Mitigating Vehicle-Miles Traveled (VMT) in Rural Development

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ABSTRACT

Vehicle-miles traveled (VMT) as an environmental review metric is more effective at combating climate change than level of service (LOS), and policymakers are beginning to advance its adoption for this purpose. Years of research and development prove that VMT mitigation strategies such as density, diversity, and design succeed in urban areas, but doubts remain about how VMT can be mitigated in rural development. This report reviews the current understanding of both urban VMT mitigation and rural development. Finally, additional literature and evidential case studies are explored to identify urban VMT mitigation strategies that can be modified for the rural scale as well as mitigation strategies unique to the rural context.

1 INTRODUCTION

California recently took the step towards combating climate change of retiring the level of service (LOS) environmental review metric, which is disposed to favor free flowing vehicular movement and greenhouse gas (GHG)-intensive development. Its replacement will be based on vehicle-miles traveled (VMT), which favors reduced vehicle use and therefore GHG-reductions *(1)*. Moving forward, California's environmental review will encourage California's developers to mitigate the VMT generation of new development.

Decades of research by Smart Growth proponents and New Urbanists will inform developers how to mitigate VMT in urban areas, but VMT mitigation in rural places is less understood. This issue will be very important to California as it works to meet its climate goals, as up to 95% of California's land and 5% of its population is rural *(2)*. This report inventories and assesses strategies that will enable development in these rural areas to strive for climate resiliency alongside their urban counterparts.

2 LITERATURE REVIEW

The subject of rural VMT mitigation sits between two broader questions: how is VMT mitigated, and in what way do rural places develop? Existing research provides clear, generalizable, and widely accepted strategies of urban VMT mitigation. Existing research also closely examines non-urban spaces, distinguishing the economic and physical characteristics that drive development of any kind.

2.1 VMT Mitigation

Cervero and Kockelman identified three "D's," principles for reducing VMT through planning and development *(3)*. Other researchers later extended these three to six *(4, 5)*.

- Density
- Diversity
- Design
- Destination accessibility
- Distance to transit
- Demand management of parking

The combined effect of these choices is a reduction in VMT through four methods *(5)*.

- Shift mode choice
- Increase vehicle occupancy
- Reduce trip generation
- Reduce trip lengths

2.2 What is Rural?

Current official definitions of "rural" are inadequate for comprehensive rural planning. Though no individual rural area has a large population, California's aggregate rural lands occupy a large portion of the State and a significant population share. How large, precisely, is difficult to say. The three major taxonomical institutions in the United States (Census Bureau, Office of Management and Budget, Economic Research Service) and the State of California disagree on what constitutes rural (the California State Code applies 11 different definitions). These definitions all "round up" the urban/rural fringe

(to use Census language) in varying degrees. This fringe area is considered in metropolitan planning, where the majority of population and activity are focused in metropolitan centers, but it is critical to rural planning, where these fringes are relatively population dense and foretell the trajectory of new development *(6)*. Based on the three Federal definitions, Figure 1 shows the share of California's rural population, and Figure 2 shows California's share of rural land.

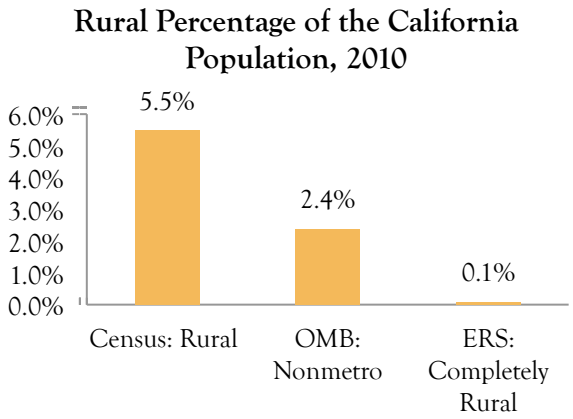


FIGURE 1 Rural Percentage of California Population, 2010

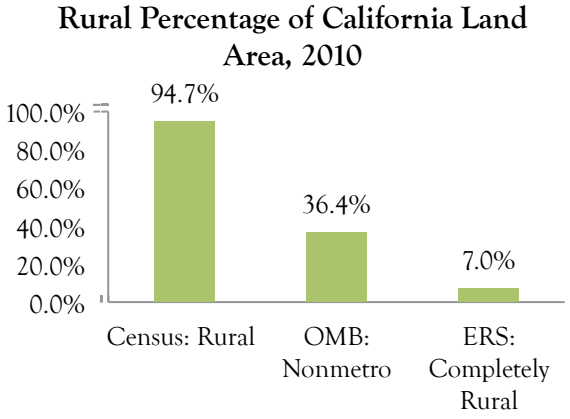


FIGURE 2 Rural Percentage of California Land, 2010

Ruth Miller, at the University of California, Berkeley, proposed a framework of three placetypes for rural planning in California *(6)*.

- Productive: Low population density and growth, with economic reliance on extractive and agricultural (non-transferable) uses of the land itself.
- Destinations: A large supply of seasonably occupied housing, high median household incomes, and essentially a population split between local staff of modest means and wealthier visitors.
- Edge: Undeveloped land within urban boundaries, developed land beyond municipal services, or land within reach of urban centers but developed at too low a density to be extended urban services.

3 METHODS

VMT mitigation strategies emerged from reports and interviews from multiple sources.

- Academic institutions
- Professional organizations
- Regional planning organizations
- State and federal agencies
- Transportation advocates and research groups
- City and county governments
- Urban, suburban, and rural developers

The review process consisted of three steps.

- Collecting accounts of rural projects for which VMT mitigation was an intended or unintended outcome
- Classifying the project by rural placetype (Productive, Destination, Edge)
- Identifying analogous urban VMT mitigation strategies, or new and uniquely rural strategies

4 VMT REDUCTION STRATEGIES BY PLACETYPE

The following sections review the VMT mitigation strategies appropriate for each rural placetype. Case studies are provided for each to illustrate combinations of these strategies in action. Most, but not all, of the case studies are from California.

4.1 Productive Areas

Reducing VMT in productive communities involves focusing development in more VMT-efficient centers and restricting it elsewhere. In addition to reducing VMT, this can reduce consumption of farmland and open space while maintaining small town character *(6)*.

4.1.1 Strategies outside Productive town centers

- Develop new residential units at a density of 10 acres per unit or less *(7)*.
- Commit farmland, timber reserves, or other open spaces under a conservation easement or land trust. Many states offer reduced property taxes for land under easement, such as the Williamson Act in California *(9)*.
- Eschew new growth-inducing infrastructure, and limit new development to septic service and well water *(10)*.
- Reduce the need to travel for information by providing high quality, high-speed broadband Internet service *(11)*.

4.1.2 Strategies inside Productive town centers

- Similar to the urban context, smaller lot sizes and higher density development make trip-chaining and active transportation more feasible.
- Adapt the transportation network to accommodate active transportation, including sidewalks, buildings at a pedestrian-oriented scale, street-fronting buildings, bicycle lanes, and bicycle parking.
- Enhance the small block grid system *(8)*.

- Develop affordable housing that balances the jobs-housing mix at each income level *(9)*.
- Construct a variety of building types and sizes, to support a mixture of uses, and reduce the need to travel long distances for basic goods and services *(9)*.
- Operate and subsidize vanpool programs to connect worker housing and related jobs.
- Operate and subsidize on-demand shuttles for more infrequent trips, such as between seniors and medical care *(9)*.

4.1.3 Case studies of VMT mitigation in Productive areas

The three square miles of Guinda, California (population 254) contain a small but walkable commercial center with basic services, at the heart of a much larger agricultural area. Residents will have to make a vehicle trip to obtain some goods and services, but can fulfill many needs locally, and even walk safely between many commercial destinations *(12)*.

The City of Woodland, California is also surrounded by agricultural farmland. Developers in Woodland observed a need to improve living conditions among farmworkers, and to reduce long driven trips ("super commutes") from adequate housing many miles away. With a combination of city, state, and federal grants, private developers are constructing 60 units of affordable housing within the city limits. The units will be priced at 30-50% of area median income, and is on track to open March 2015 *(13)*.

In another heavily agricultural region of California, the San Joaquin Valley, farmworkers pay a substantial portion of their income for unregulated vanpools to their worksites. After a tragic accident killed 13 farmworker passengers, the community sought and received $6 million in grants to establish the Agricultural Industries Transportation Services (AITS). The service began operating a network of vanpools in the San Joaquin Valley in 2002. The original program now operates 100 vans, is entirely supported by rider fees, and has been replicated in neighboring counties. Today, the AITS program eliminates 15 million VMT a year, provides safe transportation, and increases farmworker disposable income by 2 to 3 percent (11, 15).

4.2 Destinations

Destinations often have an especially high VMT per capita for two reasons. First, the local economy depends on visitors, many of whom may drive long distances to enjoy the local amenities. Second, high demand for second-homes and vacation rental property can put housing costs out of reach of local employees, forcing them to live elsewhere and commute long distances *(6)*.

4.2.1. Strategies for Destinations

- Focus new development intensity around the existing town center *(7, 8)*.
- Diversify new development types to mix land uses and reduce trip lengths for goods and services (such as child care).
- Diversify residential housing types to accommodate a range of users, such as families (multiple bedrooms) and seniors (smaller units with small yards for easy maintenance) *(15)*.
- Develop quality affordable housing *(16)*.

- Follow principles of form-based codes to improve walkability and embrace the Destination's existing marketable charm.
- Implement pedestrian and bicycle way-finding signage to encourage visitors to explore without an automobile *(8)*.
- When local transit is available:
    - Orient new development to facilitate pedestrian and bicycle access to transit stops
    - Subsidize connecting service to new development
    - Provide free or subsidized transit passes to employees, residents, or guests *(18)*.
- When regional transit is available:
    - Focus new development around the regional transit connection
    - Provide bike-rentals or bike-sharing facilities at the transit station
    - Attract car-sharing services to the transit connection
    - Operate a shuttle between the transit connection and major destinations
- Operate or contribute to a shuttle from nearby urban areas to the major destination (such as a ski shuttle, or to a casino/hotel).
- Operate or contribute to a local shuttle between workers and job centers or between local attractions for visitors *(19)*
- Purchase and dedicate land on the outskirts of the destination's developed area to a land bank or trust, reducing the risk of future high-VMT development *(9)*
- Commit to using local products and services in construction and operations *(19)*

4.2.2 Case studies of VMT mitigation in Destination areas

Mode shift to shuttles, busses, and trains can reduce VMT of travelers accessing Destination areas, while developing compactly, and mixing uses and providing for active transportation can reduce VMT within Destination areas themselves. .,.

Kings Beach, California, on the north shore of Lake Tahoe, is an unincorporated community with a declining population of fewer than 3,800 residents. In spite of its lack of formal incorporation and small population, the community is incredibly dense, with over a thousand residents per acre. Most of these residents are service workers in the surrounding and costly Lake Tahoe area, and live in small and inadequate housing conditions. Other local service workers, unable to find any housing on Lake Tahoe, commute from the nearest major city, Reno, over 40 miles away *(17)*. To address the lack of local, adequate, and affordable housing, a non-profit developer constructed 77 units of deed-restricted family housing priced at 30-60% of area median income. The three-story development is LEED-Silver, with a mixture of uses and services available on site. Residents also receive free passes for the local transit system, which has a stop on site *(16)*.

Fifteen miles northwest of Kings Beach, the town of Truckee is the commercial center of Lake Tahoe. Its small, walkable downtown includes an Amtrak train station, which offers regular from the nearby San Francisco Bay Area all the way to Chicago. Ski resorts offer shuttle service to the train station, and rental cars and bicycles are available as well. Though the surrounding forests, mountains and lake are the primary destinations, Truckee is a tourist attraction in its own right. Truckee is also home to the Sierra

Business Council, which promotes the use of local materials in construction and development (supporting the local economy and reducing freight VMT) (19).

The towns of Napa and Yountville are the largest towns in California's Napa Valley. Both are popular among tourists that commonly arrive by vehicle from the San Francisco Bay Area, nearly 50 miles away. The towns experience intense periods of automobile congestion and higher than average rates of drunk driving incidents, as the major tourist destinations (vineyards) are inherently far apart and the primary feature is alcohol. In response to these concerns, Napa and Yountville area business created two private shuttle systems. The Napa Valley Wine Trolley is sponsored by vineyards and transports passengers on a daylong tour for a fee *(20)*. The Yountville trolley is sponsored by the town, and transports anyone, resident or visitor, for free between any destinations within the town *(21)*. These systems present two different models for visitor shuttles reducing VMT.

4.3 Edge Communities

Edge communities are located on the periphery of a city or metropolitan area. Though less populous than urban centers, Edge communities are generally well served by infrastructure. This infrastructure is often designed to support automobile-dependent and low-density development, and retrofitting these communities with VMT-efficient development can be challenging *(6)*.

4.3.1 Strategies for Edge Communities

- Cluster new development compactly, including on infill sites when possible
- Improve the mix of uses, adding destinations that allow shorter trips
- Build a network of trails that offer active transportation options between the development and major destinations, such as other neighborhoods, schools, shopping, and recreation.
- Provide sidewalk and street treatments that facilitate active mode transportation, such as illuminated crosswalks, bulb outs, pedestrian refuge islands, bike lanes, and protected cycle tracks *(8)*.
- Facilitate, promote, and subsidize the implementation and use of car sharing facilities or peer-to-peer car sharing among residents *(22)*.
- Commit undeveloped lands to a land trust, the Williamson Act or a Transferable Development Rights program *(6)*.
- Redevelop and intensify low-intensity development along major corridors. Sufficient intensification along such corridors can make transit feasible.
- Unbundle parking from residential units, and offer car share vehicles on site *(22)*.
- Include or contribute to development that mitigates the community's VMT, such as a centrally located neighborhood center or library *(8)*.
- Promote and/or provide schoolpooling options for parents, such as organized meeting places or ridesharing tools *(23)*.

4.3.2 Strategies for Developer/Employers in Edge Communities

- Offer a parking cash-out option to employees.
- Charge employees the daily market rate for parking, rather than subsidizing parking or charging a monthly fee *(24)*.

- Provide incentives to employees to carpool, bike, walk, or take transit *(9)*
- Fund a Guaranteed Ride Home Program or Emergency Ride Home, which distributes vouchers for some number of free cab rides to commuters for emergencies when their carpool or transit options become untenable.
- Provide bike lockers, changing areas, and showers on site
- Encourage telecommuting *(24)*.

4.3.3 Case studies of VMT mitigation in Edge communities

Because of their large scale, edge communities occasionally present the opportunity for adaptive reuse on a large footprint. One such project in Rohnert Park, in Sonoma County, is converting 175 acres (most of which is currently parking) into the Sonoma Mountain Village. This development includes 1,980 homes; 3,800 jobs; and 825,000 square feet of commercial, office, and retail space, and submitted an application for LEED-platinum. The site is served by a shuttle to the nearby Sonoma State University and was designed to anticipate a future commuter rail stop *(25)*.

The City of Covington is a small suburban community outside Atlanta in one of Georgia's most foreclosed counties of the last decade. Though nearly all construction stalled in 2008, an affordable housing developer approached the city to build 60 affordable, age-restricted apartments and townhomes near the walkable town square. The project, Harristown Park, opened in 2011, and currently has a waitlist of over 2,500 applicants. Many of the initial applicants weren't actually qualified to live in the development, indicating vast and unmet demand for compact housing even in suburban areas. Though the development is 15 miles from the nearest transit service, the city refers to the site as TOD, or transportation-oriented development *(26)*.

A 2009 study modeled the VMT outcomes of status quo and compact development in the Towns of Lisbon and Sanford, Maine. These two small, rural towns have transit, but service is very limited and 93% of commuters drive. The study found that even without urban-style transit, the densification and mixing of residential and employment growth as infill still produced an "observable impact" on VMT and average trip lengths *(27)*.

5 CONCLUSIONS

To meet California's climate goals, both urban and rural development will require a clear articulation of local challenges and opportunities and thoughtful development. Increased understanding of rural contexts will support more effective climate change policies statewide.

6 FURTHER RESEARCH

This paper explores strategies for private developers, but the public sector also has a role in rural VMT mitigation. Land banks and Transferable Development Right (TDR) programs are just two examples of VMT mitigation methods that require public implementation and can be successful in rural areas.

Regrettably, rural communities under intense development pressure suffer an unfortunate Catch-22: local governments only have the tax base to support their current population, and often don't have the resources to adequately plan for growth until after development has occurred. Future research should also focus on how to support long-

range planning for growth in understaffed and unprepared small towns to handle intense development pressure.

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