THE IMPACT OF POPULATION GROWTH ON TRAFFIC MANAGEMENT

Article

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If you look at a photograph taken in the 1930's or 40's, of a Southern California city, you can see the wide open spaces and uncrowded roadways. In the business district areas you can see more people walking than you see cars. Times have sure changed. Today more than 34 million people live in the state of California, representing 12.5 percent of the population of the entire United States. Although the state's growth rate has slowed during the decade of the 1990s, due mainly to declines in domestic migration, California's population is projected to increase by 16 percent to nearly 40 million people, as it approaches the year 2010.[1]

California is a nationally recognized transportation and traffic safety leader. California has approximately 15,000 miles of highways and freeways with approximately 250 miles of carpool lanes. Between 1990 and 1999 the number of miles traveled (VMT), by motor vehicles on California's roadways, increased 16 percent to over 300 billion miles. The number of registered vehicles in California has grown from 22.6 million in 1990 to 23.7 million by 1999.[2]

The San Bernardino and Riverside County region provides a good case study of the problems and possible solutions facing law enforcement with respect to traffic management. Encompassing over 20,160 square miles, San Bernardino County is the largest county in the United States. To the south and adjacent to San Bernardino County is Riverside County with 7,200 square miles. The two counties border on three large population centers: Los Angeles and Orange County to the west and San Diego County to the south.

The region is referred to in much of the historical literature review and research as the Inland Empire. The Inland Empire is defined as the San Bernardino and Riverside County metropolitan area. However, due to the growth in population many researchers now include the low desert area of the Coachella Valley in eastern Riverside County and the high desert area of the Mojave Desert in San Bernardino County when they refer to the Inland Empire.

The Inland Empire has almost every road challenge imaginable: major metropolitan areas, mountain roads, deserts, commuter suburbs far from many jobs, recreation destinations, heavy movement of goods on highways, and vast open spaces. The Inland Empire has seen rapid population growth fueled in part by the availability of affordable housing, job growth and population migration from the neighboring urban areas of Los Angeles and Orange County. San Bernardino County and Riverside County are the 4th and 6th largest in population of California's fifty-eight counties.

The population of San Bernardino County is currently at a little more than 1.74 million people. It is projected to increase by nearly 500,000 persons by 2010. The population of Riverside County is approximately 1.57 million persons and is projected to increase by nearly 600,000 people by 2010. The population projections were done using the results of the 2000 census, which uses an equation that balances historical trends of births and deaths with foreign migration and domestic migration. Both counties are projected to have population increases of more than 50% by the year 2020.[3]

California has all but stopped building new freeways due to environmental restrictions, budget shortfalls and conflicts with sprawling urban development. Instead, California Department of Transportation (Caltrans) will focus on improving the efficiency of existing freeways by widening existing roadways, maintenance projects and improving traffic capacity. [4]

Building more freeways is not the answer. Traditionally, transportation agencies have responded to traffic congestion by trying to add more space to the road system. An analysis of the Texas Transportation Institute's Urban Mobility Study shows that places that have built the most roads haven't had much success in slowing the growth of traffic congestion. Travel delay was actually higher in the 23 metropolitan areas that built the most roads. Adding capacity to

highways doesn't just meet the current travel demand, it actually spurs additional driving. When a road is widened, more people will choose to drive on it. New and wider roads encourage land development, often on the fringes of urban areas.[5]

One of the reasons for population growth in the Inland Empire is upward pressure of housing prices in the Los Angeles, Orange and San Diego County areas. A report prepared for the California Department of Housing and Community Development called "Raising the Roof, California Housing Development Projections and Constraints 1997 – 2020", highlights the housing needed to accommodate 45 million Californians by 2020. It contains research on housing supply shortages, local government land use regulation, the state's changing demographic characteristics, land availability, and the need for housing capital are also addressed by the report.

According to this report several of the largest counties will not be able to accommodate additional growth. Even allowing for appropriate reserves, Los Angeles and Orange counties will lack sufficient vacant suburban land to accommodate projected household growth through 2010. Four other counties, Alameda, Contra Costa, San Diego, and Ventura, will start running low on vacant or raw land soon after 2020.[6]

According to the California Association of Realtors, the median price of a single family detached home in California was just over $276,000 in September 2001. The cost of the same home in San Diego was over $314,0000; in Orange County it would be $361,000 and in Los Angeles the median price was $250,000. However, in the San Bernardino/Riverside area the median price was only $162,000. In the high desert region of San Bernardino County the median price of a home was only $114,000.

The availability of affordable housing has forced people who can't afford homes in Los Angeles and Orange County to move to the Inland Empire, especially the high desert region. The Riverside/San Bernardino County area leads the state with a housing affordability index of 51. The sub-region of San Bernardino County in the high desert has a housing affordability index of 67. The affordability index is the percentage of households who can afford to purchase a median-priced home.[7]

Urban Sprawl and Traffic Congestion

A study by the Texas Transportation Institute found that 87 percent of Americans use a car, truck or van to get to work, up 1 percent from 1990. Carpooling declined from 13 percent in 1990 to 11 percent in 2000. Commuters driving alone increased from 73 percent in 1990 to 76 percent in 2000. [8]

Meanwhile the time it takes to get to work for Inland Empire residents is getting longer. The Inland Empire Research Consortium published a survey of residents in San Bernardino and Riverside County, which was conducted in 2000. The purpose of the survey was to provide demographic research on issues important to the Inland Empire region while evaluating key public and private sector activities such as health care, education and transportation. The results of the survey provide a view of changes occurring in the region over time and the public's perception of issues related to this project such as: quality of life, economy, commuting and traffic congestion.

The majority of people surveyed rated their county as a good place to live. However, they ranked traffic congestion as the single worst aspect of living in the region. Commuting times for both counties have remained nearly the same over the past 3 years with 58.9% of

respondents reporting a commute time of less than one hour and 23% reporting commute times of 1-2 hours. However, there was a slight increase of 2-3 hour commutes with 11.3% reporting commute times of 2-3 hours.

Three out of every 10 people commute outside their own county to work. More than a third of respondents indicate freeway traffic is a large problem. The Research Consortium believes answers such as these should be taken seriously and that immediate action needs to be taken to handle the increasingly severe problem of freeway congestion.[9]

Traffic congestion is made up of two components: recurring and non-recurring traffic congestion. Recurring traffic congestion occurs when demand exceeds capacity. On recurring days of the week and hours of the day the volume of traffic due to commuters and the transportation of goods exceeds the capacity of the freeway and choke points develop. Traffic slows to a crawl and long back ups occur. Non-recurring traffic congestion is due to traffic collisions, stalled vehicles and other emergency incidents such as spilled loads of materials.

In 1999 the San Bernardino/Riverside area ranked 17th out of 68 areas nationwide and 4th highest of California's large counties in the annual delay experienced by motorists due to traffic congestion. The average annual per capita delay per motorist in the region was 38 hours. The cost of such delays translates into 59 extra gallons of fuel consumed, and $685 dollars in increased vehicle maintenance per motorist per year. Clearly the economic costs of traffic congestion are significant.[10]

Truck Traffic and Goods Movement

In 1989, the United States and Canada signed a free trade agreement. This agreement was expanded to include Mexico in the North American Free Trade Agreement (NAFTA) in

1993. International trade related transportation in the United States accounts for approximately ten percent of total tonnage moved on the domestic transportation system today. Trends suggest that international trade as a result of trade agreements will continue to grow in the future.[11]

California is an economic powerhouse, fueled by production, movement and consumption of goods and services. The trend of smaller, higher value shipments is leading the way in which goods are moved. This trend is shaped by the emergence of just in time business practices, which eliminate the need for large warehouse inventories.

In the 1996 California Trade and Goods Movement Study, trends in population growth, manufacturing activity and foreign trade all point to a considerable growth in the movement of goods. The increase in population will require more food, clothing, and household goods; more homes, stores, and other buildings will have to be built; and waste products have to be collected and transported to disposal points. All of this involves an increased movement of goods, especially to and from urban areas. From 1992 to 2012 the volume of goods transported by trucks on California highways is estimated to increase 31% from 586 million tons to 769 million tons.[12]

The Inland Empire is in the middle of one of the largest concentrations of goods movement in the US A large amount of trade goods move through the Los Angeles and Long Beach area and head east to the rest of the US. The high desert area of Barstow is also a major rail and truck concentration point for the shipment of goods in and out of the southern California region.

Travel and Tourism

The travel industry is a major component of California's economy and the primary industry in many local communities. In 2000 California was the destination of an estimated 293 million domestic and international travelers. Travel by car is the most popular mode of travel for California travelers, followed by air travel, with bus and train use third. Travel and tourism accounted for an estimated 75.4 billion dollars, which was 6% of California's gross state product. The San Bernardino/Riverside and desert area accounts for approximately 11% of California's total travel volume.[13]

The Las Vegas Convention and Visitors Authority (LVCVA) estimates 35 million people visited the Las Vegas area in 2000. Approximately 26% of the visitors come from Southern California and an estimated 84% of these visitors from Southern California drove automobiles. Travel to and from Las Vegas affects traffic along the I-15 corridor, which is one of the major traffic corridors in the Inland Empire region. In the high desert, congestion on I-15 is worst on weekends and holidays, generated by recreational travelers going from Los Angeles, Orange and San Diego counties to Las Vegas and back. As an example of this, the traffic volume on I-15 has increased from 3.7 million vehicles in 1990 to 5.9 million in 2000.[14]

Technology

Computers, electronics and information systems are influencing the movement of people and goods on our transportation system. Because traffic congestion is projected to become worse and because Transportation Departments will not be able to build more highways or widen existing highways fast enough, advanced transportation technologies known as Intelligent Transportation Systems (ITS) are being developed to improve mobility and the safety of travel through the world. The main objectives of ITS are to obtain maximum use of the transportation

infrastructure, make travel safer and more convenient, and improve the productivity of the day to day management of the transportation.[15]

ITS systems are in use all over the world. Types of technologies range from: closed circuit TV cameras (CCTV) to monitor roadways, electronic sensors to calculate traffic volume and speeds, traveler information systems, changeable message signs (CMS), freeway call boxes for disabled motorists to summon help, environmental sensing units for weather information, pre-pass programs for commercial vehicles to bypass truck weigh in stations, coordinated and synchronized traffic signals, metered ramps, High Occupancy Vehicle (HOV) lanes, and toll roads with electronic payment features.

The California Highway Patrol and California Department of Transportation jointly staff and operate Transportation Management Centers (TMC's). The TMC's are regionally located throughout southern California and are used to coordinate ITS and traffic management by use of a computer aided dispatch (CAD) system to handle responses to traffic collisions, emergency incidents and to mitigate traffic congestion.

The US Department of Transportation is developing a national ITS architecture to coordinate different modes of travel and different geographic regions. This system when fully implemented will promote the use of ITS technologies that will work with the technology eventually available in cars no matter where you are in the US.

In June of 2001, the Orange County Transportation Authority (OCTA) implemented a driver information service called "TravelTip". Travel Tip provides real time traffic information to assist motorists. The service can be accessed by web site or telephone and provides links to other transportation web sites. Travel TIP data is collected from the Caltrans Traffic Management Center, local closed circuit television cameras along transportation corridors,

California Highway Patrol incident reports, freeway and roadway sensors, city traffic engineers, and motorists who call in reports. It provides traffic speeds and estimated travel times on Orange County freeways and surface streets with data that is updated every 30 seconds. "OCTA's Travel TIP system is one of the first of ITS kind in the entire nation," said Gloria Stoppenhagen, ITS manager for the Federal Highway Administration. "…And it's only the beginning. The Federal Highway Administration sees this technology as a model for using real-time traveler information to improve the efficiency of our regional highways and arterial roads."[16]

Commercialization of Highways

The Republic of Singapore has tackled the problem of traffic congestion in a unique way. Singapore has a population of just over 4.5 million people living on just 250 square miles. Singapore has limited land availability and has chosen to implement vehicle regulations that would seem severe to most Americans. In Singapore the Land Transport Authority coordinates traffic management, road construction, traveler information systems and vehicle licensing and regulation. Only a certain number of vehicles are allowed in the country. People must wait their turn and pay a large sum to register a vehicle and then be subject to user fees on roads. People are limited as to what time of day and day of the week that they can travel to the most crowded inner city regions if they choose to use their own car. Cars are equipped with electronic devices which automatically charge the owner a toll and register fines for unauthorized travel into crowded urban areas. Public transportation is plentiful and the severe use tax and regulations of automobiles encourages people to use it.

Some people in the United States believe Americans should also implement such regulation and user fees for transportation. Robert Poole of the Reason Public Policy Institute

believes the US highway system is suffering from funding shortfalls and anti-highway politics of environmental concerns and urban planning organizations which oppose expansion of highways. According to Poole, the US highway system is failing to satisfy its customers. He proposes a new highway paradigm for the 21st Century, which would change the highway system into a road utility similar to telecommunications systems. If Robert Poole had his way, private companies would buy existing roadways from public agencies. The private companies would then be responsible for building and maintaining highways. Traffic congestion would be tamed by variable pricing. Users would pay higher prices during peak commute hours.[17]

There are political obstacles to this new idea of a road-utility paradigm. One is people's innate dislike of paying tolls. Part of their dislike stems from their unhappiness with tollbooths, the lines caused by congestion and fumbling for coins. However, as electronic toll technology makes tollbooths obsolete, these problems will disappear. The other part of their dislike is opposition to perceived "double taxation." Since most US gas taxes have historically been highway-user fees, trucking and automobile organizations oppose paying both fuel taxes and tolls for the same roadway. Rebates of fuel taxes for miles driven on toll roads could address this problem. Another price-related concern is that tolls are unfair to low-income people. Without the availability of public transit, low income Americans who drive but cannot afford tolls, are unable to have access to jobs, health care or education.[18]

Researchers at City University of New York undertook a study to determine which factors were most important in promoting self-sufficiency among the poor. The study, which surveyed 400 households, was published in the Journal of Urban Affairs. The research found the two most important factors in promoting self-sufficiency were whether the adults in the household had work experience and whether they had a car. Just 28 percent of households with

no work experience or car were economically self-sufficient. Having a car boosted the chances of self-sufficiency to 74 percent. Having a car and work experience boosted their chances to 94 percent. The City University researchers also cite a study done by the Brookings Institute, which seemed to show the automobile as the most economical, efficient, adaptable and flexible form of transportation for low income people with the spread out pattern of most urban development.[19]

Conclusions

In conclusion, the research conducted clearly shows the Inland Empire region is poised for a large increase in population. The increase in population will be fueled in large part by domestic migration due to affordable housing and the availability of undeveloped land. Population increases also means more need for goods and services and more commercial vehicle traffic associated with the movement of goods. The increased traffic and need for people to travel to large urban centers in Los Angeles and Orange Counties for higher paying jobs means longer commutes and increased traffic congestion.

The San Bernardino/Riverside region was selected for this study because it posed so many different challenges due of the rapid pace of growth. The lessons learned from this study can be applied to any region that is experiencing similar trends in population growth, traffic management and transportation planning. Clearly, there is a need for new and better strategies for law enforcement to manage the traffic congestion associated with this population increase.

State, county and local law enforcement agencies will need to establish better coordination of existing ITS. They will need to collaborate by working together towards incorporating future up grades into a system that everyone has access too and can be used to coordinate traffic management across city and county jurisdictions. The ability to access

information and coordinate traffic management techniques such as signal light timing, traffic diversion and use of alternate routes can be done if we cooperate regionally.

There is a saying in business, “Think global, act local.” When it comes to transportation planning and management the saying should be, “Think regional, act regional.” There are many unanswered questions with respect to which direction we should take with urban planning and growth. Technology alone cannot solve all of the problems associated with population growth and the strain on the transportation system. Sustainable growth means taking into consideration the social, environmental and economic issues which effect a region, anticipating and planning for the future needs of that region. Making decisions which are strategic means focusing on future outcomes, the prevention of problems and looking at the long range implications.

The full impact of the decisions we make today may not be realized for 20-30 years. Some decisions may have unintended consequences. Limiting the use of automobiles or requiring motorists to pay as you go on highways, toll roads or imposing higher registration or impact fees may have the unintended consequence of negatively impacting people with lower incomes. It may have the impact of depriving people with lower incomes of the ability to seek out higher paying jobs and the flexibility to move from crowded urban centers to suburban areas which may improve their quality of life or at least the choices they have.

Hopefully, this may provoke more research on smart growth policies, urban planning and land use issues. Local law enforcement agencies need to adopt a collaborative regional approach to traffic management. They will need to use Transportation Management Centers with Intelligent Transportation Systems and Automated Traffic Management Systems to coordinate regional transportation planning if they are going to be able to manage the growth in population and the growth in traffic that will go along with it.

Notes

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