Mile	Local Transit Providers	
Distressed Lane Miles Total and % Total By Jurisdiction By Facility Type	Federal Highway Administration	http://www.fhwa.dot.gov/tpm/rule/pmfactsheet.pdf
	Regional or local pavement management system	https://www.federalregister.gov/articles/2015/01/05/2014-30085/national-performance-management-measures-assessing-pavement-condition-for-the-national-highway
Pavement Condition Index (PCI) for Local Roads	Regional or local pavement management system	
Land Use Efficiency	Farmland Mapping and Monitoring Program (FMMP) DOF Annual population estimates	http://www.conservation.ca.gov/dlrp/fmmp

APPENDIX B – PERFORMANCE MEASURE MATRIX

ID	Transportation Indicators/Performance Measures	Apline CTC	Amador CTC	Calaveras CAG	Colusa CTC	Del Norte LTC	El Dorado CTC	Glenn CTC	Humboldt CAG	Inyo County LTC	Lake County/City APC	Lassen CTC	Mariposa CLTC	Mendocino CG	Modoc CTC	Mono CLTC	TA for Monterey County	Nevada CTC	Placer CTPA	Plumas CTC	San Benito COG	Santa Cruz CRTC	Sierra CLTC	Siskiyou CTC	Tehama CTC	Trinity CTC	Tuolumne CTC	MTC (ABAG)	SACOG	SANDAG	SCAG	AMBAG	BUTTE CAG	SBCAG	SHASTA RTA	SLO COG	TAHOE MPO	FRESNO COG	KERN COG	KINGS COG	MADERA CTC	MERCED CAG	SJCOG	STAN COG	TULARE CAG	SIV BLUEPRINT	RSPMT Caltrans	SANDAG Study	Bay to Basin Study
	I. Congestion/Delay/Vehicle Miles Traveled																																														
A-1	Congested VMT - total, per capita, by source - total, per capita, per job, for household-generated								■					■					■		■								■			■	■		■			■				■						■	■
A-2	Congested VMT, percent of total auto/transit travel in congested conditions (peak/all day)						■												■																		■						■				■	
A-3	Congestion, average level in hours										■							■	■																			■	■			■	■				■		
A-4	Person delay by facility type (mixed flow, HOV, arterials), per capita in minutes																													■							■											
A-5	Traffic volumes										■		■						■						■		■								■	■	■										■		■
A-6	Truck delay by facility type (highway arterials)																				■									■																		
A-7	Vehicle delay, daily, per capita																		■											■			■		■								■						
A-8	Vehicle miles traveled per capita (VMT)*, Total VMT, per capita or per job (percent change)						■											■		■						■	■	■	■	■	■		■	■	■	■	■		■				■						
A-9	VMT - commute VMT, per worker & household-generated, by community type and regional										■																			■																		
A-10	VMT - commute share of household-generated VMT																													■																		
A-11	VMT - weekday household-generated VMT, per capita by community type, by TPA																													■																		
A-12	VMT - weekday VMT, total and average annual growth																													■						■												
A-13	VMT - weekday VMT, by source and total, by source per capita/per job																													■				■														
A-13.1	VMT - daily vehicle miles of delay																		■															■													■
	II. Mode Share/Trips																																															
A-14	Bike and walk mode share in EJ and non-EJ areas																												■																		
A-15	Bike and walk trips to total trips (percent), total						■		■								■					■						■		■			■	■	■	■						■		■				
A-16	Mode share - all trips (percent trips auto, transit, bike, walk) (percent total alternative), daily						■		■								■					■						■						■	■	■	■					■	■				
A-17	Mode share - non-commute																■		■			■							■										■									
A-18	Mode share - work trips/commute (peak periods): drive alone, carpool, transit, bike/walk								■									■	■			■					■		■	■								■								■		
A-19	Mode share - workers (percent trips auto, transit, bike, walk)																					■												■	■	■							■					
A-20	Mode share - to commercial and recreation sites																					■																										
A-21	Mode share - within, to and from the Region								■								■					■															■										
A-22	Peak highway trips																																			■			■	■									
A-23	Peak period trips (percent) within 1/2 mile of transit stop																														■										■							
A-24	Peak transit trips																																			■			■	■									
A-25	Transit mode share, Environmental justice (EJ) and non-EJ areas																												■																				■
A-26	Trips by transit, walk, bike, per capita, weekday, by community type, by TPA																	■											■										■				■						
A-27	Trips, daily (percent) within 1/2 mile of transit stop																														■			■									■						
A-28	Vehicle occupancy, average (AVO)																														■					■												
A-29	Vehicle trips x occupancy rate, peak, daily average																																	■														
A-30	Vehicle trips, average peak period, average daily			■																													■		■	■												
A-31	Work trip travel speed (MPH) (average) by mode (drive alone, carpool, transit)																														■					■												
A-32	Total interregional passenger miles traveled																														■						■											
A-33	Average weekday freeway travel per capita																														■																	
A-33.1	Mode share - sinle occupancy vehicle as a percentage																																	■														
	III. Safety																																															
A-34	Accident rates, percent reduction		■						■		■		■	■			■				■	■			■		■		■					■		■	■										■		
A-35	Bicycle and Pedestrian Collisions								■		■				■			■		■					■	■	■								■	■												
A-36	Bicycle fatalities, injuries								■		■				■			■		■					■	■	■				■	■			■	■												
A-37	Collision/accident rates by severity, by mode								■	■	■			■	■		■	■		■		■			■	■	■								■											■		
A-38	Collisions per VMT, total vehicle collisions			■			■		■	■	■			■	■		■	■		■		■			■	■	■				■				■	■	■				■						■	■
A-39	Fatalities/injuries, all collisions per VMT/accident statistics, annual av. daily traffic, reductions	■		■		■			■	■	■		■	■			■				■	■			■		■	■		■	■	■	■	■	■		■	■	■		■	■		■	■			■	
A-40	Fatalities per passenger miles, by transit mode share										■																						■		■	■												
A-41	Household growth (percent new) in areas with historically high fatal or severe injury collisions																											■																				
A-42	Pedestrian facilities, injuries, and fatalities													■				■		■					■	■				■					■	■												
A-43	Property damage per VMT			■									■												■										■													
Other	Fatalities / serious injuries per capita						■																																								■	
	IV. Transit/Bicycle/Pedestrian (Alternative)																																														
A-44	Bicycle route mileage by county, increases in miles, ratio of completed network			■					■							■	■					■					■		■			■		■								■						
A-45	Bike routes per 100,000 population																										■		■							■												
A-46	Farebox revenues as percent of operating costs (farebox recovery rate)			■		■		■	■	■	■		■	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■			■		■		■												
A-47	Park-and-ride lot use and number																										■									■												■
A-48	Transit assets, (reductions), share of assets exceeding their useful life								■																			■																				■	
A-49	Transit fares, average cost (RTAC)						■		■		■			■			■					■		■			■								■	■												
A-50	Transit passengers, per vehicle revenue mile						■		■		■			■			■					■					■						■														■		
A-51	Transit vehicle - weekday service hours, per day by transit type (increases)																							■			■		■			■		■	■								■					
A-52	Transit/urban passenger rail ridership, service			■		■										■											■		■		■		■		■	■								■	■			
A-53	Weekday boardings per service hours																										■		■						■												
A-54	Weekday passenger boardings					■			■		■			■			■	■				■					■		■						■	■												
Other	Ridership by age			■																																												
Other	# of people living within 1/4 mile of transit stop or route																								■																							
Other	# of people living within 1/2 mile of transit stop or route																																															
Other	Jobs within 1/2 mile of transit stop						■																																									
Other	Mean travel time to work						■																																										
	V. Transportation System Investment/Preservation/Service/Fuel Use																																														
A-55	Distressed lane miles, (total and percent), by jurisdiction			■		■	■	■	■	■			■				■	■		■		■	■		■	■		■				■	■		■												
A-56	Expenditures vs. passenger miles traveled - highway, transit, EJ/non-EJ																					■																■										
A-57	Investment in active transportation (percent of total plan)																■				■	■																■										
A-58	Investment, per passenger mile traveled, av. daily; balanced; comparison by type, EJ areas		■														■					■																■	■			■		■	■			
A-59	Investment to serve major employment areas					■											■					■																■	■		■			■				
A-60	Maintenance dollars per lane mile (percent change)																				■																■										
A-61	Pavement Condition Index, local roads			■	■	■		■	■		■	■	■		■		■	■		■		■	■	■	■	■	■				■			■	■										■		■
A-62	Person miles of travel compared to percent of transportation investments, EJ/non-EJ TAZ						■										■					■																							■			
A-63	Project maintenance funded over time			■		■																																	■					■				
A-64	Quality of service, change in average trip delay on roadway projects inside EJ/non-EJ TAZ																■					■																							■			
A-65	Roadway level of service (LOS)/VMT; by segment, operating LOS D , E or worse (EJ/non-EJ areas)			■	■			■			■	■	■	■		■		■		■				■	■	■	■					■	■	■	■	■								■		■
A-66	Roadway utilization/optimal use, return on investment (ROI) on transportation investments	■								■																			■																■		
A-67	Vehicle fuel consumption*, per capita, total								■								■					■											■														

ID	Transportation Indicators/Performance Measures	Apline CTC	Amador CTC	Calaveras CAG	Colusa CTC	Del Norte LTC	El Dorado CTC	Glenn CTC	Humboldt CAG	Inyo County LTC	Lake County/City APC	Lassen CTC	Mariposa CLTC	Mendocino CG	Modoc CTC	Mono CLTC	TA for Monterey County	Nevada CTC	Placer CTPA	Plumas CTC	San Benito COG	Santa Cruz CRTC	Sierra CLTC	Siskiyou CTC	Tehama CTC	Trinity CTC	Tuolumne CTC	MTC (ABAG)	SACOG	SANDAG	SCAG	AMBAG	BUTTE CAG	SBCAG	SHASTA RTA	SLO COG	TAHOE MPO	FRESNO COG	KERN COG	KINGS COG	MADERA CTC	MERCED CAG	SJCOG	STAN COG	TULARE CAG	SJV BLUEPRINT	RSPMT Caltrans	SANDAG Study	Bay to Basin Study
		Metropolitan Planning Organizations (MPO)																																											Other State Agency Reports		
A-68	Travel Demand Management (employer-based trip reduction, commute connection programs)																	■																													
A-69	Freight tonnage and value imported/exported at regional gateways, by mode																												■			■															
A-70	Percent of trans investments towards maintenance/rehab and operation improvements			■													■			■						■																					
A-70.1	Pavement condition - Percent of distressed lane miles	■			■	■		■	■		■	■			■		■	■		■			■	■	■	■	■			■			■		■								■			■	
Other	Intelligent Transportation Systems (ITS)															■																															
Other	Pavement Surface Evaluation Rating (PASER)	■																																													
	VI. Travel Distance/Times/Costs																																															
A-71	Commute hours, weekday, by mode																											■										■										
A-72	Commuter savings, money, (net)																																■														
A-73	Commuter savings, time (net)																																■														
A-74	Costs of driving, daily (RTAC)									■																																						
A-75	Time to destinations										■			■			■					■																								■	■		
A-76	Time to transportation system										■						■					■																						■	■		■			
A-77	Travel distance, all trips, work and non-work (average) (miles)										■																			■			■	■	■		■							■				
A-78	Travel on regional road network that is delayed, percent of daily travel													■										■																			■					
A-79	Travel time distribution for transit, SOV, & HOV, for work and non-work trips						■															■								■					■												
A-80	Travel time, overall (average)	■								■																									■	■								■				
A-81	Travel time, non-peak period (average), non-work trip (average)																					■						■							■	■												
A-82	Travel time, peak period trip (average) , by mode for EJ and non-EJ a.m./p.m., TAZ																					■											■		■	■			■	■							
A-83	Travel time and travel distance savings (distribution)																															■															
A-84	Travel time to job centers - work trip (average min.), commute length (distribution), (mode)													■							■						■		■	■		■		■		■		■	■							
A-85	Trip delay time in hours (average)	■																					■									■		■				■								■		
A-86	Trip time (average) for low-income and minority communities																																														
A-87	Work trips less than three miles (percent of total)																■																						■								
A-88	Annual transit passenger miles per capita																													■																
Other	Travel time reliability						■						■														■																			■	■	
Other	Transit travel time reliability						■																																									
Other	Transit Frequency												■														■																					
	**** 2010 California Regional Progress Report Indicator***																																														
	VII. Environmental Quality																																															
	Air Quality/Air Emissions; Particulate Emissions Regulations															■					■						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			■	
	Environmental Protection and Enhancement; Short term and long term												■			■					■						■		■	■	■	■															■	
	GHG emissions	■																			■						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			■	
	Compliance with State air quality standards and procedures (SB375)	■		■																	■						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
	Environmental Justice	■																			■						■		■	■	■	■													■			■	
	Compliance with environmental criteria from CEQA and NEPA	■		■									■								■						■		■			■		■		■	■			■								
	VIII. Economic Impact																																														
	Sales tax revenue generated by visitors	■																																		■	■										
	IX. Aviation																																														
	Airport usage data														■																					■	■										
	X. Summary performance measures																																														
Other	Return on investment		■				■																				■																				
Other	Cost/benefit		■																																												
Other	Benefit per income and ethnic group																										■																				

ID	Land Use Indicators/Performance Measures	Apline CTC	Amador CTC	Calaverals CAG	Colusa CTC	Del Norte LTC	El Dorado CTC	Glenn CTC	Humbnoldt CAG	Inyo County LTC	Lake County/City APC	Lassen CTC	Mariposa CLTC	Mendocino CG	Modoc CTC	Mono CLTC	TA for Monterey County	Nevada CTC	Placer CTPA	Plumas CTC	San Benito COG	Santa Cruz CRTC	Sierra CLTC	Siskiyou CTC	Tehama CTC	Trinity CTC	Tuolumme CTC	MTC (ABAG)	SACOG	SANDAG	SCAG	AMBAG	BUTTE CAG	SBCAG	SHASTA RTA	SLO COG	TAHOE MPO	FRESNO COG	KERN COG	KINGS COG	MADERA CTC	MERCED CAG	SJCOG	STAN COG	TULARE CAG	SJV BLUEPRINT	RSPMT Caltrans	SANDAG Study	Bay to Basin Study
		Metropolitan Planning Organizations (MPO)																																												Other State Agency Reports		
	I. Ag Land/Open Space Conversion/Use																																															
B-1	Agriculture (ag) land conserved, prime farmlands avoided																																														
B-2	Ag land and open space retained (percent) per year in incorporated and unincorporated areas																																														
B-3	Ag lands acres directly impacted by transportation improvements																																														
B-4	***Conversion of ag lands to urban & built-up uses*** *																																														
B-5	Farmland acres developed - total and per capita/important farmland consumed due to new																																														
B-6	Farmland, acres of impact from growth and transportation projects, by type of farmland																																														
B-7	Household growth (percent new) in areas with prime farmland or critical habitat																																														
B-8	Williamson Act contract acres impacted (percent)																																														
B-9	Habitat conserved within designated preserve areas																																														
Other	Acres of prime farmland avoided																																														
Other	Preserves cultural resources important to tourism or Native Americans																																														
	II. Compact-Infill Development/Density/Land Use																																														
B-9	Compact development: growth in population compared with acres developed																																														
B-10	Commercial core areas (share) meeting pedestrian and transit-oriented development design																																														
B-11	Constrained lands (gross acres) consumed for transit and highway infrastructure																																														
B-12	Development (percent occurring) within Butte Regional Conservation Plan-urban permit areas																																														
B-13	Dwelling units per acre																																														
B-14	Household growth (percent new) in areas with existing housing densities above 6 units/acre																																														
B-15	Household growth (percent new) in areas considered walkable																																														
B-16	Household growth (percent of new) in areas with highest access to frequent transit																																														
B-17	Household growth (percent new) in areas with lowest current VMT per capita																																														
B-18	Households and employment, share of region's growth, within 1/2 mile of bus rapid																																														
B-19	Land consumption, acres consumed due to new development																																														
B-20	Land urbanized (acres), development, per capita (acres), developed acres by community type																																														
B-21	Land use mix by community type (percent of new development-infill redevelopment, greenfield)																																														
B-22	Non-agricultural development within the urban footprint																																														
B-23	Population (percent of EJ area and non-EJ area) in community types and TPAs																																														
B-24	Residential density (average) by community type, for new growth (RTAC)																																														
B-25	Residential + employment densities (average) (RTAC)																																														
B-26	Street pattern in different community types (change in)																																														
B-27	Transit areas, high quality, households & employment share of growth																																														
B-28	Zoning capacity (new) less than or equal to du/acre within 1/4 mile of frequent and reliable																																														
Other	Livable community design standards																																														
Other	Per Capita Acres of Developed Land																																														
Other	Building Permits Issued																																														
	III. Housing Development																																														
B-29	Housing growth, (percent new), by community type, in areas with existing job densities above 5																																														
B-30	Housing growth, (new) within 1/2 miles of transit stops, quality transit																																														
B-31	Housing product mix by community type, (growth), change in mix																																														
B-32	Housing product mix in EJ and non-EJ areas by community type, change, new mix in TPAs																																														
B-33	Housing type, by percent																																														
B-34	Housing units (percent) expected to be constructed in 200-year flood plain																																														
B-35	Housing unit capacity (percent new) accommodated by infill development																																														
Other	% of develoment within HCP																																														
Other	% high density low income housing within 1/4 mile of existing transit stop																																														
Other	Percent of higher density low income housing																																														
Other	Percent of minority area population within 1/4 mile of existing transit stop																																														
	IV. Jobs/Housing Balance																																														
B-36	Jobs-Housing balance - changes in ratio,within 4-mile radius of employments centers (RTAC)																																														
	V. Urban Greening																																													
B-37	Urban greening *																																														
**** 2010 California Regional Progress Report Indicator***																																															

ID	Economic Competitiveness & Opportunity Indicators/Performance Measures	Apline CTC	Amador CTC	Calaverals CAG	Colusa CTC	Del Norte LTC	El Dorado CTC	Glenn CTC	Humbnoldt CAG	Inyo County LTC	Lake County/City APC	Lassen CTC	Mariposa CLTC	Mendocino CG	Modoc CTC	Mono CLTC	TA for Monterey County	Nevada CTC	Placer CTPA	Plumas CTC	San Benito COG	Santa Cruz CRTC	Sierra CLTC	Siskiyou CTC	Tehama CTC	Trinity CTC	Tuolumme CTC	MTC (ABAG)	SACOG	SANDAG	SCAG	AMBAG	BUTTE CAG	SBCAG	SHASTA RTA	SLO COG	TAHOE MPO	FRESNO COG	KERN COG	KINGS COG	MADERA CTC	MERCED CAG	SJCOG	STAN COG	TULARE CAG	SJV BLUEPRINT	RSPMT Caltrans	SANDAG Study	Bay to Basin Study
	Metropolitan Planning Organizations (MPO)																																															
	Other State Agency Reports																																														
	I. Economically Disadvantaged/Gentrification/Reinvestment																																														
C-1	Gentrification and displacement																													■																		
C-2	Higher density low income housing, percent																																■															
C-3	Household growth (percent new) in areas with a mean school API less than 800																											■																			
C-4	Household growth (percent new) in areas with highest violent crime rates																											■																			
C-5	Household growth (percent new) in census tracts that are majority rental																											■																			
C-6	Housing growth (percent new) in areas with high poverty concentration																											■																			
C-7	Housing growth (percent new) in areas that are majority people of color																											■																			
C-8	Housing growth through reinvestment																												■																		
	II. Jobs (Employment)/Economy/Productivity																																															
C-9	***Green employment & establishments****																																															
C-10	Gross regional product (GRP) (net contribution to, increase)																											■			■																	
C-11	***Job growth* (overall), job growth by community type, in different community types by sector***																												■						■	■											
C-12	Job growth through reinvestment																												■																			
C-13	Jobs (additional) supported by improving competitiveness																														■																	
C-14	Jobs (additional) supported by transportation investment																														■																	
C-15	Net commuter savings (time)																																		■	■											
C-16	Net commuter savings (money)																																		■	■											
C-17	***Wage growth****																																															
C-18	Per capita income in region																														■																	
C-19	Retail gasoline sales per capita by County (millions of gallons)																														■																	
	III. Housing/Jobs/Transportation Accessibility																																															
C-20	Accessibility w/in 30 mins by car to jobs, retail jobs, medical jobs, higher education, and park															■													■																	■			
C-21	Dwelling units (share) with access to transit, bike and pedestrian facilities																																				■											
C-22	Dwelling units within 1/2 mile of quality transit (in TPA) by county (TPA = Transit Priority Area)																			■									■			■				■											
C-23	Employees within 1/2 mile of quality transit (in TPA) by county															■				■									■			■																
C-24	Homes (percent) within 1/2 mile of transit stop (fixed route/express), & for low-income/minority						■									■														■								■								■	■		
C-25	Housing near public transit (less than 1/2 mile and more than 1/2 mile)																													■							■										
C-26	Housing units within distance of transit service (RTAC)																																				■										
C-27	Jobs (total) within 30-minute drive by community type															■														■																	
C-28	Jobs, higher education, parks (percent) accessible within 30 minutes by transit vs. car from EJ and																													■																	
C-29	Low income population (percent) within 1/4 mile of transit route																																		■											
C-30	Minority Population (percent) within 1/4 mile of transit route																																		■											
C-31	Non-work trips (percent) accessible w/in 15 minutes by mode (drive alone, carpool, transit)																														■	■															
C-32	Population (percent) within 2 miles of state highway																																		■											
C-33	Population, jobs (% inc. low income & minority) w/in 1/4 mile of bus stops w/ frequent/reliable																													■			■	■	■	■	■					■		■			
C-34	Proximity to transit by community type, increases in daily transit vehicle service hours in EJ areas																													■																	
C-35	Recreation sites (share) with access to transit, bike and pedestrian facilities																																				■										
C-36	Work trips (percent) accessible w/in 30 minutes during peak periods by mode: all, low income,																			■											■	■															
C-37	Number of total jobs per capita in region																														■																
	IV. Housing Affordability																																															
C-38	Affordable and workforce housing units (new) by affordability level																																		■	■										
C-39	Affordable and workforce housing (percent increase in) near jobs																																		■	■										
C-40	Affordable and workforce housing (percent increase in) near transit																																		■	■										
C-41	Affordable and workforce housing (new) within 1/4 mile of bus stops with frequent and reliable																																		■	■										
C-42	***Housing affordability for renters & owners (housing costs 30% or more of income)*,*** *median income*																																															
C-43	Housing affordability relative to local wages (jobs/housing fit) (RTAC)																																															
C-44	Housing (percent new) where more than 8% of housing stock is deed-restricted affordable																											■																			
C-45	Residents' (low/lower-middle income) household income share consumed by transportation &																											■																			

**** 2010 California Regional Progress Report Indicator***

ID	Resource Preservation/Performance Measures	Apline CTC	Amador CTC	Calaverals CAG	Colusa CTC	Del Norte LTC	El Dorado CTC	Glenn CTC	Humbnoldt CAG	Inyo County LTC	Lake County/City APC	Lassen CTC	Mariposa CLTC	Mendocino CG	Modoc CTC	Mono CLTC	TA for Monterey County	Nevada CTC	Placer CTPA	Plumas CTC	San Benito COG	Santa Cruz CRTC	Sierra CLTC	Siskiyou CTC	Tehama CTC	Trinity CTC	Tuolumme CTC	MTC (ABAG)	SACOG	SANDAG	SCAG	AMBAG	BUTTE CAG	SBCAG	SHASTA RTA	SLO COG	TAHOE MPO	FRESNO COG	KERN COG	KINGS COG	MADERA CTC	MERCED CAG	SJCOG	STAN COG	TULARE CAG	SJV BLUEPRINT	RSPMT Caltrans	SANDAG Study	Bay to Basin Study
		Metropolitan Planning Organizations (MPO)																																												Other State Agency Reports		
I. Energy Use/Consumption																																																
D-1	Energy use per capita *																																															
D-2	Natural gas use per capita *																																															
II. Habitat/Land Conservation																																																
D-3	Biologically sensitive lands avoided (acres)																				■											■			■	■												
D-4	Habitat and land cover impacted (percent)																											■				■			■	■											
D-5	Habitat lands conserved																												■							■											
D-6	Impervious surfaces, total acres, built from new growth																																					■										
D-7	Resource areas (CNDBB, critical habitat, vernal pools & wetlands, etc.), total acres																																					■										
D-8	Vernal pool acres developed																												■																			
D-9	Wildland habitat/land cover, by type, acres of impact from growth & trans. projects																										■		■				■			■											
III. Water Use																																																
D-10	Urban water use per capita *																														■					■	■											
D-11	Water consumption, daily, by new housing development																																					■										

**** 2010 California Regional Progress Report Indicator***

APPENDIX C – WEB-BASED SURVEY RESULTS

As part of the Rural County Task Force Transportation Performance Indicator Study, each participating agency was invited to respond to a written survey regarding their performance monitoring practices and an oral interview with members of the consultant team. This memorandum provides a summary of agency responses to survey questions. The goal of this activity was to determine what metrics and resources are considered important to the rural Regional Transportation Planning Agencies (RTPA) and participating small Metropolitan Planning Organizations (MPO). The prior study conducted by the San Diego Association of Governments (SANDAG) is potentially less reflective of the needs and priorities of rural and small communities; therefore, this study hopes to identify which measures and practices may be more appropriate for Rural County Task Force members.

SURVEY FINDINGS

Most important measures. Safety and System Maintenance stood out as the two most important measurement factors for 25 of the 28 participating agencies. Congestion management and active transportation were indicated as least important with only 3 agencies rating them their highest priorities. The survey also indicated safety as the metric most tracked by the responding participants (25 of 27) followed by Transit (20 of 27) and Transportation System Operations (16 of 27). Interregional connectivity and tourism traffic were two additional themes added by participants to the provided list.

Barriers to enhance or maintain performance measurement system. Data availability was indicated as the most common barrier to an expanded or refined performance indicator program followed by a lack of measures with local relevance. Many agencies also indicated that funding resources limit their ability to pursue a more robust measurement program or that they are struggling to meet their existing requirements due to insufficient funding.

Most important source of performance measures. The participating agencies indicated a nearly equal reliance on California RTP Guidelines, development of custom measures in-house or with consultant support, and peer RTPA/MPOs. MAP-21 was also indicated as a source for many agencies. Standardized performance measurement packages such as Caltrans' Smart Mobility Framework and the Sustainable Transportation Analysis and Rating System (STARS) were used by only a few responders.

Sustainable Communities Strategy. Only five responding agencies reported the need to develop and maintain a Sustainable Communities Strategy (SCS). Those agencies indicated a shift away from some of the traditional vehicular LOS and operational analyses in favor of active transportation measures.

Funding / programming decisions. Of the 22 agencies reporting on this issue, eight actively use performance measures in their project programming and funding formulae. Four limit their use to

deficiency evaluations, five use them for qualitative support in project prioritization, and five do not typically use performance measures as part of their funding/programming process.

Performance measure data sources. The data sources most commonly indicated to be very important for the performance measurement programs were local Pavement Management Systems, Caltrans collision data, transit ridership data, and Caltrans published roadway volumes. Data from previous studies was not generally reported as very important. Other data sources that agencies reported relying on include local turning movement count programs, US census data, and local traffic collision databases that are updated more quickly that Caltrans sources.

Quantification of performance measures. Three agencies indicated that they have attempted to standardize their performance measures to allow for cumulative analysis while 12 agencies have attempted to use benefit / cost ratios to help with project prioritization. Nine of those agencies said that it was a somewhat helpful measure and none reported it as very helpful. The factors that made it less helpful was that it was data intensive, it made elected officials uncomfortable, and it doesn't necessarily scale well between rural and urbanized areas.

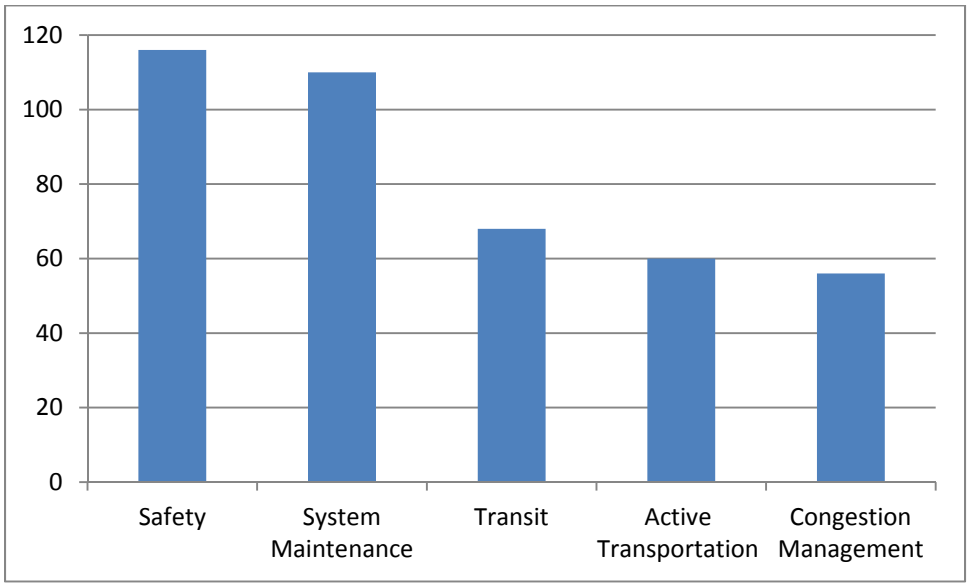
Socioeconomic data sources. California Department of Finance sources such as population and housing estimates and county profile/statistical snapshots were the most important sources for the responding agencies. Census data from American Factfinder, Longitudinal Employment and Housing Dynamic, and travel survey data sources were also referenced frequently.

SURVEY RESULTS

This section of the memorandum will provide the specific responses received for each survey question.

What are your main priorities with the management of your transportation infrastructure?

Figure 1. Relative importance of each category as ranked by respondents



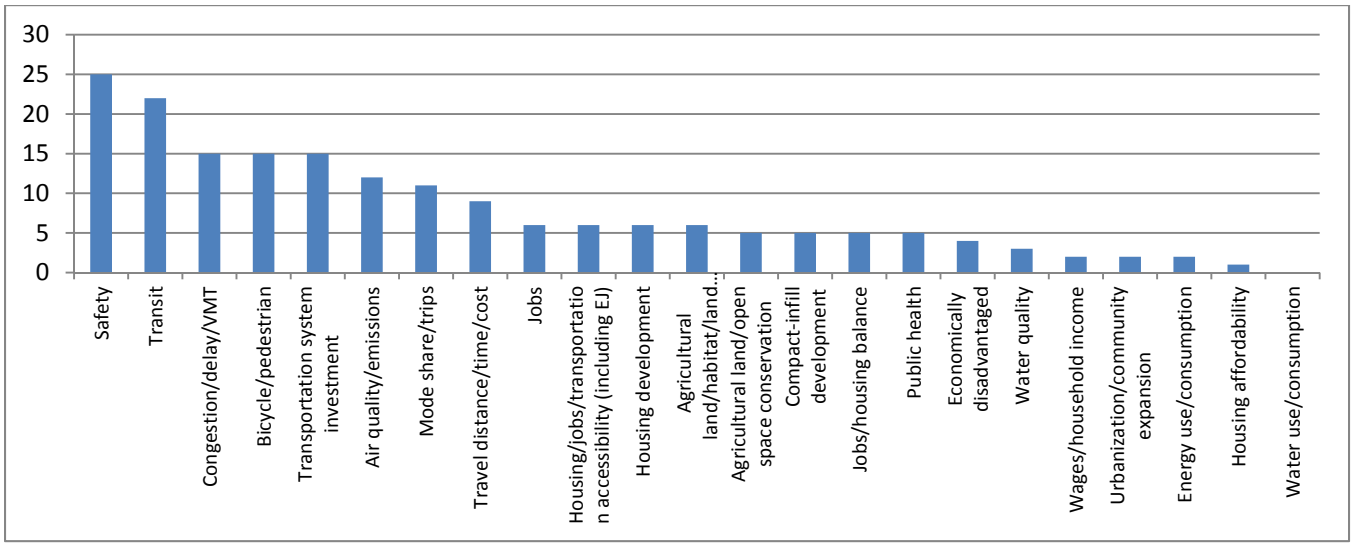
Additionally, agencies were asked to list other priorities that they have which were not included in the above selections. The answers supplied include:

- Connectivity
- Preservation/enhancement of community character and the environment
- Socioeconomic growth and development.
- Goods Movement
- Economic Development
- Maintaining Air Quality Standards
- Regional Transportation Plan, RTIP, Regional Traffic Impact Fee Programs
- Complete Streets
- Main Street improvement on state highways that accommodate all users
- Foster economic development
- Connectivity of local street networks
- Inter-regional Connectivity
- Long-term: Passenger Rail, Truckee/Reno
- Seasonal travel/tourism
- Operations during key tourist seasons
- Impacts of interregional tourism based traffic on the rural state system
- Optimize the use of existing inter-regional and regionally significant roadways to prolong functionality and maximize return-on-investment
- Strategically increase capacity on inter-regional and regionally significant roadways to keep people and freight moving effectively and efficiently.

- Provide an integrated, context-appropriate range of practical transportation choices.
- Create vibrant, people-centered communities.
- Strengthen regional economic competitiveness for long-term prosperity.
- Promote public access, awareness and action in planning and decision-making processes.
- Practice and promote environmental and natural resource stewardship.
- Sustainable Rural Communities Strategies
- Rail extension to Monterey County
- Provide for the Parking Needs of Local Residents, Visitors, and Tourists
- Enhanced Airports in the County; Goal 8: Encourage and Pursue Railroad Facilities in the Region
- Incorporate New Developments in Transportation Technology, Including ITS Approaches
- Management of the Transportation System
- Land Use Integration
- Transportation Demand Management (TDM)
- Integration of transportation with land use and economic development
- Regional planning
- Maintaining the existing infrastructure
- Establish local funding sources to complete and maintain vital county transportation infrastructure needs
- Improvements to the State highway system, particularly left turn pockets for safety reasons.
- Operations
- Mitigating impacts of development on the transportation network
- Equitable environmental sustainability
- Serving disadvantaged communities
- Non-Emergency medical transit
- Connectivity
- Preservation/enhancement of communicy character and the environment
- Socioeconomic growth and development
- Goods movement economic development
- Maintaining air quality standards
- Regional Transportation Plan
- RTIP
- Traffic Impact Fee Programs

What performance measures does your RPTA or MPO currently use?

Figure 2. Number of agencies using specific performance measures

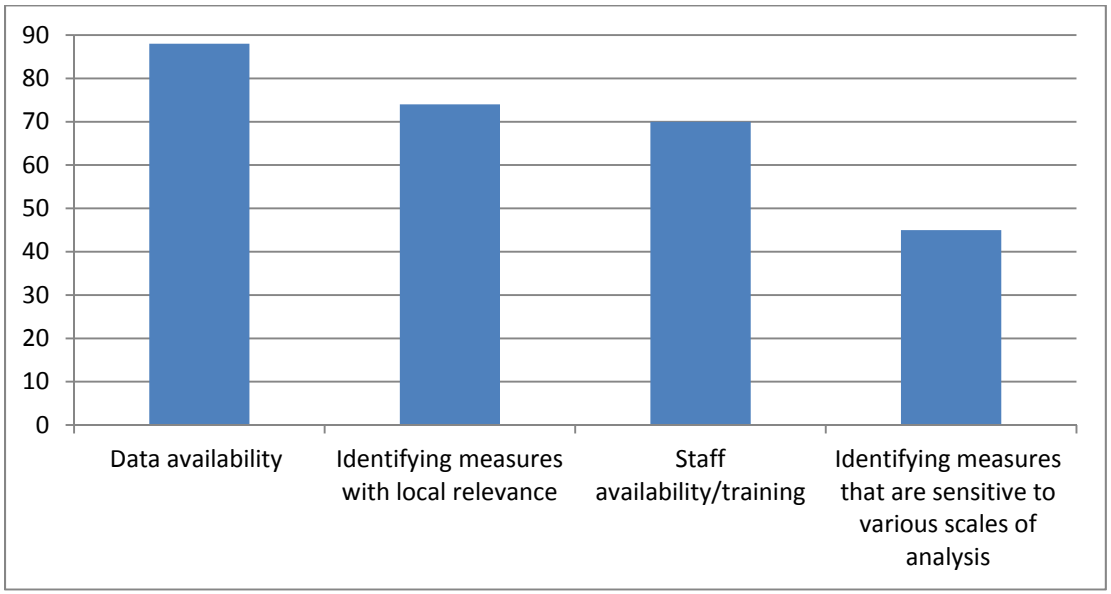


Additional measures that agencies track include:

- Fundable within 25 years
- Cost benefit
- Meets federal and state environmental standards
- Public support
- Level of Service
- Pavement Condition Index
- Wildlife/vehicle collisions
- Seasonal road conditions
- Reinvest based on reductions in VMT
- Fuel costs per household
- Cost Effectiveness
- Maintenance on state and local roads
- Reduction in deferred maintenance miles
- Land Use

Please rank the potential barriers to maintaining or enhancing your performance measurement program

Figure 3. Most significant barriers



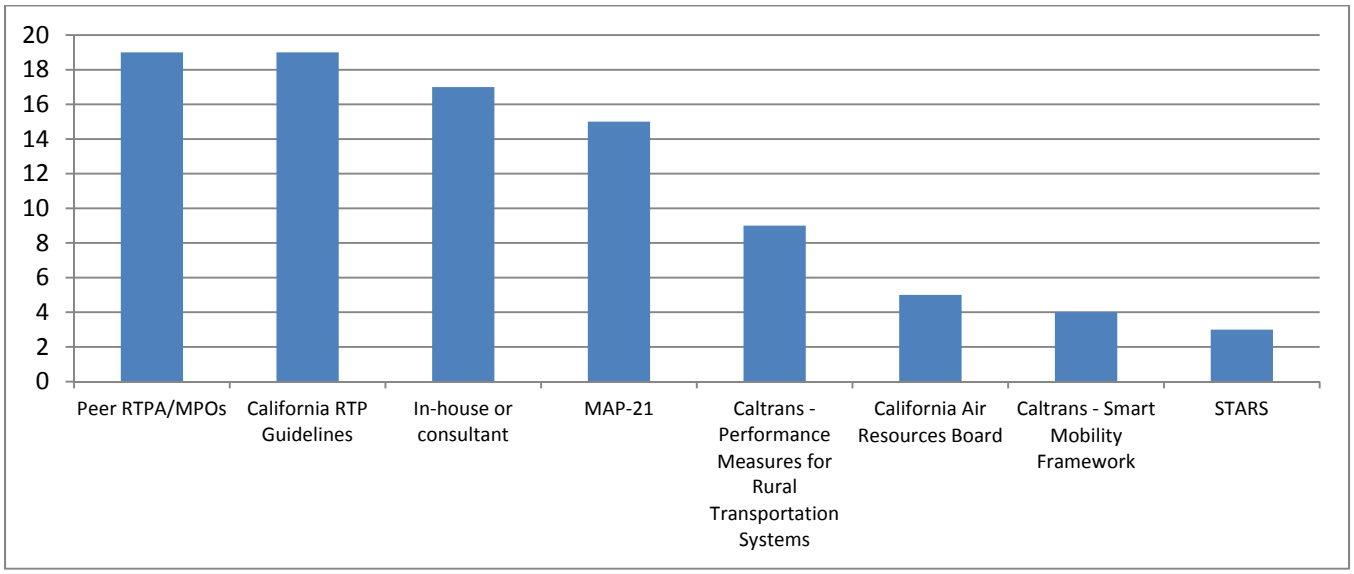
Other barriers indicated by respondents include:

- Lack of funding to perform an ever growing list of bureaucratic demands for uncertain discretionary funding.
- Funding. Technology & tools.
- Seasonal road closures, lack of rural competitiveness for funding (1 - ATP, 2 - STIP - when CTC implements allocation plans because of funding limitation these allocation plans tend to impact rural more than urban areas)
- Unfunded mandates along with performances measures and programs that are forced upon us by the State
- Need funding for analysis of performance measures and to monitor performance over time. Need tools that will use available data to determine how well advancing targets.
- Lack of staff time to calculate performance measures at the project level.
- Local jurisdiction awareness of PM importance.
- Political priorities
- Lack of recognition of rural development issues, characteristics, and related transportation components; lack of funding; institutional barriers with federal land managers. Lack of sustainable communities guidance for non-MPOs;
- Data relative to small and sparsely populated areas
- Availability of and eligibility for State and federal funding
- Alpine County does not have safety or congestion issues to be able to compete for statewide funds. System preservation is the only performance measure where we can compete, but we have other projects that need ATP funding, such as signage updates.

- Identification of measures with appropriate significance.
- Availability of infrastructure funding to make meaningful improvements.
- The Statewide deference to urban transportation issues.

Which of the following sources have facilitated your agency's choice of performance measures?

Figure 4. Most important data sources

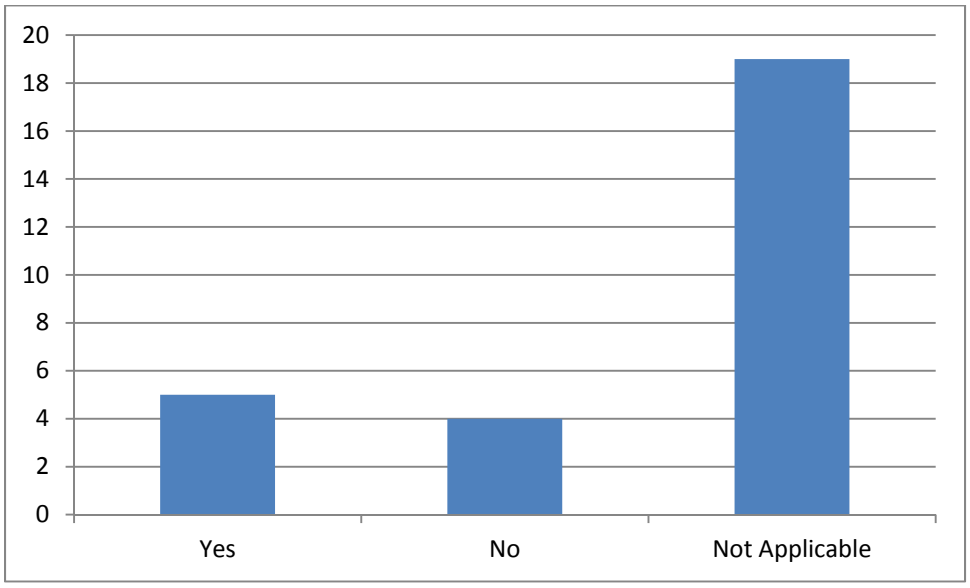


Other data sources used by the responding agencies include:

- Local priorities
- local circumstances
- 35 years of experience in rural transportation
- Regional Travel Demand Model
- SB 375
- Blueprint Planning
- SWITRS
- RCTF
- STIP Guidelines

Have you moved away from traditional Regional Transportation Plan metrics such as LOS, ADT thresholds?

Figure 5. Agencies moving from LOS and ADT thresholds



Agencies required to complete a SCS have ceased collecting:

- LOS at signalized Intersections
- Backlog of road maintenance and buses/bus facilities overdue for maintenance
- Backlog for roads
- Lack of revenues for local road maintenance
- Smog forming pollutants (tons)
- Emissions from motor vehicles per day
- Greenhouse gas emissions
- Vehicle Miles Traveled
- Transportation expenditures per jurisdiction & per mode
- Average vehicle occupancy
- Vehicle hours of delay
- Average commute time
- Transit ridership
- Number of jobs and housing units within 1/4 mile of transit stops (not route) on fixed routes
- Number of paratransit & senior/disabled fixed route rides/% of population that is elderly or disabled
- Miles of class 1 & 2 bikeways
- Rate of reported bike collisions to population
- Miles of pedestrian facilities
- Rate of reported pedestrian collisions to population

Measures that have replaced the above include:

- Per capita VMT
- Per capita GHG
- Pedestrian-Bike LOS
- Improve people's ability to meet most of their daily needs without having to drive
- Improve access and proximity to employment centers.
- Increase the percentage of people that can travel to key destinations within a 30-minute walk, bike or transit trip by 20 percent by 2020 and 40 percent by 2035.
- Re-invest in the local economy by reducing transportation expenses from vehicle ownership, operation and fuel consumption. Reduce smog-forming pollutants and greenhouse gas emissions.
- Reduce per capita fuel consumption and greenhouse gas emissions by 1 percent by 2020 and 5 percent by 2035.
- Re-invest in the local economy $5 million/year by 2020 and $10 million/year by 2035 from savings resulting from lower fuel consumption due to a reduction in vehicle miles traveled.
- Improve the convenience and quality of trips, especially for walk, bicycle, transit, freight and carpool/vanpool trips.
- Improve travel time reliability for vehicle trips.
- Improve multimodal network quality for walk and bicycle trips to and within key destinations.
- Improve health by increasing the percentage of trips made using active transportation options, including bicycling, walking and transit.
- Decrease single occupancy mode share by 4 percent by 2020 and by 8 percent by 2035.
- Reduce injury and fatal collisions by mode by 20 percent by 2020 and by 50 percent by 2035.
- Reduce total number of high collision locations. Maintain the existing system and improve the condition of transportation facilities.
- Increase the average local road pavement condition index to 57 by 2020 and 70 by 2035.
- Reduce the number of transportation facilities in "distressed" condition by 3 percent by 2020 and 5 percent by 2035. Enhance healthy, safe access to key destinations for transportation-disadvantaged populations.
- Reduce travel times and increase travel options for people who are transportation disadvantaged due to income, age, race, disability or of limited English proficiency by increasing the percentage that are within a 30-minute walk, bike or transit trip to key destinations by 20% by 2020 and 40% by 2035.
- Ensure transportation services (and impacts) are equitably distributed to all segments of the population.

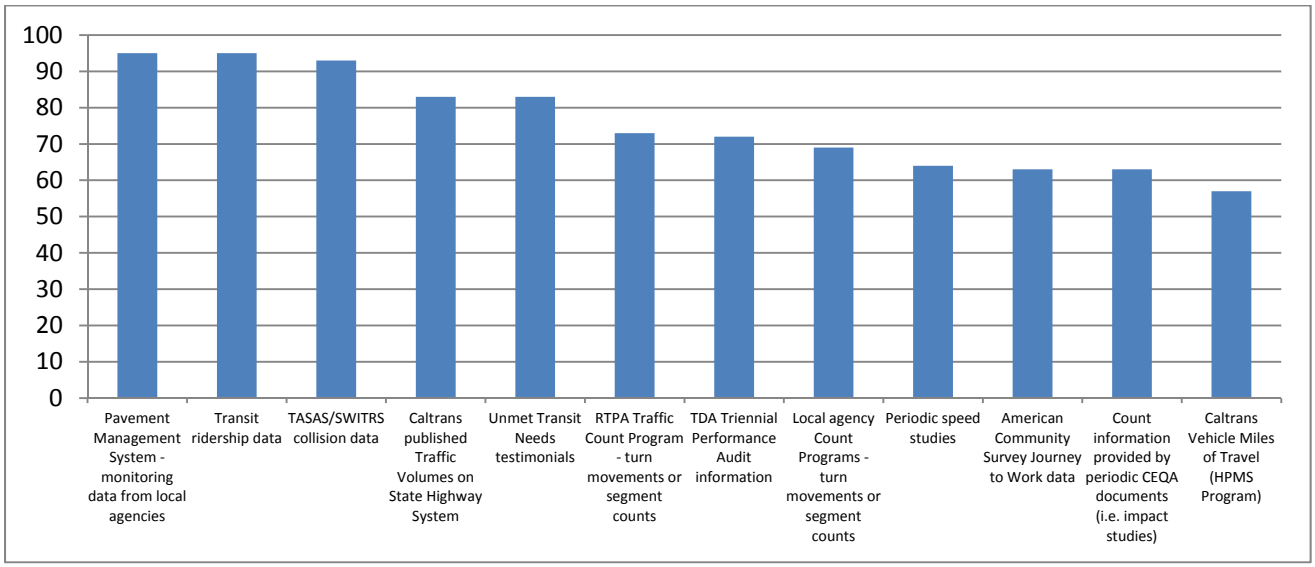
How are performance measures used in your agency's project funding/programming decisions and/or allocations?

- A performance measure matrix is used to prioritize projects in the Regional Transportation Plan.

- Infrequently. Sometimes to compare projects that are competing for funding.
- Part of the funding formula
- Performance Measures are used to identify system deficiencies and effectiveness of proposed solutions
- Qualitatively used for RTP and project programming
- General consideration only. Lack of data prevents quantitative analysis.
- PCI, accident data, and ADT
- Used to implement agency goals and inform scoring criteria for call for projects; utilized in regional planning documents and project prioritization processes
- Performance measures are used in evaluating the projects for funding/programming decisions
- RSTP and CMAQ are the only discretionary sources and local agencies submit projects based on their priorities that would achieve the goals of each program. Not a top down process.
- We have not yet implemented performance based planning to any effective degree.
- The use of performance measures for funding/programming decisions and/or allocations is evolving. Past efforts considered performance measures only minimally. SRTA is working to improve this.
- We currently assess performance measures as part of the RTIP process, and show consistency with the RTP - the programming priorities are set by our Board
- Primarily used to determine road network pavement condition/usage to prioritize investments.
- Non-programmed project selection criteria used to evaluate projects
- We are implementing asset management systems that will drive priorities on the existing local systems. Long term commitments via regional MOUs drive programming of state-system STIP. Qualitative rather than quantitative assessments are also factors in programming and allocations.
- Performance measures inform priority setting, especially safety and cost/benefit ratio.
- We have approved policies for our TDA bike and ped fund but have faced local resistance to approve policies for STIP funds. We have developed 6 pm s to create a regional priority list in our RTP but do not yet have approved policies to ensure that those projects have priority in funding. Our local government reps do not want to be restricted by policies. We intend to continue the effort.
- We don't submit for most statewide project funding because we know our performance measures or B/C ratio won't compete successfully.
- Used in RTP and RTIP to assist in selecting and prioritizing projects. Community desire also plays an important role when considering projects.
- Minimally -- our programming capacity is very limited and priority projects were established several years ago.
- Specific to funding program. For example, VMT and GHG reduction are heavily weighted for CMAQ, ATP, etc.
- Performance measures are generally used to qualify for discretionary funds or to allocate regional funding among local agencies.

Please indicate the level of importance each of the following data sources has for you agency.

Figure 6. Data sources by relative degree of importance



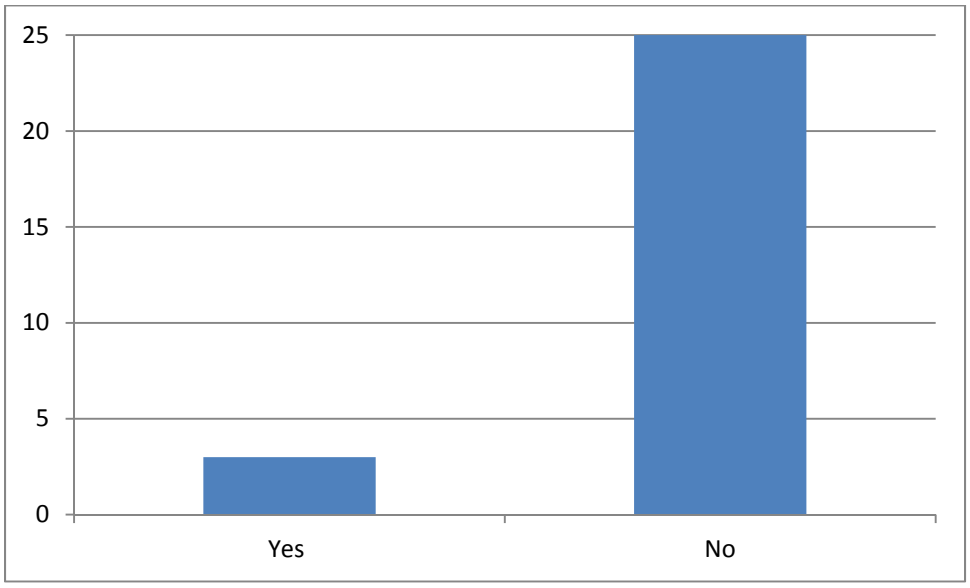
Other data sources used by responding agencies include:

- Benefit/cost ratio
- Stakeholder meetings
- California Wildlife Action Plan
- U.S. Census data
- Wine Country IRP (however data now aging)
- Turn Movement Counts - Annual Traffic Count Program
- Local traffic accident data bases
- DOF population projections
- EDD data
- Infogroup employment data
- Housing development info from local agencies
- Park and ride lot usage info
- Average vehicle occupancy
- Carpool + vanpool database (opt in)
- Air and rail ridership
- Gas prices
- Cal Poly data
- 2010 census
- Department of Finance population projections
- Environmental data from state and federal agencies
- U.S. Forest Service recreation visitor days (RVD's)

- LEHD on the map
- Caltrans local count data
- Bike and ped count data
- Caltrans Socio Economic data & Forecasts
- California Local Needs Assessment annual report
- Transit farebox
- Cost per transit passenger
- Regional studies on jobs/housing
- US Census, housing assessments
- Assessor records via GIS
- Environmental data from CFW
- Cal Fire
- Federal Emergency Management Agency (FEMA)
- US Fish and Wildlife Service
- US Forest Service
- Bureau of Land Management
- US Army Corps of Engineers
- Fault hazard maps
- Avalanche studies (local)
- US Geological Survey
- Ped/Bike counts in school zones.
- Transportation Injury Mapping System
- AMBAG Population, employment & housing forecasts
- Census Journey to Work
- School districts
- National Transit Database
- Caltrans Highway Bridge Program
- Regional travel demand model
- Regional land use model
- Caltrans State of the Pavement Report

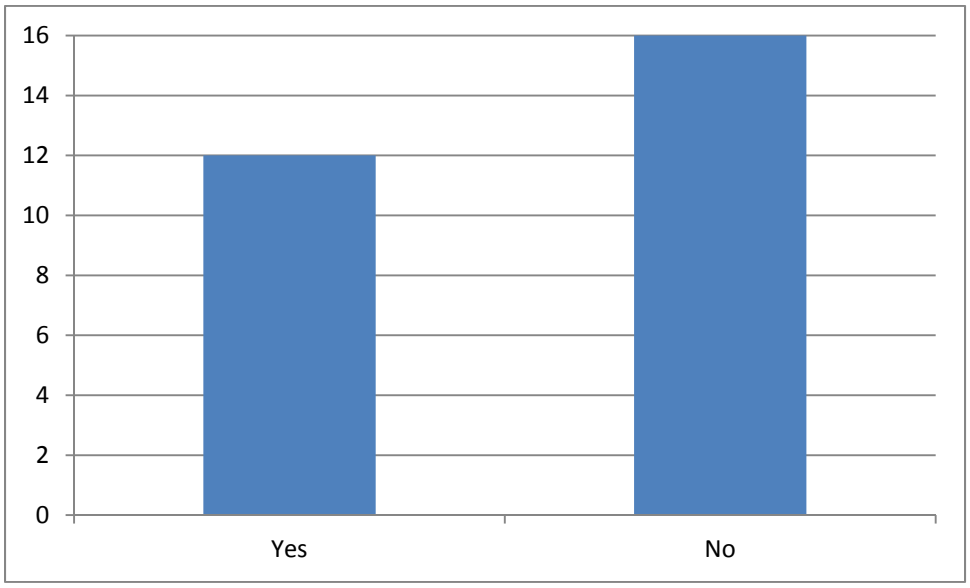
Has your agency attempted to standardize performance results across measures to aid in project prioritization?

Figure 7. Agencies attempting to cumulatively analyze performance measures



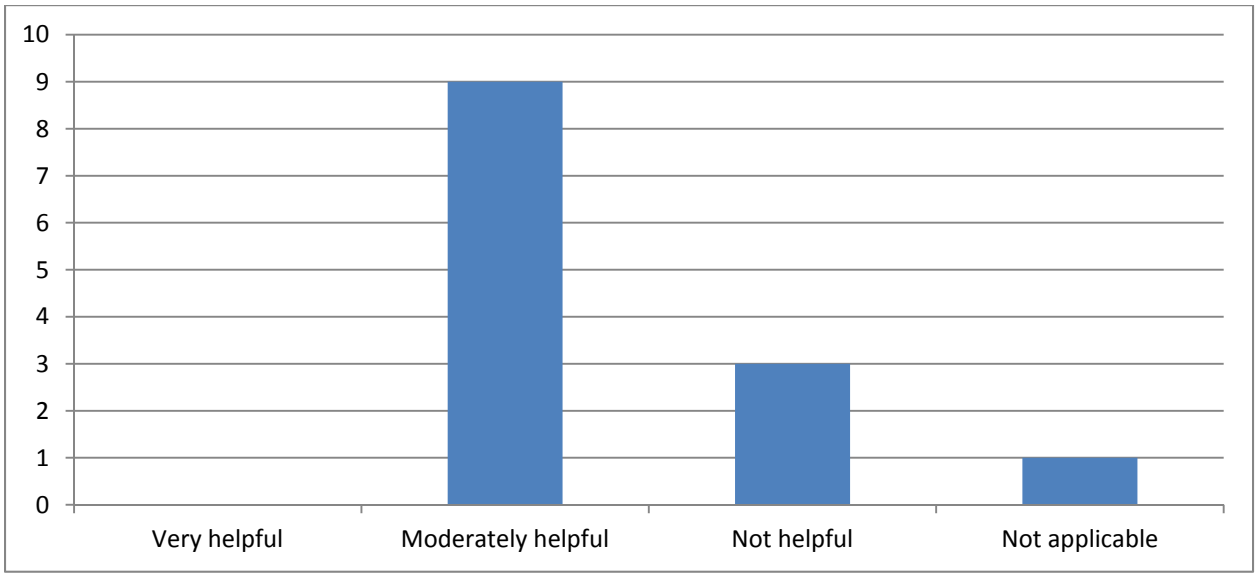
Has your agency used benefit/cost (B/C) as a metric to help inform project funding/programming decisions?

Figure 8. Agencies that have used B/C as a metric



How would you characterize your experience using the B/C metric?

Figure 9. Agency's impression of the utility of B/C



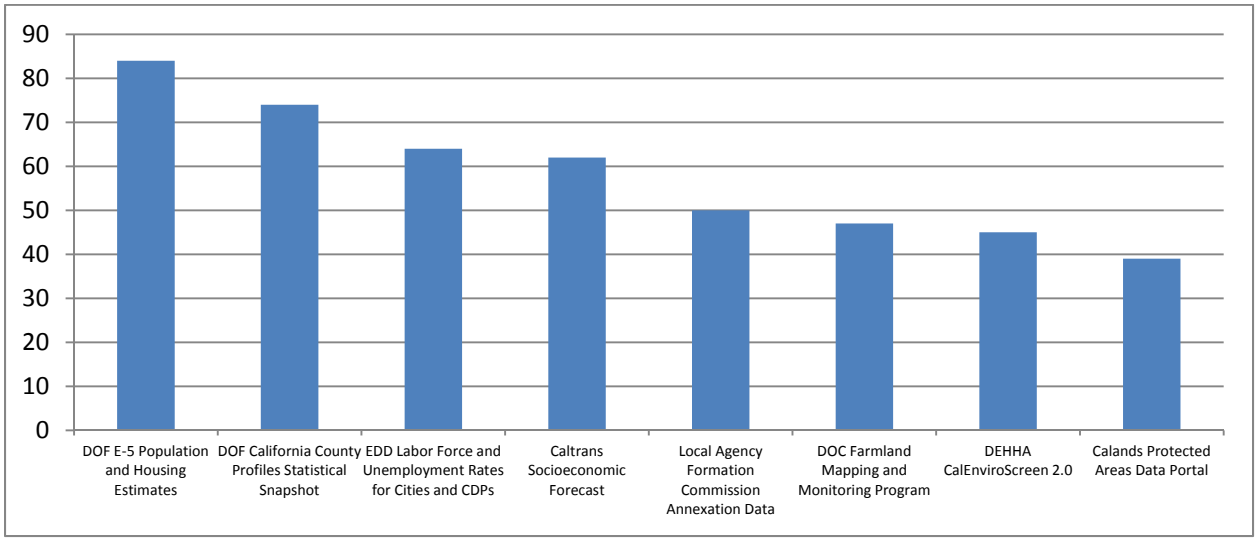
Agencies had the following comments on what made B/C difficult to implement or limited in its utility:

- It has been helpful as a standard method to make comparisons across projects in order to develop priorities. However, since it does not provide a meaningful valuation of any one specific project, its usefulness is limited.
- We do not receive adequate funding to do B/C analysis on a comprehensive basis, so it is only used when necessary for funding.
- Our elected officials were uncomfortable with data that might interfere with their preferences.
- Most existing B/C metrics are set up for projects in urbanized areas. We don't want to be forced into a system where we lose because of our small population.
- Using the Cal B/C model is data intensive, time consuming, and limited to mainline projects. This metric has been used to substantiate benefit, but not as a decision factor for funding. With limited funding availability, the most congested facilities and those with a collision history are almost self-selecting
- Prioritization of projects.
- Requirement for the TIGER Grant Apps
- Low numbers on rural roads
- Lack of local data and small population and use numbers make analysis difficult
- B/C can determine if a project is eligible for funding.
- While it can be helpful to select the priority proposal, using a State-generated b/c tool does not always support the greatest needs of the communities.
- Systematic rate vs. % of accidents.

- It is highly sensitive to volume data, which isn't supportive of rural conditions and relatively diminishes the importance of safety.

For the following socio-economic data sources, please indicate how important they are to your agency

Figure 10. Sources of socio-economic data



Other sources of socio-economic data indicated by the responding agencies include:

- US Census data
- Local Jurisdiction Financial Annual Reports.
- Previously noted in open-ended Traffic data question.
- 2010 census, economic development strategic plan
- American Factfinder
- Census and American Community Survey; local agency business license and assessor data; local agency General Plans
- These data sources are important to the MPO for our region and therefore are important to us indirectly. The definition of transportation disadvantaged in the Cal EnviroScreen affects funding availability for our county and we would like to see this be inclusive of more disadvantaged areas that are in need.
- American Community Survey socioeconimic data.
- Local agency information on development projects (highly important) Census Bureau Decennial Census and American Community Survey tables (highly important)
- Building permit data, General Plan Map data & other local data used in the UPlan Growth Model
- Local surveys of income or other metric collected by County Health and Human Services Agency

- State and local economic development data and strategies; Sierra Business Council and Sierra Nevada Conservancy studies; YARTS statistics, Caltrans Origin and Destination studies; local tourism data
- Economic and Demographic Profile by Center for Economic Development at CSU Chico.
- US Census, CA Household Travel Survey
- Disadvantaged Communities
- DOF school enrollment projections
- Regional housing needs assessment
- State Mining and Geology Board – mineral resource zones
- FEMA flood zones

PARTICIPATION

The 26 rural RTPAs and four of California's smaller MPOs were invited to participate in this study. The survey was distributed to each and each agency was also approached for an interview with the consultant team. Due to limited resources, so of the agencies were unable to participate before the project deadline. The following table summarizes agency participation in the outreach portion of this study.

Agency	Type	Survey
Butte County Association of Governments	MPO	Y
San Luis Obispo Council of Governments	MPO	Y
Shasta Regional Transportation Agency	MPO	Y
Tahoe Regional Planning Agency / Tahoe Metropolitan Planning Organization	MPO	Y
Amador County Transportation Commission	RTPA	Y
Alpine County Transportation Commission	RTPA	Y
Calaveras County Association of Governments	RTPA	Y
Colusa County Transportation Commission	RTPA	-
Del Norte Local Transportation Commission	RTPA	Y
El Dorado County Transportation Commission	RTPA	Y
Glenn County Transportation Commission	RTPA	Y
Humboldt County Association of Governments	RTPA	Y
Inyo County Local Transportation Commission	RTPA	Y
Lake County / City Area Planning Council	RTPA	Y
Lassen County Transportation Commission	RTPA	Y
Mariposa County Local Transportation Commission	RTPA	-
Mendocino Council of Governments	RTPA	Y
Modoc County Transportation Commission	RTPA	Y
Mono County Local Transportation Commission	RTPA	Y
Transportation Agency for Monterey County	RTPA	Y
Nevada County Transportation Commission	RTPA	Y
Placer County Transportation Planning Agency	RTPA	Y
Plumas County Transportation Commission	RTPA	Y
San Benito Council of Governments	RTPA	Y

Santa Cruz County Regional Transportation Commission	RTPA	Y
Sierra County Local Transportation Commission	RTPA	Y
Siskiyou County Transportation Commission	RTPA	Y
Tehama County Transportation Commission	RTPA	Y
Trinity County Transportation Commission	RTPA	Y
Tuolumne County Transportation Commission	RTPA	Y