RURAL COUNTY TASK FORCE

Rural Induced Demand Study

NEVADA COUNTY TRANSPORTATION COMMISSION

Rural Induced Demand Project Advisory Committee
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Project Organization Chart

California Rural County Task Force

NEVADA · COUNTY · TRANSPORTATION
NCTC
COMMISSION

Jim Damkowitch
Project Manager

Don Hubbard
CEQA
Technical Lead

GHD

Dr. Anurag Pande
Research
Technical Advisor

CAL POLY

Work Scope:

Literature Review: Applicability of Research to Rural Projects

- Research that Purports/Refutes a Significant Induced Effect from Added Capacity
- Latent Demand and Induced VMT
- Context and Applicability Issues & Selectivity of Research Findings

Rural Case Studies of Induced Demand Resulting from Roadway Capacity Expansion

- Sensitivity Testing of NCST Tool in Rural Areas within MPO boundaries.
- Sensitivity Testing of NCST Tool in Rural Areas
- Before and After Studies (Inferences of Causality)

Travel Demand Modeling vs. NCST Tool Applications

- Short-Term vs. Long-Term Induced Demand
- Appropriate Applications

Work Scope: Develop Recommendations

Recommendations to Address CEQA

- OPR's Technical Advisory on Evaluating Transportation Impacts in CEQA
- Caltrans' Transportation Analysis Framework (TAF)
- Caltrans' Transportation Analysis Under CEQA (TAC)

Recommendations for State Planning and Programming Guidance

- CAPTI
- CSIS
- CTC's 2017 Regional Transportation Plan Guidelines for RTPAs
- Caltrans Corridor Planning Guidebook
- CTC's Comprehensive Multimodal Corridor Plan Guidelines

Recommendations for Future Technical Studies and Data Improvements

- UC Davis Research (Caltrans)

Professional Societies and Conference Proceedings

- National Transportation Research Board (TRB) Annual Meeting
- TRB Tools of the Trade Conference
- ITE Western District Conference
- APA California Conference and National Conference
- San Joaquin Valley Policy Conference

(Very Brief)
Findings from the Literature Review

Literature Review

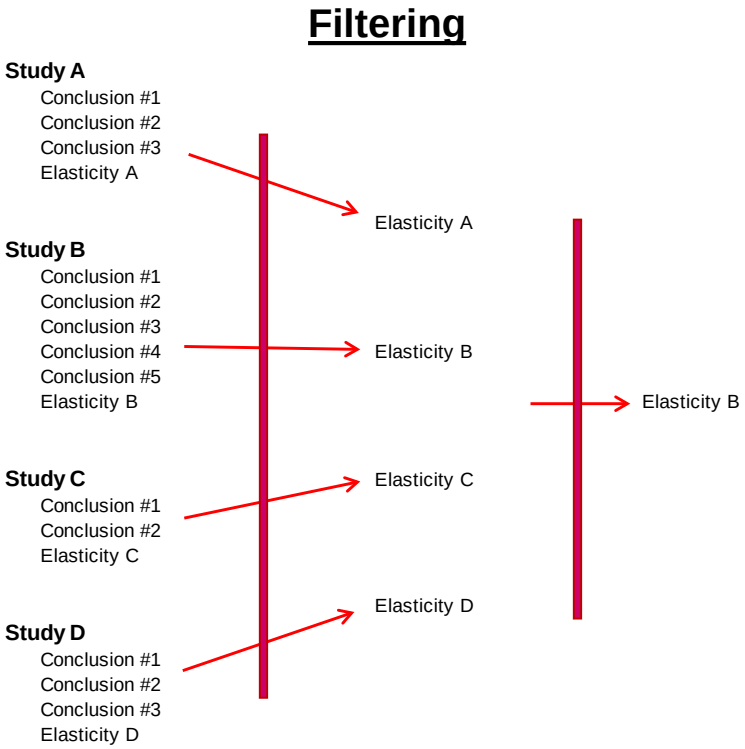
Key Finding: Reliance on Review-Studies is Leaving Important Information Out of the Discussion

- Current guidance and policies are based on review-studies
- Review-studies, or studies-of-studies, summarize the findings of original research studies for an audience that may not have the time, training, or inclination to read through the originals
- While these serve an important function in making findings digestible for the intended audience, it comes at the cost of filtering out other information found in the original study

Literature Review

Key Finding: Over-Reliance on Review-Studies is Leaving Important Information Out of the Discussion

- Quoting an elasticity while leaving out the caveats, qualifications, and context that appear in the original work distorts the message
- The distorting effect is significant for induced demand. ***Every*** original research paper we reviewed that computed an elasticity had other findings
- Our draft report will describe a lot of interesting and relevant findings that have not made it into current guidance and should be factored into the policies regarding rural counties



Literature Review

So, What Was Filtered Out?

- **Lane-miles are a flawed proxy for travel time savings** – The thing that drives induced travel is a reduction in travel times, not additional capacity per se. So in the absence of congestion, additional capacity does not induce demand. The only reason lane-miles have been used in induced demand studies is because the data was much easier to get than historical data on congestion levels

- **Estimates of induced demand declined over time:** There is a downward trend in the estimated elasticities over time. There seem to be two reasons for this:
  - In the studies: The more other factors were controlled for, the less effect was attributable to induced demand
  - In the field: Induced demand seems to be fading as a phenomenon

- **Only *significant* reductions in travel times change travel behavior** – Travelers interview surveys found that travel times would have to be reduced by at least 15 minutes to have any appreciable effect on origin-destination choice

Literature Review

The Assumed Mechanisms are Not Borne Out by Interviews with the Actors Involved

The assumption in nearly all of the literature, often explicitly stated, is that developers base their decisions on good freeway access. However, interviews with developers seriously undermine this assumption:

- Developers stated were looking for cheap land that had some access to the roadway system; they were indifferent to the quality of the access. Exurban land was developed because it was cheap. Years later, residents of these areas would apply political pressure to improve the quality of access (i.e demand was inducing roads, not the reverse)

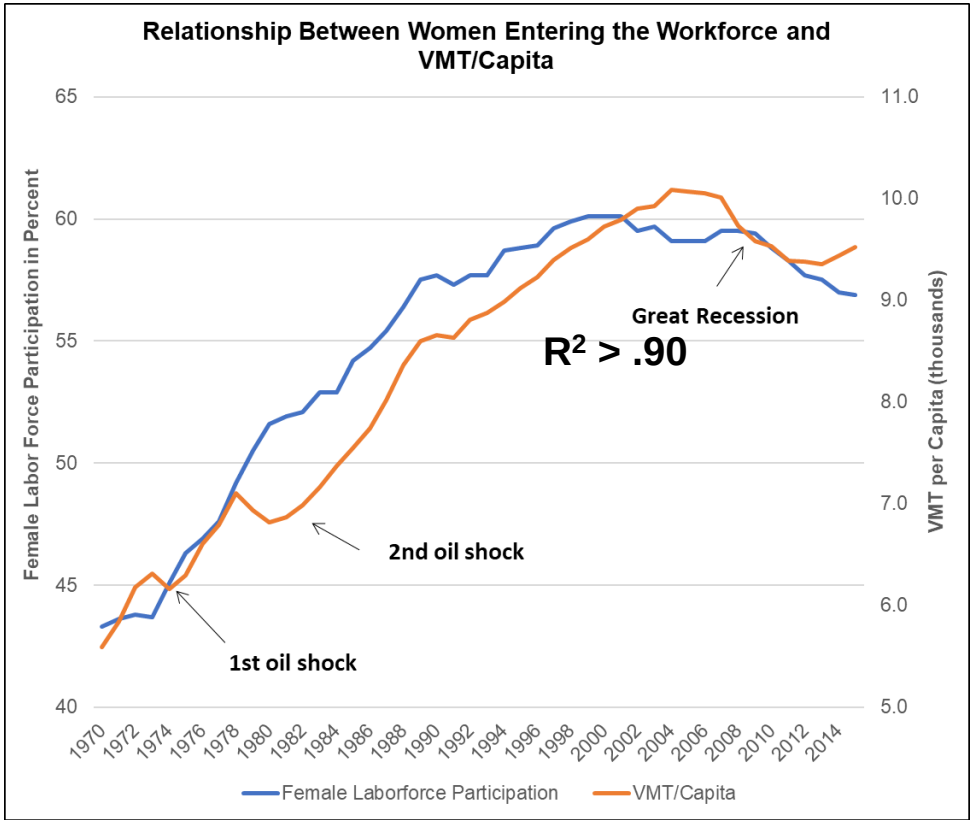
- "*While the expansion of I-580 is seen as a bonus to developers in the area, **all indicate that their projects would still have been constructed in the absence of the freeway improvement***." (Hansen, Gillen, and Dobbins, 1993)

Access is important; capacity much less so.

Literature Review

Female Labor Force Participation

- Sometimes, it isn't what is in a study that is important, but what is *not* in the study.
- Most of the studies controlled for population and income, but very few controlled for the number of workers
- There is a big difference in the VMT effect between a household's income going up because a worker got a raise, versus income rising because someone else in the HH started working
- The period of rapid increase in VMT/capita corresponded with the increase in female labor force participation



Literature Review

Conditions When Induced Demand Might Occur

Short-Term Induced Demand

1) **Existing Congestion Poses a Serious Constraint** – Congestion must be severe enough to suppress existing demand, leaving a pool of latent demand that could be released

Long-Term Induced Demand

2) **Development Must be Free to Respond to New Opportunities –** There must be sites served by the road where development is not constrained by topography or regulation

3) **Sites Must be Marketable** – There must be unmet demand for development in the area served by the road. Developers will not build if the product cannot be sold

Of these 3 conditions, only the 2nd occurs in rural areas

Literature Review

Did Not Find Support for a NCST-Style Forecasting Tool

Quite the contrary, several studies warned against using simplified tools based on aggregate elasticities. Some examples [emphases added]:

- "*Simple models of the kind presented here cannot supplant the detailed analyses needed to evaluate specific projects.* ***It should not be assumed that the aggregate elasticities obtained in our analysis apply equally to every urban region, let alone to any particular project***." (Hansen and Huang, 1997)

- "*The analysis presented here uses aggregate state level time-series data to determine relationships to VMT. The analysis in this paper does not imply that any specific project will generate additional traffic.* ***Obviously specific project level analysis is needed to assess impacts of specific transportation plans***." (Noland 1998)

We picked these particular quotes because these authors are cited in the documentation for the NCST tool.

(Very Brief)
Findings from the Testing of NCST Calculator for Rural Projects

NCST Tool Rural Sensitivity Analysis

NCST California Induced Travel Calculator

- Estimates the VMT induced annually as a result of expanding the capacity of publicly owned roadways
- Applies only to FHWA Functional Class I (interstate highways), II (other freeways), or III (other principal arterials)
- Produces estimates of short- and long-term induced VMT

UC Davis Considered 3 Validation Procedures:

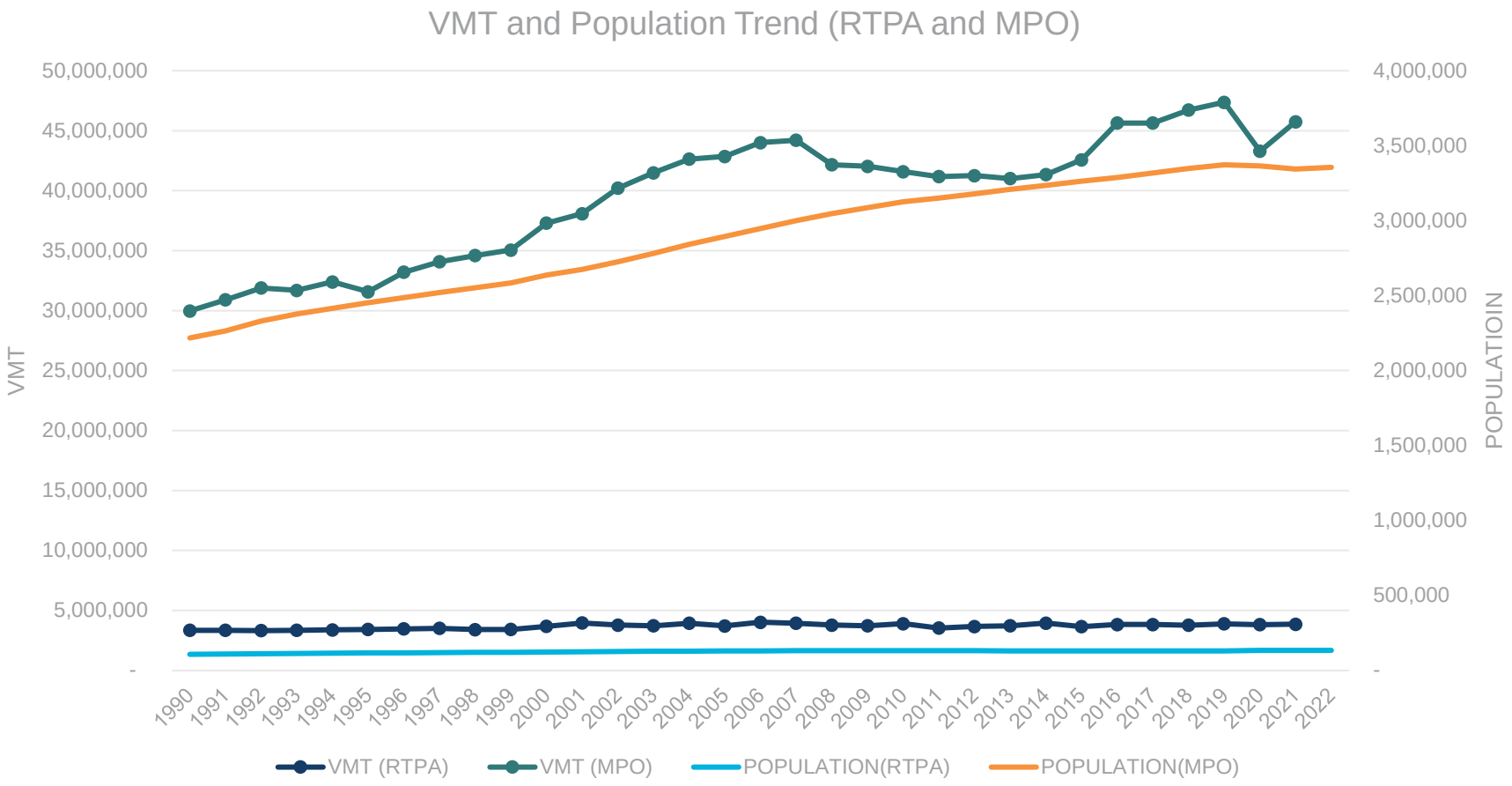
- Simple comparison of VMT in the relevant area (county or MSA) before and after (e.g., 10 years after) a major capacity expansion project using HPMS data
- Difference-in-differences analysis using facility level traffic flow data
- Interrupted time series technique using facility level traffic flow data

Did not attempt to validate.

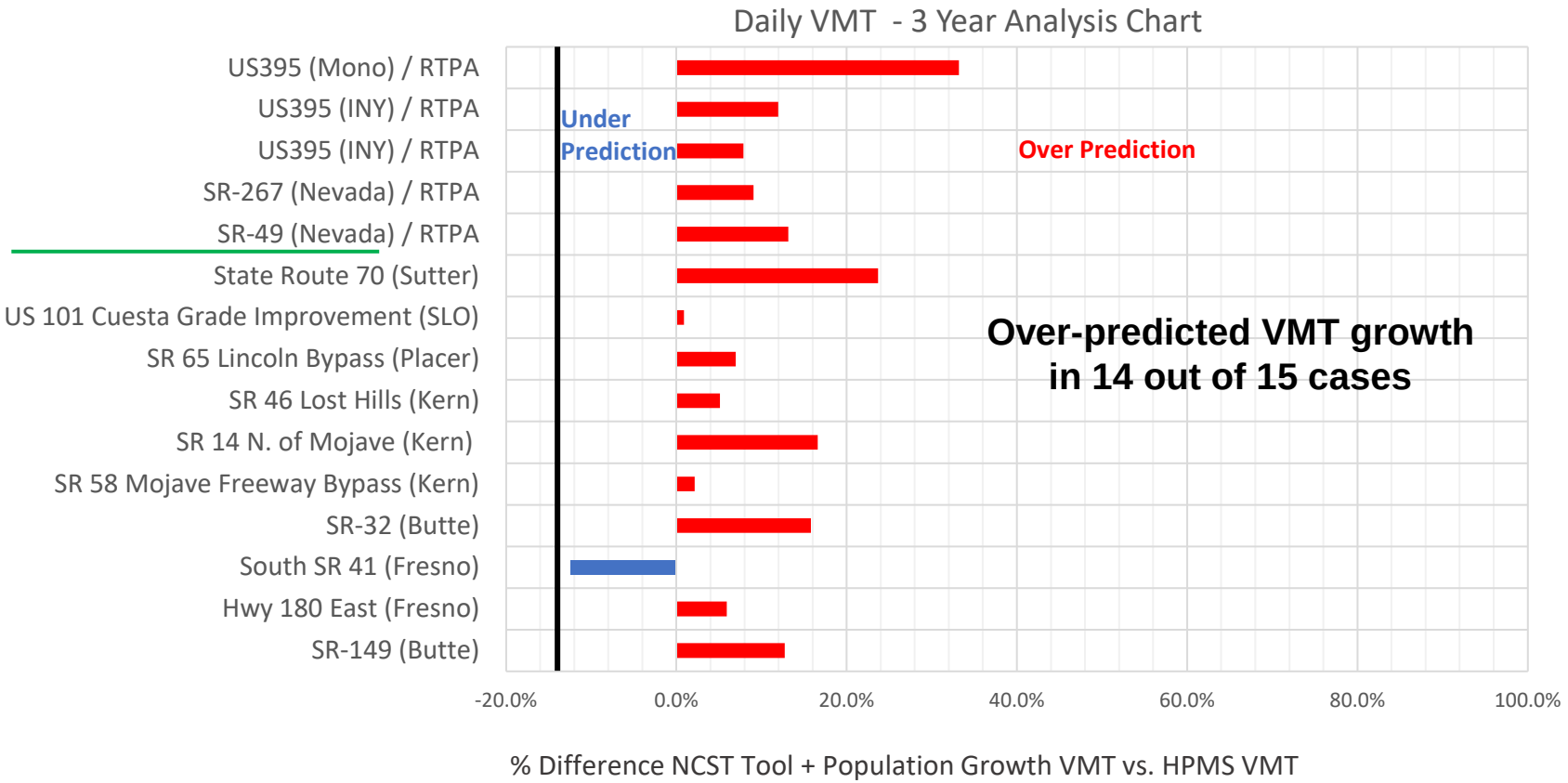
NCST Tool Rural Sensitivity Analysis

- **Simple Comparison Method of Past Projects**
  - If the NCST Tool was applied then – how would it have performed?
  - Analyzed: post 3-years; post-10 years; and post-20 years
- **Applied to past projects implemented in rural area types**
  - Identified 15 Capacity Increasing Projects for Evaluation
    - Rural RTPA areas (no MSA): **5**
    - Rural MPO areas: **10**
  - Class II and III facilities (widening projects)
  - Regional Analysis (versus facility specific)
  - Data Sources: Caltrans Lanes Miles, HPMS VMT, DOF Population (1990 to 2021)
  - Applied against the 0.75 Elasticity

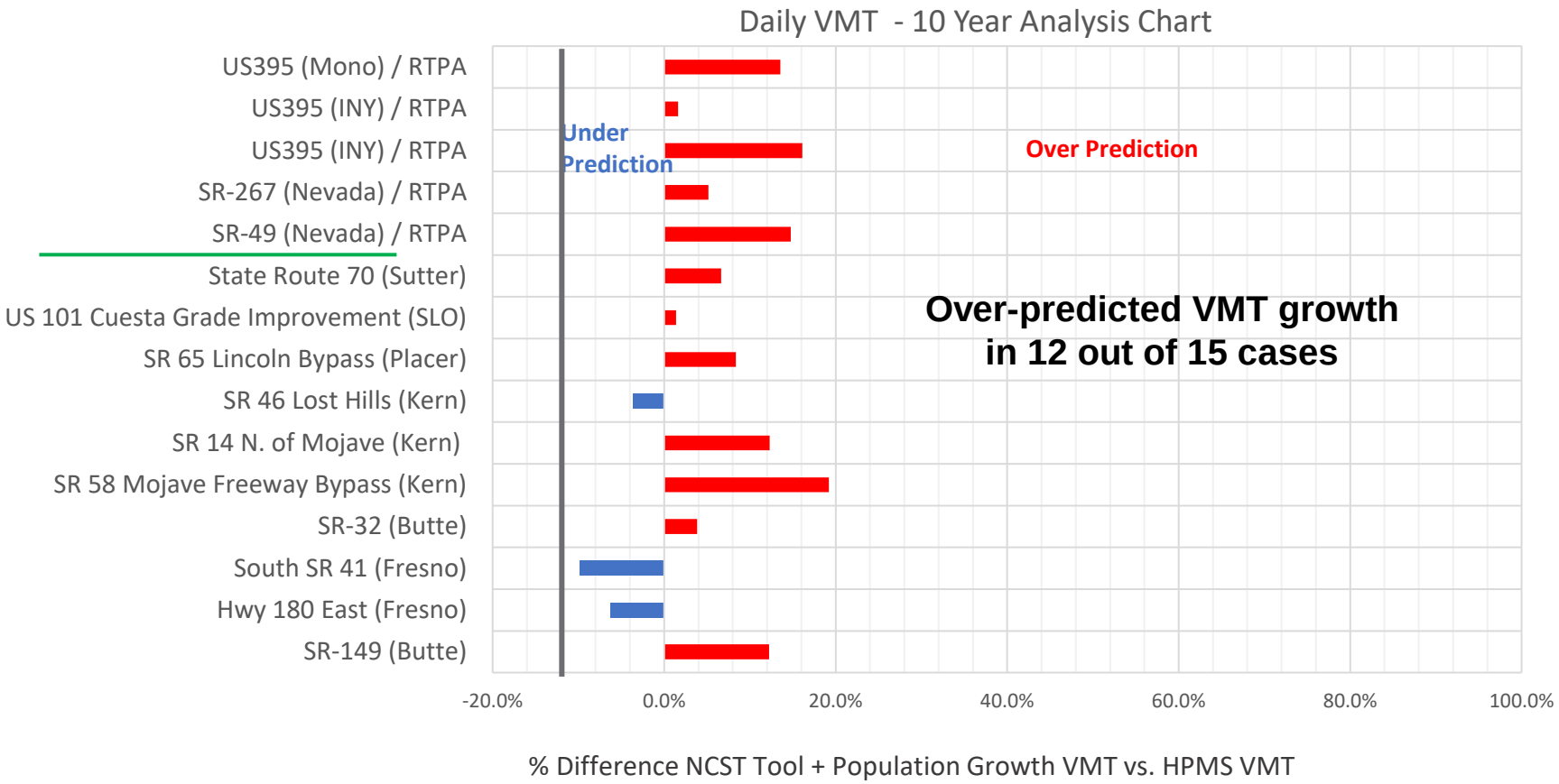
NCST Tool Rural Sensitivity Analysis



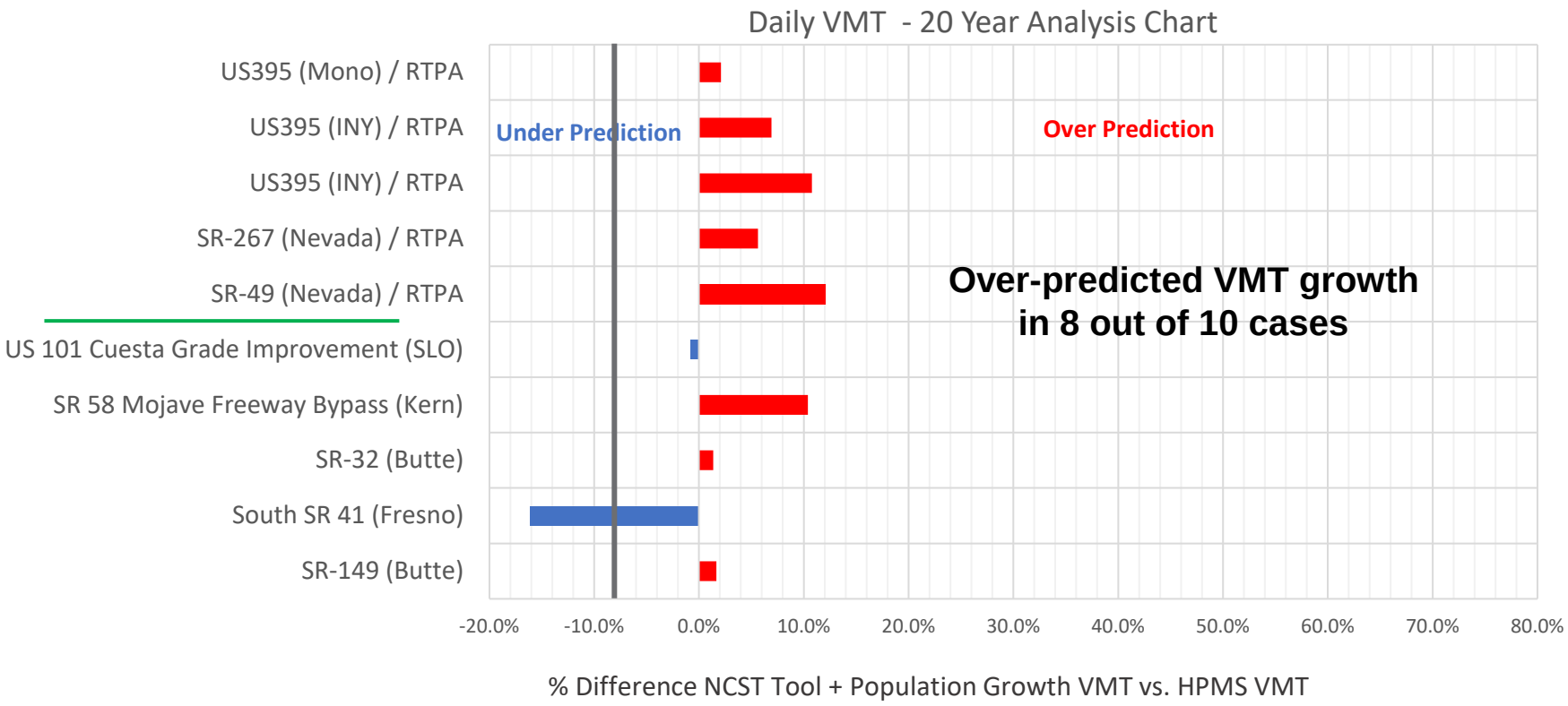
Rural Induced Demand Study – 3 Year Estimate Comparison



Rural Induced Demand Study – 10 Year Estimate Comparison



Rural Induced Demand Study – 20 Year Estimate Comparison



NCST Tool Rural Sensitivity Analysis

Findings

NCST Tool did not perform well in rural areas:

- Consistently overestimated regardless of whether the rural project is in an MPO region
  - Of the 5 Rural Non-MPO area projects – Overestimated in 100% of the time
  - Of the 12 Rural Area MPO projects – Overestimated 80% of the time
- Consistently overestimated regardless of forecast period (3, 10, and 20 years out)
- Magnitude of error decreased over time
- Incrementally small capacity increases (the more significant the project the worse the tool performs – overly sensitive)

Dr. Pande will be examining the presence of congestion as a requisite condition and other causality factors – Before and After Assessments.

(Very Brief) Recommendations

Draft Recommendations

Technical Guides

- Office of Planning and Research (OPR)Technical Advisory on Evaluating Transportation Impacts on CEQA
- Caltrans Transportation Analysis Framework (TAF) - (currently being updated)
- Caltrans' Transportation Analysis Under CEQA (TAC) (currently being updated)
- 2017 California Regional Transportation Plans (RTPs) Guidelines – (currently being updated)
- Climate Action Plan for Transportation Infrastructure (CAPTI)
- California System Investment Strategy (CSIS)
- California Air Resources Board Sustainable Communities Strategy (SCS) Evaluation Guidelines

Draft Recommendations

Induced Demand Checklist

1. Does the facility experience significant recurring congestion for extended periods of the day? Yes/No
2. Does the facility experience off-peak period congestion? Yes/No
3. Will travel time increase by more than 15 min per motorist? Yes/No
4. Is the project on a state facility or any other access-controlled facility? Yes/No
5. Does the project increase access to existing or future developable land? Yes/No

Questions 1, 3, 4 and 5 must all be "Yes" for latent demand to be potentially present to consider the application of the NCST Tool

Further Considerations:

1. Is the project a result of an approved development? Yes/No
2. Does the project result in diversion resulting in VMT reduction? Yes/No

Draft Recommendations

NCST Induced Travel Calculator, components of 1.0 elasticity for induced VMT are:

- Changes in commercial driving = 19 to 29%
  - Exempt under CEQA and SB 375
- Changes in individual or household driving = 9 to 39%
  - Short-Term Effect – Travel Demand Model Superior
- Diversion of traffic = 0 to 10%
  - Short-Term Effect – Travel Demand Model Superior
- Changes in Land Use Patterns (including migration) = 5 to 21%
  - Long-Term Effect – Travel Demand Models (in of themselves) do not explicitly address
- Elasticity Range: = .33 to 1.00

Duranton, G., & M. A. Turner (2011). The Fundamental Law of Road Congestion: Evidence from US Cities. American Economic Review, 101(6), 2616-2652. Retrieved from https://www.aeaweb.org/articles?id=10.1257/aer.101.6.2616.

Draft Recommendations

Induced Demand Calculation

a) Areas with 4-step or Activity-Based Travel Demand Models
    a) If the long-term induced effect is applicable, a maximum induced elasticity is 0.21
    b) If no long-term induced effect is anticipated, no adjustment is needed

b) Areas with 3-step Travel Demand Models
    a) If the long-term induced effect is applicable, a maximum induced elasticity is 0.30 (urban area)
    b) If the long-term induced effect is applicable, a maximum induced elasticity is 0.21 (rural area)
    c) If no long-term induced effect is anticipated, no adjustment is needed.

c) Areas with Land Use Allocation model with validated feedback mechanics.
    a) No adjustments needed for long-term induced effect

d) Areas with no travel demand model (statistical trends, statewide model, big data)
    a) Qualitative Analysis

Next Steps

Next Steps

Finalize Recommendations (Mid-November)

Complete Causality Assessment Case Studies (Early-December)

Draft Report (December)

Final Report (January)

Questions / Feedback?