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16. Abstract

Three California communities were selected to participate in the study on the basis of comparability and isolation from each other. Two of the communities' police departments implemented special speed enforcement programs focused on six zones within each community. The third community refrained from implementing any special traffic enforcement effort for the six-month duration of the programs, provided crash, speed, and crime data for six comparable control zones, and served as a comparison site in the quasi-experiment. Officers in both experimental communities spent, on average, more than 8 hours each week conducting radar and laser-assisted speed enforcement in each of the special enforcement zones. Project staff also organized traffic safety program support committees in the experimental communities. The committees planned and implemented extensive publicity programs to elevate public awareness of the special enforcement efforts.

Crash, speed sample, and crime data were obtained from the participating police departments and a state wide reporting system. The primary dependent measure of program impact was the incidence of injury, fatal, and property damage only crashes in which unsafe speed, following-too-closely, or right-of-way violation was the primary collision factor. No significant differences in effectiveness between the two special enforcement programs were found. However, the experimental communities experienced declines in the numbers of speed-related crashes of 11.3 and 1.1 percent, while the same categories of crashes increased by 3.4 percent in the comparison community. A statistically significant reduction in speed-related crashes was found in one of the experimental communities. Time series analysis found no significant declines in *all* crashes, suggesting that program effects were confined to the primary collision factors associated with vehicle speed. Further, unobtrusive measures of vehicle speed found 19 and ten percent declines in the numbers of vehicles exceeding the limits in the two experimental communities, while the numbers of speeders declined by only three percent in the comparison community. The incidence of Part I and Part II crimes in the special enforcement and control zones was analyzed for all three communities. Both experimental communities experienced statistically significant declines in the incidence of the only type of Part I crime that is equally likely to occur during daylight hours as at night (i.e., when the special enforcement was conducted). Paired samples analyses found the 11 and 12 percent declines in larceny/theft to be statistically significant, and attributable to the deterrence effects of the special enforcement programs; larceny/theft declined by only 1.7 percent statewide and increased by four percent in the control zones of the comparison community. Overall, the research showed that municipal speed enforcement programs can have significant, positive effects on measures of public opinion, traffic safety, and crime.

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EXPERIMENTAL EVALUATION OF MUNICIPAL SPEED ENFORCEMENT PROGRAMS

EXECUTIVE SUMMARY

The purpose of this study was to determine whether municipal speed enforcement programs can reduce the numbers of speeding motorists and the incidence of speed-related crashes in a community. A further objective of the study was to explore the hypothesis that traffic enforcement has a deterrence effect on criminal activity in the vicinity of the enforcement effort.

FIELD STUDY

Three communities were selected to participate in the study on the basis of comparability and isolation from each other. Two of the communities' police departments implemented special speed enforcement programs focused on six zones within each community; four of the zones in each community were selected on the basis of speed-involved crash statistics and two in each community on the basis of chronic citizen complaints of speeding. The third community refrained from implementing any special traffic enforcement effort for the six-month duration of the programs, provided crash, speed, and crime data for six comparable control zones, and served as a comparison site in the quasi-experiment. Officers in both experimental communities spent, on average, more than eight hours each week conducting radar and laser-assisted speed enforcement in each of the special enforcement zones (which were several blocks to nearly a mile in length).

Project staff organized traffic safety program support committees in both of the experimental communities. The committees were composed of police managers, local leaders, and concerned citizens; hospital emergency department physicians were recruited to serve as committee chairmen. The committees, facilitated by project staff, planned and implemented extensive publicity programs to elevate public awareness of the special enforcement efforts. The publicity campaigns included press conferences, posters, brochures, supermarket drop-ins, public speakers, bus bench display advertising, media events, and TV and radio public service announcements.

RESULTS

Crash, speed sample, and crime data were obtained from the participating police departments and a state wide reporting system. The primary dependent measure of program impact was the incidence of injury, fatal, and property damage only crashes in which unsafe speed, following-too-closely, or right-of-way violation was the primary collision factor. No significant differences in effectiveness between the two special enforcement programs were found. However, the experimental communities experienced declines in the numbers of speed-related crashes of 11.3 and 1.1 percent, while the same categories of crashes increased by 3.4 percent in the comparison community. Paired samples analyses found a statistically significant reduction in speed-related

crashes in one of the experimental communities. Time series analysis found no significant declines in *all* crashes, suggesting that program effects were confined to the primary collision factors associated with vehicle speed. Further, unobtrusive measures of vehicle speed found 19 and ten percent declines in the numbers of vehicles exceeding the limits in the two experimental communities, while the numbers of speeders declined by only three percent in the comparison community.

The incidence of Part I and Part II crimes in the special enforcement and control zones was analyzed for all three communities. Overall, the more serious, or Part I crimes, declined by eight percent in the special enforcement zones of one of the experimental communities, and by one percent in the other experimental community; Part I crimes increased by four percent in the comparison community's control zones. None of the changes in combined Part I crimes was statistically significant, but both experimental communities experienced statistically significant declines in the incidence of the only type of Part I crime that is equally likely to occur during daylight hours as at night (i.e., when the special enforcement was conducted). Paired samples analyses found the 11 and 12 percent declines in larceny/theft to be statistically significant, and attributable to the deterrence effects of the special enforcement programs; larceny/theft declined by only 1.7 percent statewide and increased by four percent in the control zones of the comparison community. In addition, the less serious Part II crimes declined by nine percent in the only experimental community for which Part II data could be obtained; this change from the same six-month period one year earlier was found to be statistically significant. The incidence of Part II crimes increased by eight percent in the comparison community's control zones during the same periods.

IMPLICATIONS

The research showed that municipal speed enforcement programs can have significant, positive effects on measures of public opinion, traffic safety, and crime. The specific benefits obtained during the current study included,

1) Increased public awareness of law enforcement activity and public support for the special enforcement programs;

2) Reduced incidence of speeding and speed-related crashes, resulting in millions of dollars in savings to society and the intangible benefits of less pain and suffering than would otherwise have been experienced;

3) The economic and law enforcement advantages of apprehending individuals who were wanted for outstanding warrants, or were observed in the conduct of illegal activity, as a consequence of routine traffic enforcement stops; and,

4) The similar economic and law enforcement advantages derived from deterring individuals from committing crimes in the vicinity of the enforcement effort.

All of these important benefits were obtained *in addition* to receiving a five-hundred percent return in the form of municipal revenue for the cost of equipment and officer time. In short, study results suggest that traffic enforcement should be considered by police managers as a certain, important, and self-sustaining component of an overall municipal law enforcement strategy.

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ACKNOWLEDGEMENTS

The Anacapa Sciences project team is grateful to the many individuals who provided guidance and cooperation during the performance of this important study. We are particularly grateful to the managers of the Modesto, San Bernardino, and Salinas Police Departments for accepting our invitations to participate by disrupting schedules and diverting officer effort from previously-planned activities. The study was made possible by the dedication of these managers to improving traffic safety in their communities and elsewhere. We are also indebted to the police officers of the participating departments for their high levels of motivation and professionalism, and for their commitments to the difficult study requirements. In addition, the project team is grateful to the concerned local citizens who organized as committees to support the special enforcement programs, and especially to Dr. Michael Rossini, Jr. in Modesto and Dr. Dev Gnanadev in San Bernardino, for taking the time from their busy schedules to provide leadership to the program support committees. Police department personnel who contributed to the success of the programs are listed below.

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CHAPTER 1: INTRODUCTION

This report presents the results of a research project conducted by Anacapa Sciences, Inc., for the National Highway Traffic Safety Administration (NHTSA). The objective of the research was to evaluate and compare the effects of two separate municipal speed enforcement programs. One of the programs focused on speed enforcement, while the other maintained a second enforcement emphasis on following too closely. Both of the experimental programs were accompanied by extensive publicity to elevate public awareness about the special enforcement. A third community served as an experimental control, refraining from any special speed enforcement or publicity during the study period. The research documented in this report was conducted during the 22-month period, from October 1993 through August 1995.

The report is presented in four chapters. This brief introductory chapter provides a statement of the problem addressed by speed enforcement programs, and a summary of the theoretical bases of the research project. Chapter 2 describes the steps followed by the research team in planning and implementing the study. Chapter 3 presents the results of the research effort. Finally, Chapter 4 provides a discussion of the implications of the study to traffic safety experts, and to law enforcement and public policy managers.

BACKGROUND

Nearly 1.4 million people have died in traffic crashes in the United States since 1966, the year of the National Traffic and Motor Vehicle Safety Act (which led to the creation of NHTSA in 1970). During the late 1960s and early 1970s more than 50,000 people lost their lives each year on our nations streets, roads and highways. Traffic safety has improved considerably since that time: the annual death toll has recently declined to about 40,000, even though the numbers of drivers, vehicles, and miles driven have all increased. The dramatic improvement in traffic safety is more clearly evident in the change in fatality rate per 100 million vehicle miles traveled: The fatality rate fell from 5.5 in 1966 to 1.7 in 1994--the lowest rate since records have been maintained (FARS--Fatal Accident Reporting System--94), representing a 69 percent improvement in traffic safety, as measured by this key indicator. In other words, although there were "only" 10,000 fewer fatalities in 1994 than in 1966, when miles traveled are considered the likelihood of being killed in traffic in 1966 was nearly three times what it is today!

FARS 94 reports that 64 percent of all drivers involved in fatal crashes made some type of operator error that contributed to the crash. About 18 percent of those errors were driving in excess of speed limits or driving too fast for conditions, a category second only to weaving across lanes or running off the road (25 percent of all operator errors). Similarly, California's Statewide Integrated Traffic Reporting System (SWITRS) reports that speed was a primary collision factor in 23 percent of all injury

crashes and 11 percent of all fatal crashes during 1991. Speed was the leading primary collision factor for injury crashes and the second most frequent factor in fatal crashes, ranked behind driving under the influence (responsible for 35 percent of fatal crashes).

A list of the most frequent causes of fatal crashes on surface streets is presented in Table 1. While reviewing each cause, it is an interesting exercise to consider, from a driver's perspective, how excessive vehicle speed and following too closely could precipitate or contribute to the severity of the crash. Even the most cursory review of Table 1 reveals that the speed of another vehicle is a clear factor in whether the crash could be avoided in six of the eight crash causes; in the remaining two (numbers 6 and 8), the speed of one's own vehicle either causes or contributes to the severity of the crash. An insufficient following headway is a clear contributing factor in four of the causes and an insufficient turning headway in one.

TABLE 1
MOST FREQUENT CAUSES OF
FATAL CRASHES ON SURFACE STREETS

1. Vehicles emerging from driveways or side roads without warning.
2. Slowing or stopping without signaling.
3. Changing lanes without signaling.
4. Turning in front of oncoming traffic.
5. Running stoplights or stop signs at intersection.
6. Colliding with vehicles that have stopped for stoplights or signs.
7. Stopping within intersections.
8. Loss of control during unexpected braking or turning.

Speed and "headway," or the distance between vehicles (either following or turning headway), are related as causal factors by the physics expressed by stopping distances. In all but one of the causal factors listed in the table either 1) vehicle speed was too great, or 2) the headway was too short. As a consequence of the relationship between vehicle velocity and stopping distance (and other factors such as vehicle weight, traction, etc.), there are only two means available to limit the frequency and severity of crashes by compensating for the imperfect driving of motorists: Either vehicle speeds can be limited to reasonable levels, or safe, but possibly unrealistic following and turning headways must be maintained. Limiting speed appears to be the favored choice.

Perhaps the opponents of speed enforcement assume that all motor vehicle operators are well-rested, unimpaired by age or alcohol, and optimally attentive to their driving tasks. But this is not the case: Many people drive when seriously fatigued;

others are impaired by alcohol, prescription drugs, recreational drugs, or by illness and other physiological conditions. Finally, vigilance while driving, even under optimal conditions, is difficult to sustain. There are many possible distractions for a driver, including children or other passengers in the vehicle; looking for a street, address or landmark; or, operating a radio or a cellular telephone while driving (a relatively recent source of distraction and considerable driver error). Complete vigilance while operating a vehicle is an unrealistic ideal; operationally, driving is always performed as a divided attention task, a requirement for which normal human capabilities are poorly suited.

ORGANIZATION

This report is presented in four chapters. Following this brief introduction, Chapter 2 provides a detailed description of the research tasks that were conducted as part of this study; Chapter 2 also includes summaries of the experimental traffic enforcement and publicity programs that were developed, implemented, and evaluated by the research team. Chapter 3 presents the results of the research. The results are organized and discussed in terms of administrative measures and program impact on measures of public awareness, traffic safety, and crime in the vicinity of the special enforcement. Chapter 4 discusses some of the implications of study results that were presented in the previous chapter.

CHAPTER 2: THE RESEARCH

The research documented in this report was conducted during the 18-month period between October 1993 and June 1995. The study involved eight major project tasks performed in two phases; the sequence in which the tasks were conducted is illustrated in Figure 1. This chapter provides a step-by-step summary of those activities.

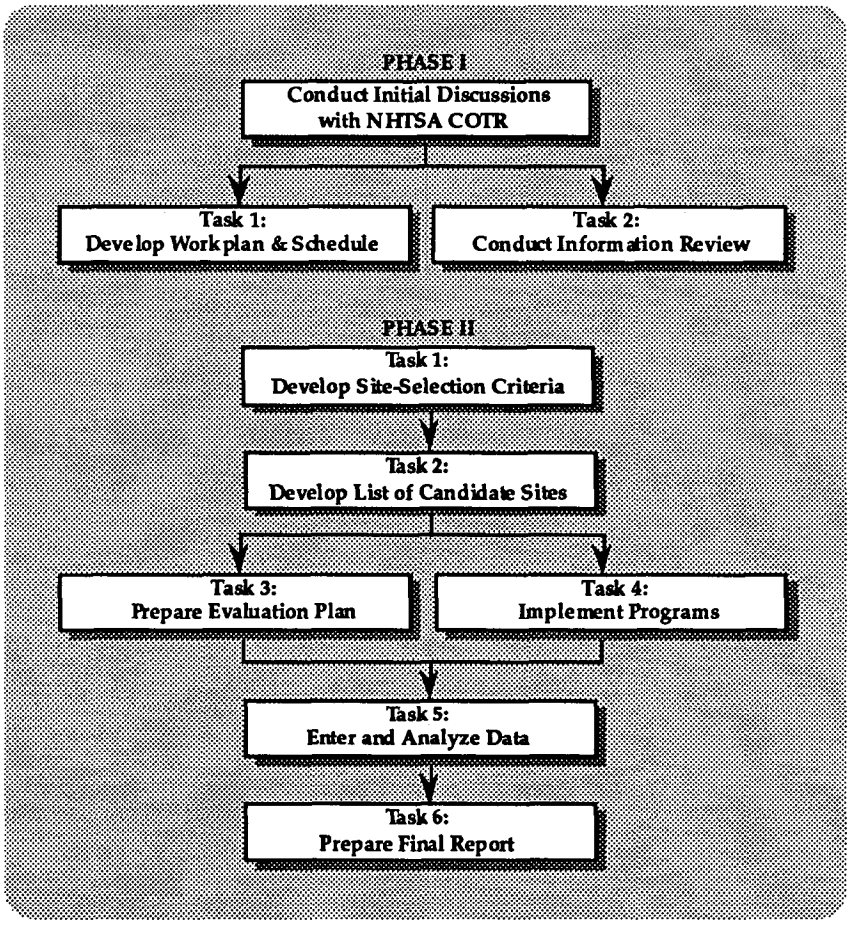


Figure 1. Sequence of major project tasks.

DEVELOPED WORK PLAN

The first few months of Phase I of the project were devoted to planning, research design, and preparation of a detailed Work Plan that would guide the conduct of all subsequent project activities. The Work Plan was based on the approach that was outlined in the original proposal to conduct the work and modified in response to subsequent communications with the Contracting Officer's Technical Representative (COTR) and other NHTSA traffic safety experts. Each section of the Work Plan addressed a separate component of the research project.

CONDUCTED INFORMATION REVIEW

A computerized literature search of the National Technical Information Services (NTIS) database, plus other law enforcement and periodical databases, was performed to identify and review published materials relevant to speed enforcement. The results of the literature search were submitted to NHTSA as a catalog of references on the subject of speed enforcement. In addition to the literature review, special inquiries regarding speed enforcement efforts of member agencies were made by the Police Executive Research Forum (PERF); nearly 100 municipal law enforcement agencies responded to the inquiry with detailed descriptions of their speed enforcement programs. In-depth interviews were then conducted with representatives of more than 20 municipal law enforcement agencies that had been identified as conducting innovative speed enforcement programs; the interviews were performed to provide additional information to supplement the literature search and initial inquiries. The objective of the information review was to identify any new, newsworthy, or particularly effective speed enforcement strategies to consider including in the experimental programs to be developed and implemented during Phase II of the project. A brief report, entitled *Speed Enforcement Methods and Impact: Information Review,* was prepared and submitted to NHTSA; that review is presented as Appendix A to this technical report. The speed enforcement methods addressed in the review are listed below.

- Aerial enforcement
- Photo-radar
- Drone radar
- Mobile patrol vehicles
- Stationary patrol vehicles
- Speed indicators
- Speed bumps and rumble strips
- Laser speed monitoring and detection equipment
- Drone patrol vehicles and decoy patrol vehicles
- Traffic enforcement notification signs
- Following headway enforcement
- Pole wraps
- Radar speed monitoring and detection equipment

The following paragraphs describe the approach that was developed based on the results of the information review, and recommended in the Work Plan.

It was suggested that two communities be selected from within a single state to participate as experimental sites; a comparable third community would be recruited to serve as a control site. One of the experimental sites would implement a program of vigorous speed-limit enforcement and the other would implement a more complex program that targeted both excessive speed and unsafe following and turning headways. Both programs would involve the use of laser and radar speed monitoring, and high-visibility enforcement. Also, the programs would employ some of the innovations discovered during the Phase I information review (e.g., decoy police vehicles, traffic hot lines, etc.). In addition, psychological principles would be applied to enhance the effectiveness of enforcement schedules (e.g., intermittent enforcement at specific sites, linking decoys and special signage to the enforcement activities, etc.).

Perhaps most important, the two experimental enforcement programs would be supported by extensive yet comparable public information and education (PI&E) campaigns. The PI&E programs would be designed to increase motorists' perceived risk of receiving a citation by informing the public of the crash risks associated with speeding or speeding/headway violations, but more important, that the police were focusing their enforcement effort on those unsafe driving behaviors. The PI&E programs would be designed and implemented by traffic safety program support committees organized and facilitated by the Anacapa project team.

DEVELOPED SITE-SELECTION CRITERIA

The first step of Phase II was to define the criteria to be used in the selection of candidate sites to serve as experimental and control communities for the study. The following site-selection criteria were established.

1. *The existence of an identified speed problem.* The existence of a local speeding problem was considered necessary for two important reasons: 1) To ensure that a sufficient number of speed-related and following too closely-related (FTC-related) crashes would occur within monthly reporting periods (to facilitate statistical analyses during the program evaluation); and, 2) Perhaps more important from a practical standpoint, an identified speed problem was considered to be necessary for the enforcement program to have credibility with participating police personnel and members of the community. In addition, it was considered to be important that the local "speed problem" be of a chronic nature (i.e., that the problem existed over at least a two-year period), rather than a statistical aberration or a response to a temporary condition.

2. *The existence of a dedicated traffic enforcement unit.* A police department with a special traffic unit would be more likely to have the motivation to participate in the proposed study and the trained personnel necessary to conduct the special enforcement. In addition, a traffic unit usually has an accident reconstruction expert whose expertise would be necessary in the accurate assignment of primary collision factors (PCFs).

3. *Size of city or municipality.* In traffic safety studies, the participating cities must be large enough to generate sufficient speed- and FTC-related crash data, yet small enough for the results of the study to be perceived as relevant to most other communities. Smaller community size also increases the probability of a successful publicity campaign (i.e., smaller media markets that are insulated from each other, not dominated by large urban areas). It has been found that communities with populations of approximately 100,000 residents (and similar daytime service populations) experience between 60 and 75 injury crashes per month, which is a sufficient number of crashes for statistical analysis. State data indicate that in approximately 24 percent of those crashes, speed is identified as a PCF (and in 11 percent of all fatal crashes), and FTC is the PCF in about four percent of the injury crashes (and seven percent of the fatals); by comparison, driving under the influence of alcohol is the PCF in 10.5 percent of all injury crashes (but in 34 percent of all fatal crashes). The statewide data indicated that cities with populations of about 100,000 would provide sufficient traffic collision data to conduct all planned statistical analyses. Further, it was reasoned that the results of a study conducted in cities of about 100,000 would be perceived as relevant to the full range of municipalities, from small communities to large urban jurisdictions.

4. *The existence of a traffic data system.* Traffic data systems are the most cost-effective means to obtain large volumes of data for program evaluation, with no sacrifice in accuracy. There is only one drawback to using data provided by a statewide service, such as the Statewide Integrated Traffic Records System (SWITRS) in California and that is the three to four-month delay in obtaining data for a current month (three months are usually required to receive, process, and enter all reports for a month from a community).

5. *Operational data available to indicate where and when traffic activities occur.* Records that indicate locations within a community with histories of speed-related traffic crashes would be preferable to the anecdotal accounts of officers when identifying locations for special speed-limit enforcement. However, most traffic officers with several years experience in a community of the size to be selected usually have an accurate, informed opinion where speeding is a chronic problem. In short, if a speeding problem exists in a community, there should be no difficulty in documenting it, either by archival records or personal interviews with experienced traffic officers.

6. *Operational data available to indicate where and when traffic related criminal arrests occur.* Most departmental records systems do not track ancillary arrests made as a result of traffic enforcement stops. Providing this information would probably be a special data collection requirement of the study. Even if historical data do not exist for a comparison period in a community, the incidence of ancillary arrests to enforcement stops would be collected as one of the measures of administrative impact of the experimental program.

7. *Evidence that the data are available must be in the form of written permission.* A memorandum or letter of agreement signed by the chief of police is sufficient to ensure access to all required data in studies of this type.

8. *Evidence that there are sufficient law enforcement agency resources to conduct the study and to support the types of enforcement strategies proposed.* It is essential that participating police departments have the resources to conduct the special enforcement program without additional support. In this regard, it might be possible to select communities that have recently received speed enforcement grants from a state Office of Traffic Safety.

9. *The existence of a crime problem of the type that might be affected by high-visibility traffic enforcement.* The communities selected to participate in the study should suffer a relatively high incidence of criminal activities of the types that might be deterred by nearby traffic enforcement. A relatively high incidence of crime is necessary to be able to measure a change in the criminal activities if a deterrence effect is obtained by the experimental programs.

10. *A written agreement from the chief administrative officer that indicates a willingness to participate in the study (including the willingness of prosecutors, judges, etc.).* A traffic safety study that involves special enforcement effort will also require the approval of the local city council or city administrator. No problems are anticipated in obtaining the cooperation of prosecutors, judges, city councils, or police managers. In fact, the special inquiries conducted by the Police Executive Research Forum found that almost all speed enforcement programs enjoy considerable public support. Follow-up interviews with traffic sergeants indicated that it is typical for a department to receive at least two complaints *about speeders* for every complaint they receive from someone who received a speeding ticket. In short, we do not anticipate that public acceptance of the experimental programs will be a problem, if residents of the communities selected perceive their community to have a speeding problem. It is further believed that the traffic safety program support committees that will be organized as part of the study will significantly increase public awareness and support for the experimental programs. As part of the committees' publicity campaigns, demonstrations of the laser speed guns will be conducted for judges, district attorneys, and media representatives in the selected communities to obtain additional administrative and judicial support for the programs.

11. *Comparable capabilities in accident reconstruction.* It will be necessary to select communities (experimental and control sites) that have police departments with comparable capabilities in accident reconstruction. Under ideal conditions, all three participating police departments would have on staff personnel who specialize in the scientific reconstruction of crashes. Accident reconstruction experts are trained to methodically interpret the physical evidence of a collision; the formulas used by the experts provide relatively precise estimates of speed and are important to the accurate assignment of in a crash. A more important criterion, however, is that the manner in which CF is determined *during* the field study must be the same as *prior* to the study. Accident reconstruction experts will be interviewed during the development of the site-selection report regarding the procedures that have been followed to assign PCF in their communities. Those procedures will be established as site-specific study procedures.

Application of the site-selection criteria led to the conclusion that all sites should be selected from within one state to ensure maximum comparability among the experi-

mental communities. Selecting sites from within one state controls for prevailing traffic laws, department of motor vehicles procedures, judicial policies, and to a large extent, public attitudes about speeding and awareness of traffic enforcement. Further, it was found that California, containing 36 cities with populations between 100,000 and 200,000, was the only state that offered a sufficient number of communities of the established size from which to choose. Texas, with 12 cities within the criterion population range, was the only alternative, but several of the cities are located adjacent to each other, and others are dominated by the four, large metropolitan cities of Texas.

DEVELOPED LIST OF CANDIDATE SITES

A report was prepared that summarized the relevant characteristics of ten candidate sites. Table 2 presents the list of ten candidates along with key statistics for each community; communities are listed in descending order of the proportion of all crashes in each city involving excessive speed during 1992. The key statistics presented in Table 2 include population, speed-involved crash information, close following headway-involved crash information, crime activity, and law enforcement agency size. To describe the incidence of speeding and following-too-closely in each city, we have calculated the total number of speed-involved crashes in 1992, the percent change in speed-involved crashes from 1991 to 1992, total following-too-closely crashes in 1992, and the number of speed involved crashes per 100,000 residents in 1992. The incidence of crime in each city is measured as the number of criminal offenses known to police (including murder, rape, robbery, aggravated assault, burglary, larceny-theft, car theft and arson) per 100,000 residents in 1992. Appendix B provides the decision matrix that contains all site-selection statistics.

Only cities with 1992 populations ranging from 70,000 to 175,000 were considered for recommendation; this population range formed a natural grouping of moderately sized communities in California. The main figure of merit used for comparing and selecting communities to participate in the field study was the proportion of all crashes that were speed-related in 1992. Our examination of these proportions revealed a cluster of cities with substantial (although not chronic) speed-related crash problems--individual proportions in this group of communities ranged from .19 to .26 of all crashes related to speed in 1992. We then checked for robust numbers of speed-involved crashes for each of these cities in 1992, bearing in mind the statistical requirements of the planned data analyses. Application of these three primary criteria (population, proportion of crashes involving speed, and number of speed related crashes) resulted in the identification of the ten cities listed in Table 2. Figure 2 illustrates the geographic distribution of all candidate sites listed in the table. The ten steps followed by the research team to identify candidate communities are listed following Table 2.

TABLE 2
LIST OF CANDIDATE COMMUNITIES AND KEY STATISTICS*

City	Pop. (1992)	Prop. of Crashes Speed-related (1992)	Total Speed Crashes (1992)	Change in Speed-involved Crashes (1991-1992)	Total FTC Crashes (1992)	Fat. & Inj. Sp. Cra. per 100,000 (1992)	Crimes per 100,000 (1992)	Full-time LE Officers (1992)	Comments
Sunnyvale	117,200	0.26	454	-17.45%	69	136.52	4,017.06	122	Sizable decline in speed-involved crashes.
Chula Vista	135,200	0.25	421	3.95%	34	183.43	8,008.88	154	Existing speed-enforcement program.
Torrance	133,100	0.24	504	-18.97%	132	152.52	6,099.92	238	Sizable decline in speed-involved crashes.
San Bernardino	164,200	0.24	859	-3.59%	38	197.32	10,763.70	253	Satisfies all site selection criteria.
Salinas	108,800	0.24	480	-1.03%	94	71.69	7,077.21	138	Satisfies all site selection criteria.
Orange	110,700	0.24	413	-8.63%	4	137.31	6,891.60	142	Low level of FTC crashes.
Modesto	164,700	0.23	846	-0.59%	95	156.65	6,902.85	199	Satisfies all site selection criteria.
Oxnard	142,200	0.21	564	7.22%	157	163.15	6,933.19	145	Existing speed-enforcement program.
Bakersfield	174,800	0.19	390	43.91%	3	168.19	8,168.78	244	Sizable increase in speed-involved crashes.
Vallejo	*109,200*	*0.19*	*390*	*2.09%*	*66*	*124.54*	*8,303.11*	*132*	*Satisfies all site selection criteria.*

*Boxed values and descriptions are conditions that would limit community effectiveness in this study.

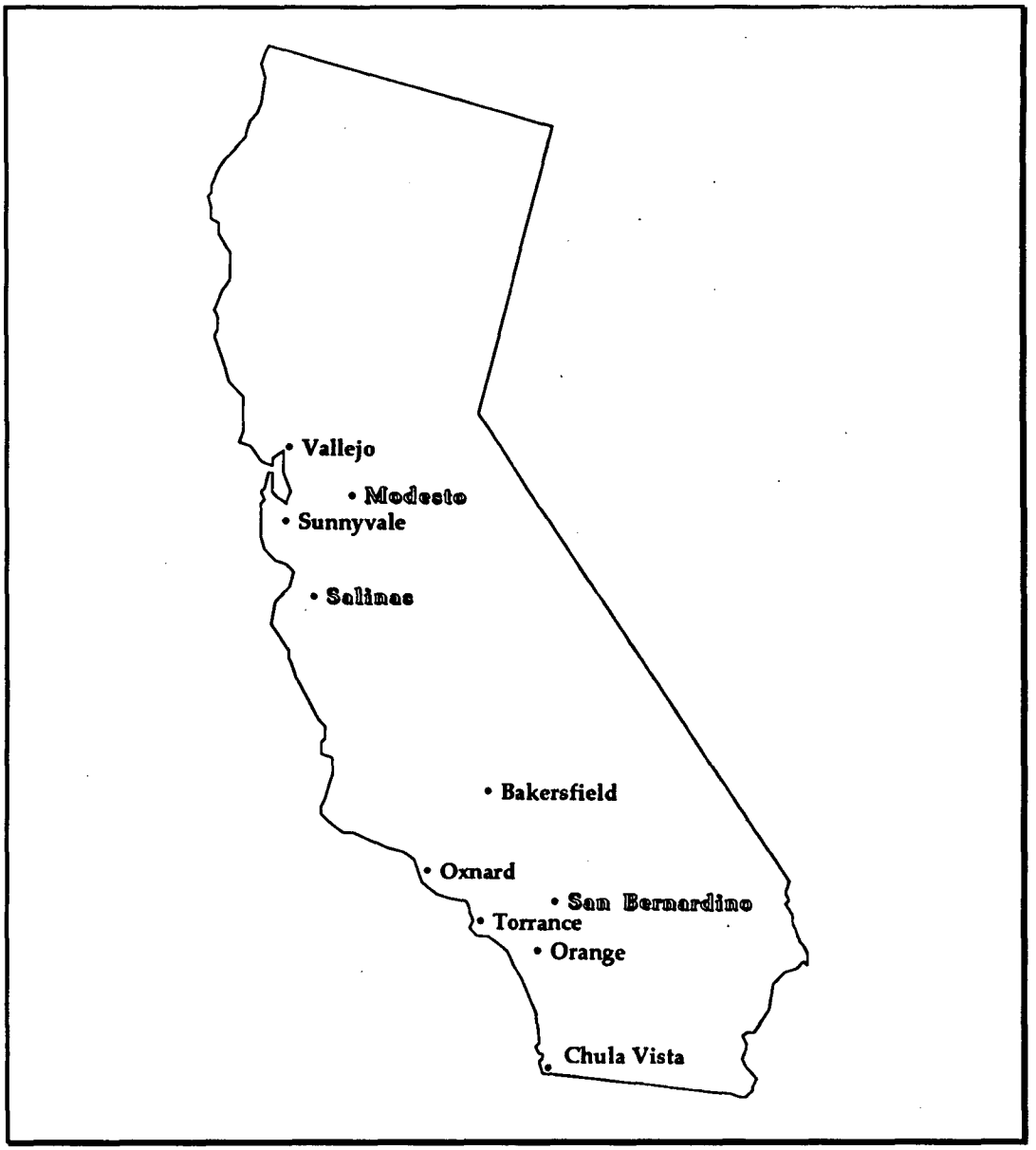


Figure 2. Geographic distribution of candidate sites.

1. Identified California cities with populations between 75,000 and 175,000.

2. Ranked the cities in terms of the proportions of all crashes that had speed as a primary collision factor (PCF). (This is the order in which the site-specific data are presented in the decision matrix.) Proportions ranged from a high of .33 (Hayward) to a low of .04 (Santa Barbara).

3. Focused on the top 25 of the 45 cities (i.e., those with proportions of speed-involved crashes greater than .19) to ensure that only cities with speed-related crash problems would be considered. Eliminated the top city (Hayward) from consideration due to the extreme value (.33).

4. Reviewed the total number of speed-involved (SI) crashes for 1992 and identified 390 per year as the natural break in the distribution; then, identified the ten cities with more than 390 SI crashes in 1992.

5. Reviewed SI injury/fatal crashes and identified those with more than 200 in 1992.

6. Calculated the change in proportion of SI crashes from 1991 to 1992, then identified those cities that experienced less than a .08 change in either direction. (This procedure is to ensure that cities are selected that have consistent speed-related problems, rather than base site-selection on a single anomalous year.)

7. Inspected the incidence of crashes in which following-too-closely (FTC) was the PCF. Identified those cities with the largest number of FTC crashes in 1992.

8. Reviewed crime statistics for the sites.

9. Inspected list for geographic separation of sites (i.e., sites must be isolated from each other to avoid contamination by the publicity campaigns).

10. Identified the four cities (two experimental sites, one control site, and one alternate control site) that best satisfied the established criteria.

The three communities that were recommended to be recruited as primary field sites are shaded in Table 2: San Bernardino, Modesto, and Salinas. It was recommended that San Bernardino and Modesto be recruited as the two experimental sites for the study. Although comparable in all key dimensions, San Bernardino appeared to be the most appropriate site in which to conduct the program of special speed enforcement, while Modesto appeared to be the most appropriate for conducting the program of speed and following headway enforcement. Salinas was recommended to serve as the control community. Vallejo (italicized in Table 2) was recommended as an alternate control site if Salinas were to be unable to participate. Geographic isolation of the control community was considered to be particularly important. The remaining six candidate communities suffered from specific deficiencies in one or more of several secondary site evaluation criteria described in Table 2 (see boxed values and comments). For example, Sunnyvale, Torrance, and Bakersfield all experienced substantial fluctuations in speed-involved crashes from 1991 to 1992. This lack of stability in the key figure of merit raised concerns about the existence of possible confounding influences on speed-related crashes in these communities (e.g., changes in accident investigation procedures) and the potential consequences of data instability on the statistical analyses planned for the evaluation phase of the project. Orange reported too few following-too-closely crashes in 1992 to enable statistically reliable or valid historical analysis of these data. And, it was learned that both Chula Vista and Oxnard had recently implemented special speed-enforcement programs that eliminated their utility as experimental sites. Site profiles were included in the Site-Selection Report that was submitted to NHTSA. The profiles prepared to describe the three recommended sites are presented as Appendix C to this report.

PREPARED EVALUATION PLAN

The purpose of the Evaluation Plan was to identify the dependent measures that would be used to evaluate program effects and to specify the methods by which any programmatic effects would be measured. The ultimate objective of the report was to provide NHTSA personnel an opportunity to review our approach to the planned evaluation before, rather than after, the evaluation had been performed. The plan was presented in five sections: Introduction, Research Design, Experimental Programs, Measures of Program Effectiveness, and proposed Statistical Methods.

The fundamental principal followed during the development of the site-selection criteria was the need to ensure comparability among the three communities that would be selected to participate in the field study. Comparability of conditions (e.g., vehicle codes, judicial policies, motor vehicle department procedures, demographics, etc.) was necessary to control all external variables, to the maximum extent possible. It was necessary for conditions to be as similar as possible in all three communities so that any changes experienced in the dependent measures during the field study could be attributed with confidence to the experimental conditions that were implemented as part of the study (i.e., the enforcement and publicity programs) rather than to an uncontrolled variable.

Comparability of sites was also necessary in the baseline dependent measures. In particular, it was important that the sites selected for participation in the study had experienced approximately the same levels of speed- and following headway-related crashes. "Levels," in this regard, were defined as the proportions of all crashes that have been found to have either speed or following too closely (FTC) as a primary collision factor (PCF). Baseline comparability of key dependent measures was necessary to permit the later statistical comparison of any experimental effects (i.e., changes in the dependent measures) that might be obtained during the field study.

The following paragraphs summarize the field study that was described in our Work Plan and Evaluation Plan, and accepted by NHTSA. The Evaluation Plan was used to guide the collection and analysis of both quantitative and qualitative data during the field study. To summarize, the Evaluation Plan involved a one-way, four-cell design (two experimental sites, a control site, and statewide data as an additional control). The use of a control site and a statewide control eliminated the need to make assumptions about changes in public awareness and speed-related activity in the absence of special traffic enforcement and publicity programs. The plan called for the two experimental programs to be implemented simultaneously and operate for a period of six months; program implementation was preceded by a one-month baseline data-collection period. Figure 3 illustrates the research design that was presented in the Evaluation Plan.

The Evaluation Plan specified the dependent measures of program effects on traffic safety. Measures included the numbers and proportions of all crashes that were

speed- or following headway-related, average speed over the posted limits of those cited, and average speed as measured unobtrusively. In addition, a survey of public awareness of the programs and perceived risk of receiving a citation for speeding, was planned to measure the effects of the PI&E campaigns that were linked to the experimental enforcement programs. Finally, the incidence of certain categories of crime in the vicinity of the special enforcement was specified in the plan as a dependent measure to explore the hypothesis that high-visibility traffic enforcement can deter some types of criminal behavior in addition to affecting driver behavior. The plan specified that, to the extent possible, the two special enforcement programs would be identical, except that one of the programs would focus on speed limit enforcement while the other would have an additional focus on following headway infractions. The Evaluation Plan also specified the study-specific responsibilities of the participating police departments.

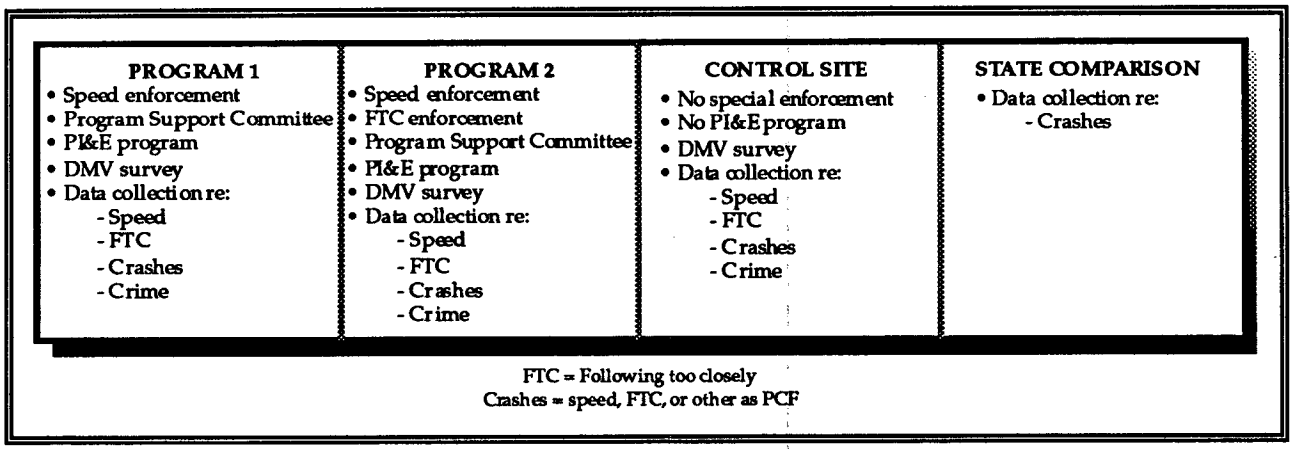


Figure 3. Summary of the research design.

The plan to evaluate program effectiveness was designed to focus on two sets of dependent variables: 1) Administrative aspects, and 2) Impacts. Table 3 summarizes the dependent measures, and associated sources of data. The variables listed in the table formed the core of the Evaluation Plan. Most of the proposed program evaluation measures are relatively simple and self-explanatory. For example, all measures of administrative aspects of the experimental programs were to be gathered from the records maintained by the participating law enforcement agencies and the local judicial system. Most of the measures of program impact would be similarly obtained. All of the measures listed in Table 3 would be applied systematically at the experimental sites and in the control community.

Estimates of the costs of speed-related crashes were to be calculated on the basis of established economic models; "savings to society" resulting from any measured *declines* in speed- or FTC-related crashes that could be attributed to the programs would be similarly calculated. In this regard, it is possible that a sufficient number of "prevented crashes" could be perceived as economic justification for considerable enforcement effort.

TABLE 3

SUMMARY OF THE PROGRAM EVALUATION PLAN

Administrative Measures	Data Source
Labor costs	Participating law enforcement agencies
Equipment costs	Participating law enforcement agencies
Number of vehicles stopped	Participating law enforcement agencies
Number of citations issued	Participating law enforcement agencies
Revenue generated by programs	Local courts/District Attorneys' Offices
Measures of Impact	**Data Source**
Numbers of speed-related crashes	Participating law enforcement agencies/SWITRS
Numbers of FTC-related crashes	Participating law enforcement agencies/SWITRS
Numbers of all injury/fatal and PDO crashes	Participating law enforcement agencies/SWITRS
Speed at selected location	Unobtrusive measurement by city personnel
Numbers and types of ancillary arrests	Participating law enforcement agencies
Incidence of crime in vicinity of enforcement	Participating law enforcement agencies
Estimated costs of speed-related crashes	Econometric projection based on CHP estimates
Estimated savings from prevented crashes	Econometric projection based on CHP estimates
Ratings of awareness of programs	Survey conducted by DMV offices
Ratings of perceived risk of detection	Survey conducted by DMV offices
Ratings of perceived risk of citation	Survey conducted by DMV offices

The last three measures listed in Table 3 require further discussion; these are the measures of public awareness of the special enforcement programs, and public perceptions of risk of detection and apprehension for speeding. The survey was conducted by DMV personnel who provided a one-page questionnaire to each applicant for a driver's license or license renewal; the applicant was asked to complete the brief questionnaire while waiting for his or her license application to be processed. The survey instrument contained questions concerning age, gender, driving experience, residence, and other relevant information. The key questions about awareness of speed enforcement and risk of citation included ten-point Likert scales to obtain precise measures suitable for statistical analysis. Questions were also be asked about the *sources* of subjects' personal awareness and perceived risk. Appendix D presents examples of the English and Spanish language versions of the questionnaire used in the study.

In addition to the quantitative data described above, the evaluation plan called for the research team to collect qualitative data from participating law enforcement officers through informal personal interviews and observation to be performed during

the enforcement programs. The qualitative data would address issues such as officer safety, logistics, administrative issues, and operational or procedural problems encountered with the experimental enforcement programs. Proposed statistical methods were also described in the Evaluation Plan.

In summary, the key research questions that the data collection and analysis efforts were designed to answer are listed below.

- Does special speed-limit enforcement elevate public awareness of traffic safety issues?
- Does special speed-limit enforcement elevate the perceived risk of receiving a citation?
- Does special speed-limit enforcement affect the speed-related driving behaviors of motorists (i.e., as measured by changes in the numbers of speeding violations issued, the average speed over the limit of those cited, and the average speed as measured unobtrusively)?
- Does special speed-limit enforcement affect the incidence or severity of speed-related crashes (i.e., as measured by changes in the proportion of all crashes that are speed-involved)?
- Does a program that involves speed-limit *and* headway enforcement, affect speed-related driving behavior (e.g., as measured by citations, average speeds, or speed-related crashes)? If so, is the effect more or less than a program that focuses on speed-limit enforcement alone?
- What are the costs associated with the special enforcement programs?
- What kinds of ancillary arrests are made during traffic enforcement?
- Does a traffic enforcement program affect the incidence of criminal activity in the vicinity of the enforcement effort?
- What type of program is superior in terms of cost-benefit analysis?
- What safety, administrative, logistical, operational, or procedural problems are associated with the special enforcement programs?

IMPLEMENTED PROGRAMS

A detailed Implementation Plan was developed by the project team to guide the conduct of the field study. The plan included the research design illustrated in Figure 3, the specific procedures to be followed by each of the participating police departments, data collection requirements, a discussion of how the project team planned to organize traffic safety program support committees in the experimental communities, and specific publicity objectives for the program support committees. The Implementation Plan specified that in both of the experimental programs law enforcement personnel would,

- Select four enforcement locations within their community by examining crash records to identify road segments and intersections that have been the sites of speed-related crashes.

- Select two locations within their community that have been the sites of chronic citizen complaints about speeding.
- Deploy to the selected sites during hours of greatest crash risk, but following a weekly schedule that prevents motorists from predicting with certainty when the special enforcement will be in place.
- Use radar and laser speed monitoring equipment.
- Use decoy vehicles at the special enforcement sites and elsewhere in the communities to contribute to motorist uncertainty and public awareness, and to generate free publicity about the enforcement programs (when news reports and letters to the editor inevitably comment on this "innovation").
- Place an emphasis on speed enforcement (and improper following headway, in the second community) by routine patrols throughout the communities, in addition to increased enforcement by the dedicated traffic personnel.
- Participate in the meetings and activities of the program support committees (e.g., stopping distance demonstrations and ride-along opportunities for reporters; demonstrations of the laser equipment for reporters, DAs and judges; speakers bureau; TV and radio interviews, etc.).
- Sustain their commitment to a vigorous enforcement program for a period of six months.

The project director began the recruitment process upon approval of the candidate sites by the government's COTR. Letters describing the project and inviting the department's participation were composed and sent to the chiefs of the selected police departments, many telephone conversations were held with police managers, and site visits were made to discuss project requirements. All three of the communities selected for participation in the study were successfully recruited. The special enforcement and data collection obligations of the departments were specified in letters of agreement signed by the project director and the chiefs of the three police departments; the participating departments and their roles in the study are presented in Table 4.

TABLE 4
SITE-SELECTION AND RECRUITMENT SUMMARY

Program/Site Number	City	Program Description
1	Modesto	Special Speed and FTC Enforcement
2	San Bernardino	Special Speed Enforcement
3	Salinas	Control Site (no special enforcement)

The project team organized program support committees in each of the two experimental communities. A committee had been formed by the researchers in Modesto a few years earlier to support an experimental DWI-deterrence program; the

members of Modesto's Citizens for Safe Driving agreed to take responsibility for publicizing and supporting the Modesto Police Department's experimental speed and following headway enforcement program. A similar program support committee was organized for this study in San Bernardino. Several individuals were identified for recruitment; the research team focused on community leaders, local traffic safety experts, medical professionals, and citizens who had previously demonstrated an interest in traffic safety issues. The members of the San Bernardino committee selected the name Speedwatch. The committees consisted of about 15 members each, with core groups of six to ten highly-motivated and active members. Both groups elected local hospital emergency department physicians to serve as chairmen.

The general deterrence programs implemented in the two experimental communities were composed of two elements: 1) special enforcement, and 2) publicity. These elements are described separately in the following sections, although they formed a unified general deterrence program in each of the communities.

SPECIAL ENFORCEMENT

Both of the experimental programs were initiated during the first week of June 1994 and continued through the end of November of that year. It was necessary to implement and conduct the programs simultaneously to permit comparisons; that is, driving behavior can be influenced by external factors such as weather and holidays and these influences would have confounded attempts to evaluate main effects if the programs were not contemporaneous. The following paragraphs summarize the special enforcement efforts.

The research team worked with traffic officers, supervisors, and police data processing personnel to identify four locations, or zones (i.e., road segments and intersections), within each of the three participating communities that have been the sites of speed-related crashes. Two additional sites were identified in each community on the basis of chronic citizen complaints about speeding. Then, for a period of six months, officers deployed to the selected special enforcement zones during normal traffic enforcement hours, but following a schedule that might prevent motorists from predicting with certainty when the special enforcement would be in place. It was specified in memoranda of agreement that the police department in the control community would refrain from any special, or additional, speed enforcement for the six-month duration of the study, while the two police departments in the experimental communities would devote at least four hours of special speed enforcement effort to each of their six special enforcement zones during each week of the program. Both departments devoted more time to special enforcement during the first month of their programs than in subsequent months, to stimulate public awareness of the special enforcement. Although the hours devoted to the zones fluctuated during the course of the study, both police departments far exceeded the overall minimum requirements of four hours per zone during each week of the six-month special enforcement program, as summarized in Table 5.

TABLE 5
OFFICER HOURS DEVOTED TO THE SPECIAL ENFORCEMENT PROGRAMS
AND NUMBERS OF CITATIONS ISSUED

Site	Total Officer Hours	Total Citations Issued	Average Hours Per Zone Per Week	Average Citations Per Zone Per Week
Modesto	1,372	2,196	9.5	15.3
San Bernardino	1,042	2,165	7.2	15.0

The magnitude of the effort contributed by the participating police departments is truly remarkable because the special enforcement program was conducted in addition to the officers' normal responsibilities. Perhaps more important, the special enforcement was performed largely during the summer months when temperatures routinely exceeded 90°F in both communities. Monitoring approaching traffic while sitting astride a hot motorcycle and wearing a helmet, body armor, and a dark uniform can be extremely uncomfortable. But the participating officers endured these unpleasant conditions and devoted, on average, more than double the number of hours to the special enforcement program than minimally specified in their operating procedures.

The officers in both communities used state-of-the-art radar and laser speed monitoring equipment, provided by NHTSA, to help with their speed enforcement efforts. Further, the officers used deployment strategies that maximized visibility, for example two and three motorcycle officers working a zone together, and minimized the likelihood that motorists might predict the time and location of the special enforcement effort. Officers reported anecdotally what they perceived to be clear deterrence effects as the programs progressed. In fact, in certain special enforcement zones it became nearly impossible for officers to find a speeding motorist during a deployment. When this occurred, the officers would shift their efforts to the zones that remained "productive."

Officers in both experimental programs periodically deployed decoy vehicles, that is, empty police cars parked at the special enforcement sites, and elsewhere in the community, to contribute to speed deterrence, police visibility, and public awareness of the special enforcement programs. It was assumed that this tactic would generate free publicity about the enforcement programs, as it has in other communities, but no articles or letters to the editor emerged in response to the decoy vehicles in the experimental communities. Officers in both communities also periodically deployed radar-controlled speed display devices at their six special enforcement locations, and elsewhere in their communities. Officers were deployed in the vicinity of the display devices during approximately 25 percent of the deployments in the special enforcement zones to monitor vehicle speeds, issue citations, and reinforce the link between the speed displays and speed enforcement.

Finally, all police officers in the experimental communities placed an emphasis on speed enforcement (and improper following headway in Modesto) during routine patrols throughout their communities. These emphases on speed and following headway enforcement were implemented for the duration of the programs, in addition to the increased enforcement by the dedicated traffic personnel in the special enforcement zones.

PUBLICITY

The program support committee was organized in San Bernardino during April and May of 1994; the existing committee in Modesto was contacted during that time and the members agreed to focus their efforts on the Modesto Police Department's special speed and following headway enforcement program. The committees' objectives are summarized in the following statement of purpose; this statement was modified with the name of the local community and program and, therefore, served as a uniform guide to both of the committees.

> The Traffic Safety Program Support Committee is responsible for creating a six-month long campaign to publicize the special traffic enforcement efforts in the community. The committee will inform the public of the special enforcement program, the purpose of the enforcement, and in general, educate the public concerning traffic safety issues. Committee activities will include, 1) conducting press conferences and related media events, 2) creating, producing and airing public service announcements (PSAs), 3) promoting police traffic safety efforts at special events, 4) arranging tie-ins with other related traffic safety programs and activities, and in other ways supporting efforts to improve traffic safety in the community and surrounding areas. The committee will recruit volunteers and pool resources needed to conduct these activities. In addition, the committee will work closely with local media to ensure adequate coverage of its activities.

The committees met frequently during the two months prior to program implementation, selecting names for the committees and enforcement programs, developing logos, recruiting additional members, and selecting leaders. The primary task during this period, however, was the organization of kick-off press conferences and preparation of press kits. The press kits contained information about the local enforcement program and the program support committee, general information about traffic safety, speeding, and following too closely, and relevant statistics for the community and state. The materials were enclosed in folders bearing the logo of the local committee, as might be expected of a professionally produced press kit.

Although organized and conducted by volunteers, both of the kick-off press conferences were highly successful, as measured by the quality of the presentations, the numbers of distinguished guests, and most important, by the news coverage generated by the events. News coverage--free publicity--is the only reason a press conference is held. Both of the kick-off press conferences were reported prominently in local newspapers, but only the Modesto press conference was covered by local television and radio stations, despite the considerable efforts of San Bernardino police personnel and committee members to generate media interest in their well-organized and exciting press conference.

The press conference organized by Speedwatch and the San Bernardino Police Department was conducted in the parking lot of the Orange Show Fairgrounds. News reporters, law enforcement managers from local agencies, invited speakers and other guests sat in bleachers to observe the press conference. Speakers included Police Chief Daniel Robbins, Committee Chairman Dr. Dev Gnanadev, and Mr. Craig Miller, representing NHTSA. Following the speakers' brief remarks, members of the San Bernardino Police Department's traffic unit performed dramatic demonstrations of the relationship between vehicle speed and stopping distance. Police patrol cars and motorcycles were driven by members of the unit at various speeds, then stopped as quickly as possible, complete with screeching tires, billowing smoke and the pungent order of burning rubber. Traffic Sergeant Jennifer Aragon and Officer Tom Adams instructed the observers in the physics expressed by the stopping distances: a speed of only 25 miles per hour results in a skid mark 23 feet long; at 49 mile per hour the skid mark extends to 111 feet, and so on. The traffic safety implications of the demonstration were clear and to the point, and they graphically supported the importance of municipal speed enforcement.

The press conference organized by Citizens for Safe Driving and the Modesto Police Department was held in a vacant lot near an intersection that is well known in the community as the site of many speed-related crashes. A raised stage with chairs and a podium for the speakers was erected on the lot, and framed by large US and State of California flags. Twelve Modesto motorcycle officers sat astride their machines, lined up behind the stage and facing the audience; one of the officers wore a Darth Vadar costume as part of the committee's efforts to obtain publicity regarding the advanced laser and radar speed monitoring equipment that the officers would be using in the special enforcement program. The officers sitting at attention on their motorcycles and the colorful flags fluttering in the breeze provided an imposing and visually interesting backdrop for the proceedings. Invited speakers included Committee Chairman Dr. Michael Rossini, Modesto Mayor Richard Lang, Police Chief Paul Jefferson, and Mr. Paul Snodgrass, representing NHTSA. An automobile recently involved in a speed-related crash was also on display at the press conference to illustrate the possible consequences of speeding.

Both the San Bernardino and Modesto press conferences concluded with demonstrations of the radar and laser speed detection equipment that was provided to the participating police departments by NHTSA. News media personnel were permitted to operate the devices and officers were available to answer questions about the new equipment and the special enforcement programs. It was on these demonstrations and equipment that the news reporters tended to focus in their coverage of the kick off press conferences. Appendix E presents some of the newspaper articles generated by the kick-off press conferences and subsequent activities of the program support committees. Those activities included the full range of publicity efforts that can be developed in support of a general deterrence program in the absence of a special funding source. Nearly all of the publicity activities and materials developed by the program support committees were paid for by locally donated resources.

A partial list of publicity activities implemented by the program support committees is presented in Table 6. Appendix F provides examples of some of the items developed for the publicity programs, and Appendix G provides a comprehensive inventory of the committees' activities. These items are included in this report to both document the research project and illustrate the considerable level of effort devoted to the publicity programs by the participating police officers and the members of the two traffic safety program support committees.

TABLE 6
PARTIAL LIST OF PUBLICITY ACTIVITIES
IMPLEMENTED BY THE PROGRAM SUPPORT COMMITTEES

- Banners displayed in parades and at special events
- Brochures presenting speeding myths and facts
- Bumper stickers
- Bus bench advertising
- Displays at fairs, local festivals, and special events
- Displays at local colleges
- Interviews with police and committee personnel on radio and television programs
- Cable access television programs dedicated to the special enforcement programs
- Lifesaver coupons (Save $200 by *not* receiving a speeding citation)
- Media tie-ins and media events (e.g., crashed car display, etc.)
- News articles about the programs
- Permanent signs posted to identify special enforcement zones
- Posters (distributed to schools, businesses, retail stores, and major local employers)
- Presentations at city council meetings
- Presentations at high schools, and civic group meetings
- Press conferences to announce the programs
- Press releases, ride-alongs, and other special opportunities for reporters
- Public service announcements on radio (locally-developed)
- Public service announcements on television (both NHTSA-provided and locally-developed PSAs)
- Resolutions and proclamations by local politicians and community leaders
- Speakers bureaus
- Specially prepared articles published in newspapers, newsletters, and bulletins
- Supermarket drop-ins (brochures dropped in shopping bags)
- Tie-ins with DUI-deterrence and safety restraint programs
- Video display at a local shopping mall

The publicity programs that were developed and implemented by the program support committees were based on a set of target objectives that was specified in the Implementation Plan. The nature of committee work and different local opportunities, however, resulted in two separate publicity programs, as must be expected. Although

the programs varied in content and emphasis, they were comparable in their overall levels of effort. For example, both of the committees developed and distributed posters, brochures, and Lifesaver coupons; materials were distributed to schools and colleges, retail stores, major employers, and other businesses, to name a few of the parallel strategies. Also, both of the committees developed and issued press releases, participated with police personnel in talk shows broadcast on local cable access channels, and developed PSAs for radio and television. In addition to the core publicity elements and materials that were common to the two programs, each committee developed at least one special approach that was unique to the local publicity effort (e.g., bus bench advertising in San Bernardino, the *Star Wars* theme in Modesto).

The project staff participated as facilitators to the program support committees, attending committee meetings regularly in the months preceding implementation and during the first few months of the experimental programs. Regular staff involvement in the committees' work resumed as the programs were nearing completion. Project staff remained in close contact with committee leaders and police liaison personnel from the time that the departments were recruited and the committees were formed until several months following completion of the field portion of the study. Also, local newspapers were reviewed by the research team to remain informed of news coverage of the enforcement and publicity programs. The researchers continuously encouraged the committee members to maintain high levels of motivation and publicity activity throughout the six-month study period. In short, the project team monitored the publicity programs closely in both communities and occasionally encouraged committee members to increase their efforts when one or the other program seemed to be lagging behind the other. The project team used this subjective process to ensure that the overall level of publicity effort remained about the same in the two communities, despite local differences in opportunities, materials, personnel, and emphases.

ENTERED AND ANALYZED DATA/PREPARED FINAL REPORT

Data concerning enforcement activity, traffic collisions, the incidence of crime, and speed samples were provided to the study team by the participating police departments on a monthly basis. Crash data were also obtained from a state traffic data analysis system. The California Highway Patrol administers the Statewide Integrated Traffic Data Records System (SWITRS), which collects and integrates data from all municipalities and unincorporated areas of the state. SWITRS managers and analysts generously responded to requests for special "runs" of data necessary during the site-selection process and later in the project to perform statistical analyses of program effects.

Completed DMV survey forms (measuring public awareness of the local special enforcement programs and perceived risk of receiving a citation for speeding, etc.) were sent by the DMV liaison personnel directly to the offices of Anacapa Sciences twice each month. The project team remained in contact with the DMV personnel to ensure that the

offices had sufficient numbers of Spanish and English language forms on hand, and to remind the DMV personnel of their important role in the study.

All data were received and entered into spreadsheet and statistical programs at the offices of Anacapa Sciences, Inc. Analyses were performed using established techniques and methods; the results of those analyses are presented in the following chapter. Project staff were assisted in the statistical analyses by Dr. Richard McCleary. The final task of the project was the preparation of this report.

CHAPTER 3: RESULTS

The study documented in this report was conducted to determine if municipal traffic enforcement affects measures of traffic safety, such as the numbers of speeding motorists and crashes caused by excessive speed or following too closely. A secondary objective of the study was to test the hypothesis that traffic enforcement has a deterrence effect on crime in the vicinity of the enforcement activity.

The following presentation of study results is organized in terms of the five primary forms of data used to evaluate the two experimental traffic enforcement programs: public awareness survey, the numbers of injury and fatal traffic collisions, unobtrusive measures of vehicle speed, the incidence of crime in the vicinity of the traffic enforcement, and administrative factors. Before proceeding, however, it is important to note that the many statistical tests mentioned in this chapter were conducted to determine if changes in frequencies, or differences in data, are attributable to the experimental conditions or are simply the results of random variation. An objective of the analyses has been to minimize the possibility of claiming there is a difference when, in fact, the difference might have been caused by chance. But, it is the nature of traffic safety statistics that even small changes can have big impacts, due to the large numbers of motorists whose behavior might be affected by a program. In other words, it might be unwise to set a probability level so high that a potentially valuable main effect might be missed, that is, attributed to chance because it did not achieve the established level of significance.

For these reasons, it is important to select a level of statistical significance that provides a high probability of being correct when attributing an effect to an experimental condition. It is equally important that project results not be evaluated exclusively on the basis of attaining a somewhat arbitrary level of statistical significance. For purposes of this analysis, the 0.05 level is accepted as statistically significant; that is, the probability of error for all statistically significant results will be equal to or less than one chance out of twenty. But it will also be indicated in this chapter when a change or difference approaches statistical significance. Actual probabilities will be provided in the text to permit readers of this report to better judge the merits of the experimental programs, the evaluation of administrative factors, and the implications of study results presented later.

RESULTS OF THE DMV SURVEY

The public awareness and perceived risk survey was administered by California Department of Motor Vehicles (DMV) personnel to all persons who visited one of the participating DMV offices regarding a driver's license matter (e.g., new or lost license, change of address, expiration, driver's test, etc.). The survey began during the first week of May 1994, one month prior to implementing the special enforcement programs. All three of the DMV offices were located within the city limits of the participating communities, but motorists are permitted to conduct their license-related business at

any California DMV office. For this reason, the questionnaires requested that subjects indicate the city in which they live. Only forms completed by residents of the control and two experimental communities were entered and analyzed.

More than 5,000 survey forms were received and processed by Anacapa Sciences, Inc., resulting in 3,833 completed forms for data entry and analysis. On average, nearly 200 acceptable forms were returned per site each month of the seven-month period. About 60 percent of the forms entered were completed by males in all three of the communities (59.6, 61.3, and 60.6 percent in Modesto, San Bernardino, and Salinas, respectively). Further, the age and driving experience distributions of those completing the survey in the three communities were comparable and within the ranges expected on the basis of state wide distributions. The following paragraphs and figures summarize the results of key survey questions.

PUBLIC AWARENESS OF THE EXPERIMENTAL PROGRAMS

The primary measures of public awareness of the experimental programs were provided by responses to Questions 5 and 6 on the DMV survey. Question 5 of the survey asked whether the respondents from the two experimental sites had *ever heard* of a special speed enforcement program in their communities; respondents from the control site were asked if they had ever heard of general, or routine, speed enforcement in their community. Figure 4 summarizes the results of these questions; Appendix H provides the supporting data in both tabular and graphic form. Figure 4a shows that awareness of the two experimental traffic enforcement programs increased during the field study from an average of 22.8 percent in May, the month before the study began, to an average of 30.1 percent in November, the last month of the experimental programs. In Modesto, program awareness peaked at 33.3 percent of respondents in September, while the highest awareness achieved in San Bernardino was 33 percent, in August. Awareness of routine speed enforcement in the control community remained relatively flat throughout the data collection period, declining inexplicably from about 60 percent to 49 percent in the final month of the field study. Table 7 provides a summary of the change in awareness from the baseline month to the last month of the programs (i.e., the final month, representing the most "mature" versions of the two experimental programs). No inferential tests of significance were performed on responses to survey questions 5 through 8 because comparable questions could not be asked in the control and experimental communities.

Figure 4a and Table 7 show that about 23 percent of all respondents in the two experimental sites reported hearing about special speed enforcement programs in their communities during the baseline month; that is, they reported awareness of special enforcement before the experimental programs had been implemented. (This is a normal phenomenon; for example, during a recent study more than half of the respondents reported awareness of nonexistent sobriety checkpoint programs during the baseline period.) About 60 percent of the respondents in the control community reported awareness of routine speed enforcement in Salinas. The descriptive statistics presented in the tables focus on change from the baseline values.

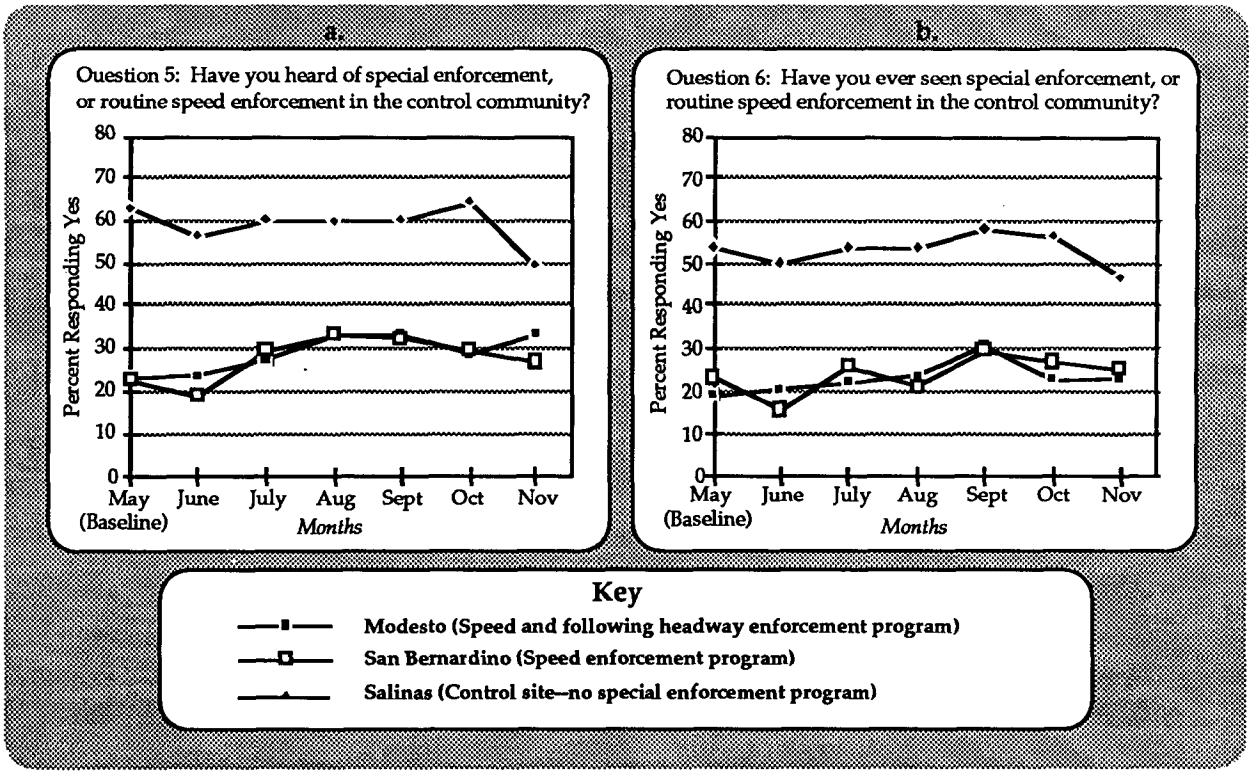


Figure 4. Summary of responses to Question 5 and 6 of the survey.

TABLE 7
QUESTION 5: SUMMARY OF RESULTS
"Before this survey, had you ever heard of special speed enforcement in Modesto (or San Bernardino)?"
"Before this survey, had you ever heard of speed enforcement in Salinas?"

Program/ Site No.	City	Program Description	Percentage May	Percentage November	Percent Change
1	Modesto	Speed & following headway	23.3	33.1	+42
2	San Bernardino	Speed enforcement	22.3	27.1	+22
3	Salinas	Control Site (no program)	62.8	49.3	-22

Question 6 asked whether the respondents from the two experimental sites had *ever seen* special speed enforcement in their communities, while respondents from the control site were asked if they had ever seen general speed enforcement. Figure 4b shows that personal observation of the special speed enforcement programs increased during the field study from an average of 20.8 percent in May, the month before the study began, to an average of 24.1 percent in November, the last month of the six-month experimental programs. Personal observation of general speed enforcement in the control community declined 7.4 percentage points during the same period. Table 8 provides a summary of the changes in personal observation of the programs from the

baseline month to the last month of the programs (i.e., the final month, during which respondents could draw upon their personal observations from the full six-months of the general deterrence programs).

TABLE 8
QUESTION 6: SUMMARY OF RESULTS
"Have you ever seen special speed enforcement in Modesto (or San Bernardino)?"
"Have you ever seen speed enforcement in Salinas?"

Program/ Site No.	City	Program Description	Percentage May	Percentage November	Percent Change
1	Modesto	Speed & following headway	18.6	23.0	+24
2	San Bernardino	Speed enforcement	23.0	25.1	+9
3	Salinas	Control Site (no program)	53.8	46.4	-14

Question 8 of the DMV survey was designed to obtain information about the various sources of public awareness of the special traffic enforcement programs. The question asked respondents to indicate how many times they had seen or heard about a program in their community on television or radio, in the newspaper, from friends, at work, or from a community organization. Figure 5 summarizes the responses to the first three parts of this six-part question for the control and experimental sites (i.e., television, radio, and newspapers as sources of program awareness). Only slight changes were measured in reports of awareness attributed to friends, work, or community organizations. Appendix H provides the supporting data for all six potential sources of program awareness in both tabular and graphic form.

The DMV surveys were entered and tabulated on a monthly basis during the experimental programs as part of the research team's effort to monitor the public information and education activities and to assess the effectiveness of specific publicity efforts and strategies. As was the case with questions 5 and 6, baseline responses to Question 8 should have been near zero in the two experimental communities (because no special speed enforcement programs had been conducted previously by the local police departments). Instead, during the baseline month at least ten percent of respondents reported awareness of the special speed enforcement programs in their communities from each of the six sources, with the exception of "community organization." Reports of awareness from the various sources of information tended to increase during the course of the field study. These data are consistent with, and provide the composing elements of, the measures of general program awareness obtained through Question 5.

Only slight increases in public awareness were measured in the experimental communities from information obtained from television or radio, despite televised coverage of Modesto's kick-off press conference, repeated appearances of San Bernardino officers on local cable access programs, and the extensive broadcasting of public service announcements about the experimental programs on radio and television

in both communities. In contrast, substantial increases in program awareness from newspaper articles were measured in Modesto during the first two months of that program, and in both Modesto and San Bernardino during months three and four of the programs.

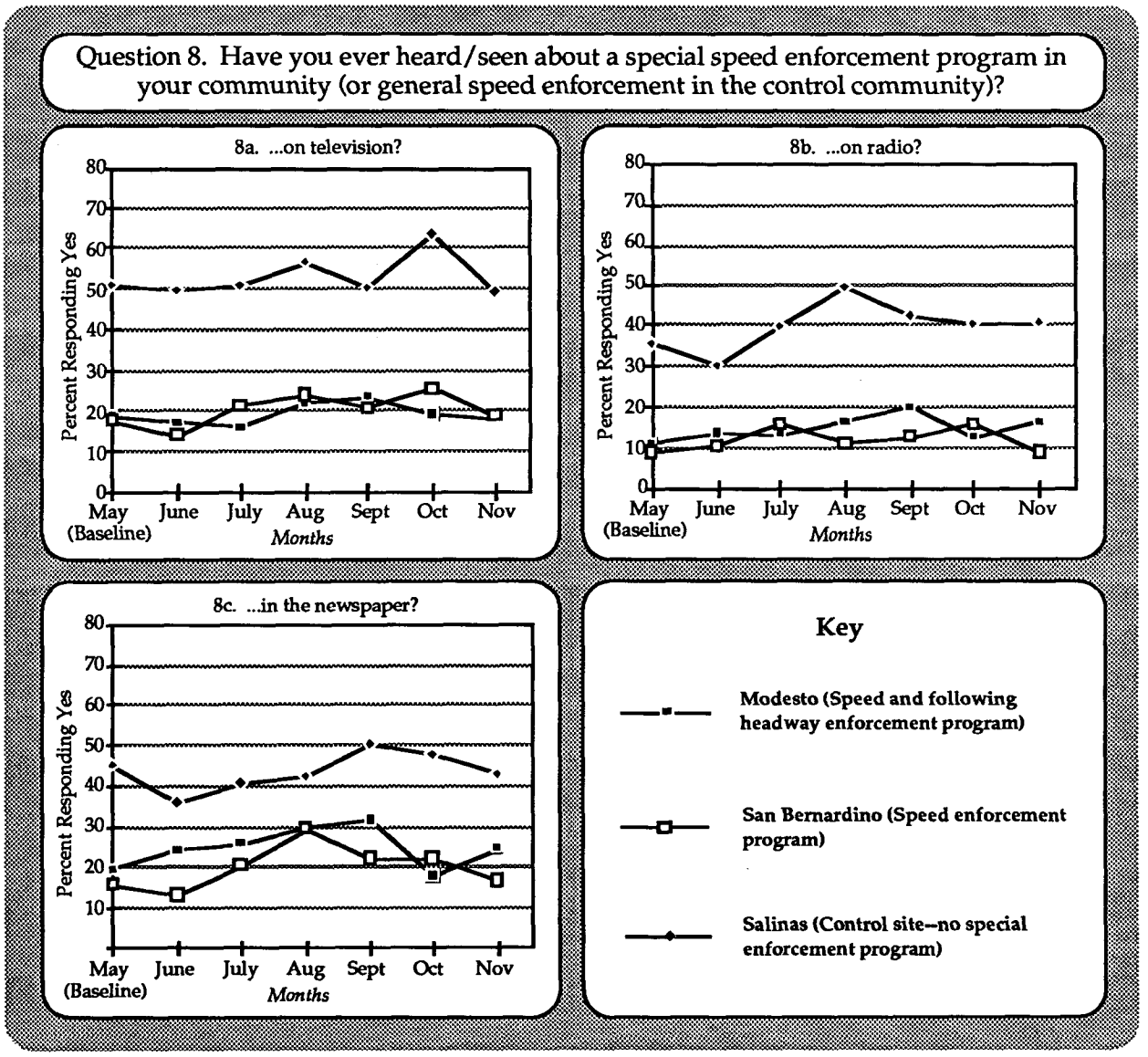


Figure 5. Summary of responses to question 8 of the survey.

PERCEIVED RISK OF DETECTION AND RECEIVING A CITATION

Log Odds Ratio Tests (Kanji, 1993) were performed on the DMV survey data addressed in the following paragraphs. This test compares the difference in odds between groups on two sequential measures of performance. The "odds" of an event occurring are similar to an event's probability, except that when calculating odds, the frequency of the subject event is compared to the frequency of observations in which

the event does not occur. For example, a horse that has won two of its last ten races might be said to have a 20 percent probability of winning its eleventh race, but the odds of the win are expressed as one to four (i.e., two wins compared to eight losses). [Note: The "odds" are not the same as "betting odds," which are calculated, and recalculated, in response to the relative volume of bets placed for the horses in a race, or the teams in a contest.] An "odds ratio" is simply the ratio of odds for two groups. In the following analyses the log odds ratio test involved calculating the odds of "yes" to "no" responses to a survey question during the baseline month to the odds of the responses obtained to the same question during the final month of the program. The resulting odds ratios were then transformed by a logarithmic function to eliminate differences in scale (recall that in the control community respondents indicated awareness of *general speed enforcement,* rather than *special speed enforcement,* as in the experimental communities); the product of the transformation is a ß statistic. Next, the differences were calculated between the log odds ratios of responses of an experimental and the control community. The significance of the difference between the two ß statistics is then tested by calculating a Z score; Z scores are derived by computing the difference between the two ß statistics and dividing the difference by an estimate of variance.

Questions 9 and 10 of the DMV survey were designed to elicit measures of perceived risk of being stopped by a police officer and cited for speeding in the control and experimental communities. Question 9 asked, "If you were driving across town on city streets and were exceeding the speed limit by at least 10 miles per hour, what are the chances that you would be *stopped* by a law enforcement officer?" Question 10 asked, "If you were driving across town on city streets and were exceeding the speed limit by at least 10 miles per hour, what are the chances that you would be *cited* if you were stopped by a law enforcement officer?" Respondents were offered the options: 1 out of 10, 2 out of 10, and so on, up to 10 out of 10. The mean monthly responses to these two questions are presented in Figure 6.

Figures 6a, 6b, and the supporting data presented in Appendix H, show very little change in these two measures of perceived risk over the course of the programs. The perceived risk of being stopped and for receiving a citation if stopped remained essentially unchanged throughout the seven-month duration of the survey at all three sites; that is, only trivial differences were found between the before and after values, and no statistically significant changes in the risk of being stopped or cited were measured when the full series' of data were subjected to statistical analysis. It is interesting to note, however, that younger drivers and drivers who reported awareness of the special enforcement programs, indicated consistently higher risk of detection and arrest. It is believed that these survey questions were not fully sensitive to perceived risk, and that actual driver behavior, rather than self-reports, provides a better measure of program effect. The issue of perceived risk of detection will be discussed later in the implications section of this report.

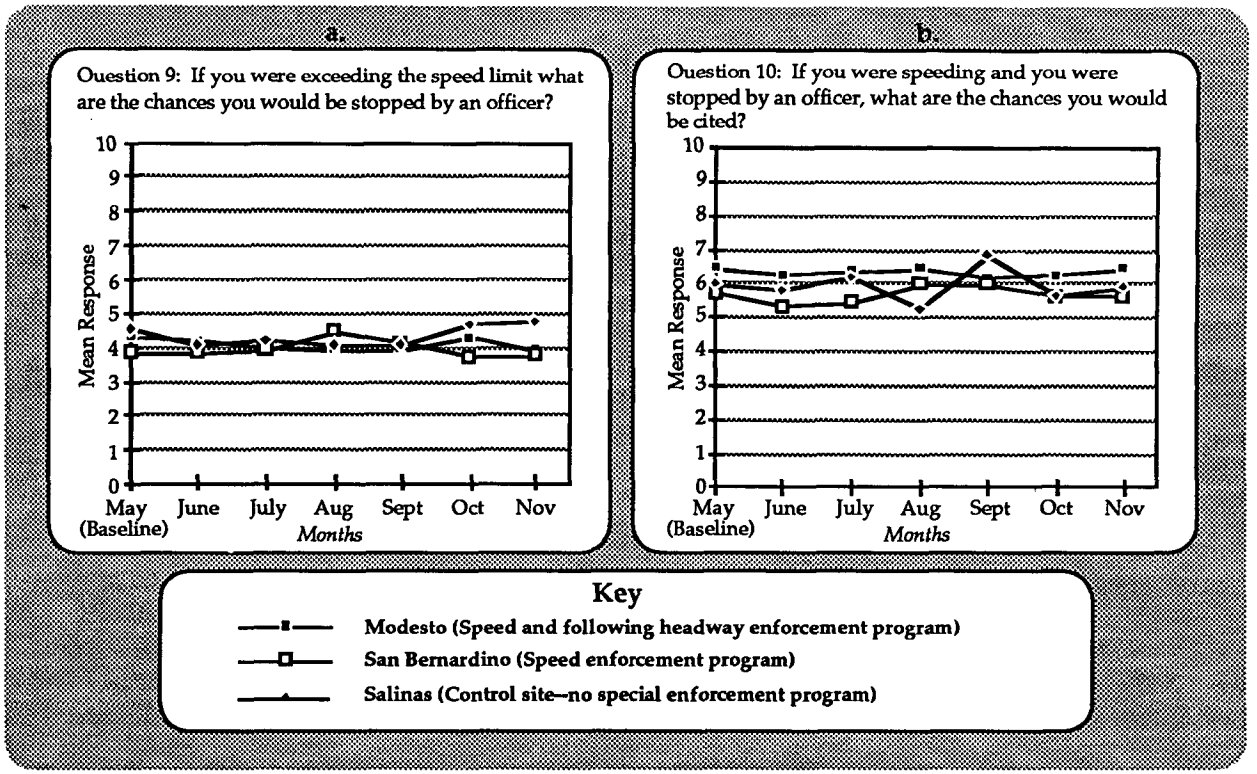


Figure 6. Summary of responses to survey Questions 9 and 10.

Questions 11, 17, and 18 of the survey were designed to link perceived risk to driver behavior by asking respondents to report changes in their speeding. Question 11 asked, "If you had to drive, and you knew in advance that there was going to be special speed enforcement (or routine speed enforcement in the control community), would you drive as usual, slower than usual, or no faster than the posted speed limit?" Question 17 asked, "Have you ever reduced your driving speed on the streets of your community out of concern for being stopped by a law enforcement officer?" Question 18 asked, "Do you ever exceed the posted speed limits while driving on city streets in your community?" Responses to these questions are summarized in Figure 7.

Analysis of responses to Question 11 found significant increases in drivers reporting that they would drive no faster than the posted speed limits in San Bernardino ($p=.02$), but not in Modesto. Similarly, analysis of responses to Question 18 found a significant decrease in San Bernardino drivers who reported that they exceed the speed limits when driving on city streets ($p=.005$). No changes were found in the responses to Question 17 of the survey. Again, it is believed that self-reports of illegal behavior, in the context of a DMV office, are probably not fully sensitive to these dependent measures. Appendix H provides the supporting data for Figures 11, 17, and 18 in both tabular and graphic form. Further discussion of these results is provided in Chapter 4.

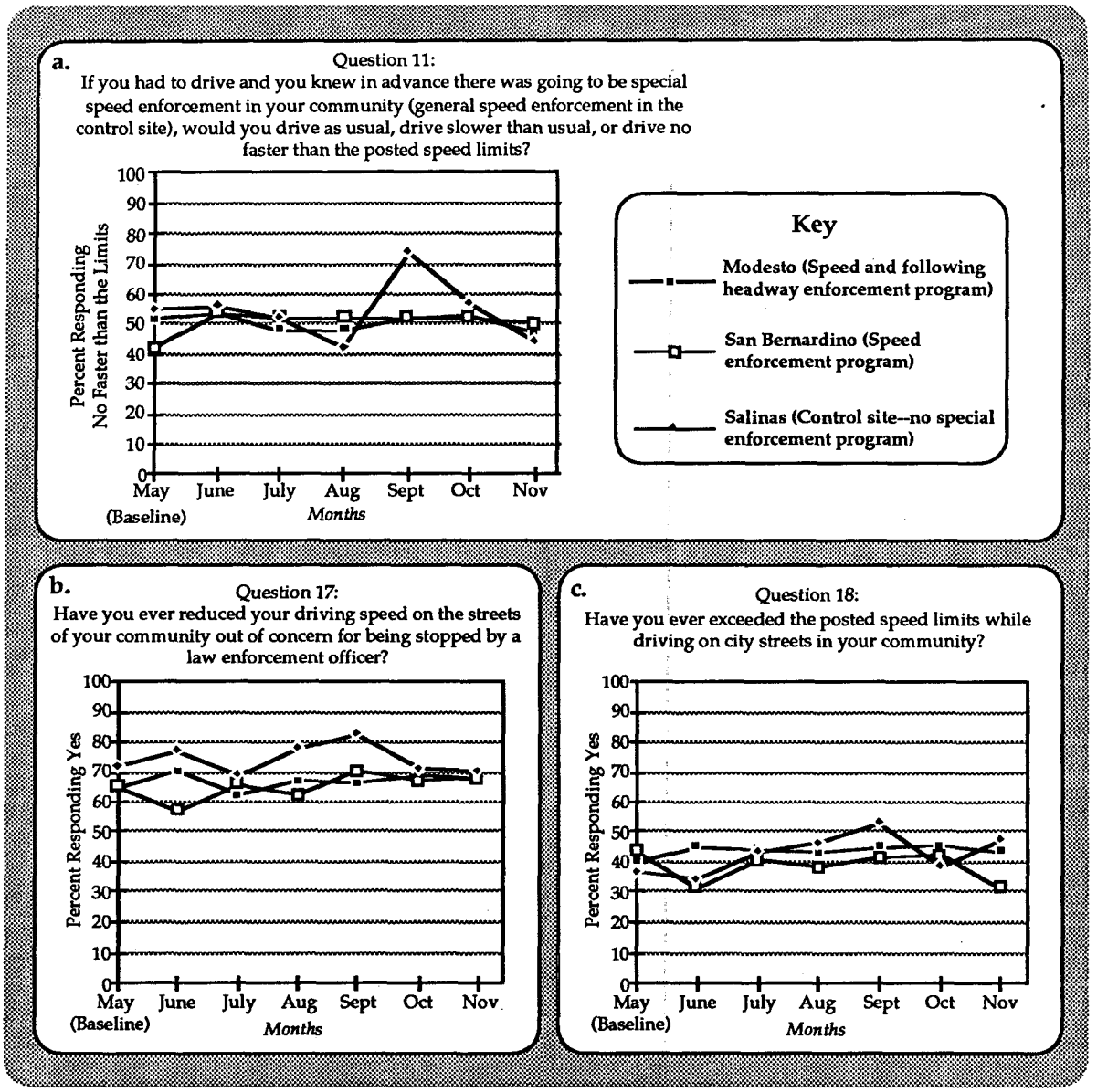


Figure 7. Summary of responses to survey Questions 11, 17, and 18.

PUBLIC PERCEPTIONS OF AND SUPPORT FOR SPECIAL SPEED ENFORCEMENT PROGRAMS

Questions 12 and 13 were included in the survey to measure public perceptions of the contributions of special and routine speed enforcement to traffic safety. Question 12 asked, "How much do you think special speed enforcement (general speed enforcement in the control community) helps to reduce vehicle speeding?" Question 13 asked, "How much do you think special speed enforcement (general speed enforcement in the control community) helps to reduce the numbers and seriousness of speed-related crashes?" Response options to both questions were, "Not at all," "A little," "Some," and "A lot." Figure 8 summarizes the responses to these two questions.

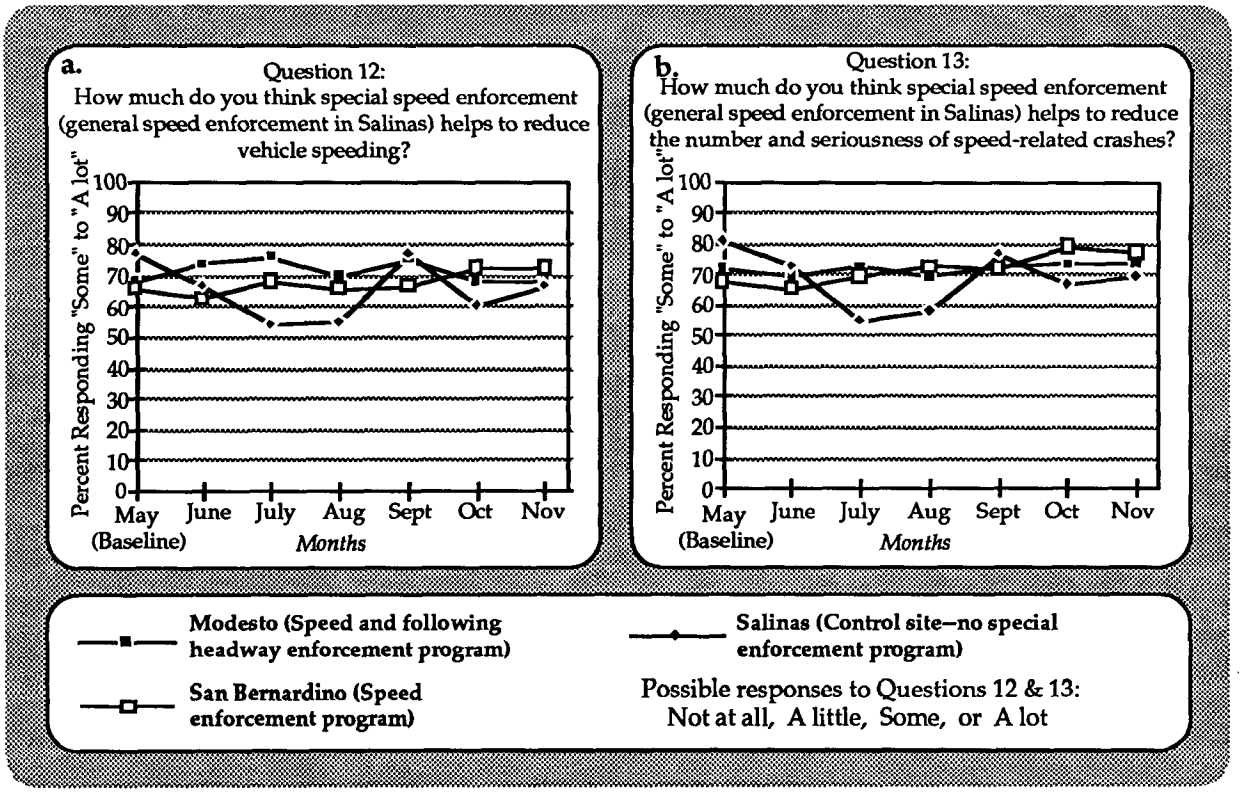


Figure 8. Summary of responses to survey Questions 12 and 13.

Log odds ratio tests performed on the data summarized in Figure 8 found significant increases in the numbers of respondents who indicated that the special enforcement programs helped to reduce speeding and speed-related crashes "some" to "a lot." For Questions 12 and 13, significant increases over baseline values were measured in both experimental communities for each two-month segment of the six-month programs. In other words, more than 60 percent of the motorists sampled by the DMV survey reported during the baseline period that special enforcement would help reduce speeding and speed-related crashes, and the proportions of motorists responding in this manner increased significantly following the implementation of the experimental, special enforcement programs. Tables 9 and 10 present the results of these analyses.

TABLE 9

QUESTION 12: SUMMARY OF LOG ODDS RATIO TESTS BY PROGRAM PERIOD

"How much do you think special speed enforcement helps to reduce vehicle speeding in Modesto (or San Bernardino)?"
"How much do you think general speed enforcement helps to reduce vehicle speeding in Salinas?"

Program/ Site No.	City	Program Description	p Values Months 1&2	Months 3&4	Months 5&6
1	Modesto	Speed & following headway	.0001	.004	.03
2	San Bernardino	Speed enforcement	.004	.02	.002

TABLE 10

QUESTION 13: SUMMARY OF LOG ODDS RATIO TESTS BY PROGRAM PERIOD

"How much do you think special speed enforcement helps to reduce the number and seriousness of speed-related crashes in Modesto (or San Bernardino)?"
"How much do you think general speed enforcement helps to reduce speed-related crashes in Salinas?"

Program/ Site No.	City	Program Description	p Values Months 1&2	Months 3&4	Months 5&6
1	Modesto	Speed & following headway	.003	.01	.02
2	San Bernardino	Speed enforcement	.002	.002	.0003

Question 16 was included in the survey to measure public support for the special enforcement programs. Question 16 asked, "What do you think about special speed enforcement (general speed enforcement in the control community)?" Response options to this question were, "I strongly disapprove," "I disapprove," "I am neutral," "I approve," and "I strongly approve." Figure 9 provides a summary of the responses to this question. Although the numbers of survey respondents indicating that they approved or approved strongly increased during the programs, the changes failed the overall tests of significance. Significant increases in public support were, however, measured in San Bernardino during the first and second thirds of that experimental program (p=.04 and .05).

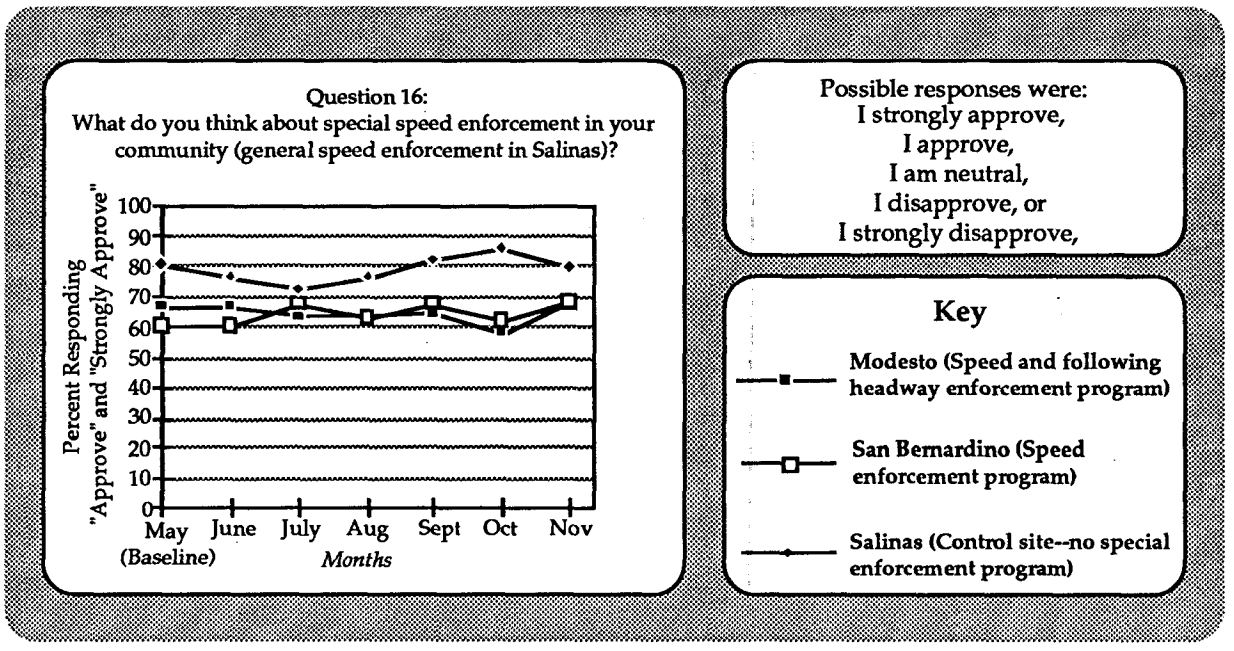


Figure 9. Summary of responses to survey Question 16.

Questions 14 and 15 were included in the survey to measure public perceptions of the effects of special and routine speed enforcement on the apprehension of persons wanted for crimes and the deterrence of criminal activity in the vicinity of the

enforcement. Question 14 asked, "How much do you think special speed enforcement (general speed enforcement in the control community) contributes to catching people who are wanted for crimes?" Question 15 asked, "How much do you think special speed enforcement (general speed enforcement in the control community) reduces criminal activity in city areas where enforcement takes place?" Response options to both questions were, "Not at all," "A little," "Some," and "A lot." Figure 10 summarizes the survey responses to these questions.

Log odds ratio tests performed on the data summarized in Figure 10a found significant increases in the numbers of respondents who indicated that the special enforcement programs contributed to catching people who were wanted for crimes "some" to "a lot." Significant increases over baseline values were found in both Modesto and San Bernardino (p=.04 and .01, respectively) on this measure of public perception. In contrast, only the respondents in San Bernardino indicated a significant increase in the perception that special speed enforcement reduces criminal activity in areas where the enforcement takes place (p=.03). The change in public perception of a crime-deterrence effect in Modesto was in a positive direction, but failed the statistical test; a significant increase, however, was measured during the second two-month period of Modesto's special enforcement program (p=.01).

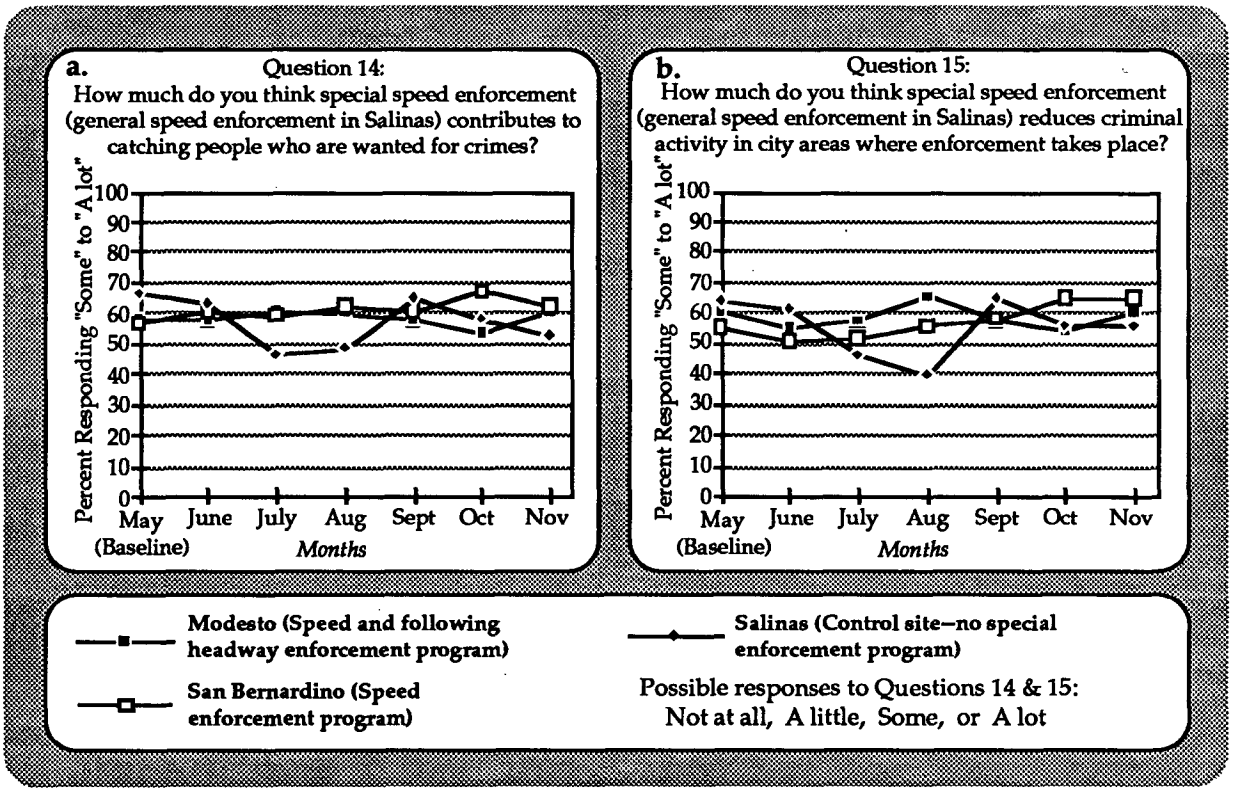


Figure 10. Summary of responses to survey Questions 14 and 15.

A summary of survey results and a discussion of the implications of those results are presented in Chapter 4 of this report.

EFFECTS OF THE EXPERIMENTAL PROGRAMS ON MEASURES OF TRAFFIC SAFETY

Two categories of data were collected and analyzed to measure the effects of the experimental programs on traffic safety: 1) The numbers of vehicle crashes that occurred in the six special enforcement zones, and 2) Samples of vehicle speed obtained unobtrusively twice each month during the special enforcement programs. The results of the analyses are presented in the following pages.

VEHICLE CRASHES

A standard traffic collision record form is submitted to California's Statewide Integrated Traffic Records System (SWITRS) for every injury and fatal traffic collision that occurs within the state, and for most crashes involving property damage only; SWITRS is operated by the California Highway Patrol (CHP). Crash data were obtained from SWITRS for each of the three participating sites, and for California as a whole. The data provided by SWITRS excluded all crashes reported by sheriff's departments and by the CHP; that is, only crashes that were reported by municipal police departments were included in the analyses, to maximize comparability and relevance of the data. Several categories of crash data were provided by SWITRS, by day, for the five-year period extending from June of 1989 through November of 1994.

Speed enforcement is conducted because the incidence and severity of crashes tend to increase with vehicle speed. The relationship between vehicle speed and crashes is a reflection of the relationship between the physics of moving objects and the limitations of human operators. The objective of speed enforcement is to maintain vehicle speeds within an established range; limiting velocities provides drivers with more time to process and act upon information, such as that provided by a stop sign or the recognition of a traffic hazard, and minimizes the distances required for a moving vehicle to stop. Slower speeds produce fewer crashes than higher speeds on city streets and reduce the overall severity of crashes caused when driving errors are made. Thus, the number of speed-involved crashes in a community can be considered a relevant and credible dependent measure of the effectiveness of a program designed to reduce speeding. Numbers of speeding citations, for example, can increase or decrease in response to enforcement effort, but crashes occur independently of police activity, except to the extent that enforcement effort *deters* the behaviors that contribute to crashes.

Other driving behaviors that are clearly speed-related are "following-too-closely" (FTC) and "right-of-way violations" (ROW). For a variety of reasons, many crashes that were clearly caused by a motorist's insufficient following headway are assigned "unsafe speed for the conditions" as the primary collision factor (PCF). Similarly, many crashes assigned the PCF of right-of-way violation would not have occurred if there had not been a speeding vehicle approaching the right-of-way violation. For these reasons, crash data were obtained for the control and two experimental communities categorized by crash severity (injury/fatal or property damage only) and by the three speed-related

collision factors, Unsafe speed, Following-too-closely, and Right-of-way violation. The results of the analyses are presented in the following paragraphs.

CRASH SEVERITY

Crash data were coded during data entry as either "fatal," "injury," or "property damage only" (PDO); injury and fatal crashes have been combined in the following analyses. Figure 11 illustrates the 18-month series of injury and PDO crashes that occurred in the six special enforcement zones in each of the three participating communities; included in the frequencies are only those crashes that had been assigned unsafe speed as the primary collision factor by the investigating officers. Tables 11 and 12 summarize the data presented in Figures 11a and 11b.

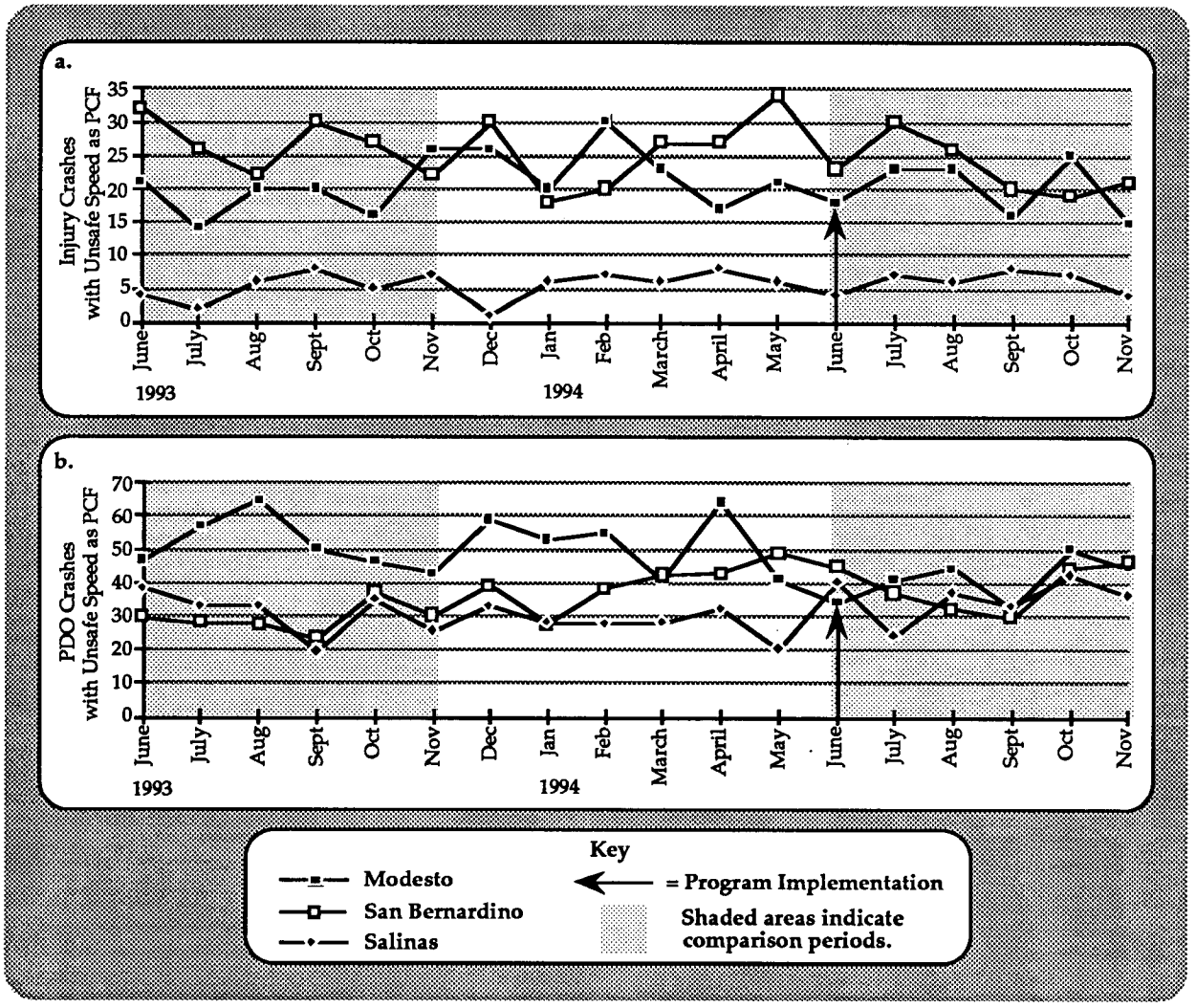


Figure 11. 18-month series of injury and PDO crashes with unsafe speed as PCF, by site.

Figure 11 and the data presented in Tables 11 and 12 permit comparisons between the six-month special enforcement periods and the same six-month period one

year earlier. The data reveal that the special enforcement zones in both experimental communities experienced changes in the incidence of injury and PDO crashes that involved unsafe speed as the primary collision factor. Table 11 shows that San Bernardino's injury crashes declined by 12.6 percent, while injury crashes in Modesto increased slightly (2.6 percent). Conversely, Table 12 shows that Modesto's PDO crashes declined by 20.1 percent, while PDO crashes appear to have increased 33.9 percent in San Bernardino. The numbers of injury and PDO crashes *both* increased in Salinas's control zones from the six-month period in 1993 to the same six-month period in 1994; the measured increases in the comparison community were 12.5 and 15.9 percent, respectively.

TABLE 11
NUMBERS OF INJURY CRASHES WITH UNSAFE SPEED AS PRIMARY COLLISION FACTOR

Program/ Site No.	City	Description	Number of Injury Crashes (June-Nov) 1993	1994	Difference	Percent Change
1	Modesto	Speed/FTC enforcement	117	120	+3	+2.6
2	San Bernardino	Speed enforcement	159	139	-20	-12.6
3	Salinas	Comparison Site (no program)	32	36	+4	+12.5

TABLE 12
NUMBERS OF PDO CRASHES WITH UNSAFE SPEED AS PRIMARY COLLISION FACTOR

Program/ Site No.	City	Description	Number of PDO Crashes (June-Nov) 1993	1994	Difference	Percent Change
1	Modesto	Speed/FTC enforcement	308	246	-62	-20.1
2	San Bernardino	Speed enforcement	174	233	+59	+33.9
3	Salinas	Comparison Site (no program)	183	212	+29	+15.9

The changes in injury and PDO crashes, in which unsafe speed was the primary collision factor, are further illustrated by Figure 12. The figure illustrates that property damage only crashes declined in Modesto and increased in San Bernardino, while injury crashes declined in San Bernardino and remained about the same in Modesto. Both injury and PDO crashes increased in Salinas, the comparison community. The crash data were subjected to a two-way (3 X 2) mixed ANOVA, which compared mean number of crashes in the three sites for 1993 and 1994. The overall effect of site was statistically significant ($p < .001$), indicating that Salinas experienced fewer crashes in both years compared to Modesto and San Bernardino. The analysis failed to find an overall difference in the number of crashes between 1993 and 1994. However, the interaction between site and year was statistically significant ($p < .001$). Newman-Keuls post hoc comparisons were conducted to identify any program effects in each of the three sites; this test is distinguished from paired-samples *t* tests by distributing the

alpha level among the component tests of simple effect, thereby reducing the possibility of committing a Type I error in the context of multiple measures of program effect. The tests found Modesto's decrease in PDO crashes to be significant at the .01 level, but San Bernardino's decrease in injury crashes failed to reach statistical significance.

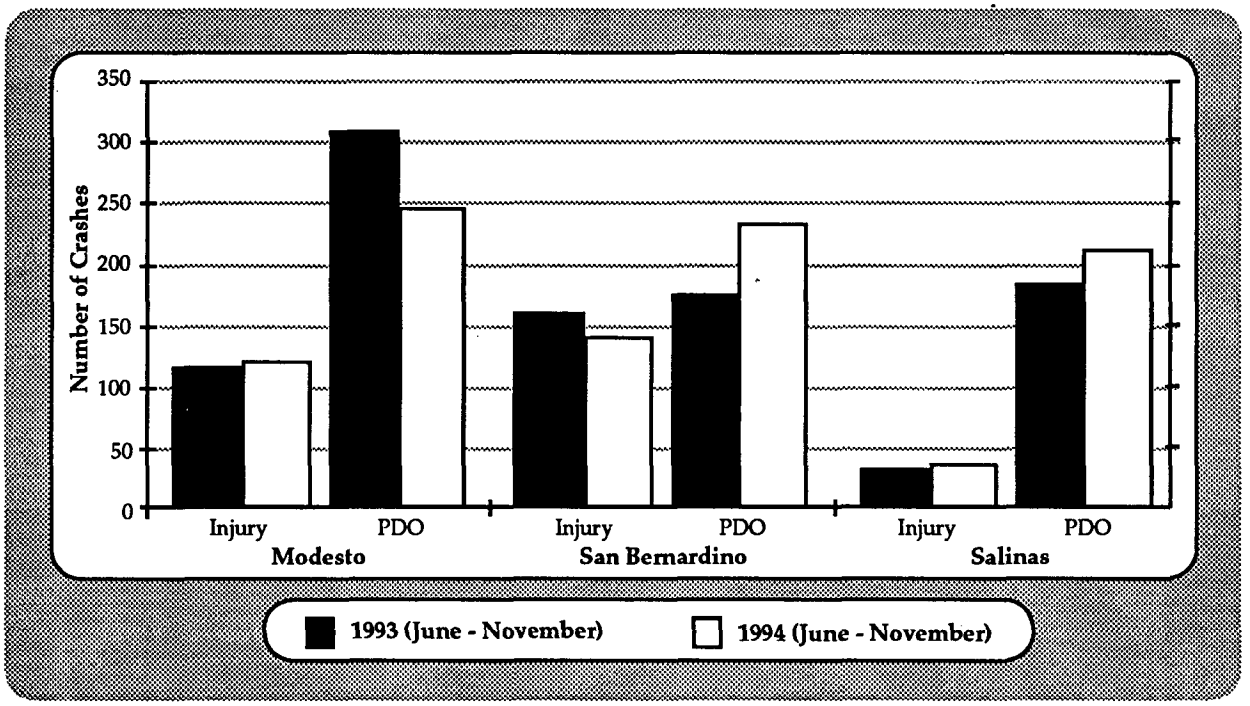


Figure 12. Comparison of injury and PDO crashes in the three communities.

CRASH PRIMARY COLLISION FACTOR

The comparisons of the two categories of crash severity, presented in the previous section, suggests that a more stable metric might be obtained by combining the categories, and focusing instead on the primary collision factors of the crashes. For example, Table 13 presents a summary of the combined measure of injury and PDO crashes in the special zones of the three communities, in which unsafe speed was the primary collision factor. Figure 13 presents the 18-month series of crash data for the special zones in the three communities. The table shows that when all crashes with a PCF of unsafe speed are considered, Modesto declined by 13.9 percent while San Bernardino increased by 11.7 percent. The control community also increased, but by 15.4 percent. Newman-Keuls tests found Modesto's decline in total crashes with unsafe speed as the PCF to be statistically significant at the .05 level of confidence.

Changes were also measured in the incidence of crashes for which following too closely (FTC) was assigned as the primary collision factor. Table 14 summarizes the comparison between the experimental period in 1994 and the same six-month period in 1993. The table shows that all three communities declined in FTC crashes: The comparison community declined by 21.6 percent, Modesto declined by 29.6 percent,

and San Bernardino declined by 50 percent. The numbers of FTC crashes reported in San Bernardino are relatively few. An overall decline of 35 percent in the experimental communities is obtained when the incidence of FTC crashes in Modesto and San Bernardino are combined to compare to Salinas. Newman-Keuls tests found no significant changes in the incidence of FTC-related crashes.

TABLE 13
TOTAL NUMBERS OF CRASHES WITH UNSAFE SPEED AS PRIMARY COLLISION FACTOR

Program/ Site No.	City	Description	Number of Crashes (June-Nov) 1993	1994	Difference	Percent Change
1	Modesto	Speed/FTC enforcement	425	366	-59	-13.9
2	San Bernardino	Speed enforcement	333	372	+39	+11.7
3	Salinas	Comparison Site (no program)	215	248	+33	+15.4

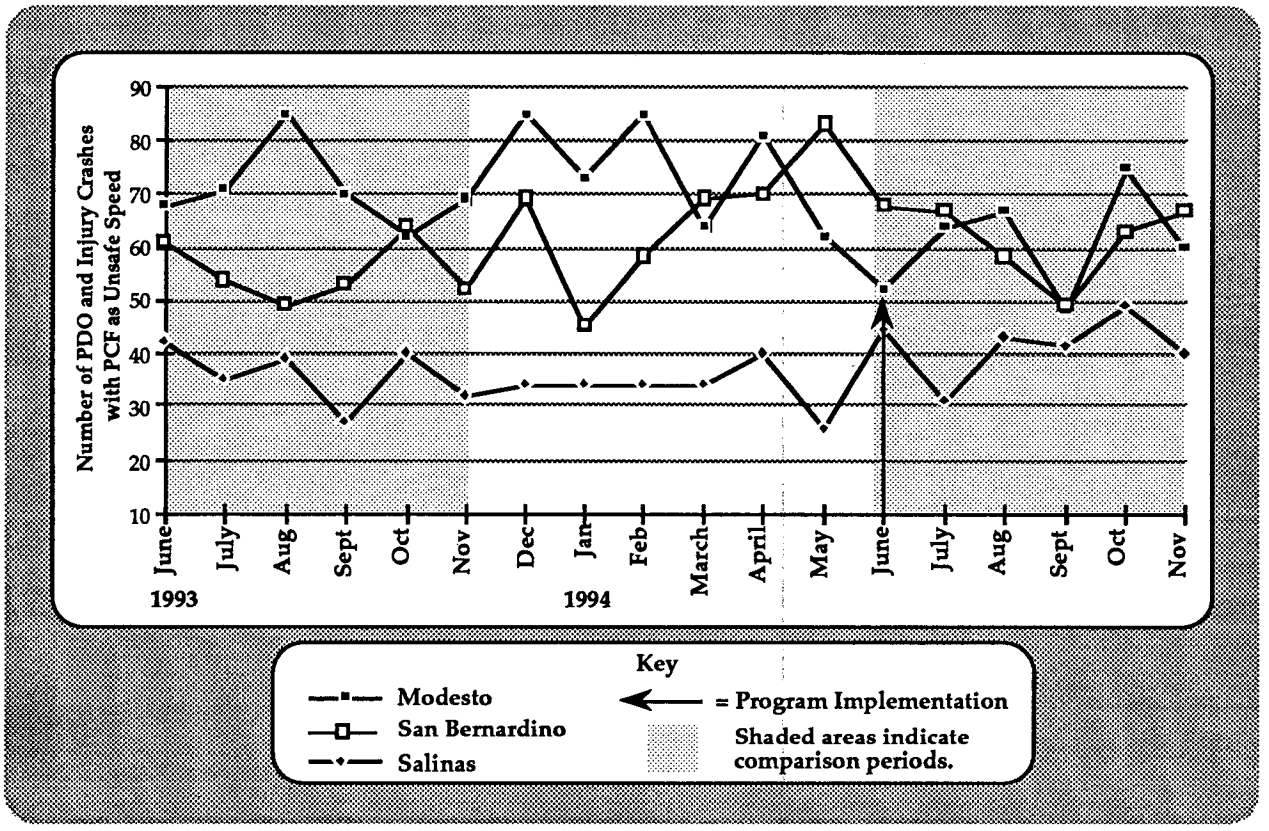


Figure 13. 18-month series of total crashes with unsafe speed as PCF, by site.

TABLE 14
TOTAL NUMBERS OF CRASHES WITH FOLLOWING TOO CLOSELY
AS THE PRIMARY COLLISION FACTOR

Program/ Site No.	City	Description	Number of Crashes (June-Nov) 1993	1994	Difference	Percent Change
1	Modesto	Speed/FTC enforcement	44	31	-13	-29.6
2	San Bernardino	Speed enforcement	16	8	-8	-50.0
3	Salinas	Comparison Site (no program)	51	40	-11	-21.6
1&2	Modesto and San Bernardino Combined		60	39	-21	-35.0

All three participating communities also experienced changes in the incidence of crashes in which right-of-way (ROW) violation was the assigned primary collision factor. Table 15 summarizes the comparison between the experimental period in 1994 and the same six-month period in 1993. The table shows that ROW crashes declined by 7.1 percent in Modesto, 10.6 percent in San Bernardino, and by 3.9 percent in the comparison community. When data from the experimental communities are combined to compare to Salinas a decline in ROW violation crashes of 8.7 percent is revealed, which is more than twice the decline measured in Salinas's control zones. Newman-Keuls tests, however, found no significant changes in this measure of traffic safety.

TABLE 15
TOTAL NUMBERS OF CRASHES WITH RIGHT-OF-WAY VIOLATION
AS THE PRIMARY COLLISION FACTOR

Program/ Site No.	City	Description	Number of Crashes (June-Nov) 1993	1994	Difference	Percent Change
1	Modesto	Speed/FTC enforcement	453	421	-32	-7.1
2	San Bernardino	Speed enforcement	367	328	-39	-10.6
3	Salinas	Comparison Site (no program)	182	175	-7	-3.9
1&2	Modesto and San Bernardino Combined		820	749	-71	-8.7

The results of the analyses of crash incidence by primary collision factor are mixed: Modesto declined in all three of the relevant PCF crashes, while San Bernardino and Salinas declined in crashes for which following-too-closely and right-of-way violations were the primary collision factors. Generally, the magnitudes of the changes were greater in the special enforcement zones of the experimental communities than in the control zones of the comparison community. The uneven shifts in crash incidence from June through November of 1993 to the same period in 1994 suggest that a more reliable measure might be obtained if all three categories of crashes were to be combined for a community. Table 16 presents the incidence of fatal, injury, and property damage only crashes in which unsafe speed, following-too-closely, or right-of-way violation was the primary collision factors for the experimental period and the

same six-month period one year earlier; data are presented for each of the participating communities. Combined data for the two experimental communities are also presented in the table to permit comparison to Salinas's control zones. Figure 14 presents the 18-month series of combined crash data for the three participating communities.

TABLE 16
TOTAL NUMBERS OF CRASHES WITH UNSAFE SPEED, FOLLOWING-TOO-CLOSELY, OR RIGHT-OF-WAY VIOLATION AS THE PRIMARY COLLISION FACTOR

Program/ Site No.	City	Description	Number of Crashes (June-Nov) 1993	1994	Difference	Percent Change
1	Modesto	Speed/FTC enforcement	922	818	-104	-11.3
2	San Bernardino	Speed enforcement	716	708	-8	-1.1
3	Salinas	Comparison Site (no program)	448	463	+15	+3.4
1&2	Modesto and San Bernardino Combined		1638	1526	-112	-6.8

Table 16 shows that when all three of the primary collision factors of particular relevance are combined, crashes in the six special enforcement zones in Modesto declined 11.3 percent, from the same six-month period one year earlier, and crashes declined by 1.1 percent in San Bernardino. Crashes *increased* 3.4 percent in Salinas's control zones; The City of Salinas received no special enforcement or public information and education campaign. Paired comparisons tests relative to Salinas (the control) showed, in one-tailed tests, a statistically significant decline in relevant crashes for Modesto ($p=.045$) but not for San Bernardino.

When crash data for Modesto and San Bernardino are combined to compare to the control, the combined values reveal a 6.8 percent *decline* in crashes in the experimental communities, compared to a 3.4 percent *increase* in the control community. This difference represents a spread of 10.2 percentage points in the rates of change. It is assumed that these changes and the difference between the experimental and control communities are attributable to the special enforcement and publicity programs that were implemented in Modesto and San Bernardino.

Time series analyses were performed, in addition to the paired samples tests. Essentially, with time series analysis a statistician attempts to predict the future by developing a mathematical understanding of the past; that understanding must take into account a great deal of variation caused, for example, by seasonal fluctuations. Variations of the time series technique are used to predict a wide range of events, from the price of corn to the incidence of disease. In the current context, time series analyses were performed to identify and mathematically model any trends in the incidence of crashes in the special zones of the three communities. The time series model includes components corresponding to both long range trends and the intervention, in this study, the implementation of the special enforcement programs in June of 1994. Trend

intervention and other (e.g., seasonality, serial dependence) components are estimated in the context of a full information model. Although the final model is constructed iteratively, final parameters are estimated in a single step. Because maximum likelihood methods are used, significance of the intervention can be tested with the familiar *t* statistic, which is a product of the estimation algorithm. A significant negative coefficient for the intervention variable means that a significant reduction in crashes occurred coincident with the countermeasure program.

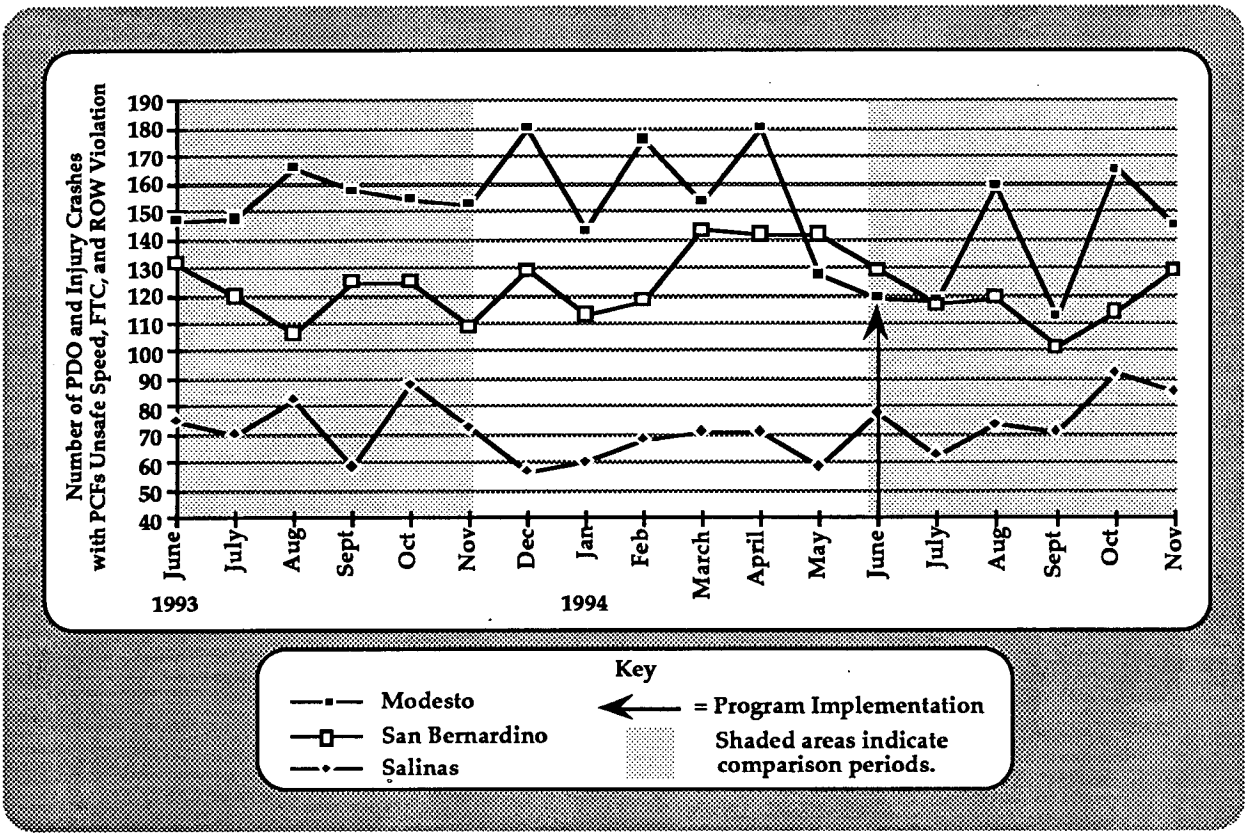


Figure 14. 18-month series of injury and PDO crashes with PCF of unsafe speed, following-too-closely, or right-of-way violation.

Interrupted time series (ITS) analyses were performed using a five-year data base provided by SWITRS. The analyses included the entire series of data from June 1989 through November 1994; data were normalized into seven-day weeks. Injury, fatal and property damage only (PDO) crashes, involving all primary collision factors, were combined. That is, all crashes, representing a total of 23 primary collision factors, were used in the time series analysis, including the crashes that had been assigned one of the three speed-related PCFs and used in the paired samples analyses described in the previous paragraphs. The ITS detected slight and non-significant downward trends in all four series of total crashes, but found no significant effects of the programs on total crashes occurring within the special zones during the experimental period. The results of the time series analysis are summarized in Table 17.

TABLE 17
SUMMARY OF THE RESULTS OF THE TIME SERIES ANALYSES:
CHANGES IN NUMBERS OF ALL CRASHES IN THE SPECIAL ZONES, 1989-1994

Program/ Site No.	City	Program Description	Mean of the Series	Percent Change	*t*	p
1	Modesto	Speed/FTC enforcement	12.59	.487	-.06	.476
2	San Bernardino	Speed enforcement	25.58	2.001	-.017	.432
3	Salinas	Comparison Site (no program)	9.14	9.356	-.98	.137
4	All California Cities (less Modesto & San Bernardino)		5436.22	-.275	-.08	.468

SPEED SAMPLES

Unobtrusive measures of vehicle speed were obtained at three of the six special enforcement zones in each of the control and experimental communities. The speeds of 100 vehicles were systematically recorded twice each month at each of the three selected sites in each community. All samples at a site were taken at the same time of day and day of the week, one in the first half of the month and one in the second half; speed measurements were made on days when there was no special enforcement at that particular zone. The same individual in each community completed the data-collection responsibility for the duration of the effort. Data-collectors used CMI Vindicator™ radar speed guns, wore plain clothes, and drove unmarked vehicles to the designated speed sample locations.

Table 18 presents a summary of the speed sample data, permitting comparisons of the numbers of drivers exceeding the speed limits between the baseline month and subsequent two-month periods during the six-month special enforcement programs. The average numbers of vehicles exceeding the posted limits are presented in the table, which may also be viewed as proportions because each sample at a zone consisted of 100 observations (100 twice each month at each of the three designated zones in each community); also presented in the table, in parentheses, are the percent changes of the two-month means from the baseline value for that community.

The table reveals that Modesto declined in drivers over the speed limits by three percent during the first two-month period, by 26 percent during the second two-month period, and by 19 percent during the final two months of the program, compared to the month prior to program implementation. San Bernardino increased by ten percent in drivers over the limits during the first two-month period of the experimental program, then declined by four percent and ten percent during the second and third periods, respectively. In contrast, declines in drivers exceeding the speed limits in the control community were consistently three percent below baseline values. When comparisons are made between the numbers of drivers exceeding the speed limits during the baseline month and the final two-month period of the experimental programs (i.e., when the programs might have had their greatest cumulative effect) it is found that the

communities experienced declines of 19 percent in Modesto, ten percent in San Bernardino, and three percent in Salinas, the control community. When data for Modesto and San Bernardino are combined to compare to the control it is revealed that the experimental communities declined in drivers over the limit by 14 percent, while drivers over the limit declined by only three percent in the control community. Log-odds ratio tests were performed on the numbers of vehicles exceeding the speed limits (rather than on the proportions, as used in the figures and tables); the tests found no significant changes, despite the apparent differences and the overall decline in speeding drivers in the experimental communities, as illustrated in Figure 15.

TABLE 18
SUMMARY OF UNOBTRUSIVE MEASURES OF VEHICLE SPEED
PERCENT OF SAMPLES OVER THE LIMIT FOR BASELINE MONTH AND
TWO-MONTH PERIODS DURING THE SIX-MONTH SPECIAL ENFORCEMENT PROGRAMS

Program/ Site No.	City	May (Baseline)	June-July (% change)	Aug-Sept (% change)	Oct-Nov (% change)
1	Modesto	72.5	70.3 (-3%)	53.3 (-26%)	59 (-19%)
2	San Bernardino	67.5	74.3 (+10%)	64.8 (-4%)	61 (-10%)
3	Salinas (control)	94.5	91.8 (-3%)	91.3 (-3%)	**91.8 (-3%)**
1&2	Modesto & SB	70.0	72.3 (+3%)	59 (-16%)	**60 (-14%)**

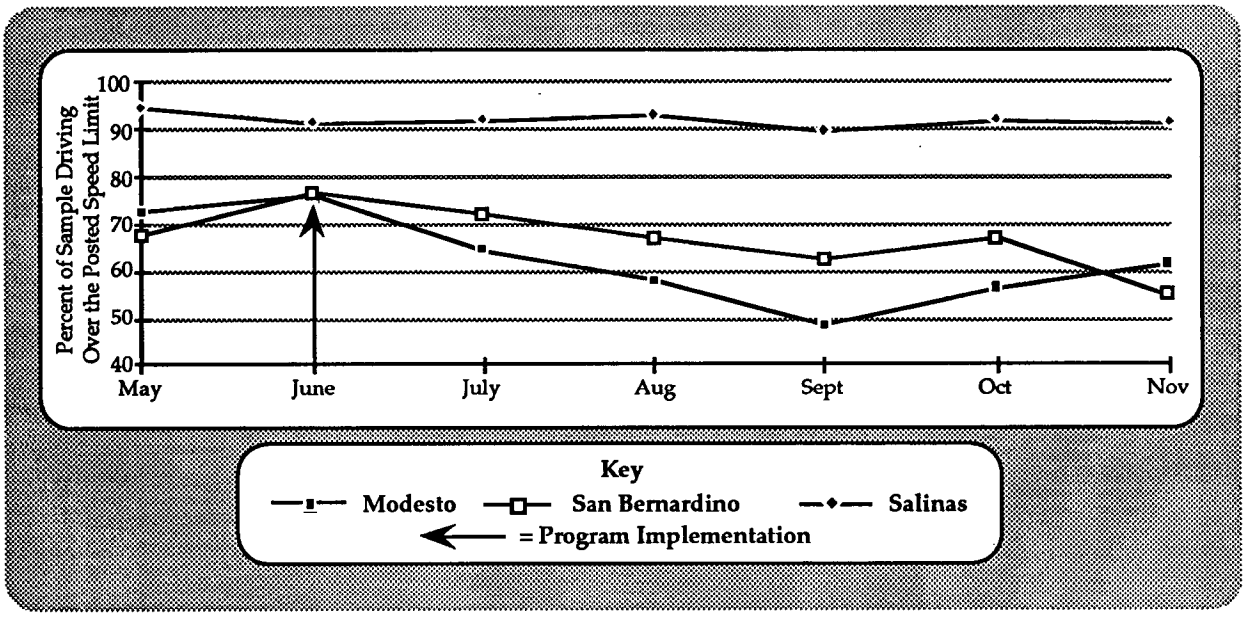


Figure 15. Summary of speed sample data.

The preceding section has focused on the study results concerning the effects of the experimental programs on measures of traffic safety. The final chapter of the report discusses the implications of the results summarized in this section.

EFFECTS OF THE EXPERIMENTAL PROGRAMS ON CRIME

Two categories of data were collected and analyzed to measure the effects of the experimental programs on crime: 1) The numbers of certain categories of crimes that occurred in the six special enforcement zones, and 2) The numbers of arrests that were made as a consequence of traffic enforcement stops. The results of the measures and the associated analyses are presented in the following pages.

INCIDENCE OF PART I CRIMES

The Uniform Crime Reporting (UCR) Program of the US Department of Justice, Federal Bureau of Investigation, promotes the use of standard terminology and definitions of crimes among law enforcement agencies in order to facilitate the collection, reporting, and analysis of crime data for the United States. Local and state definitions might vary, but the FBI's two-part taxonomy and standard categories are used when state and local agencies report crimes to the Department of Justice. The more serious, or Part I crimes, are defined by the UCR guidelines to include 1) criminal homicide, 2) forcible rape, 3) robbery, 4) aggravated assault, 5) burglary, 6) larceny/theft, 7) motor vehicle theft, and 8) arson. Part II crimes include, destruction of property, illegal weapons, drugs and narcotics, misconduct (disturbing the peace and disorderly conduct), suspicious circumstances, gun shot noises, and sex offenses. Nearly all jurisdictions maintain relatively accurate records concerning Part I crimes and report them to state departments of justice and to the FBI's UCR Program. Records concerning Part II crimes, however, are generally maintained less systematically than Part I crimes.

During our initial discussions with members of the three participating police departments it was found that Part I crime data could be provided by all three departments and would likely represent the most reliable dependent measures for purposes of assessing the effects, if any, of the special traffic enforcement programs on the incidence of crime. The Modesto and San Bernardino police departments provided data to the research team concerning Part I crimes that were reported in the six special enforcement zones, and Salinas police personnel provided Part I crime data for the six control zones in their community. Recall that the special enforcement and control zones had been identified previously on the basis of speed-related crashes and citizen complaints, and that the zones received the special high-visibility traffic enforcement in the two experimental communities. These are the same zones for which the crash data, reported in the previous section of this chapter, were obtained. Some Part II crime data were also provided by two of the three communities.

The limitations of Part I crime data as dependent measures of program effects were recognized in our Evaluation Plan. In particular, the offenses categorized as Part I crimes are relatively serious offenses, but most important, they tend to be committed during nighttime hours. It is reasonable to question whether daytime traffic enforcement should be expected to have any deterrence effect on the incidence of most categories of Part I crimes because the crimes are committed many hours later by individuals who might not have even observed the traffic officers during the day.

Figure 16 illustrates the 18-month series of Part I crime data for the six special zones in the three participating communities. In Figure 17 crime data for the six zones in each community are combined to permit overall comparisons among the three sites. The distributions and trends illustrated in the figures are summarized by the data presented in Table 19.

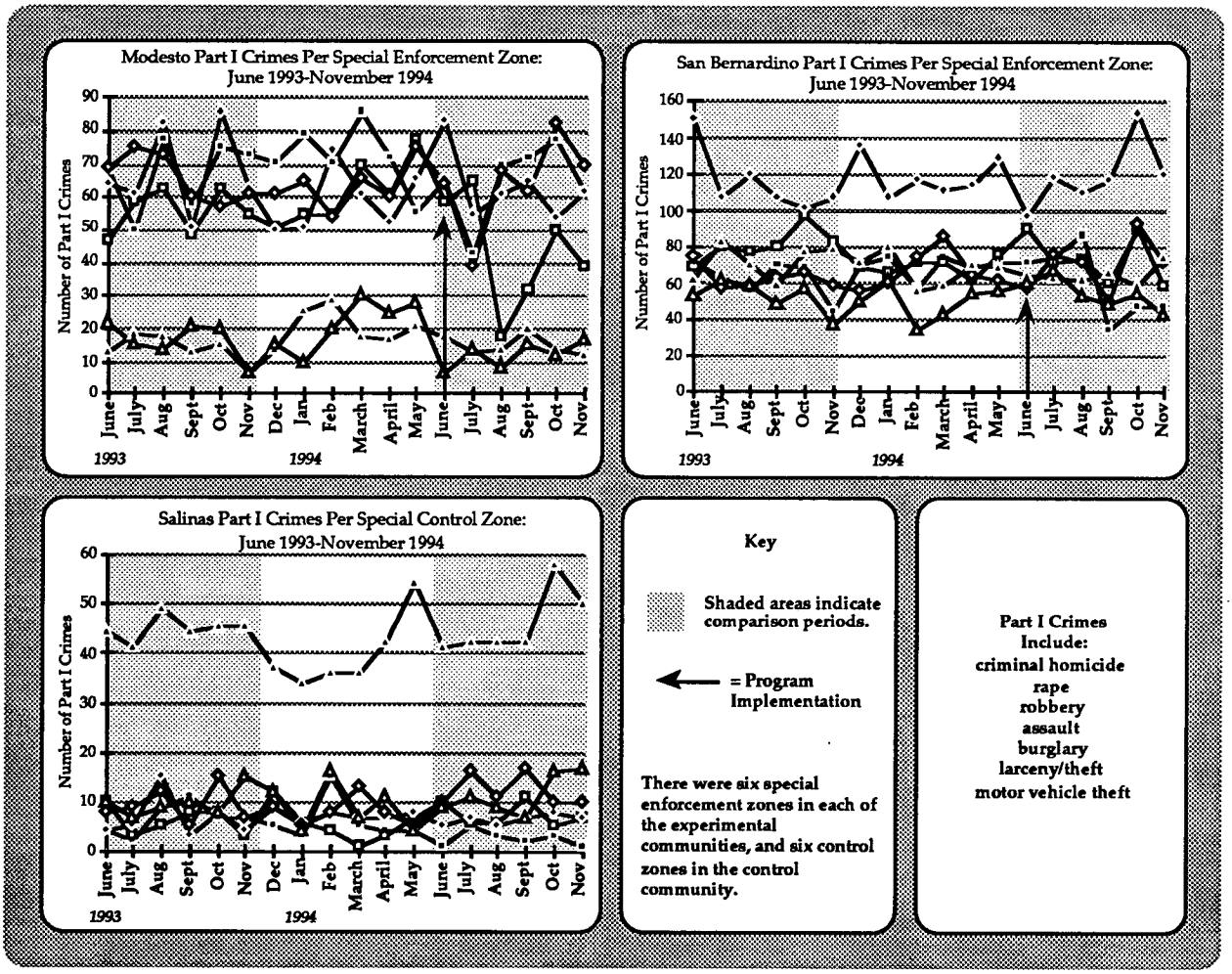


Figure 16. 18-month series of Part I crimes by special enforcement and control zone.

TABLE 19
SUMMARY OF CHANGES IN PART I CRIMES IN THE SPECIAL ZONES BY COMMUNITY

Program/ Site No.	City	June-Nov 1993	June-Nov 1994	Change	Percent Change
1	Modesto	1,723	1,583	-140	-8%
2	San Bernardino	2,677	2,655	-22	-1%
3	Salinas (control)	499	517	+18	+4%
1&2	Modesto & SB	4,400	4,238	-162	-4%

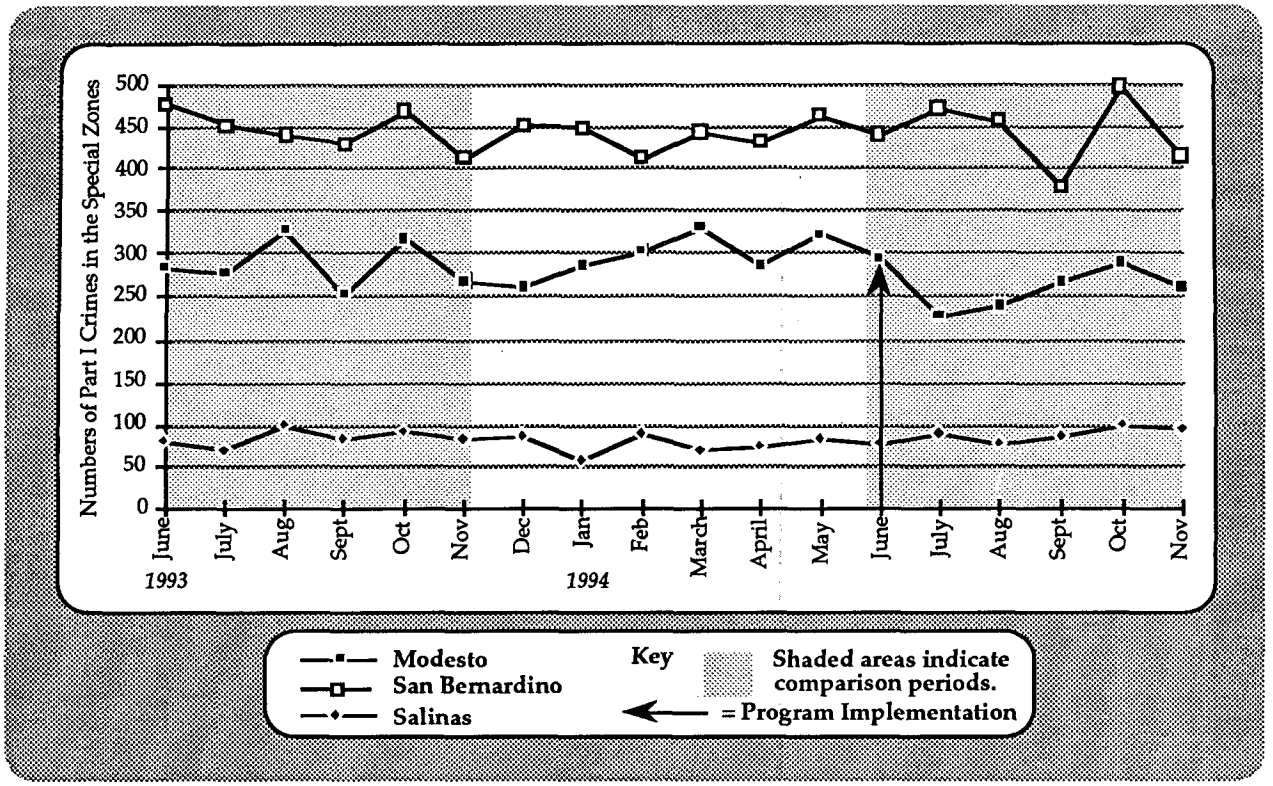


Figure 17. Part I crimes with special zones within a community combined.

The figures and table reveal that the incidence of Part I crimes declined in the special enforcement zones in both experimental communities, while Part I crimes increased in the six control zones located in the control community; Part I crimes declined by eight percent in Modesto and one percent in San Bernardino, and increased by four percent in Salinas. When data from Modesto and San Bernardino are combined to compare to Salinas, it is found that the incidence of Part I crimes *declined* by four percent in the experimental communities while the incidence *increased* by four percent in the control community. Although the changes in the combined measures of Part I crimes are in the direction predicted by our original hypothesis, none was found to be statistically significant.

INCIDENCE OF PART II CRIMES

Part II crime data were available only for Modesto and Salinas, but the results of the Part I analyses suggested that even a limited comparison of Part II crime data might be instructive. The numbers of all Part II offenses were combined for all six special enforcement zones in Modesto and all six control zones in Salinas. The 18-month series of Part I and Part II crimes in Modesto's special enforcement zones are presented in Figure 18. The figure illustrates a general decline in Part I crimes and a clear decline in Part II crimes coinciding with the implementation of the special traffic enforcement program in June of 1994. Figure 19 presents a comparison of Part II crimes during the six-month program period to the same six-month period in 1993 for both Modesto and Salinas; table 20 presents the data illustrated in the figures. Together, the figures and

table show that while the incidence of Part II crimes *declined* by nine percent in Modesto's special enforcement zones, the incidence of Part II crimes *increased* by eight percent in Salinas' control zones. Paired samples tests found Modesto's decline in Part II crimes to be statistically significant (p=.01).

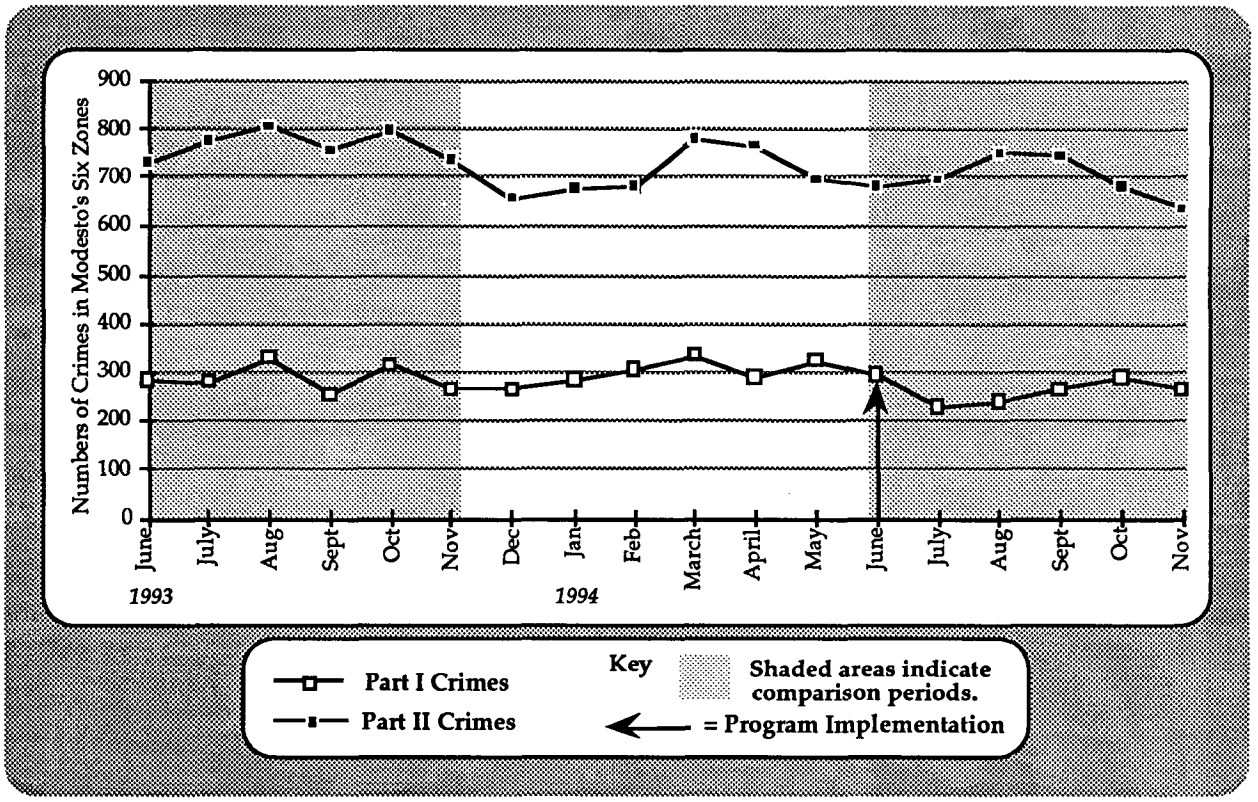


Figure 18. 18-month series of Part I and Part II crimes in Modesto's special zones.

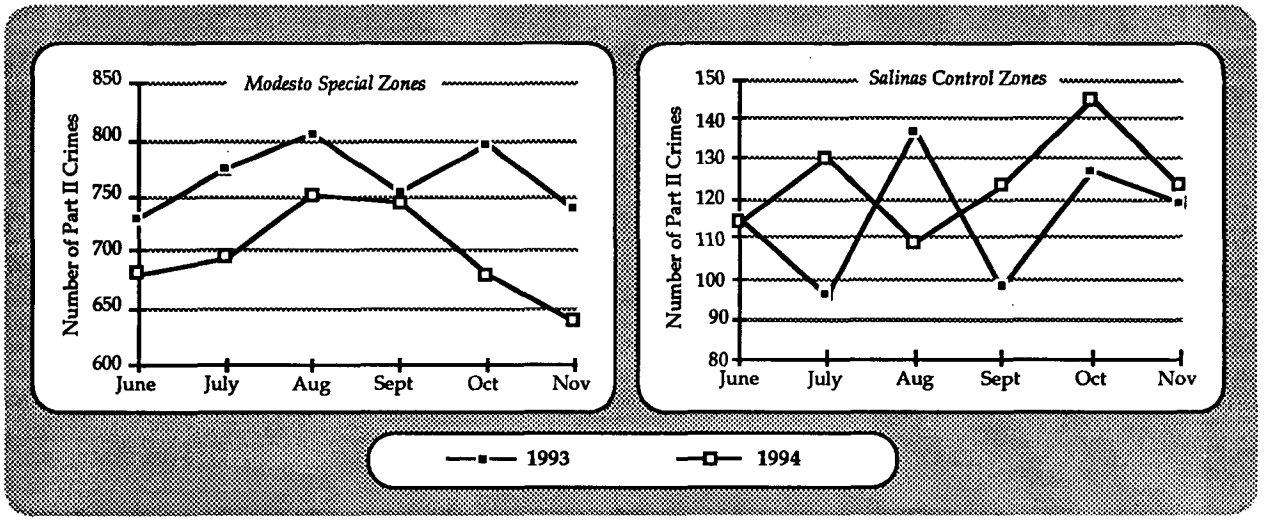


Figure 19. Comparison of Part II crimes by year in Modesto and Salinas.

TABLE 20
PART II CRIMES IN MODESTO'S SPECIAL ENFORCEMENT AND SALINAS' CONTROL ZONES
A COMPARISON OF THE PERIOD OF JUNE-NOVEMBER 1993 TO JUNE-NOVEMBER 1994

Program/ Site No.	City	June-Nov 1993	June-Nov 1994	Change	Percent Change
1	Modesto	4,595	4,191	-404	-9%
3	Salinas (control)	692	744	+52	+8%

INCIDENCE OF SPECIFIC CATEGORIES OF CRIMES

The next step in the analysis was to focus on specific Part I and Part II crimes that might be more likely than others to be deterred by the presence of daytime traffic enforcement. For example, most homicides, forcible rapes, and arsons occur during nighttime hours and, consequently, potential perpetrators are unlikely to be deterred from their crimes by the occasional presence of traffic officers in the neighborhood during the day. Other categories of crimes, such as robbery and assault, are more likely to occur during nighttime hours, but are sometimes committed during the daytime hours of the special enforcement programs. Table 21 summarizes comparisons of the incidence of six categories of crime between the experimental period and the same period one year earlier; the percent changes from the six-month period in 1993 to the same period in 1994 are presented for assault, robbery, motor vehicle theft, larceny/theft, property damage, and suspicious circumstances. The latter two categories are Part II crimes, for which data were available only for Modesto and Salinas.

TABLE 21
SUMMARY OF DIFFERENCES IN THE INCIDENCE OF CERTAIN CATEGORIES OF CRIMES
IN THE SPECIAL ENFORCEMENT AND CONTROL ZONES
A COMPARISON OF THE PERIOD OF JUNE-NOVEMBER 1993 TO JUNE-NOVEMBER 1994

Program/ Site No.	City	Assault	Robbery	Vehicle Theft	Larceny/ Theft	Property Damage	Suspicious Circumstances
1	Modesto	-3%	+13%	-5%	-11%	-5%	-14%
2	San Bernardino	+11%	-12%	no change	-12%	no data	no data
3	Salinas (control)	+17%	-64%	+84%	+4%	+13%	no data

Table 21 reveals substantial shifts in the incidence of certain categories of crimes from the six-month period in 1993 to the experimental period in 1994. As expected, changes in the incidence of assault, robbery, and vehicle theft are equivocal and for the most part unrelated to the special enforcement programs. For example, robbery increased in Modesto's zones while it declined in San Bernardino's zones, and a major shift from robbery to vehicle theft appears to have occurred in Salinas. The Part II

offenses of property damage (which includes vandalism and graffiti) and suspicious circumstances declined in Modesto, while property damage increased in Salinas, but no data were available for San Bernardino to permit systematic comparisons. Overall, Modesto declined in five of the six measures, San Bernardino declined in two out of four measures, while the control community's zones experienced *increases* in four out of the five crime measures for which data were available. It is important to note, however, that there is a single category of crime listed in the table that provides a clear indication of program effect.

Larceny is defined by the federal uniform reporting system as, "The unlawful taking, carrying, leading, or riding away of property from the possession or constructive possession of another." State and municipal offense classifications such as "grand theft," or "petty larceny" have no bearing on the reporting of these crimes for the uniform reporting system; all are counted as one offense. Larceny, also known as theft, includes crimes such as purse snatching; shoplifting; theft from buildings or fenced enclosures (like a residential or equipment yard); theft of animals, tools, fuel, or construction equipment; and, theft from a vehicle (or of parts or accessories from a vehicle). Motor vehicle theft represents a separate category, but oddly, the category of larceny includes the stealing of airplanes, bulldozers, and motorboats.

Clearly, larceny is the only category among the Part I and Part II crimes that is equally likely to occur during daylight hours as at night; that is, larceny is the type of crime that is the most likely to be deterred by daytime traffic enforcement. For example, the proximity of a police officer, even if engaged in traffic enforcement, might be considered too risky for a shoplifter to engage in his or her craft in a nearby store, or for someone to steal an item from a business, building, or yard. A traffic officer on a motorcycle, even a block away, might also deter an individual from attempting to depart a gas station without paying, attempting to pick a pocket, or even considering breaking into a parked car to steal a camera or radio. A deterrence effect, in this regard, might have something to do with perceptions of response times if detected, or the possibility of actually being observed in the criminal act by a nearby officer. Of all of the types of crimes for which data were obtained, the incidence of larceny would appear to be the measure that is most likely to change if the special enforcement programs were to have a deterrence effect on crime.

Figure 20 presents the 18-month series of larceny data for the special zones in the three participating communities. Figure 21 illustrates comparisons in the incidence of larceny between the study period and the same six-month period one year earlier; the figure presents combined data from the special zones for all three communities. Table 22 provides a summary of the larceny data from the special zones in the control and experimental communities. Together, the figures and table show that the incidence of larceny in the special enforcement zones in Modesto and San Bernardino *declined* by 11 and 12 percent, respectively, while the incidence of larceny crimes *increased* slightly in Salinas' control zones. Paired comparisons tests relative to Salinas (the control) showed, in one-tailed tests, an overwhelmingly statistically significant decline in larceny in San

Bernardino (p=.0008) and also a statistically significant decline in Modesto (p=.0437). It is important to note that, citywide, larceny increased 12 percent in Modesto and one percent in San Bernardino from 1993 to 1994; the incidence of larceny declined by 1.7 percent throughout the state during the same period (California Department of Justice, 1995). In other words, the statistically significant declines in larceny in the two experimental communities appear to be confined to the special enforcement zones and attributable to the deterrence effects of the special traffic enforcement programs.

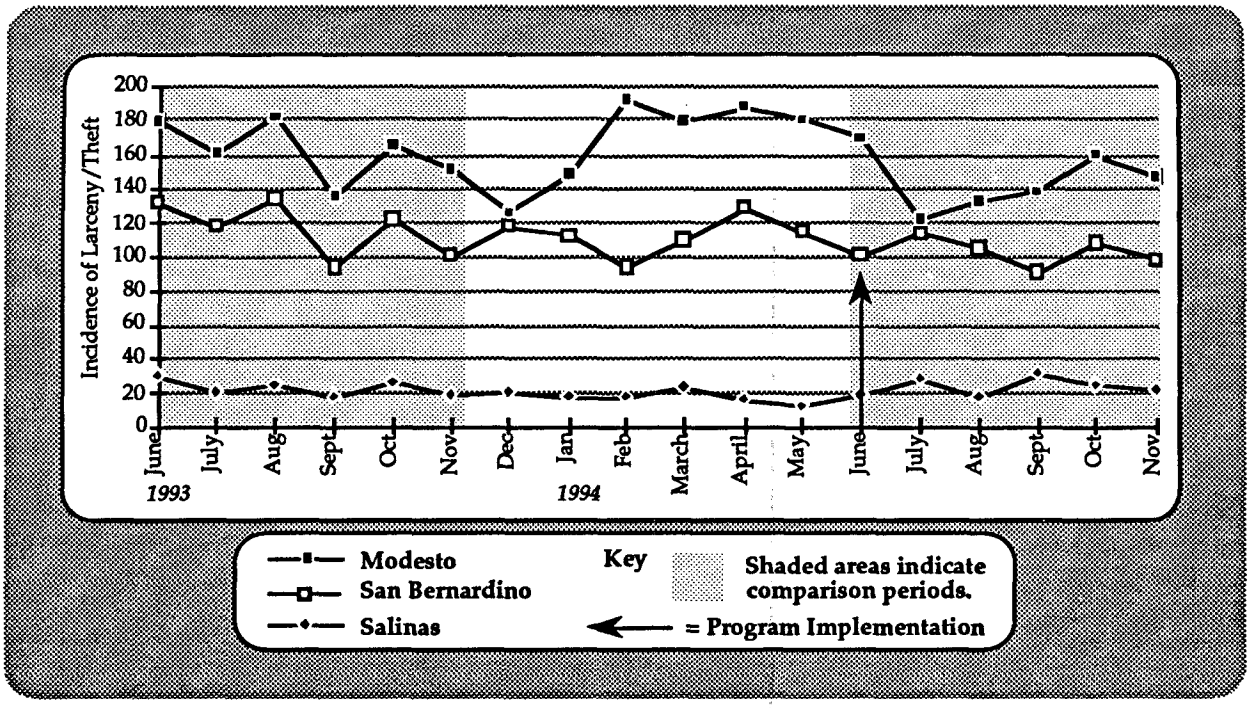


Figure 20. 18-month series of larceny/theft in the enforcement and control zones.

TABLE 22
THE INCIDENCE OF LARCENY/THEFT IN THE SPECIAL ENFORCEMENT & CONTROL ZONES
A COMPARISON OF THE PERIOD OF JUNE-NOVEMBER 1993 TO JUNE-NOVEMBER 1994

Program/ Site No.	City	June-Nov 1993	June-Nov 1994	Change	Percent Change
1	Modesto	973	870	-103	-11%
2	San Bernardino	698	616	-82	-12%
3	Salinas (control)	136	142	+6	+4%

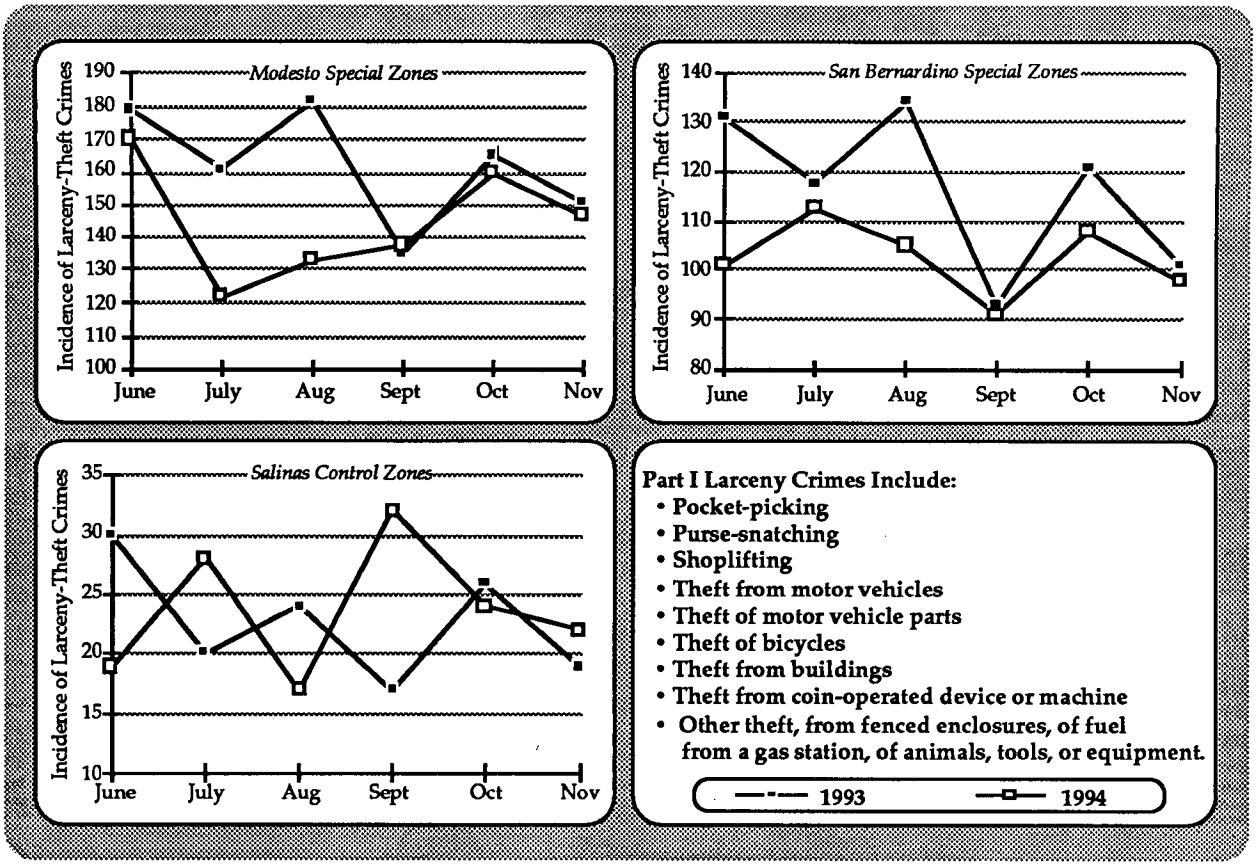


Figure 21. Comparison of the incidence of larceny/theft in the enforcement and control zones.

ARRESTS MADE AS A CONSEQUENCE OF TRAFFIC ENFORCEMENT STOPS

Of the three participating police departments, only the Modesto Police Department was capable of making the extensive modifications to its procedures and computerized records system to permit the attribution of arrests to the initiating activity, whether investigation, patrol, dispatch, or traffic enforcement. The changes implemented by the Modesto PD permitted the researchers to track the outcome of traffic enforcement stops and to link all ancillary arrests to the initiating activity. Data provided by the Modesto Police Department indicate that 1,112 arrests were made by Modesto officers during the six-month study period as a consequence of traffic enforcement stops. About a third of the arrests were made on the basis of outstanding warrants that were discovered by the officers by checking drivers' license information against state and regional databases; 43 of the warrant arrests were for felonies and 274 were for misdemeanor offenses.

Another third of the arrests (370) were for driver's license violations. Although arresting a driver for no operator's license might seem severe, there is a growing body of evidence that suggests these actions have a positive effect on measures of traffic safety. In particular, unlicensed drivers, drivers operating on suspended or revoked licenses, and drivers operating without insurance are believed by many law

enforcement personnel to be disproportionately involved in DWI and hit-and-run crashes. Laws that require the arrest of unlicensed drivers are ways to help reduce the incidence of far more serious traffic offenses.

The remaining third, or so, of the arrests made by Modesto officers as a consequence of traffic enforcement stops represent a range of criminal activity, from assault to weapons violations. Most of the arrests in this category were made in response to driver actions following an enforcement stop or an officer's observations of illegal weapons, contraband, or criminal activity. In addition, a dozen stolen vehicles were recovered and the criminals apprehended when officers checked the license plate numbers of vehicles stopped for a traffic violation against "hot sheets" and computer databases. Table 23 lists the numbers and types of crimes for which arrests were made by Modesto PD officers as a consequence of traffic enforcement stops during the six-month study period.

TABLE 23
CRIMES FOR WHICH ARRESTS WERE MADE BY MODESTO POLICE DEPARTMENT OFFICERS AS A CONSEQUENCE OF TRAFFIC ENFORCEMENT STOPS: JUNE-NOVEMBER 1994

Crime	Number of Arrests
Assault	2
Larceny	2
Reckless Driving	2
Domestic Violence	3
Stolen Property	10
Parole Violation	10
DUI Drugs	11
Auto Theft	12
Drug Sales	19
Felony Warrants	43
Weapons Violations	52
DUI	92
Drug Possession	210
Misdemeanor Warrants	274
Driver's License Violations	370

The implications of study results concerning the effects of the special programs on measures of crime are addressed in the final chapter of this report.

ADMINISTRATIVE FACTORS

The administrative factors that are discussed in the following paragraphs include, police labor and equipment costs, numbers of traffic citations issued during the special enforcement programs, revenue generated from fines, and officer safety issues.

LABOR AND EQUIPMENT COSTS

Interviews conducted with police managers during the early stages of the current study found that the Modesto and San Bernardino police departments had been spending approximately 100 hours each month in speed enforcement throughout their communities. The managers of these departments were asked to devote at least this monthly expenditure of speed enforcement to the six special enforcement zones as a condition of participating in the study. In other words, the Modesto and San Bernardino police departments were asked to spend their entire monthly speed enforcement budget on the six special zones, and the participating traffic sergeants and officers were encouraged to devote as much time as reasonably possible beyond the minimum number of special enforcement hours. Both police departments cooperated fully with these requirements, greatly surpassing the researchers' expectations. Figure 22 illustrates the numbers of officer hours devoted each month of the six-month program to traffic enforcement in the six special enforcement zones in each community. The figure shows that both departments devoted at least the minimum requirement of special enforcement to the special zones each month of the program, and devoted exceptional effort during the first two months to increase public awareness of the programs. The 14 officers of the Modesto Police Department's traffic unit devoted a total of 1,372 officer-hours to their program, while the seven officers of the San Bernardino PD traffic unit devoted a total of 1,042 special enforcement hours. The effort spent in special enforcement in a month by the departments ranged from a low of 100 hours to a high of 358. Overall, the officer hours contributed to the study were slightly more than 200 percent of the minimum commitment requested.

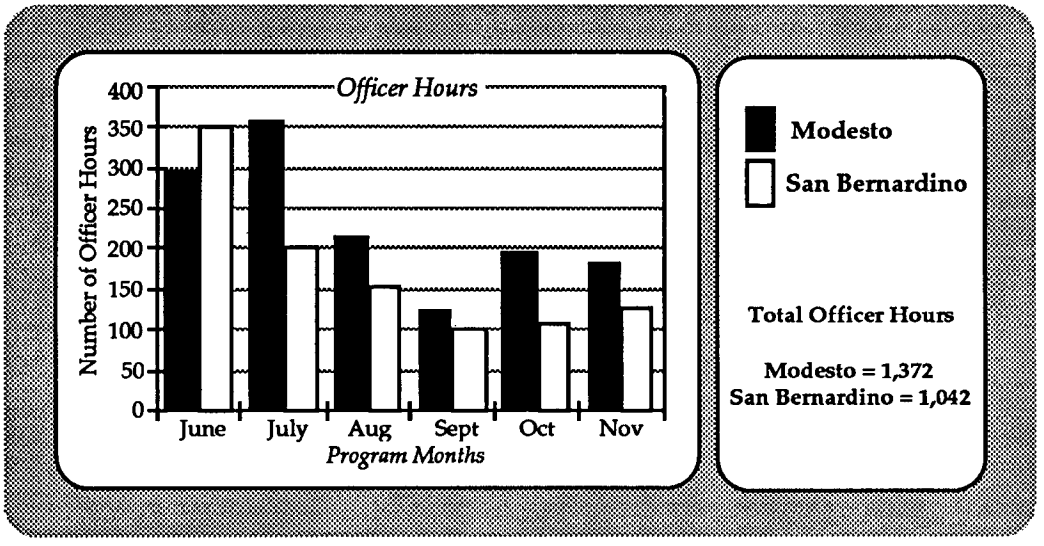


Figure 22. Officer hours devoted to the special enforcement programs by month.

Three CMI Vindicator radar speed guns and two Kustom Signals ProLaser speed guns were purchased with NHTSA funds for each of the experimental communities. Both traffic divisions were already equipped with radar guns but neither department had previous experience with the newer laser technology. The equipment provided to the departments was intended to augment existing speed enforcement capabilities, stimulate free publicity about the programs, and reciprocate in a small way for the costs of the experimental programs incurred by the departments on behalf of NHTSA. Total cost of the equipment sets provided to the experimental communities were $12,515 each. One CMI radar gun was also provided to the Salinas Police Department to facilitate the collection of speed sample data in the control zones.

Table 24 provides a summary of costs of the two special enforcement programs. The table presents the numbers of officers hours devoted to the special enforcement effort during the six-month programs, the average hourly rate of the participating traffic officers, and the cost of the NHTSA-provided equipment. The table shows that, together, the two special enforcement programs incurred labor costs of about $52,000. This cost was not an additional expenditure, but rather the cost of redirected traffic enforcement effort.

TABLE 24
SUMMARY OF DIRECT LABOR AND EQUIPMENT COSTS

Program/ Site No.	City	Officer Hours	Direct Labor Hourly Rate	Total Direct Labor Costs	Equipment Costs	Total Cost of Enforcement
1	Modesto	1,372	$20.02	$27,467	$12,515	$39,982
2	San Bernardino	1,042	$23.60	$24,591	$12,515	$37,106

NUMBERS OF CITATIONS ISSUED AND REVENUE GENERATED BY THE PROGRAMS

More than 4,300 traffic citations were issued by police officers in the special enforcement zones during the six-month program period; only 31 citations separated the two departments in their total numbers issued (i.e., Modesto officers issued 2,196 while San Bernardino officers issued 2,165 citations). Figure 23 illustrates the numbers of citations issued each month of the six-month program in the six special enforcement zones in each community. The figure shows that both departments issued particularly large numbers of citations during the first two months of the program period, corresponding to the disproportionate numbers of hours devoted to the program during that time. Officers began reporting in August of the program, however, that they were observing noticeably fewer speeding motorists in certain of the special enforcement zones. This change was interpreted by the officers as evidence of their program's deterrence effects.

The average amount of the traffic fines paid in the two communities was conservatively estimated to be $85 per citation. Table 25 presents a summary of the

numbers of citations issued as part of the special enforcement programs, and the revenue generated by the citations, in the two experimental communities. Together, Tables 24 and 25 reveal that an average expenditure of $26,000 in officer time generated an average of more than $185,000 in revenue from fines, in addition to contributing to improvements in measures of traffic safety and reductions in certain categories of crime in the vicinity of the enforcement effort, as reported in previous sections of this chapter.

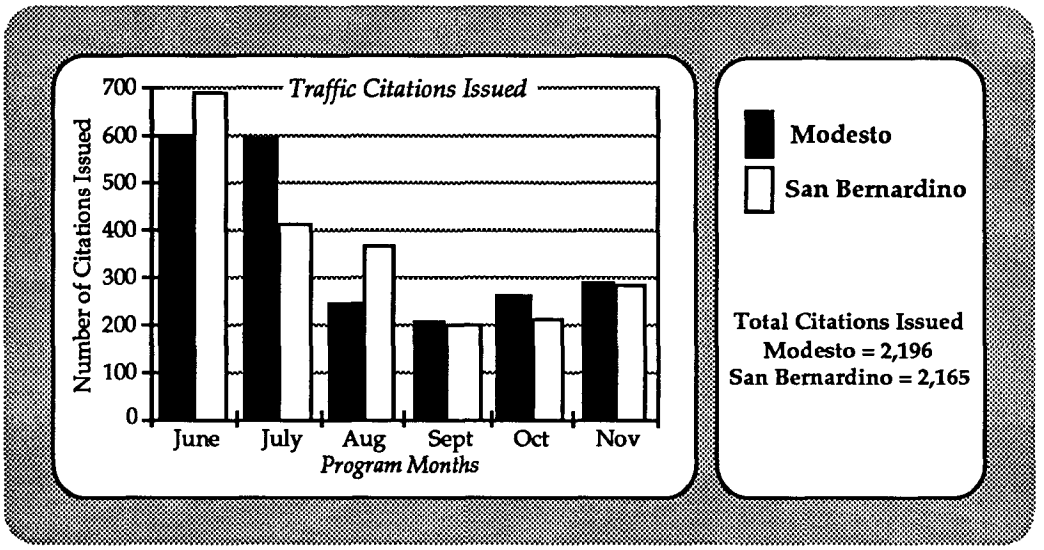


Figure 23. Numbers of citations issued by month during the special enforcement programs.

TABLE 25
SUMMARY OF CITATIONS ISSUED AND REVENUE GENERATED BY THE PROGRAMS

Program/ Site No.	City	Number of Citations Issued	Average Fine Paid	Total Revenue to the City
1	Modesto	2,196	$85	$186,660
2	San Bernardino	2,165	$85	$184,025

OFFICER SAFETY AND ACCEPTABILITY ISSUES

All of the participating officers approached their special enforcement tasks with enthusiasm. Enthusiasm, however, is usually the first element to evaporate under the scorching heat of an inland California summer. Summertime temperatures in Modesto and San Bernardino routinely exceed 95°F, and frequently exceed 100°F. Sitting astride a hot motorcycle while wearing body armor, a helmet, and a black twill police uniform can make traffic enforcement extremely difficult to perform. For this reason, officers carry supplies of drinking water with them in their (already crowded) saddlebags. At least one officer experienced mild heat stress because he failed to take sufficient water with him to the field when conducting special enforcement during one of the hottest days of the program period. Inquires were made with military special operations

personnel and physiologists at the Naval Health Research Center to obtain information and possibly examples of ice vests used to prolong effective human performance under extremely hot conditions. The information was received and passed on to the participating traffic officers near the end of the special enforcement programs.

Officers reported that they preferred to work in pairs, or groups of three and even four motorcycles, when conducting traffic enforcement in the special enforcement zones. The additional safety factor provided by working with a partner was considered to be important to the officers, and there were tactical advantages, as well. For example, officers would frequently communicate by radio to alert their comrades of speeding vehicles coming their way, or to pass on a description of a vehicle that successfully evaded an officer in pursuit. The officers worked cooperatively, in this regard, to obtain the maximum enforcement effort from the hours devoted to the special program. It was also reasoned that seeing two, three, or four motorcycle officers engaged in traffic enforcement in an area would contribute to police visibility and elevate public awareness of the special enforcement programs.

CHAPTER 4: IMPLICATIONS

This chapter presents a discussion of the implications of study results. The discussion is organized in terms of the four categories of evaluation measures: Public Awareness Survey, Measures of Traffic Safety, Measures of Crime, and Administrative Issues. Summary tables and figures are included to support the discussion.

IMPLICATIONS OF THE RESULTS OF THE PUBLIC AWARENESS SURVEY

The results of the DMV survey show that public awareness of special traffic enforcement programs can be substantially elevated by a combination of high police visibility and publicity about the special enforcement. Although awareness increased significantly in the two experimental communities, awareness levels only reached a high of 33 percent of respondents, despite the considerable publicity campaigns and the high visibility police strategies that were implemented in the experimental communities. In contrast, well-supported sobriety checkpoint programs routinely achieve public awareness rating of 70 percent, or greater. For example, in a recent experimental evaluation of checkpoint programs public awareness levels were measured ranging from 78 to 84 percent at the conclusion of the nine-month programs. However, only 29 percent of respondents reported awareness of a program of roving DWI patrols that was implemented at the same time in a comparable community to permit comparisons to the checkpoint programs (Stuster and Blowers, 1995). It appears from the results of the current study that speed enforcement, like roving DWI patrols, is considered by motorists to be less noteworthy than sobriety checkpoints.

Is it inevitable that a speed enforcement program will be perceived as "just more of the same," even if the program is presented as a special effort and involves innovative techniques and advanced technologies, as in the current study? Awareness of the programs increased substantially during the second two-month period, and was sustained through the end of the programs. Local news media provided extensive coverage of the kick-off press conferences in both special enforcement communities, but the kind of free publicity (newspaper articles, in particular) that is necessary to achieve high levels of public awareness, was difficult to obtain. The project team and local committee members encouraged news reporters to write additional articles about the programs, and reporters were provided with interim results, but broadcast and published news about the programs were rare following the initial coverage. Public awareness was influenced during the final months of the programs almost exclusively by committee-implemented publicity and the high visibility of the traffic enforcement efforts.

Survey results also suggest that at least some individuals refrain from speeding due to their awareness of the special enforcement programs. Significant changes in self-reports of driving behavior were obtained in one of the two experimental communities, but in neither community did respondents indicate that their perceptions of risk of being stopped or cited had increased. The lack of change in measures of perceived risk

are probably attributable to insensitivity of the survey questions, rather than a flaw in the theory of general deterrence. It might be unrealistic to expect candid self-reports of illegal behavior in the context of a DMV office, even if the anonymity of respondents is assured. Alternatively, it is also possible that disproportionately fewer survey participants were the type of driver that routinely exceeds speed limits; that is, a visit to a DMV office for a driver's license matter (where the survey was conducted) indicates a degree of lawfulness that might be underrepresented among chronic speeders. Researchers contemplating future surveys involving measures of perceived risk might consider abandoning the convenience and reliability of DMV offices for a strategy that permits targeting motorists who have demonstrated the risky driving behaviors in question.

The DMV survey also found statistically significant increases in public support for the special enforcement programs. Significant increases in support were measured in response to questions about the effects of special speed enforcement on speeding and crashes. Respondents in both experimental communities reported statistically significant increases in the opinion that the special programs reduced the number of speeding vehicles and the incidence and severity of speed-related crashes in their communities. These survey results are particularly important because they seem to contradict the results of other surveys that suggest motorists consider speed enforcement to be relatively unimportant. The significant increases in reports that the special programs affect the incidence of speeding and speed-related crashes must be interpreted as a positive public response to the programs, and an indication that individual perceptions of safety had improved as a consequence of the special enforcement and publicity efforts.

Significant increases were also measured in survey responses to the questions about the effects of the special traffic enforcement programs on crime. A significant increase in the opinion that traffic enforcement contributes to the apprehension of criminals was found in Modesto; this measure also increased in San Bernardino, but not to a statistically significant level. However, both experimental communities exhibited significant increases in the opinion that traffic enforcement deters criminal activity in the vicinity of the enforcement effort. In contrast, all of the measures of public opinion remained unchanged in the comparison community, in which no special program was implemented. Table 26 summarizes the key results of the survey.

The implications of the survey results are clear: 1) It is possible to significantly increase public awareness of special traffic enforcement programs using largely volunteer and donated resources; 2) Special enforcement programs supported by a public information and education campaign can affect driver behavior, as indicated by self reports; and, 3) Most motorists respond positively to special speed enforcement programs and recognize the benefits of enforcement to traffic safety and to police efforts to suppress crime. Knowing that public support for a reasonable speed enforcement program is likely to increase, rather than decrease, should remove at least one serious impediment in a police manager's decision-making process regarding the advisability of implementing a special traffic enforcement effort.

TABLE 26
SUMMARY OF DMV SURVEY RESULTS

Program/ Site No.	City	Public Awareness	Perceived Risk	Self Reports No Speeding	Support re Safety	TE Catches Criminals	TE Deters Crime
1	Modesto	*Increased 42%*	No Change	No Change	*Increased Significantly*	*Increased Significantly*	Increased
2	San Bernardino	*Increased 22%*	No Change	*Increased Significantly*	*Increased Significantly*	*Increased Significantly*	*Increased Significantly*
3	Salinas (control)	Declined 22%	No Change	No Change	No Change	No Change	No Change

IMPLICATIONS OF THE MEASURES OF TRAFFIC SAFETY

The effects of the experimental programs on measures of traffic safety clearly suggest that some motorists were effectively deterred from speeding in Modesto and San Bernardino, and that a portion of those motorists avoided speed-related crashes as a consequence of the change in their driving behavior. The paired samples tests, which compared the six-month program period to the same months one year earlier, revealed the larger effect in Modesto. Crashes in Modesto's special enforcement zones that were assigned the primary collision factor (PCF) of unsafe speed declined by 14 percent, and by more than 11 percent when crashes for all three of the speed-related PCFs were combined. Modesto's declines in both key measures of traffic safety were found to be statistically significant. In summary, Modesto's special enforcement zones experienced declines in all five of the measures listed in Table 27, while San Bernardino's zones experienced declines in four of the five measures. In contrast, Salinas declined in only two of the five measures listed in the table.

TABLE 27
SUMMARY OF MEASURES OF TRAFFIC SAFETY

Program/ Site No.	City	Crashes PCF Unsafe Speed	Crashes PCF FTC	Crashes PCF ROW Violation	Crashes PCF Speed, FTC, or ROW	Speed Samples
1	Modesto	*Declined Significantly*	Declined	Declined	*Declined Significantly*	Declined
2	San Bernardino	Increased	Declined	Declined	Declined	Declined
3	Salinas (control)	Increased	Declined	Declined	Increased	No Change

Fortunately, only a small portion of speeding motorists are involved in collisions. It is this relatively low probability of occurrence, however, that makes it difficult to obtain changes in crash statistics of sufficient magnitude during a brief program to confidently determine program effects. In this regard, it is likely that many thousands of motorists must be deterred from their risky driving behavior for every crash that is to

be prevented. Modesto's statistically significant declines, and the decline of 6.8 percent when speed-related crashes in Modesto and San Bernardino are combined, reflect tens of thousands of motorists whose driving behavior was influenced by the special enforcement programs. It is important to note that while the three categories of speed-related crashes declined by 6.8 percent in the (combined) special enforcement zones, the same categories of crashes *increased* 3.4 percent in the control zones of the comparison community. These changes represent a difference of more than ten percent between the experimental and comparison communities on this important measure. The absence of a significant change in *all* crashes, as measured by the time series analysis, indicates that the program effects were confined to the three speed-related primary collision factors.

The speed samples, taken twice each month at three of the zones in each of the participating communities, provide an additional measure of program effects on traffic safety. Modesto declined by 19 percent in the numbers of vehicles exceeding the speed limit, from the baseline month to the final two-months of the program; vehicles over the speed limit declined 10 percent in San Bernardino. When the data are combined, the two experimental communities are found to decline by 14 percent, compared to a three percent decline in Salinas, the comparison site. Although the incidence of speeding declined slightly in Salinas, the decline in the experimental communities was nearly five times greater. A large portion of that decline is believed attributable to the special enforcement programs, despite the lack of statistical significance.

The relationship between traffic enforcement effort and vehicle speeds, measured unobtrusively in the absence of officers, is illustrated in Figures 24 through 26. The figures compare the number of officer hours and citations issued per program month to the proportion of vehicles exceeding the speed limits at the three designated zones in each community. Figure 24 presents data individually for the three Modesto zones and Figure 25 presents the comparable data for San Bernardino. The figures clearly show pronounced effects of the initial enforcement activity on the proportions of vehicles exceeding the speed limits. The deterrence effects appear to have been sustained with fewer enforcement hours in some of the zones as the programs progressed (e.g., McHenry, Highland), while in other zones (e.g., La Loma, Waterman) speeding appears to have increased in response to fewer enforcement hours (and fewer citations issued) later in the programs.

Figure 26, in which data have been combined, provides the clearest illustration of the relationship between the special enforcement programs and the proportions of vehicles exceeding the speed limits in the zones for which speed samples were obtained in the experimental communities. The figure shows a linear decline in the proportion of vehicles exceeding the speed limits in San Bernardino's special enforcement zones. The decline in San Bernardino begins with program implementation and continues for the six-month duration of the special enforcement effort. In contrast, the proportion of vehicles exceeding the speed limits in Modesto's zones declined for the first four months of the program, then increased during the final two-month period. Overall, the implications of these results are unequivocal: Speed enforcement reduces the number of speeding vehicles, a key objective measure of traffic safety.

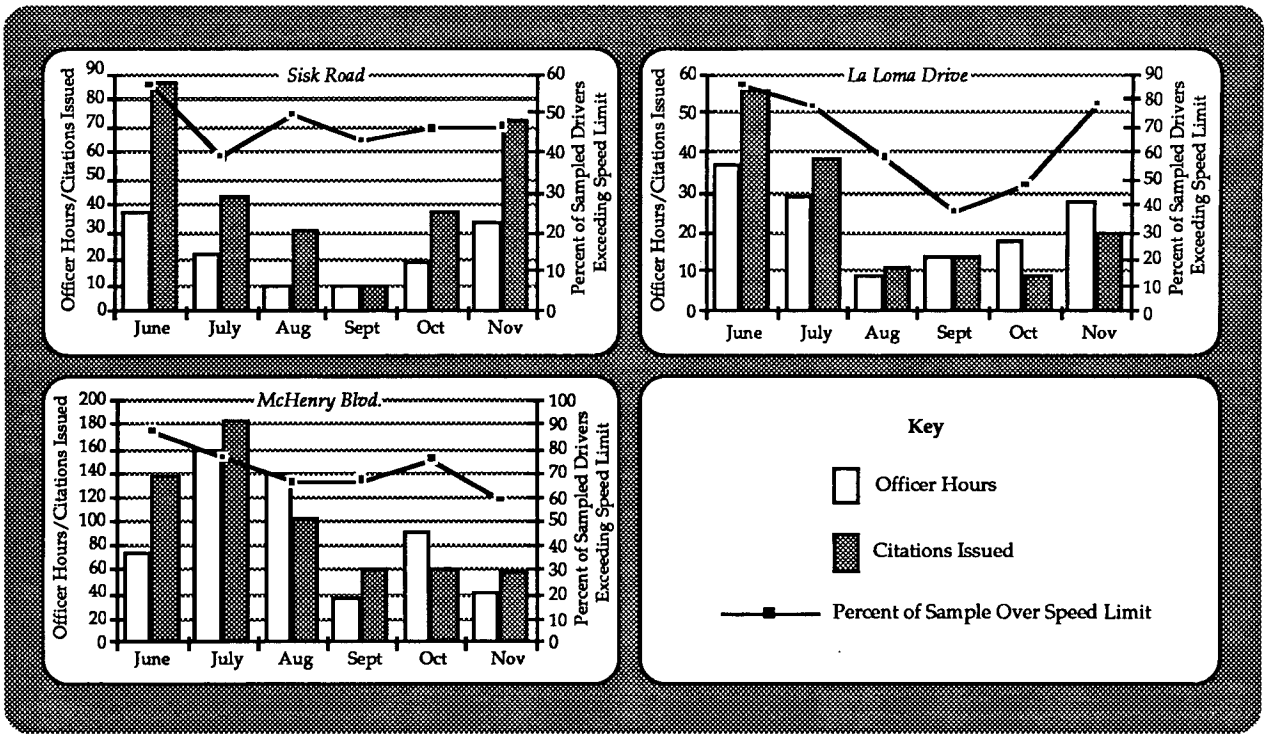


Figure 24. Officer hours, citations issued, and drivers over the speed limit in Modesto zones.

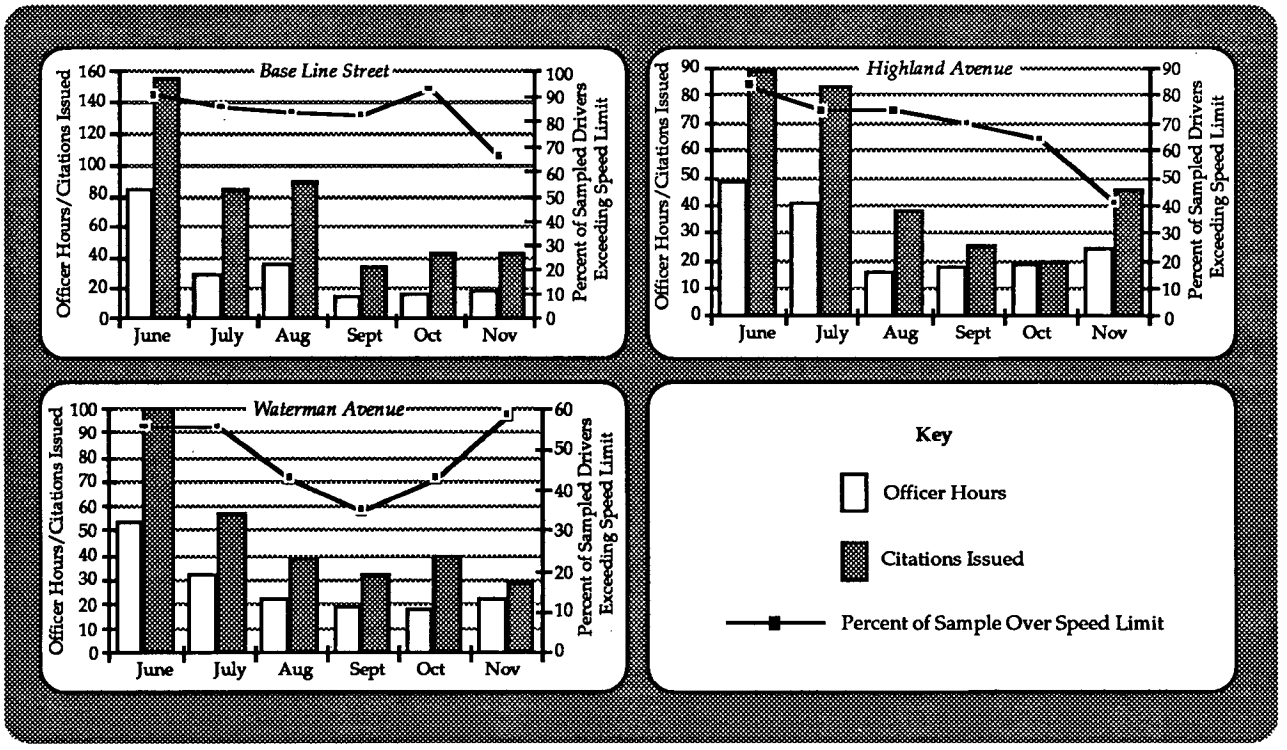


Figure 25. Officer hours, citations issued, and drivers over the speed limit in San Bernardino zones.

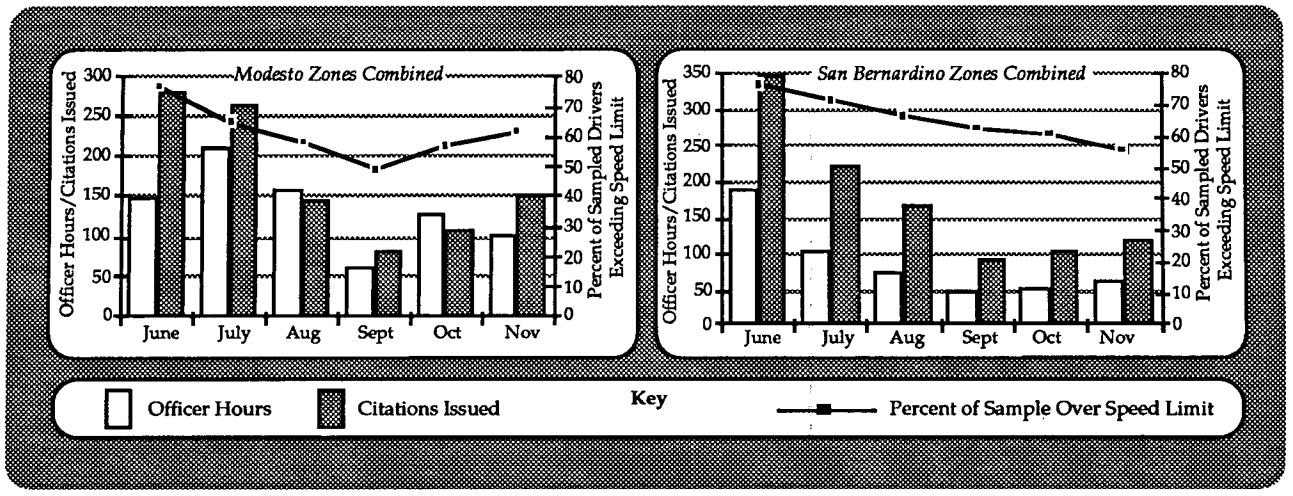


Figure 26. Officer hours, citations issued, and drivers over the speed limit in the Modesto and San Bernardino zones.

IMPLICATIONS OF THE MEASURES OF CRIME

It is unrealistic to expect daytime traffic enforcement to have a measurable deterrence effect on the types of crimes that are usually committed at night. However, the statistically significant declines in larceny measured in both experimental communities supports the anecdotal accounts and opinions of many officers that traffic enforcement reduces the number of calls for patrol response in an area. Larceny (theft) is the only category of Part I crimes that is equally likely to be committed during the day, when traffic enforcement is conducted, as at night. Larceny declined by 11 percent in Modesto's special enforcement zones and by 12 percent in San Bernardino's zones, compared to the same six month period one year earlier. In contrast, the incidence of larceny declined by only 1.7 percent statewide from 1993 to 1994, and *increased* by four percent in Salinas's control zones, where no special traffic enforcement was conducted.

Modesto's statistically significant nine percent decline in the less serious Part II crimes, compared to an increase of eight percent in Salinas, also supports the hypothesis that traffic enforcement deters criminal activity in the vicinity of the enforcement. Part II crimes include several offenses that occur during daylight hours, such as public intoxication, gambling, and prostitution. Unlike the more serious Part I crimes, many Part II crimes are recorded in response to citizen complaints. Thus, a significant decline in Part II crimes, as was measured in Modesto, might reflect both a decrease in criminal activity and an increase in public perceptions of personal safety. This implication of study results provides clear guidance to law enforcement managers who are searching for means to respond to both real and perceived citizen concerns about crime in their communities.

Table 28 summarizes the results of the measures of crime. The table shows that Modesto's special enforcement zones declined in Part I crimes and declined significantly in Part II crimes, while both categories increased in the control zones of the

comparison community. (There was no change in the incidence of Part I crimes in San Bernardino and Part II data were not available for analysis.) Most important, the table further shows that the incidence of larceny declined consistently and significantly in both of the experimental communities, while larceny actually increased in the control zones of the comparison community (larceny remained essentially unchanged statewide). To these results of the effects of traffic enforcement on crime must be added the 1,112 arrests that were made by Modesto traffic officers, many for serious crimes and outstanding warrants, and a similar number of unrecorded arrests that were made by San Bernardino officers during their six month special enforcement program.

TABLE 28
SUMMARY OF THE MEASURES OF CRIME

Program/ Site No.	City	Part I Crimes	Part II Crimes	Assault	Robbery	M/V Theft	Larceny/ Theft
1	Modesto	Declined	***Declined Significantly***	Declined	Increased	Declined	***Declined Significantly***
2	San Bernardino	No Change	No Data	Increased	Declined	No Change	***Declined Significantly***
3	Salinas (control)	Increased	Increased	Increased	Declined	Increased	Increased

Together, the data clearly show that the traffic enforcement efforts of the Modesto and San Bernardino police departments deterred criminal activity and contributed substantially to the apprehension of criminals in those communities. These study results strongly suggest that traffic enforcement can play an important role in support of a police department's overall mission by identifying and apprehending criminals as a consequence of routine traffic stops, and by deterring certain types of crimes in the vicinity of the enforcement effort.

IMPLICATIONS OF THE ADMINISTRATIVE ISSUES

There were a total of 112 fewer crashes (with PCFs of speed, FTC, or ROW violation) in the experimental communities during the special enforcement period, compared to the same months one year earlier. At the same time, the comparison community experienced an increase of 15 crashes of the same types in the control zones. Statewide statistics were used to calculate the proportions of all crashes within each of the severity categories. For example, it was found that .007 of all crashes in the state (in 1993) involved fatalities, .023 resulted in severe injuries, .163 resulted in less serious but visible injuries, and .348 of crashes result in complaints of pain; .459 of all crashes are limited to property damage only. It was also calculated that each injury or fatal crash involves an average of 1.6 persons. These values were used to estimate the savings to society from the 112 speed-related crashes that did not occur in the special enforcement zones. The costs per person for the five crash severity categories for 1994 were calculated based on estimates developed by Miller (1993) for the Urban Institute and NHTSA. Table 29 summarizes the calculations.

TABLE 29
SUMMARY OF SAVINGS TO SOCIETY FROM PREVENTED CRASHES
(ALL ESTIMATES ARE ADJUSTED FOR CALIFORNIA AND EXPRESSED IN 1994 DOLLARS)

Crash Category	Proportion of All Crashes	Number Fewer	Number Prevented	Per Person Economic Costs	Per Person Comprehensive Costs	Savings to Society
Fatalities	.007	179*	1.25	$874,031	$2,964,987	$3,706,234
Severe Injuries	.023	179	4.12	55,434	216,010	889,961
Other Visible Injury	.163	179	29.18	15,914	43,321	1,264,107
Complaint of Pain	.348	179	62.29	10,926	22,829	1,422,018
Property Damage Only	.459	112**	89.45	3,475***	3,917	350,376
				Total Savings to Society		**$7,632,696**

*112 fewer crashes x 1.6 people per crash . ***Includes PDO and reported PDO in which injuries later developed.
**PDO costs are per vehicle x 1.74 vehicles per crash. Discount rate = 4%

Economic costs, also called human capital costs, include the costs for hospital and medical treatment, emergency services, and other actual expenses; economic costs also include estimates of a crash victim's lost productivity and wages. Comprehensive costs combine the economic costs with estimates of the dollar value of the quality of life factors associated with the crash severity categories. Total economic costs saved by the 112 fewer speed-related crashes amount to $2,776,718; the total savings to society based on comprehensive costs are nearly three times the economic savings. All of the estimates presented in Table 29 are believed to be conservative.

Miller (1993) has also calculated the average number of years of life and functioning that are lost with each category of crash, ranging from a high of 19.39 years for a fatality to a low of .005 years, or 1.8 days, for a PDO crash. (Note the PDO category includes actual property damage only crashes as well as a small portion of crashes in which injuries were not apparent to the reporting officer but emerged later.) The estimates of years lost for each category of crash were multiplied by the projected number of persons who would have been involved in the prevented crashes. The results of these calculations indicate that more than 44 years of human life and functioning were saved as a consequence of the 112 fewer speed-related crashes that were experienced in the special enforcement zones of the two experimental communities.

The problem with prevented crashes is that one can never be certain that the crashes did not occur due to the experimental conditions. For example, we cannot be certain what proportion of the 112 fewer crashes in the special enforcement zones was prevented by the programs *because the crashes never occurred*. The uncertainty remains even though the same categories of crashes increased in the control zones. But the overwhelming benefit of the special enforcement programs is demonstrated if only 75 percent, 50 percent, or even 25 percent of the reduction in crashes were to be attributed to the deterrence effects of the special enforcement programs. That is, the savings to

society would still be nearly two million dollars even if only 25 percent of the reduction in crashes was caused the programs.

The substantial economic and intangible benefits of the special enforcement programs were obtained for a cost of about $38,500 in police labor and speed enforcement equipment per community. This "investment" of resources is believed to be within the range of possibility for most municipal police departments, and could be accomplished without *additional* expenditures by systematically redirecting existing or planned police effort. In fact, "investment" is a misleading term in this context because no risk is involved. The economic and intangible benefits described above *will* accrue in response to properly implemented traffic enforcement programs. But even if the benefits fail to materialize, a community would at least receive the fines collected for the traffic citations that were issued. The dollar values of the fines collected by Modesto and San Bernardino were five times greater than the expenditure in labor and equipment; that is, the programs paid for themselves five times over *just in fines.*

CONCLUSIONS

The results of the research reported in this document show that municipal traffic enforcement programs can have significant, positive effects on measures of public opinion, traffic safety, and crime. The specific benefits of special traffic enforcement obtained during the current study include,

1) Increased public awareness of law enforcement activity and public support for the special enforcement programs;

2) Reduced incidence of speeding and speed-related crashes, resulting in millions of dollars in savings to society, as many as 44.3 years of human life and functioning saved, and the intangible benefits of less pain and suffering than would otherwise have been experienced;

3) The economic and law enforcement advantages of apprehending individuals who were wanted for outstanding warrants, or were observed in the conduct of illegal activity, as a consequence of routine traffic enforcement stops; and,

4) The similar economic and law enforcement advantages derived from deterring individuals from committing crimes in the vicinity of the enforcement effort.

All of these important benefits were obtained *in addition* to receiving a five-hundred percent return in the form of municipal revenue for the cost of equipment and officer time. In short, the results of this study suggest that traffic enforcement is not really an investment, in the typical use of the term. Rather, traffic enforcement should be considered by police managers as a certain, important, and self-sustaining component of an overall municipal law enforcement strategy.

Appendix I presents guidelines and suggestions that can be used by police managers, and others with public policy responsibilities, to develop special traffic enforcement programs similar to the programs described in this report.

REFERENCES

California Department of Justice. *California and FBI Crime Index Offense Reports for 1993 and 1994.* Law Enforcement Information Center, Sacramento, CA, 1995.

Kanji, G.K. *100 Statistical Tests.* Sage Publications, Newbury Park, CA, 1993.

Miller, T.R. Costs and functional consequences of US roadway crashes. *Accident Analysis and Prevention, 25,* 5, pp. 593-607, 1993.

Stuster, J. and Blowers, P. *Experimental Evaluation of Sobriety Checkpoint Programs.* National Highway Traffic Safety Administration Report HS 808 287, Washington, DC, 1995.

APPENDIX A

SPEED ENFORCEMENT METHODS AND IMPACT INFORMATION REVIEW

SPEED ENFORCEMENT METHODS AND IMPACT
INFORMATION REVIEW

INTRODUCTION

This information review has been prepared to support three major research objectives:

- Design two innovative speed enforcement programs,
- Implement the programs in the experimental communities; and,
- Evaluate the deterrent effects of traffic enforcement on the incidence of speed-related crashes in the community, and on crime in the vicinity of the special enforcement activity.

A computerized literature search of the National Technical Information Services (NTIS) database, plus other law enforcement and periodical databases, was performed to ensure a complete investigation of pertinent speed enforcement topics for this review. Special inquiries regarding the speed enforcement efforts of member agencies were made by the Police Executive Research Forum (PERF) to establish the most current speed enforcement practices in the United States. The Anacapa research team also conducted in-depth interviews with personnel from more than twenty U.S. municipal law enforcement agencies, that were identified as conducting innovative speed enforcement programs, to supplement the literature search and PERF inquiries. The review begins with a general description of public attitudes toward speed enforcement and their potential impact on the success of a deterrence program. Next is presented a comprehensive survey of speed enforcement methods and evaluations of their effectiveness. The methods described in this section include the following enforcement strategies.

- Aerial enforcement
- Photo-radar
- Drone radar
- Mobile patrol vehicles
- Stationary patrol vehicles
- Speed indicators
- Speed bumps and rumble strips
- Laser speed monitoring and detection equipment
- Drone patrol vehicles and decoy patrol vehicles
- Traffic enforcement notification signs
- Following headway enforcement
- Pole wraps
- Radar speed monitoring and detection equipment

The review of speed enforcement methods is followed by a related discussion of the effectiveness of public information and education activities associated with traffic and speed enforcement programs. The third section of this review addresses the theoretical relationships between aggressive traffic enforcement and crime activity; the discussion supports the current investigation of the potential deterrent impact of speed enforcement on crime activity in the areas surrounding increased patrols. The review culminates with a description of a recommended speed enforcement program to be conducted by participating police departments based on the research results summarized in the information review.

PUBLIC SENTIMENT AND SPEED ENFORCEMENT

Speed enforcement has traditionally been unpopular among the motoring public, and often strains relationships between police departments and the communities they serve. Advocates of less constrained road speed claim that, for the most part, police speed enforcement activities are misguided attempts to increase road safety or to boost traffic citation revenues (Tomerlin & Whitledge, 1991). While they agree that some control over road speeds is necessary, particularly on busy urban streets, critics of enforcement maintain that road safety statistics do not warrant the current level of regulation of speed on America's roads. The German autobahn system is often used as an example of the poor statistical relationship between speed and road safety. Many sections of autobahn have unlimited speeds and the average speed on the system is above 80 mph. Still, the accident rate on the autobahns is less than on American interstates where a 55 or 65 mph speed limit is enforced. Only 4 percent of all German roads are autobahns, but they account for 30 percent of all German road miles traveled. Despite their disproportionate usage, only 10 percent of all German traffic deaths occur on the autobahns (Eisenstein, 1993).

Negative attitudes toward speed enforcement appear to change, however, when the motoring public makes a distinction between arbitrary or unfounded speed restrictions and speed restrictions that lead to tangible driver safety or societal benefits. For example, unrestricted speed on German autobahns is increasingly criticized because of its harmful impact on the environment. Vehicles traveling at higher speeds operate less efficiently, using more fuel and producing more air pollution. Conservation has long been the argument for the national maximum speed limit in the U.S., and in Germany the environmental effect of automobile pollution on German sources of national pride (e.g., the Black Forest) is quickly changing attitudes toward unlimited speed on the autobahns. As a result, fewer and fewer sections of the autobahn permit free speeds (Eisenstein, 1993). The American public also appears willing to tolerate speed enforcement as long as there is a demonstrable speed-related problem. For example, an opinion poll of public attitudes toward automatic speed enforcement found that motorists would tolerate this type of enforcement within school speed zones, for increased officer safety, to slow large trucks, and to decrease speeds through construction zones (Streff & Schultz, 1992). This finding is supported by traffic enforcement officials interviewed for this review. In most cases, the residents of the communities these officers protect are very appreciative of the speed enforcement activities in their neighborhoods, public districts and school zones. Opposition to speed limit enforcement is, for the most part, limited to highways. Thus, it is believed that the current study's focus on municipal speed enforcement will avoid negative public sentiment regarding speed enforcement.

SPEED ENFORCEMENT METHODS

This section describes a variety of speed enforcement methods currently employed by law enforcement agencies around the world. Methods were selected for discussion in this review because they are well-established, well-documented, or because they have the potential to offer innovative approaches to speed enforcement.

Aerial Enforcement

Aerial surveillance consists of an aircraft flying along a highway while an on-board observer times a vehicle between two ground reference points. The observer then radios vehicle description and speed information to a ground patrol vehicle. The advantages of aerial enforcement include difficulty of visual or electronic detection and its ability to detect a great number of speed violators in a short period of time. On the other hand, the technique is relatively expensive and can only be implemented in reasonably good weather.

Research has demonstrated that aerial speed enforcement programs have a generally positive effect in reducing highway speeds. Three evaluation studies were identified that concern aerial enforcement, two from Australia and one from the United States. In Western Australia, researchers compared the impact of changing the levels of aerial enforcement on several roadway sites maintaining aerial programs (Saunders, 1979). The removal of aerial enforcement in one site increased the percentage of cars violating the posted speed limit by 6.1 percent, and the number of trucks by 6.2 percent. An increase in aerial enforcement at another site reduced the percentage of trucks violating the speed limit, but had no impact on the percentage of cars traveling above the limit. In a later Australian study, eleven months of aerial speed enforcement in New South Wales was investigated (Kearns & Webster, 1988). The aerial program resulted in a vehicle crash reduction of 22 percent. Researchers calculated a program crash prevention benefit to program cost ratio of 12:1, to emphasize the effectiveness of the program. Blackburn, Moran & Glauz (1989) evaluated alternative methods of enforcing New York State's 55 mile per hour speed limit, specifically targeting *professional speeders* (i.e., those drivers using radar detectors and CB radios in order to exceed the speed limit). Aerial enforcement was significantly more effective than radar in detecting and apprehending the category of drivers labeled professional speeders. As in Australia, a cost-benefit analysis determined that the extra cost of the aerial enforcement was outweighed by increased income from fines and improved general deterrence.

Aerial enforcement has been conducted in Cincinnati, Ohio, for the past three years to enforce expressway speed limits according to Sergeant Steven Eggers of the Cincinnati Police Department. The Cincinnati P.D. uses the services of an Ohio State Patrol aircraft and pilot to monitor vehicle speeds on local expressways. The pilot radios the speed and description of speeding vehicles to ground patrols who then locate and cite the speeders. The police department was granted funds to operate the aerial program when the state of Ohio offered to pay for an innovative speed enforcement effort in Cincinnati. To date, the program has received favorable media coverage on local television, and public response has been positive. Sergeant Eggers notes, however, that the program is more expensive to operate than traditional radar or laser enforcement.

Photo-Radar

A photo-radar system combines radar technology and photographic identification to automatically detect and record speed limit violations. Radar detects a speeding vehicle and triggers a pre-positioned camera to photograph the vehicle's

license plate and the driver. The time of the violation and recorded speed of the vehicle are superimposed on the photograph. If the license plate number and driver can be clearly identified in the photograph, a citation is issued and mailed to the registered owner. The main advantage of photo-radar (when operated in an unsupervised manner) is its ability to free police personnel for assignment to other law enforcement activities. On the other hand, photo-radar is not able to detect every speeder that passes by the system. Only a small percentage of all speed violations detected and photographed by photo-radar are clear enough to permit issuance of a citation.

A large-scale evaluation program to determine the feasibility of photo-radar implementation along the Capital Beltway addressed operational, legal and societal acceptance issues associated with the technology (Lynn, et al., 1992). Researchers found that current applications of photo-radar in rural and suburban American communities have been successful in deterring speed and freeing officer time. Field evaluations of photo-radar equipment identified which units most reliably detect speed violations and meet the operational requirements needed for implementation. It is interesting to note that a survey of Maryland, Virginia, and District of Columbia residents revealed 60 percent approval of photo-radar use along the Beltway.

Drone Radar

The drone radar method uses the prevalence of radar detecting evasion devices to its advantage in enforcing speed limits. Unattended radar units are set up along roadways and automatically send speed radar signals that are detected by motorist's radar detectors. Motorists are alerted to the drone radar signal by their detectors and, led to believe that speed radar enforcement is ahead, slow down. Surrounding traffic also slows down as the drivers with detectors reduce their speeds. Federal Communications Commission (FCC) regulations currently require that unattended radar be capable of sending a signal and receiving its reflection. In addition, the reflected signal must be used for some purpose according to the FCC. Because unattended radar is not designed to receive a usable reflected signal, it is not permissible in the United Stated and has only been demonstrated in this country for experimental purposes.

Freedman, Teed and Migletz (1993) evaluated the impact of drone radar on average travel speeds and on the proportion of drivers exceeding the posted speed limit by ten miles per hour through highway construction zones. Drone radar was associated with a slight reduction in average vehicle speed--an average reduction of one mile per hour or less. However, the proportion of vehicles exceeding the speed limit by more than ten miles per hour through the zones was reduced by 30 to 50 percent during active drone radar enforcement.

Mobile Patrol Vehicles

The mobile patrol vehicle method involves a police patrol car or motorcycle circulating through traffic and citing speeding drivers. Speed measurement is usually performed using moving radar detection or pacing. A characteristic effect of the mobile patrol vehicle is the development of a speed halo in which cars near the cruising patrol travel at or under the patrol vehicle's speed. Cars approaching the vehicle slow down

as they approach to avoid overtaking the patrol. Mobile patrol vehicles have a greater impact on slowing traffic than the more covert stationary speed enforcement techniques. However, the slowing of traffic is isolated to the location of the patrol vehicle.

Benekohal, et al. (1992) evaluated the impact of mobile patrol vehicle speed enforcement on car and truck speeds through a highway construction zone. They found that the presence of a marked patrol car reduced average car and truck speeds while no such reduction occurred in an unpatrolled control condition. Additionally, the proportion of cars traveling faster than conditions permitted in the work zone was reduced by 14 percent, and trucks traveling faster by 32 percent, when the patrol car was present. A time halo effect on average truck speeds lasted for about one hour after patrols ended. Average car speeds increased immediately after patrols ended.

Mobile patrol vehicle speed enforcement (usually in conjunction with stationary patrol enforcement) is one of the most popular means of conducting speed enforcement in the United States. The PERF survey of municipal speed enforcement programs revealed that nearly all of the responding police departments use some form of mobile patrol vehicle enforcement to regulate road speeds. The prevalence of mobile enforcement is not surprising considering the convenience of speed monitoring from within a patrol vehicle, the ability of an officer to perform speed enforcement while performing other police duties, and the simplicity of mobile patrol methods relative to dedicated speed enforcement programs.

Stationary Patrol Vehicles

The stationary patrol vehicle method also uses a patrol vehicle to increase the visibility of speed enforcement, but the vehicle remains parked along the side of a roadway instead of circulating in traffic; marked and unmarked police cars, pickup trucks, and motorcycles may be used in this method. A patrol officer takes speed measurements either from within or while standing next to the vehicle using radar detection or laser detection methods (discussed later in this review). A speed halo effect is produced by the technique in which average traffic speed immediately before, at, and after the site of the vehicle hovers at or below the posted speed limit. The deterrence effect decays "downstream" of the patrol vehicle location as average speed slowly increases to previous levels. Like the mobile patrol technique, the greater visibility of the stationary patrol vehicle is effective in actually reducing traffic speeds during enforcement, and in reducing traffic speeds to acceptable levels in localized areas (e.g., school zones, pedestrian crossings). The technique is less effective in producing a large number of citations or reducing speeds over long distances than are aerial or mobile patrol vehicle enforcement methods.

Hauer and Ahlin (1982) conducted several experiments to measure the impact of stationary patrol vehicle enforcement on traffic speeds before, at, and after the site of enforcement, and during and after the enforcement period (the time halo). The researchers detected a pronounced decrease in average traffic speed to the posted speed limit at the location of the parked vehicle. By identifying vehicles passing through the enforcement area, the researchers were also able to determine that repeated exposure of

the enforcement to drivers had no significant effect in increasing speed reduction after the first encounter with the stationary patrol vehicle. Long term stationary patrol vehicle enforcement (over a five day period) had the greatest effect in prolonging the decay in reduced speeds after enforcement ended.

Armour (1986) examined the impact of parking a marked patrol car along an urban street on traffic speeds. The presence of the patrol car was associated with (1) a 2/3 drop in the number of vehicles violating the speed limit, (2) an increase in community awareness of police enforcement in the surrounding area, and (3) a measurable decrease in speed at the site of enforcement. Based on these findings, Armour recommends the use of the stationary patrol car enforcement technique for localized speed problems.

The use of stationary patrol vehicles to enforce speed limits appears to be just as prevalent as mobile patrol efforts among American municipal law enforcement agencies according to the PERF survey and traffic officer interviews. Police departments representing an array of city population sizes, demographic characteristics, and economic conditions reported using this method because of its convenience and wide acceptance as a speed enforcement technique.

Speed Indicators

A speed indicator, also known as a radar display device, is a large sign set up along a road that displays the speeds of passing cars to their drivers. A speed measurement device determines a car's speed as it approaches the indicator; the speed is then displayed to the driver. Speed indicators are designed to increase awareness of excessive speeds and to encourage drivers to slow down. The devices require little supervision, police involvement, attention, etc., and are easy to transport and deploy. According to research, however, it appears that speed indicators must be combined with more expensive and labor intensive enforcement methods (e.g., a highly visible patrol vehicle) to be most effective in reducing speed.

For example, in research performed by Casey & Lund (1990), a mobile speed indicator was set up along a roadside and the speed of passing cars was measured immediately after cars passed the indicator. In general, the presence of the indicator decreased speeds at the placement site and for a short distance past the site. No speed reduction was noted after the indicator was removed. Speed reduction decay rates downstream from the location of the indicator were significantly prolonged when minimal traffic enforcement activities were conducted in the area immediately surrounding the location of the indicator. Similarly, Dart and Hunter (1976) included a speed indicator as a condition in comparing the effects of four speed enforcement techniques (the speed indicator was not combined with any other authoritative enforcement technique). The other techniques included a speed check zone, a stationary patrol car, and a simulated pull-over. While all of the other techniques had a significant impact on reducing speeds at enforcement sites, the speed indicator had no significant effect on traffic speeds. In another study, a well-publicized speed indicator program was set up and evaluated under the direction of Finnish provincial police departments (Hamalainen & Hassel, 1990). Speed and overtaking incidence was measured along

roadway sites employing a speed indicator. Reduced speeds were noted while the indicator was present and the speed halo effect lasted up to 10 kilometers after the location of the display. The incidence of overtaking was also reduced. This reduction in passing behavior exhibited a time halo effect, continuing for a short period after the end of the experiment. It is not clear from the report whether the speed indicator was combined with other speed enforcement techniques.

The PERF survey of municipal speed enforcement methods revealed that speed indicators are frequently used to support traffic enforcement. Anacapa interviewed five traffic safety officers responding to the PERF survey to learn more about the use of speed indicators by their particular departments. The contacted officers represent the Fremont and Huntington Beach Police Departments in California, the Bellingham Police Department in Washington, the Leawood Police Department in Kansas, and the Clearwater Police Department in Florida. All of the officers agreed that speed indicators are most effective in low volume traffic locations where each passing driver can be made aware of his or her speed while moving through the enforcement area. They are much less effective when used on high volume or multi-lane routes where it is difficult to establish which passing car resulted in the displayed speed. Due to the limitations, these departments use speed indicators exclusively to respond to complaints of speeding in residential neighborhoods or city streets with minimal traffic flow. In addition to the operational advantages of deploying speed indicators in these low traffic volume areas, the high visibility of the displays readily appeases the local individuals issuing the speeding complaints. On the other hand, all of the officers complained that deploying, monitoring, and then retrieving the speed indicator equipment is time consuming and a waste of manpower. Also, many of the speeding complaints they receive are exaggerated or unfounded, and result in unproductive deployment of the speed indicator equipment and enforcement personnel.

A few of the departments interviewed have implemented innovative programs and methods to overcome the problems associated with speed indicator operation. The Bellingham Police Department, for example, uses the services of senior citizen volunteers to transport the speed indicator equipment to an enforcement site, set up the equipment, monitor it during the enforcement period, and then dismantle and return the equipment to the department. Traffic officers arrive at the site at the beginning of the enforcement period and devote their time exclusively to citing speed limit violators. According to Traffic Sergeant Steven Felmley, this program satisfies a dual need: the seniors want to be actively involved in their community, and the police department needs to minimize the manpower requirements of speed indicator operation. The program also fosters communication and cooperation between the police department and the citizens of Bellingham. The Clearwater Police Department avoids wasting speed enforcement resources on unfounded community speed complaints by verifying the existence of a speed problem with a speed survey. The department's speed indicator equipment is designed to automatically record speed data during deployment and compute speed statistics. Once a complaint is issued, the department deploys the speed indicator equipment unsupervised at the problem location for a period of several hours to collect speed data. Afterward, the survey data is reviewed and if a speed

problem is verified the department schedules actual enforcement to accompany speed indicator deployment at the location. Traffic Sergeant Steven Burch explains that the approach maximizes the utility of the speed indicator equipment by (1) immediately appeasing the complaining parties who see the indicators during the speed survey period, (2) permitting automatic verification of a speed problem before committing manpower resources, and (3) making passing motorists more aware of traffic safety in their community. In San Diego, CA, the city's traffic engineering department, rather than the police department, deploys several speed indicators around the community in response to speeding complaints. Once deployed, they allow the local citizens to monitor the speeds registered by the equipment and take license plate numbers of speeding motorists. The engineering department then sends letters to the registered owners of these vehicles requesting their assistance in reducing speed in their neighborhoods. The program has been widely accepted and the waiting list for speed indicator deployment by citizen's groups is reported to be approximately six months.

Speed Bumps and Rumble Strips

Speed bumps and rumble strips are raised mounds or bumps in the roadway that alert drivers to reduced speed zones. In the United States, speed bumps are commonly used in parking lots and along private roadways to slow vehicles. Rumble strips are also frequently used to slow down vehicles prior to inspection or toll stations along major highways. Speed bumps and rumble strips are practical methods for very slow driving requirements, or to alert drivers to rapidly changing speed requirements. They are, however, expensive to install and maintain. In addition, installation of speed bumps on moderate to high speed roads is impractical and dangerous.

Available research is limited to a study of rumble strip speed deterrence in Amsterdam (Rooijers, 1991). Three types of speed reduction methods were evaluated along several types of urban roadways with different speed limits. Speed reduction methods included the use of a speed indicator sign to advise motorists of their speed, the combination of the speed indicator with rumble strips, and a combination of speed indicator, rumble strips and radar enforcement. Results indicated that the speed indicator combined with rumble strips had the greatest effect in reducing speeds.

Radar Speed Monitoring and Detection Equipment

Radar speed detecting equipment has been used by municipal police departments since the 1960s. The original radar units operated on the X-band range of the electromagnetic spectrum, from 10.500 to 10.550 gigahertz (GHz); the X-band range is crowded with other applications, for example the motion detectors that automatically open most supermarket doors use the X-band. More than 100,000 X-band radar devices have been sold to law enforcement agencies. K-band radars appeared in the 1970s; the K-band radars use a narrower and higher frequency channel (24.050 to 24.250 GHz) that permits an officer to better target a specific vehicle than possible with X-band units. The Federal Communications Commission (FCC) permits the use of K-band motion detectors, but there are far fewer of them because they are more expensive than X-band motion detectors. It is estimated that there are tens of thousands of K-band radars in use by law enforcement agencies, both hand-held and mounted on patrol vehicles. The

latest development in radar speed detection is the Stalker system, which operates between 34.200 and 35.200 GHz of the K-band. The Stalkers currently in use were produced to operate between 34.700 and 34.900 GHz, but the wide bandwidth allocated to Stalkers will permit the hand-held Stalker units to be modified to use other channels within the band. The future of Stalker is unclear; it is twice as expensive as other hand-held radar units, and only a few hundred have been sold so far.

Radar speed-measuring technology has evolved considerably during the past three decades, but each development has been quickly countered by the manufacturers of radar detectors. A variety of radar-detecting devices is available; for about $100, a motorist can purchase a small instrument that will detect emissions on all three of the radar bands used by law enforcement to measure vehicle speed. *Car and Driver* magazine recently published a review of radar detector performance (Csere, 1992). A field study was conducted that found commercially available radar detectors capable of detecting X-band radars at a distance of about 1.3 miles; K-band radars at about one mile; and, Stalker guns at just under a half-mile. Photo-radars, discussed earlier in this review, were detected at just under a quarter mile distance by only the best quality devices; it is estimated that the less capable detectors did not produce a warning until about the time that the photograph was taken.

The channel used by Stalker radars is 20 times wider than the X-band; this will permit considerable capacity for changing frequencies to deny K-band detectors tuned to 34.700 to 34.900 the ability to detect modified Stalker's emissions. The Stalker units in use will need to be retrofitted to change the frequency. Applied Concepts Marketing, the maker of the Stalker gun, even has plans for a military-style frequency-hopping approach to further avoid detection, but that will still not make Stalker invisible to motorists. The reason is economics: Law enforcement agencies purchase between 10,000 and 15,000 speed monitoring devices each year, but nearly two million radar detectors are sold during the same period (a $30 million industry vs. a $300 million counter-industry). In the words of one analyst, "There is simply more profit potential in detectors than there is in radars and therefore more incentive to win" (Bedard, 1992). "Win" is an appropriate metaphor because the manufacturers of radar guns and the designers of radar detectors are indeed locked in competition. But the economics involved make it extremely likely that every innovation in radar speed monitoring will quickly be countered by a commercially-available and affordable detector.

Radar monitoring and detection are the most prevalent means of speed determination according to the PERF survey of municipal speed enforcement. Nearly 90 percent of the 52 municipal police departments responding to the PERF survey reported using some form of radar detection in their speed enforcement efforts. All of the traffic officers contacted during follow-up interviews were highly satisfied with the performance of their radar equipment. A few officers commented that their department had plans to introduce new detection technologies to supplement radar, but none of the contacted departments intends to replace radar with the new technologies.

Laser Speed Monitoring and Detection Equipment

What are popularly called laser speed guns use lidar technology. Lidar stands for LIght Detection And Ranging, as radar is derived from RAdio Detection And Ranging. The two technologies use a similar concept, but rather than the microwave beam used by radars, lidars emit pulses of relatively coherent infrared light; the light pulses that are reflected back and received by the lidar device are used to measure the distance to an object. If the object is moving (i.e., a vehicle), the device will measure the change in distance over time, and from that change calculate the vehicle's velocity.

Teed and Lund (1991) studied the relative effectiveness of police radar and laser speed monitoring equipment in a brief field trial; the researchers used the same four locations, alternating use of radar and laser speed guns over a two week study period. They found that laser guns were significantly more effective in identifying speeding motorists (41 citations per 1,000 vehicles, compared to 33 per 1,000 for radar). Perhaps more important, it was found that speeders identified under the laser enforcement condition were four times more likely to have a radar detector in their vehicles than those ticketed under the radar condition -- in fact, most of the "additional" speeders caught by the laser guns were using radar detectors, and those vehicles tended to be traveling at the most extreme speeds. The implications are clear: Some speeders use radar detectors to avoid speeding citations, and radar detectors do not alert drivers to laser speed enforcement. But there have been many important developments since the Insurance Institute for Highway Safety conducted its evaluation. Most notable among the developments has been the proliferation of inexpensive laser detectors.

Schroeder (1992) conducted an evaluation of laser speed gun detectors for *Car and Driver* magazine. Under simulated highway conditions, it was found that all three of the detectors tested alerted drivers to the presence of the infrared beam at more than two miles at night, and between one and two miles during the day. The evaluation found, however, that it can be difficult to reduce speed in response to an alert quickly enough to avoid a lock-on and confirmed speed by the laser gun (when driving a highly reflective vehicle). It is important to note that the *Car and Driver* field trial was conducted at highway speeds; manufacturers acknowledge that lock-on is significantly slower for laser guns when vehicles are traveling at the slower speeds typically enforced by municipal police departments.

Laser speed monitoring and detection equipment are used by only seven of the 52 police departments that responded to the PERF nationwide survey of municipal speed enforcement. Anacapa contacted three of the seven departments (the Chula Vista Police Department in California, the Annapolis Police Department in Maryland, and the Racine Police Department in Wisconsin) and interviewed their traffic enforcement directors about their experiences with the laser equipment. All three were highly enthusiastic about the capability of laser equipment to discriminate and lock onto a moving vehicle from a distance. As Traffic Investigator Waangard of the Racine Police Department describes it, "There is no guessing involved when using laser" to detect a speeding vehicle in heavy traffic from distances greater than 150 yards. Investigator Waangard is also impressed by the laser's ability to escape detection by laser detectors.

The three departments are currently using laser detection on a limited basis to demonstrate its capabilities to the community and test its acceptance in the local courts. Both Chula Vista and Racine conducted demonstrations of the laser technology for local judicial officials. The officials were highly impressed by the level of confidence laser technology provides in acquiring and confirming a speeding vehicle. On the other hand, judicial officials in Annapolis refused to attend laser demonstrations because they view the technology as a glorified version of radar, and because they felt it would jeopardize their objectivity.

Drone Patrol Vehicles and Decoy Patrol Vehicles

An innovative (but rarely employed) approach to speed deterrence is the deployment of an unmanned (drone) police patrol alongside roadways. As motorists approach the vehicle from behind, it appears to be a stationary patrol car positioned for speed detection. Theoretically, motorists slow down when they see the vehicle and a speed halo (similar to the one created by a stationary patrol vehicle) develops around the unmanned vehicle. Drone vehicles have the ability to free up police manpower while having a potentially significant effect on localized speed problems. The method is, however, rarely employed because patrol cars are usually unavailable for deployment. To overcome this problem, inexpensive "decoy" patrol cars made out of durable plastic materials supported by internal aluminum structures have recently been developed for use by law enforcement agencies. The decoy is a two-dimensional representation of the back of a patrol car and is deployed on the shoulder or center median of a roadway.

Only one of the police departments that responded to the PERF survey of municipal speed enforcement methods reported using a decoy patrol vehicle to deter speeding. The Cary Police Department (serving the city of Cary in the Research Triangle area of North Carolina) recently purchased three vinyl patrol car decoys for use in enforcing speed limits in school zones, along thoroughfares and freeways, and in highway construction zones within the community. Sergeant Doug Scott, traffic safety director at the Cary Police Department, is quite pleased with the quality of the decoys and the response they have received from the local, national and international media. The department ordered custom Crown Victoria decoys that match the color scheme of its current patrol cars. According to Sergeant Scott, the decoys are easy to deploy and operate well under all sorts of weather conditions. Sergeant Scott is worried about vandalism, however, and only uses the decoys at busy road locations during daylight hours. Although there appears to be no research that evaluates the impact of drone or decoy vehicles on actual vehicle speeds and speed-related crashes, Sergeant Scott believes that the enormous publicity surrounding the implementation of the decoy program has a significant deterrent effect on motorists driving in or through Cary. The decoy enforcement program has been covered by both CNN and the London Times, and was recently featured on the syndicated television program "Inside Edition." Even more publicity was generated regarding the program when the police department in the neighboring city of Morrisville, not to be outdone by the Cary P.D., implemented a drone patrol vehicle program that features a mannequin (donated by a local department store and dressed like a police officer) sitting in the front seat of the vehicle. Whether or

not the decoys and drone vehicles actually slow traffic at the deployment locations is not as important to Sergeant Scott as the fact that motorists' awareness of speed enforcement in Cary and the surrounding area has increased. He hopes that, in the long run, this will influence drivers to slow down.

Traffic Enforcement Notification Signs

Another innovative means of speed enforcement that emphasizes increasing driver awareness of speed is the use of portable traffic enforcement warning signs. The use of the signs evolved from ideas generated by the Huntington Beach Police Department's Critical Accident Suppression and Enforcement (CASE) Team. The team's mission is to educate the community about the enforcement programs being conducted in their city. The signs are placed at each end of a targeted roadway just prior to an enforcement period. During the enforcement period, officers write citations for all traffic and vehicle violations occurring within the target area. The team believes that, by alerting drivers to active traffic enforcement with the signs, many more drivers will be made aware of their driving behavior than the few that are actually detected and cited by the enforcement. There has been a 17 percent reduction in injury crashes in Huntington Beach since the introduction of the traffic enforcement warning sign program, and fatal crashes have decreased by 100 percent.

Following Headway Enforcement

During the preparation of the proposal for this project, Anacapa interviewed traffic safety experts who indicated that statistics concerning excessive speed as a primary collision factor (PCF) might be systematically inflated. The source of the apparent over-estimation of speeding as a PCF was explained by a highly-experienced accident investigator for a municipal police department:

> When someone makes a lawful stop on the lane of traffic, for example to avoid hitting a pedestrian or another vehicle, and that person's vehicle is hit from behind by someone who might have been momentarily distracted, it is called a rear end collision. The logical PCF for most rear end crashes is **following too closely**--the vehicle that hit the stopped vehicle was following too closely to stop in time to avoid the collision. However, in most states you must prove *chronic* following too closely for it to be a PCF; that is, a history of following too closely over some period of time or distance is required--but there is rarely a witness available to say that the person had been tailgating (e.g., for the past two blocks). So unsafe speed becomes the PCF even though the driver who hit the vehicle was traveling within the posted speed limit. When a driver complains that he or she was not exceeding the speed limit, and the accident reconstruction proves it, they might be asked how fast the vehicle in front of them was traveling. When they respond that the vehicle wasn't traveling at all because it was stopped, they are then informed that this is why they were going an unsafe speed for the conditions. But had they not been following too closely they could have avoided the crash. It's really crazy.

The investigator estimated that 75 to 80 percent of all rear end collisions are assigned unsafe speed as a PCF, instead of following too closely. He further estimates that excessive speed is actually the PCF in only eight to ten percent of all crashes.

The subsequent PERF survey of municipal law enforcement agencies identified only one out of 52 respondents that planned to enforce following headway violations.

During a follow-up interview with this agency, Corporal Tom Hogard of the Leawood Police Department in Leawood, Kansas, stated that his organization recognizes that following too closely is the primary cause of speed-related collisions in the community and plans to begin an enforcement program that targets unsafe following distances. Corporal Hogard's primary difficulty in designing an effective enforcement program is demonstrating chronic following headway by the suspect. Currently, officers in the department make visual estimates of following headway over a reasonable distance or period of time before citing a motorist. Corporal Hogard is concerned that officer estimations of following headway will be less convincing in court challenges than objective proof. He has, therefore, decided to implement video surveillance as part of the enforcement program. As planned, two patrol cars will be deployed during following headway enforcement periods. One patrol car will be equipped with video camera equipment and positioned alongside a roadway to record vehicles maintaining unsafe following distances. A description of the suspect will then be radiod to the second patrol car waiting farther down the road. The second patrol car will detain and cite the offending driver.

Pole Wraps

The police department of Racine, Wisconsin, has a long tradition of establishing highly innovative traffic safety programs that emphasize community awareness and crash prevention. The police department's response to the PERF survey described one such program established in 1983 to reduce crashes at the ten most dangerous intersections in the city. The "EZ" program, as described by Traffic Investigator Van Waangard during a follow-up interview, established "enforcement zones" around each of the ten dangerous intersections. All traffic safety laws within the zones (including speed limit laws) were strictly enforced. A unique feature of the EZ program was the use of pole wraps placed on every light pole within one block of a targeted intersection. The pole wraps served as visual reminders to drivers that intensified traffic enforcement was being conducted in the area. Traffic officers issued written warnings in the form of EZ "contact cards" (instead of citations) for minor traffic violations within the zones. Each contact card listed the ten dangerous intersections and encouraged drivers to drive more safely in Racine. EZ contact cards were also issued to motorists who drove safely through the enforcement zones. These commendation contact cards were put into drawing for prizes supplied by the police department. The EZ program lasted for three years and was hugely successful. The community realized a 30 percent reduction in traffic violations over the life of the program.

COMMUNITY SUPPORT FOR ENFORCEMENT METHODS

Public acceptance and understanding of police efforts to control speed are critical to the success of a speed enforcement program. Many motorists are intolerant of what appear to be unfounded or overly-aggressive traffic control methods (Tomerlin & Whitledge, 1991), and public hostility toward traffic enforcement often takes the form of negative publicity (Billheimer, et al., 1983). Unfortunately, many speed enforcement programs are rejected or canceled by police agencies to avoid confrontation with the media, the community, or local government. Ultimately, traffic safety is sacrificed in an attempt to improve police public relations.

Negative publicity often stems from a misinterpretation by the public of what law enforcement is attempting to accomplish by enforcing speed limits. Generally, there seems to be a failure on the part of law enforcement to adequately inform and educate the community about speed enforcement and other issues of traffic safety. For example, the notorious diamond lane program begun in the mid-seventies to promote high occupancy vehicle use in Southern California was highly berated by the mass media (Billheimer, et al., 1983). Police and highway patrol were seemingly unable to handle the number of access violations to the diamond lanes, and accidents related to unfamiliarity with the system proliferated. Many blamed the failures of the diamond lane program on poor program design, and on a failure of law enforcement to adequately describe the purpose of the new program and prepare motorists for its implications.

Traffic safety programs that include highly visible public information and education (PI&E) campaigns that accompany law enforcement efforts have proven to both increase positive public impressions toward police activities and result in safer driving habits. Sali (1983) evaluated the impact of a Selective Traffic Enforcement Program (STEP) initiated in Boise, Idaho, in 1979. The program combined an aggressive traffic enforcement effort with a strong PI&E program in order to reduce injury accidents in Boise. The STEP publicity program was designed to inform the driving public of hazardous road locations, the types of driver actions that made these locations unsafe, and the traffic enforcement that would be used to alleviate the problems at these locations. It was also important for the PI&E program to portray the Boise Police Department as genuinely interested in increasing public safety, as opposed to simply citing motorists and collecting fines. STEP advisory messages were broadcast twice a day over three local radio stations. The implementation of STEP in Boise was associated with a significant 17 percent reduction in the number of injury accidents; a non-STEP control area experienced no similar change. What is more important, the change was most dramatic following the delayed implementation of the STEP PI&E campaign (publicity began one month after the start of aggressive traffic enforcement). Besides the Boise STEP efforts, successful speed enforcement programs using speed indicators and photo-radar have been attributed to well-mounted PI&E programs (Hamalainen & Hassel, 1990; Cameron, Cavallo & Gilbert, 1992).

THE IMPACT OF SPEED ENFORCEMENT ON CRIME

The deterrent effects of police practices on crime have been a topic of research and debate for several years. In 1974 a report was released describing the impact of the Kansas City Preventive Patrol Experiment (Kelling, et al., 1974); it was an early evaluation of the effect increasing or decreasing police personnel has on crime. No significant differences in the incidence of crime, citizen fear of crime, or satisfaction with police services were found between Kansas City, Missouri, neighborhoods varying in levels of enforcement. The Kansas City study was criticized for only examining variations in force size and not taking into account the type of police strategies used in combating crime.

In partial response to the Kansas City study, Wilson and Boland (1978) developed a model predicting that police techniques that maximize the level of interaction between the police and the community (termed *aggressive* policing) will result in a reduction in crime. To support their model, they examined the historical incidence of robbery in 35 large American cities and found that robbery rates were lower in cities in which more traffic citations were written (their measure of aggressive policing). Despite criticism of the measure of aggressiveness used by Wilson and Boland (Jacob & Rich, 1981), similar historical research by Sampson and Cohen (1988) supports the model developed by Wilson and Boland.

Weiss, et al. (1993) employed quasi-experimental methodology to directly manipulate the level of traffic enforcement and measure its impact on local area crime. Local crime levels in areas treated with traffic enforcement were compared to locations where no enforcement took place. No relationship was found between traffic enforcement levels and the prevalence of crime in the experimental sites. While the researchers postulate that traffic enforcement may indeed have no impact on crime, they also recognize several flaws in their research that may have made such an effect undetectable.

Aside from the few examples cited, the current review found no additional references that were directly relevant to the impact of particular police strategies on crime. Research to date is inconclusive and suffers from theoretical and methodological uncertainties. Therefore, the current study will be among the first efforts to examine the effect of innovative traffic enforcement methods on both traffic safety and crime. Measures of ancillary arrests and citations made during special speed enforcement, and measures of general indices of municipal crime will be taken to gauge the impact of the aggressive speed enforcement programs in the communities participating in this research.

RECOMMENDED EXPERIMENTAL PROGRAMS

To summarize, it is suggested that two communities be selected from within the state to participate as experimental sites; a comparable third community will be recruited to serve as a control site. One of the experimental sites will implement a program of vigorous speed-limit enforcement and the other will implement a more complex program that targets both excessive speed and unsafe following and turning headways. Both programs will involve the use of laser and radar speed monitoring, and high-visibility enforcement. Also, the programs will employ some of the innovations discovered during the Phase I information review (e.g., decoy police vehicles, traffic hot lines, special signage, traffic enforcement zones, etc.). In addition, psychological principles will be applied to enhance the effectiveness of enforcement schedules (e.g., intermittant enforcement at specific sites, linking decoys and special signage to the enforcement activities, etc.).

Perhaps most important, the two experimental enforcement programs will be supported by extensive yet comparable public information and education (PI&E) campaigns. The PI&E programs will be designed to increase motorists' perceived risk of

receiving a citation by informing the public of the crash risks associated with speeding or speeding/headway violations, but more important, that the police are focusing their enforcement effort on those unsafe driving behaviors. The PI&E programs will be designed and implemented by traffic safety program support committees that will be organized and facilitated by the Anacapa project team.

To the extent possible, the special enforcement and associated PI&E programs will be identical, except that one of the programs will focus on speed limit enforcement while the other will have an additional focus on following headway infractions (i.e., following too closely). In each of the experimental programs law enforcement personnel will,

- Select four enforcement locations within their community by examining crash records to identify road segments and intersections that have been the sites of speed-related crashes.
- Select two locations within their community that have been the sites of chronic citizen complaints about speeding.
- Deploy to the selected sites during hours of geatest crash risk, but following a weekly schedule that prevents motorists from predicting with certainty when the special enforcement will be in place.
- Use radar and laser speed monitoring equipment.
- Use decoy vehicles at the special enforcement sites and elsewhere in the communities to contribute to motorist uncertainty and public awareness, and to generate free publicity about the enforcement programs (when news reports and letters to the editor inevitably comment on this "innovation").
- Place an emphasis on speed enforcement (and improper following headway, in the second community) by routine patrols throughout the communities, in addition to increased enforcement by the dedicated traffic personnel.
- Participate in the meetings and activities of the program support committees (e.g., stopping distance demonstrations and ride-along opportunities for reporters; demonstrations of the laser equipment for reporters, DAs and judges; speakers bureau; TV and radio interviews, etc.).
- Sustain their committment to a vigorous enforcement program for a period of six months.

REFERENCES

Armour, M. (1986). *The effect of police presence on urban driving speeds* (Report No. HS-039 925). Washington, D.C.: Institute of Transportation Engineers.

Bedard, P. (1992, April). They have lasers. *Car and Driver*, pp. 87-92.

Benekohal, R.F., Resende, P.T.V., & Orloski, R.L. (1992). *The effects of police presence on speed in a highway work zone: Circulating marked police car experiment* (Report No. FHWA/IL/UI-240;UILU-ENG-92-2020). Washington, D.C.: Federal Highway Administration.

Billheimer, J.W., McNally, J., & Trexler, R. (1983). Evaluating and planning HOV lane enforcement. *Transportation Research Record, 910*, 56-68.

Blackburn, R.R., Moran, R., & Glauz, W.D. (1989). *Update of enforcement technology and speed enforcement devices* (Final Report No. DOT-HS-807 584). Washington, D.C.: national Highway Traffic Safety Administration. (NTIS No. PC A05/MF A01)

Cameron, M.H, Cavallo, A., & Gilbert, A. (1992). Crash-based evaluation of the speed-camera program in Victoria. *Report, 42*, 63 p.

Casey, S.M., & Lund, A.K. (1990). *The effects of mobile roadside speedometers on Traffic Speeds: Santa Barbara, CA, 1990.* Arlington, VA: Insurance Institute for Highway Safety.

Csere, C. (1992, October). Radar wars: Upping the ante. *Car and Driver*, pp. 152-162.

Dart, O.K., & Hunter, W.W. (1976). Evaluation of the halo effect in speed detection and enforcement. *Transportation Research Record, 609*, 31-33.

Eisenstein, P.A. (1993, October). Germany's Autobahn: Life in the fast lane. *Hemispheres*, pp. 39-42.

Freedman, M., Teed, N., & Migletz, J. (1993). *The effect of radar drone operations on speeds at high crash risk locations.* Arlington, VA; Insurance Institute for Highway Safety.

Hamalainen, V., & Hassel, S-O. (1990). *The giant speed-indicating display in police traffic control* (Report No. HS-040 655). Helsinki, Finland: Central Organization for Traffic Safety.

Hauer, E., & Ahlin, F.J. (1982). Speed enforcement and speed choice. *Accident Analysis and Prevention, 14*(4), 267-278.

Jacob, H. & Rich, M.J. (1981). The effects of police on crime: A second look. *Law and Society Review, 15*, 109-115.

Kearns, I.B., & Webster, K.A. (1988). The effect of aerial speed enforcement on traffic crashes. *Research Note, 4,* 12 p.

Kelling, G.L., Pate, T., Dickman, D., & Brown, C. (1974). *The Kansas City preventive patrol experiment: Technical report.* Washington, D.C.: Police Foundation.

Lynn, C.W., Ferguson, W.S., Garber, N.J. (1992). Feasibility of photo-radar for traffic speed enforcement in Virginia. *Transportation Research Record, 1375,* 11-16.

Rooijers, A.J. (1991). *The influence of selective traffic enforcement, rumble strips and 'feedback' signalization on the driving speed of drivers inside built-up areas of Amsterdam* (Issue No. VK 91-01). Haren, The Netherlands: Rijksuniversiteit Groningen, Verkeerskudig Studiecentrum.

Sali, G.J. (1983). Evaluation of Boise selective traffic enforcement project. *Transportation Research Record, 910,* 68-74.

Sampson, R.J., & Cohen, J. (1988). Deterrent effects of the police on crime: A replication and theoretical extension. *Law and Society Review, 22*(1), 163-189.

Saunders, S.M. (1979). *The effect the aerial patrol has on vehicle speeds* (Research Report No. 11). Perth, Western Australia: Western Australia Traffic Authority.

Schroeder, D. (1992, December). Do laser detectors work? *Car and Driver,* pp. 133-137.

Streff, F.M., & Schultz, R.H. (1992). *Field test of automated speed enforcement in Michigan: Effects on speed and public opinion* (Report No. UMTRI-92-39). Lansing, MI: Michigan Office of Highway Safety Planning.

Teed, N., & Lund, A.K. (1991). *The effect of laser speed measuring devices on speed limit law enforcement in Charleston, S.C.* Arlington, VA: Insurance Institute for Highway Safety.

Tomerlin, J., & Whitledge, D. (1991). *The safe motorist's guide to speedtraps: State by state listings to keep drivers alert* (1st ed.). Chicago: Bonus Books, Inc.

Weiss, A., Lucke, R., & Reischl, B. (1993). *Effect of traffic enforcement on crime* (Final Report, Contract No. DTNH22-90-C-05103). Washington, D.C.: National Highway Traffic Safety Administration.

Wilson, J.Q., and Boland, B. (1978). The effect of the police on crime. *Law and Society, 12,* 367-390.

APPENDIX B

SITE-SELECTION DECISION MATRIX

Decision Matrix

City	Population (1990; 1992 shaded)	1991 Crash Statistics																	1992 Crash Statistics													
		Total Crashes	Total PDO	Total Injury	Total Fatal	Total Injury/ Fatal	SI Crashes	SI PDO	SI Injury	SI Fatal	SI Injury/ Fatal	FTC Crashes	FTC PDO	FTC Injury	FTC Fatal	FTC Injury/ Fatal	Prop of Crashes SI	Prop of Crashes FTC	Total Crashes	Total PDO	Total Injury	Total Fatal	Total Injury/ Fatal	SI Crashes	SI PDO	SI Injury	SI Fatal	SI Injury/ Fatal	FTC Crashes	FTC PDO	FTC Injury	FTC Fatal	FTC Injury/ Fatal
Hayward	105,500	1,772	1,010	750	12	762	593	315	276	2	278	2	2			0	0.33	0.00	1,749	1,007	733	9	742	585	330	253	2	255	3	3			0
Irvine	102,400	1,114	667	441	6	447	316	198	118		118	4	3	1		1	0.28	0.00	1,151	658	488	5	493	306	178	127	1	128	3	3			0
Simi Valley	101,500	475	11	460	4	464	119	3	114	2	116	7	1	6		6	0.25	0.01	437	4	431	2	433	116	2	114		114	2		2		2
Sunnyvale	117,200	1,874	1,258	614	2	616	550	370	180		180	79	61	18		18	0.29	0.04	1,753	1,159	590	4	594	454	294	160		160	69	54	15		15
Chula Vista	135,200	1,766	923	835	8	843	405	171	234		234	33	15	18		18	0.23	0.02	1,688	868	813	7	820	421	173	248		248	34	15	19		19
Fontana	87,400	872	285	579	8	587	200	70	130		130	7	1	6		6	0.23	0.01	953	314	632	7	639	233	74	159		159	4	1	3		3
Torrance	133,100	2,359	1,392	961	6	967	622	370	251	1	252	120	76	44		44	0.26	0.05	2,063	1,212	840	11	851	504	301	203		203	132	84	48		48
San Bernardino	164,200	3,582	2,136	1,428	18	1,446	891	553	335	3	338	46	30	16		16	0.25	0.01	3,519	2,131	1,368	20	1,388	859	535	322	2	324	38	18	20		20
Salinas	108,800	2,192	1,768	418	6	424	485	387	98		98	146	127	19		19	0.22	0.07	1,999	1,594	399	6	405	480	402	78		78	94	79	15		15
Orange	110,700	1,920	1,225	687	8	695	452	291	161		161	11	9	2		2	0.24	0.01	1,730	1,112	612	6	618	413	261	151	1	152	4	3	1		1
Modesto	164,700	3,481	2,443	1,024	14	1,038	851	591	259	1	260	87	60	27		27	0.24	0.02	3,621	2,480	1,125	16	1,141	846	588	256	2	258	95	65	30		30
Ventura	92,300	1,475	962	508	5	513	336	223	113		113	19	16	3		3	0.23	0.01	1,396	891	498	7	505	322	201	121		121	9	6	3		3
Concord	111,300	1,122	654	463	5	468	273	143	130		130	16	6	10		10	0.24	0.01	1,067	597	461	9	470	244	127	117		117	38	12	26		26
San Mateo	85,600	1,252	797	453	2	455	255	135	119	1	120	23	12	11		11	0.20	0.02	898	460	436	2	438	204	87	117		117	12	4	8		8
Escondido	104,200	945	7	930	8	938	159	1	157	1	158	30	1	29		29	0.17	0.03	859	10	842	7	849	189	3	186		186	16		16		16
Moreno Valley	114,900	1,078	711	362	5	367	250	164	86		86	11	9	2		2	0.23	0.01	1,129	715	409	5	414	246	158	88		88	38	20	18		18
Thousand Oaks	106,400	842	415	423	4	427	191	94	96	1	97	4	3	1		1	0.23	0.00	656	209	443	4	447	141	30	111		111	1		1		1
Whittier	75,600	1,268	746	520	2	522	243	141	102		102	43	23	20		20	0.19	0.03	1,058	567	490	1	491	220	113	107		107	44	28	16		16
Oxnard	142,200	2,979	1,733	1,236	10	1,246	526	280	246		246	236	133	103		103	0.18	0.08	2,732	1,616	1,108	8	1,116	564	332	229	3	232	157	81	76		76
Rancho Cucamonga	115,000	1,394	1,049	339	6	345	308	247	60	1	61	38	36	2		2	0.22	0.03	1,311	1,033	275	3	278	261	217	44		44	78	63	15		15
Inglewood	102,600	1,838	922	901	15	916	314	158	154	2	156	73	33	39	1	40	0.17	0.04	1,290	596	690	4	694	256	118	138		138	45	18	27		27
Santa Clarita	121,200	1,413	862	550	1	551	283	179	103	1	104	110	67	43		43	0.20	0.08	1,377	798	570	9	579	270	152	117	1	118	105	69	36		36
Norwalk	91,600	1,416	1,013	397	6	403	240	187	50	3	53	135	104	31		31	0.17	0.10	1,430	1,046	378	6	384	272	214	58		58	112	86	26		26
Bakersfield	174,800	2,002	854	1,125	23	1,148	271	46	223	2	225	3	1	1	1	2	0.14	0.00	2,058	762	1,274	22	1,296	390	96	293	1	294	3	1	2		2
Vallejo	109,200	2,149	1,530	612	7	619	382	270	112		112	47	32	15		15	0.18	0.02	2,096	1,446	645	5	650	390	254	135	1	136	66	39	27		27
South Gate	79,800	625	302	316	7	323	88	46	40	2	42	12	5	7		7	0.14	0.02	753	447	300	6	306	135	76	58	1	59	18	14	4		4
Ontario	129,300	2,489	1,718	764	7	771	401	284	117		117	141	90	51		51	0.16	0.06	2,338	1,555	775	8	783	417	259	158		158	117	66	51		51
Lancaster	88,700	1,483	903	559	21	580	254	155	97	2	99	81	56	25		25	0.17	0.05	1,589	934	642	13	655	277	169	108		108	102	65	37		37
Garden Grove	111,700	2,729	1,663	1,062	4	1,066	614	319	295		295	75	47	28		28	0.22	0.03	2,575	1,441	1,123	11	1,134	441	203	238		238	143	59	84		84
Oceanside	125,800	1,151	450	692	9	701	171	58	111	2	113	74	21	53		53	0.15	0.06	1,132	338	784	10	794	192	53	138	1	139	64	13	51		51
Daly City	86,400	556	448	106	2	108	99	78	20	1	21	25	24	1		1	0.18	0.04	440	321	118	1	119	74	57	17		17	35	29	6		6
Glendale	174,800	3,338	2,469	861	8	869	573	414	159		159	62	51	11		11	0.17	0.02	3,155	2,313	835	7	842	528	382	145	1	146	54	42	12		12
Burbank	95,300	907	360	542	5	547	136	50	84	2	86	7	1	6		6	0.15	0.01	887	382	504	1	505	146	54	92		92	15	6	9		9
Carson	88,800	1,137	704	429	4	433	164	105	58	1	59	41	19	22		22	0.14	0.04	1,089	685	394	10	404	179	110	68	1	69	33	18	15		15
Alhambra	76,000	954	562	389	3	392	154	86	68		68	26	13	13		13	0.16	0.03	948	546	401	1	402	152	71	81		81	22	6	16		16
Pomona	121,600	1,919	991	908	20	928	296	137	156	3	159	124	70	54		54	0.15	0.06	1,526	517	990	19	1,009	238	78	158	2	160	96	20	76		76
Downey	87,200	425	14	404	7	411	49		49		49	11	2	9		9	0.12	0.03	359	5	351	3	354	53	1	52		52	10		10		10
Berkeley	106,300	2,131	1,124	1,004	3	1,007	344	152	192		192	76	25	51		51	0.16	0.04	1,933	1,051	877	5	882	275	119	155	1	156	75	21	54		54
Santa Monica	96,900	1,642	1,047	586	9	595	194	115	78	1	79	64	51	13		13	0.12	0.04	1,619	1,027	583	9	592	200	119	81		81	73	54	19		19
Pasadena	133,900	2,803	1,848	938	17	955	230	150	77	3	80	347	233	114		114	0.08	0.12	2,864	1,919	932	13	945	304	215	88	1	89	306	203	103		103
Fairfield	80,800	1,084	653	429	2	431	99	62	37		37	13	7	6		6	0.09	0.01	1,083	640	442	1	443	112	70	42		42	6	3	3		3
El Cajon	86,500	1,389	530	854	5	859	129	37	91	1	92	120	35	85		85	0.09	0.09	1,353	563	783	7	790	110	35	74	1	75	150	51	99		99
El Monte	95,900	1,517	859	648	10	658	124	55	65	4	69	160	90	70		70	0.08	0.11	1,386	773	605	8	613	109	63	45	1	46	116	65	51		51
Visalia	72,200	1,883	1,172	707	4	711	203	117	85	1	86	305	205	100		100	0.11	0.16	1,683	1,124	554	5	559	91	58	33		33	381	237	144		144
Santa Barbara	80,400	1,532	794	732	6	738	121	67	53	1	54	87	28	59		59	0.08	0.06	1,391	744	642	5	647	53	25	27	1	28	76	30	46		46

City	Prop of Crashes SI (1991)	Prop of Crashes SI (1992)	Prop of Crashes FTC (1992)	% Change Prop Crashes SI ('91-'92)	% Change SI ('91-'92)	% Change SI-PDO ('91-'92)	% Change SI-I/F ('91-'92)	Injury Crash Rate per 1,000 (1992)	F/I SI Crash Rate per 100,000 (1991)	F/I SI Crash Rate per 100,000 (1992)	Full-time LE Officers	Murders	Rapes	Robberies	Assaults	Burglaries	Larceny-Thefts	Auto Thefts	Arsons	Total Crimes	Crimes per 100,000 Pop	Murders	Rape	Robbery	Assault	Burglary	Larceny-Theft	Auto Theft	Arson
	1992 Crime Statistics																					Incidence of Criminal Activity (as % of total crim							
Hayward	0.33	0.33	0.00	-0.05%	-1.35%	4.76%	-8.27%	6.95	263.51	241.71	164	10	41	333	568	1,737	4,782	957	77	8,505	8,061.61	0.12%	0.48%	3.92%	6.68%	20.42%	56.23%	11.25%	0.91%
Irvine	0.28	0.27	0.00	-6.28%	-3.16%	-10.10%	8.47%	4.77	115.23	125.00	125	0	15	61	55	1,279	3,078	424	106	5,018	4,900.39	0.00%	0.30%	1.22%	1.10%	25.49%	61.34%	8.45%	2.11%
Simi Valley	0.25	0.27	0.00	5.96%	-2.52%	-33.33%	-1.72%	4.25	114.29	112.32	114	6	13	65	189	742	1,947	453	27	3,442	3,391.13	0.17%	0.38%	1.89%	5.49%	21.56%	56.57%	13.16%	0.78%
Sunnyvale	0.29	0.26	0.04	-11.76%	-17.45%	-20.54%	-11.11%	5.03	153.58	136.52	122	3	42	85	142	549	3,396	454	37	4,708	4,017.06	0.06%	0.89%	1.81%	3.02%	11.66%	72.13%	9.64%	0.79%
Chula Vista	0.23	0.25	0.02	8.75%	3.95%	1.17%	5.98%	6.01	173.08	183.43	154	8	52	445	1,016	1,903	4,901	2,463	40	10,828	8,008.88	0.07%	0.48%	4.11%	9.38%	17.57%	45.26%	22.75%	0.37%
Fontana	0.23	0.24	0.00	6.60%	16.50%	5.71%	22.31%	7.23	148.74	181.92	106	13	71	396	722	1,723	2,873	1,126	29	6,953	7,955.38	0.19%	1.02%	5.70%	10.38%	24.78%	41.32%	16.19%	0.42%
Torrance	0.26	0.24	0.06	-7.34%	-18.97%	-18.65%	-19.44%	6.31	189.33	152.52	238	2	23	508	424	1,532	3,887	1,630	113	8,119	6,099.92	0.02%	0.28%	6.26%	5.22%	18.87%	47.88%	20.08%	1.39%
San Bernardino	0.25	0.24	0.01	-1.87%	-3.59%	-3.25%	-4.14%	8.33	205.85	197.32	253	41	81	1,130	1,375	4,226	8,340	2,379	102	17,674	10,763.70	0.23%	0.46%	6.39%	7.78%	23.91%	47.19%	13.46%	0.58%
Salinas	0.22	0.24	0.05	8.52%	-1.03%	3.88%	-20.41%	3.67	90.07	71.69	138	7	42	253	805	1,173	4,823	548	49	7,700	7,077.21	0.09%	0.55%	3.29%	10.45%	15.23%	62.64%	7.12%	0.64%
Orange	0.24	0.24	0.00	1.41%	-8.63%	-10.31%	-5.59%	5.53	145.44	137.31	142	5	17	257	292	1,565	4,438	1,002	53	7,629	6,891.60	0.07%	0.22%	3.37%	3.83%	20.51%	58.17%	13.13%	0.69%
Modesto	0.24	0.23	0.03	-4.43%	-0.59%	-0.51%	-0.77%	6.83	157.86	156.65	199	7	69	290	640	2,396	6,805	1,100	62	11,369	6,902.85	0.06%	0.61%	2.55%	5.63%	21.07%	59.86%	9.68%	0.55%
Ventura	0.23	0.23	0.01	1.26%	-4.17%	-9.87%	7.08%	5.40	122.43	131.09	122	6	42	145	225	1,273	3,395	468	52	5,606	6,073.67	0.11%	0.75%	2.59%	4.01%	22.71%	60.56%	8.35%	0.93%
Concord	0.24	0.23	0.04	-6.02%	-10.62%	-11.19%	-10.00%	4.14	116.80	105.12	140	3	47	190	372	1,361	4,738	739	26	7,476	6,716.98	0.04%	0.63%	2.54%	4.98%	18.20%	63.38%	9.88%	0.35%
San Mateo	0.20	0.23	0.01	11.54%	-20.00%	-35.56%	-2.50%	5.09	140.19	136.68	103	1	22	112	200	458	2,822	362	19	3,996	4,668.22	0.03%	0.55%	2.80%	5.01%	11.46%	70.62%	9.06%	0.48%
Escondido	0.17	0.22	0.02	30.77%	18.87%	200.00%	17.72%	8.08	151.63	178.50	137	11	30	273	821	1,821	4,826	1,155	45	8,982	8,619.96	0.12%	0.33%	3.04%	9.14%	20.27%	53.73%	12.86%	0.50%
Moreno Valley	0.23	0.22	0.03	-6.04%	-1.60%	-3.66%	2.33%	3.56	74.85	76.59		21	30	392	1,005	1,917	4,451	1,388	44	9,248	8,048.74	0.23%	0.32%	4.24%	10.87%	20.73%	48.13%	15.01%	0.48%
Thousand Oaks	0.23	0.21	0.00	-5.25%	-26.18%	-68.09%	14.43%	4.16	91.17	104.32		1	19	78	185	982	1,725	333	55	3,378	3,174.81	0.03%	0.56%	2.31%	5.48%	29.07%	51.07%	9.86%	1.63%
Whittier	0.19	0.21	0.04	8.51%	-9.47%	-19.86%	4.90%	6.48	134.92	141.53	92	4	25	198	297	798	2,138	547	26	4,033	5,334.66	0.10%	0.62%	4.91%	7.36%	19.79%	53.01%	13.56%	0.64%
Oxnard	0.18	0.21	0.06	16.92%	7.22%	18.57%	-5.69%	7.79	173.00	163.15	145	8	74	518	1,055	2,125	5,047	981	51	9,859	6,933.19	0.08%	0.75%	5.25%	10.70%	21.55%	51.19%	9.95%	0.52%
Rancho Cucamonga	0.22	0.20	0.06	-9.89%	-15.26%	-12.15%	-27.87%	2.39	53.04	38.26		6	38	194	213	1,382	2,592	926	22	5,373	4,672.17	0.11%	0.71%	3.61%	3.96%	25.72%	48.24%	17.23%	0.41%
Inglewood	0.17	0.20	0.03	16.16%	-18.47%	-25.32%	-11.54%	6.73	152.05	134.50	209	46	69	1,542	1,064	2,000	2,562	2,199	104	9,586	9,343.08	0.48%	0.72%	16.09%	11.10%	20.86%	26.73%	22.94%	1.08%
Santa Clarita	0.20	0.20	0.08	-2.10%	-4.59%	-15.08%	13.46%	4.70	85.81	97.36		2	24	98	685	777	1,900	496	32	4,014	3,311.88	0.05%	0.60%	2.44%	17.07%	19.36%	47.33%	12.36%	0.80%
Norwalk	0.17	0.19	0.08	12.22%	13.33%	14.44%	9.43%	4.13	57.86	63.32		10	24	380	1,007	1,121	1,773	895	43	5,253	5,734.72	0.19%	0.46%	7.23%	19.17%	21.34%	33.75%	17.04%	0.82%
Bakersfield	0.14	0.19	0.00	40.00%	43.91%	108.70%	30.67%	7.29	128.72	168.19	244	20	71	615	1,004	3,376	7,887	1,196	110	14,279	8,168.76	0.14%	0.50%	4.31%	7.03%	23.64%	55.23%	8.38%	0.77%
Vallejo	0.18	0.19	0.03	4.68%	2.09%	-5.93%	21.43%	5.91	102.56	124.54	132	13	71	539	987	1,831	4,478	1,073	75	9,067	8,303.11	0.14%	0.78%	5.94%	10.89%	20.19%	49.39%	11.83%	0.83%
South Gate	0.14	0.18	0.02	27.33%	53.41%	65.22%	40.48%	3.76	52.63	73.93	90	11	18	546	372	1,097	1,358	1,595	30	5,027	6,299.50	0.22%	0.36%	10.86%	7.40%	21.82%	27.01%	31.73%	0.60%
Ontario	0.16	0.18	0.05	10.71%	3.99%	-8.80%	35.04%	5.99	90.49	122.20	179	26	69	696	1,046	2,244	5,294	1,753	64	11,192	8,655.84	0.23%	0.62%	6.22%	9.35%	20.05%	47.30%	15.66%	0.57%
Lancaster	0.17	0.17	0.06	1.78%	9.06%	9.03%	9.09%	7.24	111.61	121.76		14	53	194	809	1,186	2,266	559	32	5,113	5,764.37	0.27%	1.04%	3.79%	15.82%	23.20%	44.32%	10.93%	0.63%
Garden Grove	0.22	0.17	0.06	-23.88%	-28.18%	-36.36%	-19.32%	10.05	264.10	213.07	169	7	45	458	492	2,088	5,187	1,789	64	10,130	9,068.93	0.07%	0.44%	4.52%	4.86%	20.61%	51.20%	17.66%	0.63%
Oceanside	0.15	0.17	0.06	14.17%	12.28%	-8.62%	23.01%	6.23	89.83	110.49	166	13	89	528	982	1,781	3,620	1,345	49	8,407	6,682.83	0.15%	1.06%	6.28%	11.68%	21.18%	43.06%	16.00%	0.58%
Daly City	0.18	0.17	0.08	-5.55%	-25.25%	-26.92%	-19.05%	1.37	24.31	19.68	109	4	10	178	248	401	2,327	888	14	4,070	4,710.65	0.10%	0.25%	4.37%	6.09%	9.85%	57.17%	21.82%	0.34%
Glendale	0.17	0.17	0.02	-2.51%	-7.85%	-7.73%	-8.18%	4.78	90.96	83.52	207	8	36	398	241	2,025	4,763	1,751	48	9,270	5,303.20	0.09%	0.39%	4.29%	2.60%	21.84%	51.38%	18.89%	0.52%
Burbank	0.15	0.16	0.02	9.77%	7.35%	8.00%	6.98%	5.29	90.24	96.54	234	6	21	218	286	717	2,301	1,107	150	4,806	5,043.02	0.12%	0.44%	4.54%	5.95%	14.92%	47.88%	23.03%	3.12%
Carson	0.14	0.16	0.03	13.96%	9.15%	4.76%	16.95%	4.44	66.44	77.70		7	36	381	759	1,008	1,925	1,168	52	5,336	6,009.01	0.13%	0.67%	7.14%	14.22%	18.89%	36.08%	21.89%	0.97%
Alhambra	0.16	0.16	0.02	-0.67%	-1.30%	-17.44%	19.12%	5.28	89.47	106.58	88	7	16	379	136	884	2,029	948	51	4,450	5,855.26	0.16%	0.36%	8.52%	3.06%	19.87%	45.60%	21.30%	1.15%
Pomona	0.15	0.16	0.06	1.11%	-19.59%	-43.07%	0.63%	8.14	130.76	131.58	168	25	86	977	1,214	2,511	3,635	1,699	374	10,521	8,652.14	0.24%	0.82%	9.29%	11.54%	23.87%	34.55%	16.15%	3.55%
Downey	0.12	0.15	0.03	28.05%	8.16%		6.12%	4.03	56.19	59.63	123	8	29	320	177	1,080	1,975	1,018	69	4,676	5,362.39	0.17%	0.62%	6.84%	3.79%	23.10%	42.24%	21.77%	1.48%
Berkeley	0.16	0.14	0.04	-11.87%	-20.06%	-21.71%	-18.75%	8.25	180.62	146.75	182	14	40	663	834	2,663	7,594	1,379	81	13,268	12,481.66	0.11%	0.30%	5.00%	6.29%	20.07%	57.24%	10.39%	0.61%
Santa Monica	0.12	0.12	0.05	4.56%	3.09%	3.48%	2.53%	6.02	81.53	83.59	177	14	67	652	582	1,614	5,574	1,894	130	10,527	10,863.78	0.13%	0.64%	6.19%	5.53%	15.33%	52.95%	17.99%	1.23%
Pasadena	0.08	0.11	0.11	29.36%	32.17%	43.33%	11.25%	6.96	59.75	66.47	208	15	63	785	834	1,860	4,658	1,297	115	9,627	7,189.69	0.16%	0.65%	8.15%	8.66%	19.32%	48.38%	13.47%	1.19%
Fairfield	0.09	0.10	0.01	13.24%	13.13%	12.90%	13.51%	5.47	45.79	51.98	82	8	40	205	377	910	3,927	461	39	5,967	7,384.90	0.13%	0.67%	3.44%	6.32%	15.25%	65.81%	7.73%	0.65%
El Cajon	0.09	0.08	0.11	-12.46%	-14.73%	-5.41%	-18.48%	9.05	106.36	86.71	124	6	42	222	535	1,331	3,354	1,012	37	6,539	7,559.54	0.09%	0.64%	3.40%	8.18%	20.35%	51.29%	15.48%	0.57%
El Monte	0.08	0.08	0.08	-3.79%	-12.10%	14.55%	-33.33%	6.31	71.95	47.97	114	13	51	817	585	1,605	2,145	1,290	67	6,573	6,854.01	0.20%	0.78%	12.43%	8.90%	24.42%	32.63%	19.63%	1.02%
Visalia	0.11	0.05	0.23	-49.85%	-55.17%	-50.43%	-61.63%	7.67	119.11	45.71	85	6	44	154	457	1,239	4,186	467	22	6,575	9,106.65	0.09%	0.67%	2.34%	6.95%	18.84%	63.67%	7.10%	0.33%
Santa Barbara	0.08	0.04	0.05	-51.76%	-56.20%	-62.69%	-48.15%	7.99	67.16	34.83	140	5	38	150	480	1,213	3,015	339	9	5,249	6,528.61	0.10%	0.72%	2.86%	9.14%	23.11%	57.44%	6.46%	0.17%

APPENDIX C

SITE PROFILES FOR

MODESTO, SAN BERNARDINO, AND SALINAS

Modesto

Resident Population: 164,700

Location: Modesto is located in California's San Joaquin Valley, 90 freeway miles east of the San Francisco Bay area, 316 miles north of Los Angeles, and 77 miles south of Sacramento.

Description: Modesto is the Stanislaus county seat and the geographic center of the state of California. Modesto's economy is a mix of light manufacturing, food processing, and agricultural support. In recent years, the city has become a "bedroom community" to the Bay area due to the lower costs of living in Modesto.

Law Enforcement Agency: Modesto Police Department; 199 sworn officers.

Local News Media: Post-Newsweek Cable (public access television); *The Bee, Times Review*; KDJK-FM, KFOX-FM.

Baseline Statistics:

Proportion of Crashes Related to Speed (1992)	Total Speed Crashes (1992)	Percent Change Speed-involved Crashes (1991-1992)	Total Following-to-closely Crashes (1992)	Fatal & Injury Speed-Crashes per 100,000 (1992)	Crimes per 100,000 (1992)	Comments
0.23	846	-0.59%	95	156.65	6,902.85	Satisfies all site selection criteria.

Recommendation: Modesto is recommended as an experimental site (i.e., the program of speed and following headway enforcement). Managers of the Modesto Police Department recognize that there is a speed-related crash problem in their community and are eager to participate in this NHTSA research project.

San Bernardino

Resident Population: 164,200

Location: San Bernardino is located approximately sixty miles east of Los Angeles and forty miles northwest of Palm Springs. It lies along the southern foothills of the San Gabriel and San Bernardino Mountains.

Description: San Bernardino is the seat of San Bernardino County, the largest county in the United States. It is also the economic center of the "inland empire" region of Southern California, a metropolitan area that includes portions of western Los Angeles, Riverside, and eastern San Bernardino counties. Agriculture, light manufacturing, and health care make up the major industries operating within San Bernardino. San Bernardino is also home to a campus of the California State University system.

Law Enforcement Agency: San Bernardino Police Department; 253 sworn officers.

Local News Media: KSCI-TV, KVCR-TV; *Sun*; KGGI-FM, KFRG-FM.

Baseline Statistics:

Proportion of Crashes Related to Speed (1992)	Total Speed Crashes (1992)	Percent Change Speed-involved Crashes (1991-1992)	Total Following-to-closely Crashes (1992)	Fatal & Injury Speed-Crashes per 100,000 (1992)	Crimes per 100,000 (1992)	Comments
0.24	859	-3.59%	38	197.32	10,763.70	Satisfies all site selection criteria.

Recommendation: San Bernardino is recommended as an experimental site (i.e., the program of vigorous speed enforcement). Managers of the San Bernardino Police Department recognize that there is a speed-related crash problem in their community, but they have been unable to implement a countermeasure program. They are eager to participate in this NHTSA research project.

Salinas

Resident Population: 108,800

Location: The City of Salinas is located eight miles inland from Monterey Bay, 325 miles north of Los Angeles and 100 miles south of San Francisco. Salinas is the principal community of the Salinas Valley, one of the richest agricultural areas of California.

Description: Salinas is the Monterey county seat, and the agricultural, industrial, financial and governmental center for Monterey County. The economic base includes some heavy industry and high technology firms, but it is primarily agricultural support. Salinas is home to Hartnell Community College.

Law Enforcement Agency: Salinas Police Department; 138 sworn officers.

Local News Media: Five local television stations; *California;* 15 radio stations.

Baseline Statistics:

Proportion of Crashes Related to Speed (1992)	Total Speed Crashes (1992)	Percent Change Speed-involved Crashes (1991-1992)	Total Following-to-closely Crashes (1992)	Fatal & Injury Speed-Crashes per 100,000 (1992)	Crimes per 100,000 (1992)	Comments
0.24	480	-1.03%	94	71.69	7,077.21	Satisfies all site selection criteria.

Recommendation: Salinas is recommended as the control site for the experimental evaluation of municipal speed enforcement. The proportion of all crashes that are speed-involved is comparable to those of the recommended experimental sites.

APPENDIX D

ENGLISH AND SPANISH EXAMPLES OF THE DMV SURVEY QUESTIONNAIRE

DRIVING SPEED PUBLIC AWARENESS QUESTIONNAIRE

This is a **voluntary** and **confidential** survey that asks your opinion about the problem of **unsafe driving speed.** Your opinions are important to help increase traffic safety in **Modesto.** Please complete **both** sides of the page. Please do **not** put your name on this form. **You do not have to complete it in order to receive your driver's license or vehicle registration.**

Instructions: ***For each question, please check the one response that applies to you.*** ***Today's date:*** _____

1. ***Gender:*** Male [1] Female [2]

2. ***Age:*** 16-20 yrs. [1] 21-29 yrs. [2] 30-39 yrs. [3] 40-49 yrs. [4] 50-59 yrs. [5] 60-69 yrs. [6] 70 yrs. or older [7]

	Less than 1 year	1 - 5 years	6 -10 years	11 - 15 years	More than 15 years
3. ***Number of years you have been driving:***	[1]	[2]	[3]	[4]	[5]
4. ***Number of years you have lived in Modesto:***	[1]	[2]	[3]	[4]	[5]

[0] I do **not** live in Modesto, I live in _____

This section of the survey contains questions about Special Speed Enforcement
(Special police teams that enforce speed limits on city streets that have speed-related problems).

	NO	YES	
5. ***Before this survey, had you ever heard of Special Speed Enforcement in Modesto?***	[1]	[2]	How many times?
6. ***Have you ever seen Special Speed Enforcement in Modesto?***	[1]	[2] →	_____
7. ***Have you ever driven by a car stopped by Special Speed Enforcement in Modesto?***	[1]	[2] →	_____

8. ***About how many times have you seen/heard about the Special Speed Enforcement Program in Modesto. . .***

	Never	1 - 5 times	6 -10 times	11 - 20 times	More than 20 times
a. . . . . ***on television?***	[0]	[1]	[2]	[3]	[4]
b. . . . . ***on radio?***	[0]	[1]	[2]	[3]	[4]
c. . . ***in the newspaper?***	[0]	[1]	[2]	[3]	[4]
d. . . . . ***from friends?***	[0]	[1]	[2]	[3]	[4]
e. . . . . ***at work?***	[0]	[1]	[2]	[3]	[4]
f. . . ***from a community organization?*** *(such as Boy Scouts, Kiwanis, hospitals, etc.)*	[0]	[1]	[2]	[3]	[4]

9. *If you were driving **across town on city streets** and were exceeding the speed limit **by at least 10 MPH**, what are the chances that you would be stopped by a law enforcement officer? (Circle the percent chance that you would be stopped.)*

0 1 2 3 4 5 6 7 8 9 10

0%-------10%-------20%-------30%-------40%-------50%-------60%-------70%-------80%-------90%-------100%

(0 out of 10) (2 out of 10) (4 out of 10) (6 out of 10) (8 out of 10) (10 out of 10)

10. *If you were driving **across town on city streets** and were exceeding the speed limit **by at least 10 MPH**, what are the chances that you would be cited if you were stopped by a law enforcement officer? (Circle the percent chance that you would be cited.)*

0 1 2 3 4 5 6 7 8 9 10

0%-------10%-------20%-------30%-------40%-------50%-------60%-------70%-------80%-------90%-------100%

(0 out of 10) (2 out of 10) (4 out of 10) (6 out of 10) (8 out of 10) (10 out of 10)

11. *If you had to drive, and you knew in advance that there was going to be Special Speed Enforcement somewhere in your community, would you:*

1 ☐ Drive as Usual

2 ☐ Drive Slower than Usual

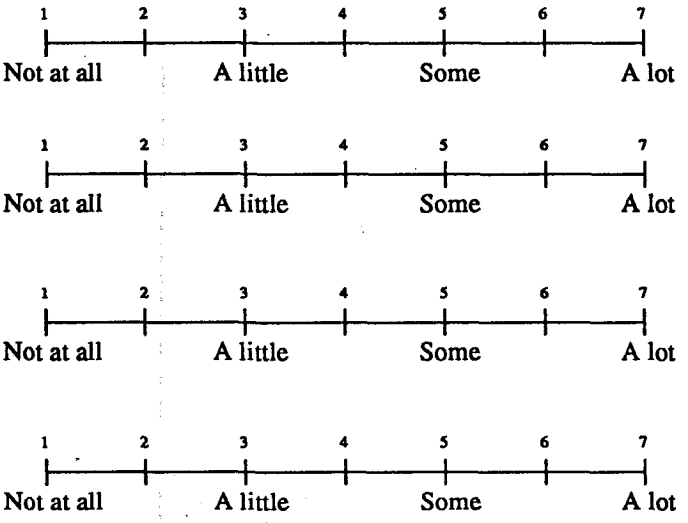
3 ☐ Drive No Faster than the Posted Speed Limits

12. *Circle the place on the scale that describes how much you think Special Speed Enforcement helps reduce vehicle speeding.*

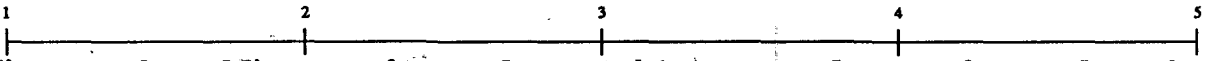
13. *Circle the place on the scale that describes how much you think Special Speed Enforcement helps reduce the number and seriousness of speed-related crashes.*

14. *Circle the place on the scale that describes how much you think Special Speed Enforcement contributes to catching people wanted for crimes.*

15. *Circle the place on the scale that describes how much you think Special Speed Enforcement reduces criminal activity in city areas where enforcement takes place.*



16. *Circle the place on the scale that describes what you think about Special Speed Enforcement in Modesto.*



1 **I strongly disapprove** of Special Speed Enforcement in Modesto

2 **I disapprove** of Special Speed Enforcement in Modesto

3 **I am neutral** about Special Speed Enforcement in Modesto

4 **I approve** of Special Speed Enforcement in Modesto

5 **I strongly approve** of Special Speed Enforcement in Modesto

17. *Have you ever reduced your driving speed on Modesto streets out of concern for being stopped by a **law enforcement officer**?* YES 1 ☐ NO 2 ☐

18. *Do you **ever** exceed the posted speed limits while driving on city streets in Modesto?* YES 1 ☐ NO 2 ☐

Thank you. Please return this to the box labeled "Public Awareness Questions."

CUESTIONARIO SOBRE LA CONCIENCIA PUBLICA CON RESPECTO AL EXCESO DE VELOCIDAD

Esta es una encuesta **voluntaria y confidencial** que le pide su opinión sobre el problema de manejar a velocidades peligrosas. Sus opiniónes son importantes para ayudar a incrementar la seguridad del tráfico en San Bernardino. Por favor complete **ambos** lados de la página. Por favor no escriba su nombre en este formulario. **Usted no tiene que completar este formulario para recibir su licencia de conducir ni la registración de su vehículo.**

Instrucciones: ***Para cada pregunta, por favor marque solamente la respuesta que corresponda en su caso.***

1. ***Sexo:*** Masculino [1] Femenino [2] ***Fecha de hoy:*** _____

2. ***Edad:*** 16-20 años. [1] 21-29 años. [2] 30-39 años. [3] 40-49 años. [4] 50-59 años. [5] 60-69 años. [6] 70 o más años. [7]

	menos de 1 año	1 - 5 años	6 -10 años	11 - 15 años	más de 15 años
3. *Número de años que ha estado conduciendo:*	[1]	[2]	[3]	[4]	[5]
4. *Número de años que ha vivido en San Bernardino:*	[1]	[2]	[3]	[4]	[5]

[0] Yo no vivo en San Bernardino, vivo en _____

Esta sección de la encuesta contiene preguntas acerca del Cumplimiento de Velocidad Especial. (Oficiales de policía que aplican los limites de velocidad en las calles de la ciudades que tienen problemas relacionados con la velocidad.)

	NO	SI	
5. *¿Antes de esta encuesta, había oído hablar del Cumplimiento de Velocidad Especial en San Bernardino?*	[1]	[2]	¿Cuántas veces?
6. *¿Ha visto usted una Cumplimiento de Velocidad Especial en San Bernardino?*	[1]	[2] →	_____
7. *¿Ha usted pasado y visto a un automóvil qu había sido parado por el Cumplimiento de Velocidad Especial en San Bernardino?*	[1]	[2] →	_____

8. *Aproximadamente cuántas veces ha visto usted, o ha oído hablar acerca del Cumplimiento de Velocidad Especial en San Bernardino . . .*

	Nunca	1 - 5 veces	6 -10 veces	11 - 20 veces	Más de 20 veces
*a. . . . . en la **televisión?***	[0]	[1]	[2]	[3]	[4]
*b. . . . . en la **radio?***	[0]	[1]	[2]	[3]	[4]
*c. . . . . en el **periódico?***	[0]	[1]	[2]	[3]	[4]
*d. . . . por medio de **amigos?***	[0]	[1]	[2]	[3]	[4]
*e. . . . . en el **trabajo?***	[0]	[1]	[2]	[3]	[4]
f. . .por medio de una organización comunitaria? (tal como Boy Scouts, Kiwanis, MADD, etc.)	[0]	[1]	[2]	[3]	[4]

9. Si usted estuviera manejando por las calles de la ciudad y estuviera excediendo la velocidad por lo menos por 10 MPH, cuántas son las posibilidades de que a usted lo detuviera un oficial de la ley? (Coloque un círculo alrededor del porcentaje de posibilidades de que lo detuvieran.)

0 1 2 3 4 5 6 7 8 9 10

0%-------10%-------20%-------30%-------40%-------50%-------60%-------70%-------80%-------90%-------100%

(0 de 10) (2 de 10) (4 de 10) (6 de 10) (8 de 10) (10 de 10)

10. Si usted estuviera manejando por las calles de la ciudad y estuviera excediento el limite de velocidad por lo menos por 10 MPH, cuáles son las posibilidades que usted fuera citado si lo detuviera un oficial de la ley? (Coloque un círculo alrededor del porcentaje de posibilidades de que lo fuera citado).

0 1 2 3 4 5 6 7 8 9 10

0%-------10%-------20%-------30%-------40%-------50%-------60%-------70%-------80%-------90%-------100%

(0 de 10) (2 de 10) (4 de 10) (6 de 10) (8 de 10) (10 de 10)

11. Si usted fuera a manejar y supiera de antemano que va a haber Cumplimiento de Velocidad Especial en alguna parte de su comunidad, usted:

Manejaría Como de Costumbre	Manejaría Más Despacio	No Manejaría Más Rápido que el Límite de Velocidad Indicado
1 ☐	2 ☐	3 ☐

12. Coloque un círculo en la escala que indica cuánto usted cree que el Cumplimiento de Velocidad Especial realmente ayuda a reducir el exceso de velocidad de los vehículos:

1 2 3 4 5 6 7

Nada Un Poco Algo Mucho

13. Coloque un circulo en la escala que indica cuánto usted cree que el Cumplimiento de Velocidad Especial ayuda a reducir el número y la gravedad de accidentes relacionados con el exceso de velocidad.

1 2 3 4 5 6 7

Nada Un Poco Algo Mucho

14. Coloque un círculo en la escala que indica cuánto usted cree que el Cumplimiento de Velocidad Especial contribue a agarrar a personas buscadas por otros delitos.

1 2 3 4 5 6 7

Nada Un Poco Algo Mucho

15. Coloque un círculo en la escala que indica cuánto usted cree que el Cumplimiento de Velocidad Especial reduce actividades criminales en areas de la ciudad donde éste cumplimiento se aplica.

1 2 3 4 5 6 7

Nada Un Poco Algo Mucho

16. Coloque un círculo en la escala indica lo que usted cree acerca del Cumplimiento de Velocidad Especial en San Bernardino.

1 2 3 4 5

Yo no estoy de acuerdo de ningun modo con Cumplimiento de Velocidad Especial en San Bernardino	**Yo no estoy de acuerdo** con Cumplimiento de Velocidad Especial en San Bernardino	**Yo soy neutral** con respecto al Cumplimiento de Velocidad Especial en San Bernardino	**Yo estoy de acuerdo** con Cumplimiento de Velocidad Especial en San Bernardino	**Yo estoy muy de acuerdo** con Cumplimiento de Velocidad Especial en San Bernardino

	SI	NO
17. ¿Ha reducido usted su velocidad en las calles de San Bernardino debido a la procupación de ser parado por un oficial de policía?	1 ☐	2 ☐
18. ¿Usted alguna vez ha excedido el límite de velocidad indicado mientras manejaba en las calles de San Bernardino?	1 ☐	2 ☐

Muchas gracias. Por favor devuelva este formulario a la caja marcada "Public Awareness Questions."

DRIVING SPEED PUBLIC AWARENESS QUESTIONNAIRE

This is a **voluntary** and **confidential** survey that asks your opinion about the problem of **unsafe driving speed.** Your opinions are important to help increase traffic safety in **Salinas.** Please complete **both** sides of the page. Please do **not** put your name on this form. **You do not have to complete it in order to receive your driver's license or vehicle registration.**

Instructions: ***For each question, please check the one response that applies to you.*** ***Today's date:*** _____

1. **Gender:** Male [1] Female [2]

2. **Age:** 16-20 yrs. [1] 21-29 yrs. [2] 30-39 yrs. [3] 40-49 yrs. [4] 50-59 yrs. [5] 60-69 yrs. [6] 70 yrs. or older [7]

	Less than 1 year	1 - 5 years	6 -10 years	11 - 15 years	More than 15 years
3. Number of years you have been driving:	[1]	[2]	[3]	[4]	[5]
4. Number of years you have lived in Salinas:	[1]	[2]	[3]	[4]	[5]

[0] I do **not** live in Salinas, I live in _____

This section of the survey contains questions about Speed Enforcement
(Police officers who enforce speed limits on city streets that have speed-related problems) .

	NO	YES	
5. Before this survey, had you ever heard of Speed Enforcement in Salinas?	[1]	[2]	How many times?
6. Have you ever **seen** Speed Enforcement in Salinas?	[1]	[2] →	_____
7. Have you ever **driven** by a car stopped by Speed Enforcement in Salinas?	[1]	[2] →	_____

8. About how many times have you seen/heard about Speed Enforcement in Salinas. . .

	Never	1 - 5 times	6 -10 times	11 - 20 times	More than 20 times
a. . . . . on **television** ?	[0]	[1]	[2]	[3]	[4]
b. . . . . on **radio** ?	[0]	[1]	[2]	[3]	[4]
c. . . in the **newspaper** ?	[0]	[1]	[2]	[3]	[4]
d. . . . . from **friends** ?	[0]	[1]	[2]	[3]	[4]
e. . . . . at **work** ?	[0]	[1]	[2]	[3]	[4]
f. . . from a **community organization**? *(such as Boy Scouts, Kiwanis, hospitals, etc.)*	[0]	[1]	[2]	[3]	[4]

9. *If you were driving* ***across town on city streets*** *and were exceeding the speed limit* ***by at least 10 MPH****, what are the chances that you would be stopped by a law enforcement officer? (Circle the percent chance that you would be stopped.)*

0 1 2 3 4 5 6 7 8 9 10

0%-------10%-------20%-------30%-------40%-------50%-------60%-------70%-------80%-------90%-------100%

(0 out of 10) (2 out of 10) (4 out of 10) (6 out of 10) (8 out of 10) (10 out of 10)

10. *If you were driving* ***across town on city streets*** *and were exceeding the speed limit* ***by at least 10 MPH****, what are the chances that you would be cited if you were stopped by a law enforcement officer? (Circle the percent chance that you would be cited.)*

0 1 2 3 4 5 6 7 8 9 10

0%-------10%-------20%-------30%-------40%-------50%-------60%-------70%-------80%-------90%-------100%

(0 out of 10) (2 out of 10) (4 out of 10) (6 out of 10) (8 out of 10) (10 out of 10)

11. *If you had to drive, and you knew in advance that there was going to be Speed Enforcement somewhere in your community, would you:*

1 ☐ Drive as Usual

2 ☐ Drive Slower than Usual

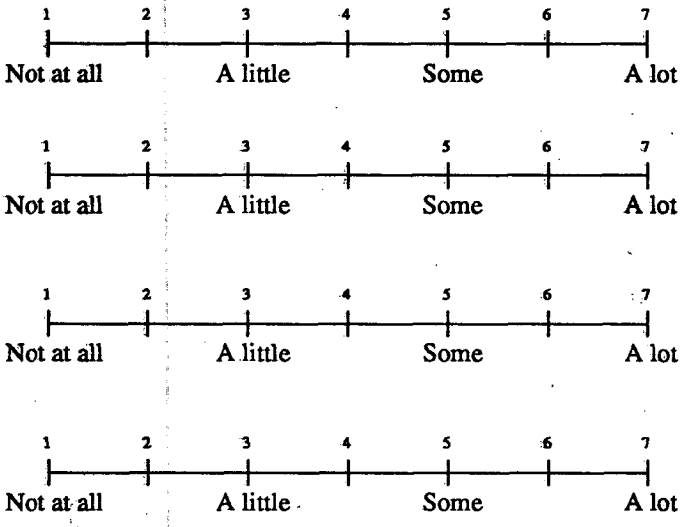
3 ☐ Drive No Faster than the Posted Speed Limits

12. *Circle the place on the scale that describes how much you think Speed Enforcement helps reduce vehicle speeding.*

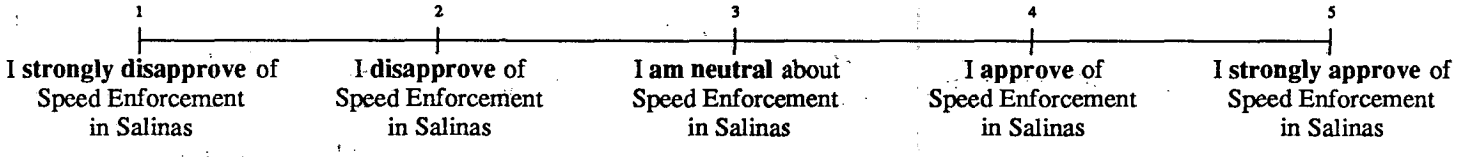
13. *Circle the place on the scale that describes how much you think Speed Enforcement helps reduce the number and seriousness of speed-related crashes.*

14. *Circle the place on the scale that describes how much you think Speed Enforcement contributes to catching people wanted for crimes.*

15. *Circle the place on the scale that describes how much you think Speed Enforcement reduces criminal activity in city areas where enforcement takes place.*



16. *Circle the place on the scale that describes what you think about Speed Enforcement in Salinas.*



17. *Have you ever reduced your driving speed on Salinas streets out of concern for being stopped by a* ***law enforcement officer****?*

18. *Do you* ***ever*** *exceed the posted speed limits while driving on city streets in Salinas?*

	YES	NO
17.	1 ☐	2 ☐
18.	1 ☐	2 ☐

Thank you. Please return this to the box labeled "Public Awareness Questions."

APPENDIX E

EXAMPLES OF NEWSPAPER ARTICLES ABOUT THE EXPERIMENTAL PROGRAMS

How to reach us: Metro News 578-2346 • Obituaries 578-2330 • State News 578-2360

Metro Saturday, June 4, 1994 • The Modesto Bee B Section

Speed cops await with laser guns

By WILLIAM D. KANE
Bee staff writer

Modesto traffic cops climbed aboard their motorcycles Friday armed with new, precise laser guns in a crackdown on speeders and tailgaters across the city.

Traffic Sgt. Burl Condit said citations will be written with no warnings in the special program aimed at cutting speed-related collisions.

City officials gathered at Scenic Drive and Coffee Road for a brief program to kick off the speed-reduction project.

Condit said traffic officers will target six notorious traffic headaches — Sisk Road, Coffee Road, Oakdale Road, Scenic Drive, La Loma Avenue and McHenry-Briggsmore.

Given sufficient resources, police could have targeted three or four dozen traffic hot spots in the city, Condit said.

At his parked motorcycle, traffic officer Clint Raymer pointed his Pro Laser II, holding it steady in a two-handed pistol grip. It shoots an invisible laser beam to one-third mile, targeting a moving car like a jet pilot's missile beam.

In the distance, a white pickup turned the bend: 48 mph at 325 feet, the laser gun read. Speed limit at the hospital bend: 30 mph.

The laser gun emitted an audible beeping tone, changing to a steady tone when the beam locked on to the moving target.

Police also will use several newer, hand-held, narrow-band doppler radar guns.

Modesto and two other cities, San Bernardino and Salinas, will take part in a six-month study paid for by the National Highway Traffic Safety Administration.

Anacapa Sciences Inc. of Santa Barbara will look at the numbers to see if Modesto drivers start changing their bad habits — speeding from intersection to intersection, hitting their brakes at the last moment and following too close.

Besides slowing down to the speed limit, police said they hope drivers observe the old formula: Leave one car space in front of you for every 10 mph of speed.

Bart Ah You/ e

No arguing with traffic officer Clint Raymer, he'll assure you his new laser speed-counter does not lie.

A driver going 40 mph should leave a four-car-length space, a courtesy often abridged by impatient lane-crashers.

"We hope people will learn to change their driving habits," Condit said. "They can leave home early enough so they don't have to drive so fast to work. They can have compassion for their fellow driver.

"Be calm. Chill out," Condit advised.

Anacapa, a consulting firm that does statistical analysis, also worked with city police on a seat-belt crackdown 10 years ago and drunken-driving checkpoints two years ago.

In a related study, police will see if incidental crime is reduced where traffic officers maintain a high profile.

Condit acknowledged that police will be waging a psychological game on motorists by varying the enforcement time-of-day, sometimes parking decoy vehicles to add to motorist uncertainty.

The Police Department's "Your Speed Is ..." patrol car also will be parked near the six enforcement areas. A radar gun inside the car flashes an approaching driver's speed in a rear-window sign.

Police said most of the city's accidents are caused by following too close or failing to yield at intersections.

Dr. Mike Rossini Jr., an emergency room physician, applauded the speed-reduction program. "We want to tell people to avoid tailgating and obey all safety laws. This will provide a useful — although unpopular — service in our area," he said. Rossini heads the city's Citizens Committee for Safe Driving.

Metro B Section

Police crack down on city speeders

By M. CRISTINA MEDINA
Bee staff writer

MODESTO — Since police began taking a hard line against speeders last month, officers have issued 601 tickets and expect to issue 1,000 before the end of the month.

"That's just for speeding," said Sgt. Burl Condit of the Modesto Police Department's traffic division. "In May we issued 524 speeding tickets. We're above average."

Equipped with six new radar guns, police are attempting to crack down on traffic accidents, which increased 28.7 percent in May compared to the same month last year.

"It's going to save people money and heartache," Condit said.

"The toll for accidents, including medical costs and property damage, far exceeds any other law enforcement activity.

"Burglary and the loss of property don't compare to the loss of lives in vehicle accidents."

There have been three traffic-related fatalities this year compared to six by this date last year, according to police figures. Most accidents are attributed to speeding, tailgating and violating the right of way.

"If we got everyone in Modesto be within five miles of the speed limit, we'd reduce accidents by 75 percent," said Cpl. Terry Snyder, a Modesto police officer issuing speeding tickets along Coffee Road on Wednesday afternoon. Within 10 minutes he snagged two drivers.

Teams of traffic officers have been stationed along the city's busiest streets, including McHenry, Standiford and Sylvan avenues, and Oakdale, Coffee, Dale, Sisk and Tully roads. The teams will be there during peak hours — 7 a.m. to 9 a.m. and 2 p.m. to 6 p.m. — but that doesn't rule out an all-day presence in those areas.

"In the past years, speeds have gotten faster and faster," said Snyder, adding that citations were up from five to nine a day before the project, to 15 to 20 now. "People don't drive the limit, they drive what they think they can get get away with."

George Hayes was spotted driving his

See Page B-2, SPEEDERS

SPEEDERS: Violators can expect stiff fines

CONTINUED from B-1

'73 Datsun pickup down Coffee Road without a front license plate. He was handed a fix-it ticket.

"I've seen people do a lot of illegal things — turns in the middle of the street and stuffing hanging in the windows blocking their view," said Hayes, a Patterson resident who only comes to Modesto to run errands.

"I think it's a matter of safety. There's a lot of people who drive like they are the only ones on the road."

Speed-limit violators can expect stiff fines of up to $270.

"Hitting people in the pocket book is one way they get the message," Hayes said.

Traffic officers said they plan to continue the high-profile enforcement until accident rates decrease.

Drivers caught speeding can expect the following fines:

- One to five mph over the speed limit, $27.
- Six to 10 mph over the limit, $54.
- 11 to 15 mph over the limit, $81.
- 16 to 20 mph over the limit, $108.
- 21 to 25 mph over the limit, $135.
- 25 mph and over, $270 and a mandatory court appearance.
- Running a stop sign, $103.
- No seat belt, $22 for first offense, $55 each additional.
- Failure to have mandatory child restraint seat, $270.

MONDAY AUGUST 1ST, 1994 - MODESTO BEE

Viewpoints

Letters

Bad drivers

A recent story in *The Bee* detailed how police are cracking down on speeders in Modesto and mentioned that they were also noticing other examples of bad driving.

What a revelation! I believe the bad drivers might be divided into three categories:

- TERRORISTS - You will often find these people hovering a few feet from your rear bumper, or just whizzing past, if you have the gall to drive at or just above the speed limit. You may also see them rolling through, instead of stopping at stop signs, or speeding through residential neighborhoods with the assurance that laws are designed for other people.
- ASLEEP AT THE WHEEL- These folks simply have things other than driving on their minds. They may be spotted driving while also reading, putting on make-up, talking on the phone, eating, fighting with the kids, or just daydreaming.
- UNCLEAR ON THE CONCEPT- This is the group for whom the concept "flow of traffic" is incomprehensible. They don't even seem to be aware any other cars are around. Terms such as right-of-way, four-way stop, left-turn lane, and red light seem to be unfathomable. None of these people have any idea how to use a turn signal.

Can the police ticket drivers for incompetence?

ALLAN W. BOVEE

Modesto

Modesto Bee

B-2 Thursday, August 18, 1994 •

Metro

In Brief

Police nab speeders

Modesto motorists have racked up more than 22 speeding tickets a day during the first two months of a six-month crackdown on speeders, police reported Wednesday. On just six busy streets, police wrote 1,359 traffic tickets between June and Aug. 1, including some for people driving 75 mph in residential zones, Sgt. Burl Condit said. Traffic officers will continue the crackdown through November, concentrating on the following thoroughfares: McHenry Avenue, Standiford and Sylvan avenues, and Oakdale, Coffee, Dale, Sisk and Tully roads.

The Sun uses recycled paper 35¢

TODAY'S QUESTION

Do you think the officers who beat Rodney King should have been forced to pay him damages? Stories/A1,3

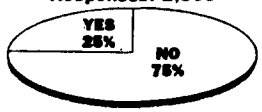
YES: (909) 386-3888 NO: (909) 386-3999

The Daily Question is an unscientific sampling of public opinion. If you have an idea for a question, call (909) 384-9859 or fax your suggestion to (909) 885-8741.

YESTERDAY'S QUESTION

Do you think police officers have the right to strike?

Responses: 2,805



Dodgers shut out St. Louis, 7-0; Cleveland edges Angels, 3-2

SPORTS/C1

Area gets ready for its biggest concert in years: The Eagles

LIVING/D1

THURSDAY
June 2, 1994

The Sun

SAN BERNARDINO COUNTY

92°/50°
S.B. Valley: Sunny
Smog: Unhealthful
Metro Final Edition

S.B. police add high-tech laser guns to anti-speeding arsenal

By PAMELA FITZSIMMONS
Sun Staff Writer

SAN BERNARDINO — A national experiment beginning this month will find out whether catching speeders can cut down on crime.

"Our purpose is not to write speeding tickets, although I have to tell you we will be out there and tickets will be written," Police Chief Dan Robbins said Wednesday.

"But that is not the intent. The intent is to reduce speed-related crashes ... The other part of this is we are going to look at traffic enforcement as it relates to the reduction of crime.

"In our hearts and guts we really feel that it does."

San Bernardino is one of three California cities selected by the National Highway Traffic Safety Administration to look at the impact of traffic enforcement on other crime.

LAW ENFORCEMENT

Starting this month and continuing through November, police will use traditional radar equipment and new laser guns to track motorists throughout the city.

Motorcycle Officer Tom Adams said the lasers have an advantage: The laser beam can isolate a vehicle's speed through lane changes and while surrounded by other cars. Traditional radar covers a scattered area.

For effectiveness, police declined to say in which neighborhoods traffic officers will be waiting with their radar and lasers.

"We want everybody in the whole city to drive the speed limit," Sgt. Jenifer Aragon said.

Neighborhoods were chosen based on the number of high-speed-related crashes or volume of citizen complaints. About 24 percent of all vehicle crashes in San Bernardino are attributed to unsafe speed.

Traffic officers will have portable signs warning "Speed Enforcement Zone" that they can use when they move into an area.

Authorities think that surrounding residential and commercial neighborhoods will show a reduction in crime because of the increased presence of the speed patrols.

Modesto and Salinas also were selected for the pilot program because of similarities in speed crash statistics, population, crime statistics and police department capabilities. Salinas will serve as a control site.

"Traffic enforcement does work," said Craig Miller, traffic safety administration regional program manager. "We are trying to establish a linkage with crime reduction. You guys are on the cutting edge in San Bernardino."

DAVID CREAMER/The Sun

Officer Tom Adams demonstrates a laser device that the San Bernardino Police Department will use to catch speeders.

Study should remind us: Speed kills, too

San Bernardino is one of three California cities selected by the National Highway Traffic Safety Administration to look at the impact of traffic enforcement on other crime.

Starting this month and continuing through November, police will use traditional radar equipment and new laser guns to track motorists throughout the city.

"Traffic enforcement does work," said Craig Miller, traffic safety administration regional program manager. "We are trying to establish a linkage with crime reduction. You guys are on the cutting edge in San Bernardino."

It will be interesting to see whether the experiment shows a correlation between speed-zone enforcement and overall crime reduction.

We hope it also will re-emphasize the fact that speeding itself is a crime.

At a time when police resources generally are spread thin, more and more drivers are casting aside all pretense of obeying speed laws.

Worse yet, drivers who do attempt to drive within speed limits are confronted with tailgating, light-flashing, horn-honking and other forms of harassment and rudeness.

Although the vast majority of us claim to be law-abiding, once behind the wheel, the vast majority of us do not find obedience to the law to be stylish.

Retired San Bernardino Police Chief Ray Rucker used to observe dryly that people get very upset when the homicide rate climbs but are unperturbed when the traffic accident death rate climbs just as high. Yet, either way, as he said, "The victim is just as dead."

The Sun's editorials represent the institutional view of the newspaper and the opinions of the members of its editorial board. If you know someone who should be considered for the rotating public member position on the board, or if you would like to be considered, please call Richard Kimball at (909) 386-3844.

San Bernardino County Sun
Editorial Sunday, 5 June 1994

■ **Inside:** Quick thinking averts fire deaths/B2 ■ **Inside:** Fire near freeway junction contained/B2

BUSINESS
Environmental Quality Act under fire/**B8**

INLAND EMPIRE

Metro | The Sun
(909) 386-3874 | Section B
Fax (909) 885-8741 | Saturday
July 16, 1994
★

POLICE

S.B. police target speeding motorists

By PAMELA FITZSIMMONS
Sun Staff Writer

SAN BERNARDINO — The sign said 40 mph.

Officer Tom Adams pointed his radar gun at the white Ford Taurus heading east on Base Line: 55 mph.

Score!

Adams hit the flashing lights on his motorcycle and pulled the car over.

"Gee whiz," said driver Richard James of San Bernardino. "I'm 78 years old. That's all I need — a speeding ticket."

James said he was hurrying to meet an 8:30 a.m. check-in time Friday for his rental car.

Unbeknownst to him, he also was part of a national experiment to see if catching speeders will reduce traffic accidents and crime in general.

A month ago, San Bernardino became one of three California cities selected by the National Highway Traffic Safety Administration to look at the impact of speed enforcement on other crime.

Traffic officers have been spending several hours a day targeting speeders in selected residential and commercial neighborhoods in the city.

The point is to find out if those neighborhoods also show a reduction in crime, such as burglaries and robberies, because of the increased presence of speed patrols.

It's too early to tell if there is a connection, said Sgt. Jenifer Aragon. The first month of the traffic program did show a drop in speed-related accidents.

In May, the month before the program began, San Bernardino had 81 speed-related crashes. In June, the first month of the program, there were 69.

Aragon said she will need six months worth of statistics before drawing any conclusions.

James was among 36 drivers who were cited Friday morning in one of the targeted areas of the speed program.

He had misgivings about the program.

"I think it's a trap."

Some drivers seemed to accept their tickets gladly.

"It was good police work," Danny Peace told Officer Steve Peck. "I must have gathered speed coming off the hill."

Peace, 40, of San Bernardino, thought he was going about 40 mph in a 45 mph zone, but Peck recorded him at 57 mph.

The intent of the speed program made sense to Peace.

"Anytime you have an area saturated with police, it makes a difference."

It's a good program if it reduces crime, said Dan Vasquez, 31, of San Bernardino, while Officer Ray King cited him.

"I knew I was wrong," said Vasquez who, according to King's radar, was traveling at 66 mph in a 45-mph zone.

"I was trying to make it to work on time."

Eddie Howard, 22, of Rialto also was running late for work when Officer Adams clocked him at 60 mph.

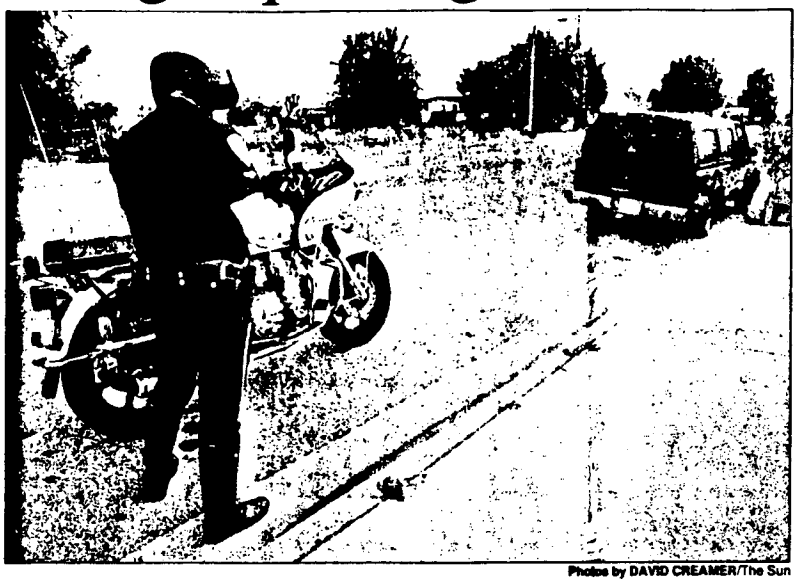
"I suppose it could reduce crime," he said. "I wish I had known about it."

The traffic officers feel sorry for some of the people they cite.

"Some of these people are just in a hurry," Adams said. "They don't realize if you're driving 60 mph you're moving at 88 feet per second. If you hit something, you're going to hit it at 88 feet per second."

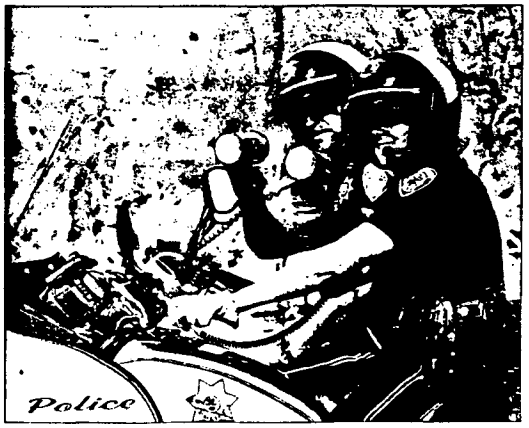
Then again, there's the thrill of victory.

Said Officer King, poised on his motorcycle, his eyes searching the road: "I'd like to catch a bus."



Photos by DAVID CREAMER/The Sun

Above: San Bernardino police Officer Steve Peck writes a ticket Friday morning on eastbound Base Line as part of the national Speed Watch program. **Below:** Officers Tracy Rogers, left and Vicki Potts check the speed of westbound traffic on Base Line at Pennsylvania Street.



Rialto Record

Serving the City of Rialto

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September 22, 1994 Volume 84, Number 22

Police Speedwatch program has seen fast rates decrease

By Denise Bell

Things are slowing down around San Bernardino thanks to the city police department Speedwatch program. Since the program's inception June 1, motorists in San Bernardino are watching their speedometers.

Officer Tom Adams said that if nothing else, Speedwatch will educate people a little. He estimated that about 24 percent of traffic crashes are related to speeding. This may be one of the main reasons for implementing the Speedwatch program.

Adams said that since the department started Speedwatch, speeding violations have been reduced. Complete data on the six-month program concluding in December is being compiled.

Adams said that as a traffic officer he may write as many as 160 tickets, for a variety of violations including speeding, each month. The officer said it is getting harder to catch speeders. "They're not bad people...," Adams said, "You almost feel bad when you have to stop them and give them a ticket." Officer Adams said that maybe as many has half of the drivers he stops are people with a suspended license or no license at all.

He said after nearly three years in the division he has heard a variety of excuses, though being late for work seems to be the most common. Adams said one of the more creative excuses he's heard was the driver saying he or she had to go to the bathroom.

Sergeant Jennifer Aragon said that some people may feel that they are being picked on, but they should just slow down and comply with the law.

Adams said the program is only available thanks to grants, because the department couldn't have afforded it due to a lack in funds and staffing. Speedwatch is receiving support from the county medical center, Auto Club of Southern California, Kids Against Crime, San Bernardino High School, the San Bernardino Area Chamber of Commerce, Mothers Against Drunk Driving and Green Speed.

The officer couldn't estimate the number of crashes reduced by the Speedwatch program, but during a two-hour period on patrol, one driver was pulled over for speeding in the Speedwatch area. The driver, Chris Weldon from Blue Jay, said he was usually very careful. He said he "had other things on his mind." Weldon said he feels signs such as "speed checked by radar" and seatbelt reminders are useful. He said his last ticket was more than 10 years ago.

There are six Speedwatch sites in San Bernardino. Previously, Adams said he has clocked vehicles doing more than 80 in a 35 mile-per-hour residential area.

Officer Jeff Lotspeich, who has been with the traffic division about four months, said, "People are really watching what they are doing out there."

When off duty, Adams, who after 10 years on the police force has seen the worst end of speeding incidents, said he drives at or below the speed limit.

APPENDIX F

EXAMPLES OF PUBLIC INFORMATION AND EDUCATIONAL MATERIALS

Radio Public Service Announcements

CITIZENS FOR SAFE DRIVING
PSA

START: ASAP
KILL: NOVEMBER 30, 1994

OPTION 1:

IF YOU LIVE IN MODESTO AND LIKE DRIVING FAST, LISTEN CLOSELY. AN INTENSIVE PROGRAM HAS BEGUN TO CRACK DOWN ON THOSE WHO SPEED OR FOLLOW TOO CLOSELY. POLICE OFFICERS HAVE BEEN EQUIPPED WITH NEW RADAR AND LASER GUNS. JOIN "CITIZENS FOR SAFE DRIVING" IN MAKING OUR STREETS SAFER.

OPTION 2:

IF YOU DRIVE TOO FAST OR TOO CLOSELY IN MODESTO, CHANCES ARE YOU'LL GET CAUGHT. THE CITY HAS BEGUN AN INTENSIVE PROGRAM TO CRACK DOWN ON THOSE WHO SPEED OR TAILGATE OTHER CARS. NEW RADARS AND LASER GUNS ARE NOW IN SERVICE. JOIN "CITIZENS FOR SAFER DRIVING" IN MAKING OUR STREETS SAFER.

CITIZENS FOR SAFE DRIVING

TOO FAST + TOO CLOSE = WRECK

Modesto, California

Speeding Myths & Facts

CITIZENS FOR SAFE DRIVING

TOO FAST + TOO CLOSE = WRECK

Modesto, California

Speeding Myths & Facts

CITIZENS FOR SAFE DRIVING

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Modesto, California

Speeding Myths & Facts

"Speeding is OK – everyone does it."

Approximately one-fourth of the motor vehicle collisions in California are attributable to drivers traveling at unsafe speeds. In California, 11.1 percent of all fatal motor vehicle collisions are caused by unsafe speeds. That's not OK.

"But I'm a safe driver – I won't hurt anyone by speeding."

Speeding can hurt all Californians. On average, pollution emissions from gasoline-powered automobile engines more than double when speeds are increased from 55 mph to 65 mph.

"I have to speed. I'm late!"

On the average 20-mile trip, only three minutes will be gained by driving steadily at 65 mph instead of 55 mph. Three minutes is not a long time.

"Gas is still relatively cheap. And fuel efficiency really isn't that important to me. Why should I slow down?"

Gasoline prices are rising and driving faster costs more. There is an average loss of two percent in fuel economy for every mile over 55 mph. Further, if speed limits were observed on California freeways alone, it is estimated that 650 million gallons of gasoline could be saved each year, saving consumers approximately $815 million.

"Getting a speeding ticket can't be that expensive, can it?"

Speeding can result in costly tickets, taint a person's driving record and increase vehicle insurance rates. For example, the fine for driving 10 mph over the speed limit in Modesto is $54, plus traffic school expenses and increased insurance rates, bringing the average total to $200. That's not cheap.

There are too many other people speeding. It's not a priority for law enforcement officials, so I probably won't ge caught."

Approximately 2.2 million speeding citations were issued in California in 1991. Drivers are getting caught and speeding is against the law.

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No expiration

This coupon good for life

LIFE-SAVER COUPON

SAVE $200*

No gimmicks, no purchase necessary.

* By obeying the speed limits on our streets and highways you are guaranteed a savings of at least $200. If you receive a ticket for speeding, however, the average fine, administrative costs, and auto insurance charges will average a total of $200 or more in Modesto.

PLEASE WATCH YOUR SPEED AND DRIVE SAFELY.

A public service of the *Citizens for Safe Driving* Traffic Safety Committee.

No expiration

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Representative Fines for Speeding in Modesto

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11 to 15 MPH	$81
16-20 MPH	$108
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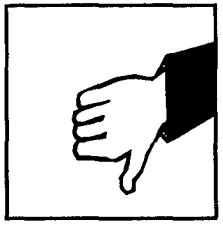
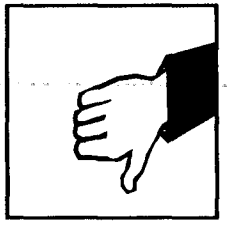


MYTH #5

"Getting a speeding ticket can't be that expensive, can it?"

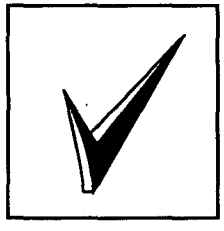
FACT

Speeding can result in costly tickets, taint a person's driving record and increase vehicle insurance rates. For example, the fine for driving 13 mph over the freeway speed limit in Los Angeles County is $35, plus an extra $69 in penalty assessments, bringing the total to $104. That's not cheap.



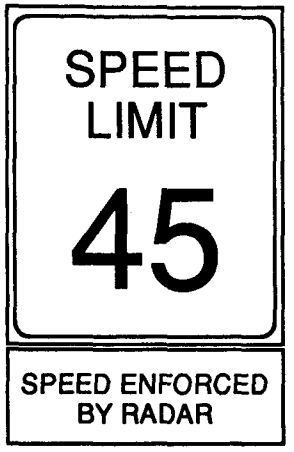
MYTH #6

There are too many other people speeding. It's not a priority for law enforcement officials, so I probably won't ge caught."



FACT

Approximately 2.2 million speeding citations were issued in California in 1991. Drivers are getting caught and <u>speeding is against the law.</u>

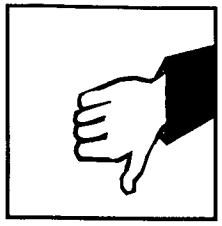


SPEEDING:

FACTS AND MYTHS

--community logo here--

SPEEDING: *FACTS AND MYTHS*

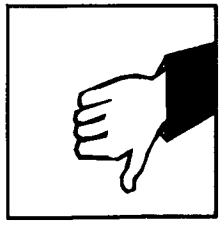


MYTH #1

"Speeding is OK -- everyone does it."

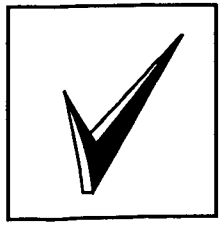
FACT

Approximately one-fourth of the motor vehicle collisions in California are attributable to drivers traveling at unsafe speeds. In California, 11.1 percent of all fatal motor vehicle collisions are caused by unsafe speeds. That's not OK.



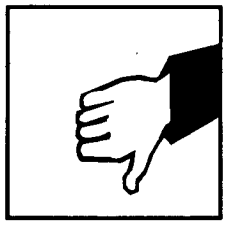
MYTH #2

"But I'm a safe driver -- I won't hurt anyone by speeding."



FACT

Speeding can hurt all Californians. On average, pollution emissions from gasoline-powered automobile engines more than double when speeds are increased from 55 mph to 65 mph.

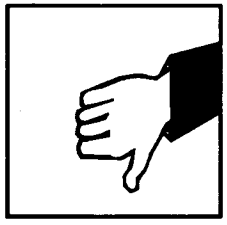


MYTH #3

"I have to speed. I'm late!"

FACT

On the average 20-mile trip, only three minutes will be gained by driving steadily at 65 mph instead of 55 mph. Three minutes is not a long time.



MYTH #4

"Gas is still relatively cheap. And fuel efficiency really isn't that important to me. Why should I slow down?"

FACT

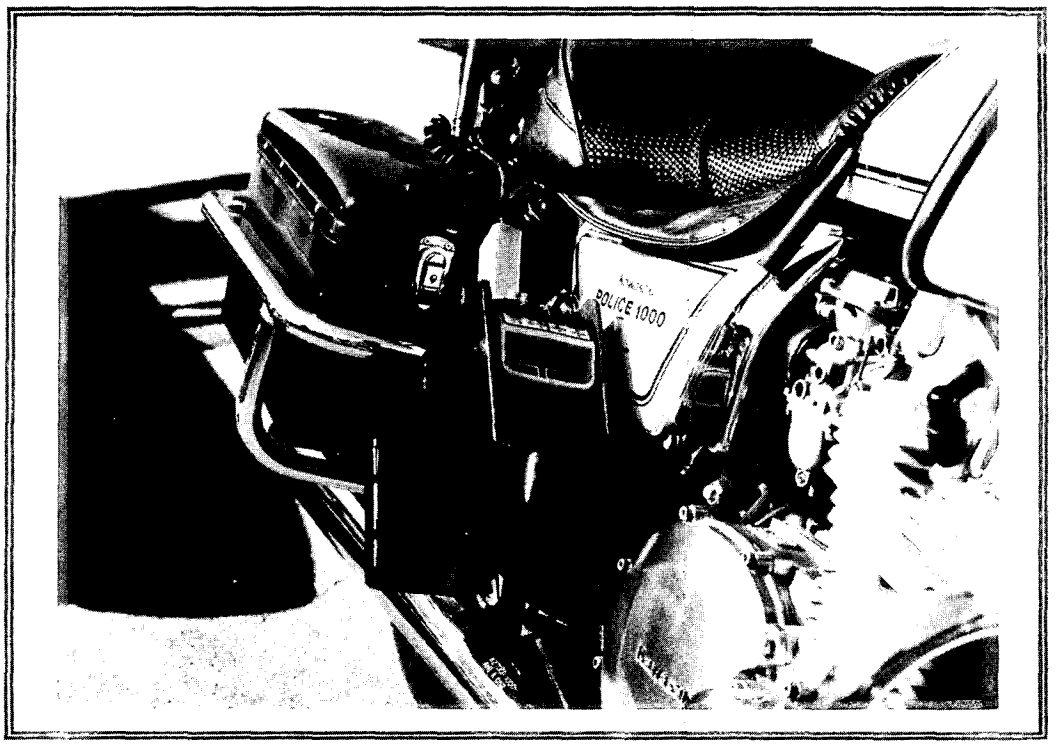
Gasoline prices are rising and driving faster costs more. There is an average loss of two percent in fuel economy for every mile over 55 mph. Further, if speed limits were observed on California freeways alone, it is estimated that 650 million gallons of gasoline could be saved each year, saving consumers approximately $815 million.

Bumper Sticker

SPECIAL ENFORCEMENT ZONE

SPEED ENFORCED BY RADAR AND LASER

MODESTO POLICE DEPARTMENT
and
CITIZENS FOR SAFE DRIVING



Holster for ProLaser

Bus Bench in San Bernardino

APPENDIX G

MONTHLY SUMMARIES OF MAJOR PROGRAM ACTIVITIES

SAN BERNARDINO
Speed Enforcement Program

May 1994
(The month prior to program implementation)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meetings (4).
- Selected program name and logo–*Speedwatch*..
- Recruited program support committee chairperson, Dr. Dev Gnanadev, Director of Trauma Services at San Bernardino County Medical Center.
- Scheduled and planned program kick-off press conference.
- Developed program banner, painted by San Bernardino High School students for use during press conference and future display at locations and events.
- Prepared Lifesavers Coupon and Speeding Myths & Facts flyers for distribution during program.
- Prepared press kit for kick-off press conference.
- Prepared radio and TV public service announcements for broadcast immediately after kick-off press conference and throughout first month of program.
- Recruited new committee members representing San Bernardino Chamber of Commerce, MADD, DARE., Kids Against Crime, Green Speed, and San Bernardino High School.
- Photographed officer for Speedwatch poster.
- Made arrangements for 25 bus bench advertisements to be displayed throughout the city during the program.
- Designed and printed bumper stickers.
- Conducted DMV Survey.
- Collected program data.

MODESTO

Speed & Following Headway Enforcement

May 1993
(The month prior to program implementation)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meetings (4).
- Scheduled and planned program kick-off press conference.
- Prepared press kit for kick-off press conference.
- Selected "Car Wars" theme for speed enforcement program; features music, characters, and phrases--"slow down and back off or the force (i.e., Modesto police force, that is) will be with you"--from the *Star Wars* movies (Modesto is filmmaker George Lucas' home town).
- Special emphasis placed on following headway in all program materials being developed by committee.
- Designed and printed bumper stickers.
- Prepared radio and TV public service announcements for broadcast immediately after kick-off press conference and throughout first month of program.
- Made arrangements for Darth Vader to make special guest appearance at the kick-off press conference.
- Conducted DMV Survey.
- Collected program data.

SAN BERNARDINO
Speed Enforcement Program

June 1994 (Month 1)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meetings (1).
- Speed awareness PSAs on radio and television.
- Held program kick-off press conference on Wednesday, June 1, at North Orange Showgrounds in San Bernardino. Speakers included Dr. Dev Gnanadev (program support committee chair), Daniel Robbins (chief of police), and Craig Miller (NHTSA representative). Several local politicians and governement representatives attended the conference The press conference concluded with demonstrations of braking distances and the radar/laser speed detection equipment.
- Presentations describing the Speedwatch program were made by Speedwatch committee members at Chamber of Commerce meetings held on June 1 and 22.
- Extensive newspaper coverage of the program including a front page story on the kick-off press conference, and a favorable editorial describing the importance of the crime research being conducted as part of the program. Newspaper articles appeared in the *San Bernardino Sun* and several other multi-lingual papers serving San Bernardino.
- Bus bench advertising went on display June 1.
- Implemented special speed enforcement activity.
- Conducted DMV Survey.
- Collected program data.

MODESTO
Speed & Following Headway Enforcement

June 1993 (Month 1)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meetings (2).
- Speed awareness PSAs on radio and television.
- Held program kick-off press conference on Friday, June 3, at the corner of Coffee Road and Scenic Avenue (a speed enforcement zone) in Modesto. Speakers included Dr. Michael Rossini (program support committee chair), Paul Jefferson (chief of police), and Paul snodgrass (NHTSA representative). The entire motorcycle traffic unit was present and provided an imposing backdrop for the proceedings. An automobile recently involved in a speed-related crash was also on display to reinforce the consequences of speeding. The press conference concluded with a demonstration of radar and laser speed detection equipment.
- Dr. Rossini and Traffic Sargeant Burl Condit were featured guests on a local call-in cable program called *Crimeline Modesto*.. The entire hourlong program was devoted to discussions of speed enforcement and traffic safety in Modesto. The program was repeated several times during the months of June and July.
- Bumper stickers were distributed throughout the community and placed on every patrol vehicle in the department.
- Press coverage of the kick-off press conference included an extensive newspaper article on the first page of the *Modesto Bee's* Metro section, television coverage by three local network affiliates, and radio coverage by two local radio stations.
- Implemented special speed enforcement activity.
- Conducted DMV Survey.
- Collected program data.

SAN BERNARDINO
Speed Enforcement Program

July 1994 (Month 2)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meetings (2).
- Speed awareness PSAs on radio and television.
- Displayed Speedwatch banner, painted by San Bernardino High School students, on the E Street pedestrian bridge in downtown San Bernardino during the entire month of July.
- Distributed Speedwatch program materials (including flyers and bumper stickers) at a seatbelt checkpoint held on July 14.
- A detailed newspaper article describing the special speed enforcement efforts of the SBPD appeared in the July 16 issue of the *San Bernardino Sun*.
- Bus bench advertising continued during July. Predicted exposure of the program is expected to exceed 17 million exposures of the Speedwatch message over the life of the program.
- Continued special speed enforcement activity.
- Conducted DMV Survey.
- Collected program data.

MODESTO
Speed & Following Headway Enforcement

July 1993 (Month 2)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meetings (2).
- Speed awareness PSAs on radio and television.
- A detailed newspaper article describing the special speed enforcement efforts of the MPD appeared in the July 14 issue of the *Modesto Bee.*
- Distributed bumper stickers and other program materials at the County Fair and at the local AAA office.
- A local driving school agreed to distribute bumper stickers to students through the remainder of the program.
- *Crimeline Modesto* television program featuring program support committee members was broadcast several times during July.
- Continued special speed enforcement activity.
- Conducted DMV Survey.
- Collected program data.

SAN BERNARDINO
Speed Enforcement Program

August 1994 (Month 3)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meeting (1).
- Speed awareness PSAs on radio and television.
- NHTSA PSA broadcast on city television station three to four times per week.
- New radio PSAs (English and Spanish language) delivered to local stations.
- Distributed Speedwatch program materials (including flyers and bumper stickers) at a DUI checkpoint on August 11 (approximately 1,100 driver contacts), at the Red Ribbon Booth in Carousel Mall on August 13, and at a bicycle rodeo on August 16.
- Displayed Speedwatch campaign message on electronic billboard at National Orange Showgrounds, and on marquee sign boards at three local high schools. Message reads "SPEED LIMITS SAVE LIVES. WE'RE PUTTING OUT FOOT DOWN SO YOU WON'T!. SPEEDWATCH."
- Bus bench advertising continued during August. Predicted exposure of the program is expected to exceed 17 million exposures of the Speedwatch message over the life of the program.
- Continued special speed enforcement activity.
- Conducted DMV Survey.
- Collected program data.

MODESTO
Speed & Following Headway Enforcement

August 1994 (Month 3)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meetings (2).
- Speed awareness PSAs on radio and television.
- Radio PSAs broadcast on KDJK-FM rock radio station approximately once a day.
- NHTSA PSA broadcast on city television station three to four times per week.
- A letter to the editor of the Modesto Bee supporting the special speed enforcement efforts of the MPD appeared in the August 1 issue of the paper (see attached).
- Distributed program materials (including flyers and bumper stickers) to local hospitals and businesses.
- "Speed Enforcement Zone" posters delivered to businesses operating within speed enforcement zones.
- Special radio news story describing mid-program results prepared by Steve Ramirez, news director of KDJK-FM radio.
- Continued special speed enforcement activity.
- Conducted DMV Survey.
- Collected program data.

SAN BERNARDINO
Speed Enforcement Program

September 1994 (Month 4)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meeting.
- Speed awareness PSAs on radio and television.
- NHTSA PSA broadcast on city television station three to four times per week.
- Speedwatch program poster delivered to committee. Two hundred posters were distributed to businesses and organizations operating within the six speed enforcement zones by members of Kids Against Crime. Many more were distributed at the annual Route 66 celebration in San Bernardino (see below).
- Distributed Speedwatch program materials (including posters, flyers and bumper stickers) at a DUI checkpoint on September 16 (approximately 1,100 driver contacts) and a seatbelt checkpoint on September 22 (similar number of contacts); and at the Route 66 celebration from September 16 through 18.
- Newspaper articles describing the progress and success of the San Bernardino speed enforcement efforts were published in the *Colton Courier* and the *Rialto Record* on September 22. Both newspapers serve the San Bernardino metropolitan area.
- Bus bench advertising continued during September and is likely to remain in place through the remainder of the program.
- Continued special speed enforcement activity.
- Conducted DMV Survey.
- Collected program data.

MODESTO
Speed & Following Headway Enforcement

September 1994 (Month 4)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meetings (2).
- Speed awareness PSAs on radio and television.
- Special news program describing the progress of MPD speed enforcement was broadcast on KDJK-FM radio early in September. Program was repeated several times during the month.
- NHTSA PSA broadcast on city television station three to four times per week.
- Great viewer interest in the speed enforcement program was expressed during the September 15 broadcast of the *Crimeline* cable television program. A majority of the callers talked about increased speed enforcement in the city or wanted speed enforcement in their neighborhoods.
- A television news report describing the speed enforcement program appeared on Channel 40 (the Fox network affiliate in Sacramento) in mid-September.
- Conducted DMV Survey.
- Collected program data.

SAN BERNARDINO
Speed Enforcement Program

October 1994 (Month 5)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meeting.
- Speed awareness PSAs on radio and television.
- NHTSA PSA broadcast on city television station three to four times per week.
- Speedwatch program banner flown during the annual Red Ribbon Parade on Saturday, October 15. Banner carried by several members of Kids Against Crime and escorted by two motor units from the SBPD traffic squad. Parade broadcast citywide over the community television channel and repeated several times during the following weeks.
- Distributed Speedwatch program materials (including posters, flyers and bumper stickers) at a DUI checkpoint on October 14 (approximately 1,100 driver contacts) and a seatbelt checkpoint on October 20 (similar number of contacts); and at Red Ribbon celebrations held from October 15 through 21.
- Speedwatch traffic safety awareness booth set up at the Carousel Mall Health and Safety Fair on Saturday, October 29. A continuous loop video featuring interviews with officers, motorcycle officer pursuits, and drivers receiving speeding tickets was presented during the event. Program posters, flyers and bumper stickers were also distributed to the public.
- Bus bench advertising continued during October.
- Continued special speed enforcement activity.
- Conducted DMV Survey.
- Collected program data.

MODESTO

Speed & Following Headway Enforcement

October 1994 (Month 5)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meetings (2).
- Speed awareness PSAs on radio and television.
- The California Highway Patrol began issuing daily announcements to the news media of impending traffic enforcement in Stanislaus County cities and rural areas. Planned speed enforcement activities in Modesto are included in the announcements and broadcast over local radio stations each morning.
- NHTSA PSA broadcast on city television station three to four times per week.
- Fifty permanent speed enforcement zone signs were purchased by the police department and placed at high crash and complaint locations throughout the city.
- Conducted DMV Survey.
- Collected program data.

SAN BERNARDINO
Speed Enforcement Program

November 1994 (Month 6)

MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meeting.
- Speed awareness PSAs on radio and television.
- NHTSA PSA broadcast on city television station three to four times per week.
- Distributed Speedwatch program materials (including posters, flyers and bumper stickers) at a DUI checkpoint on November 10 (approximately 1,100 driver contacts), and a seatbelt checkpoint on November 17 (similar number of contacts).
- Bus bench advertising continued through the end of November. The advertising will remain on the benches indefinitely until new advertisers are found.
- Continued special speed enforcement activity.
- Conducted DMV Survey.
- Collected program data.

MODESTO

Speed & Following Headway Enforcement

November 1994 (Month 6)

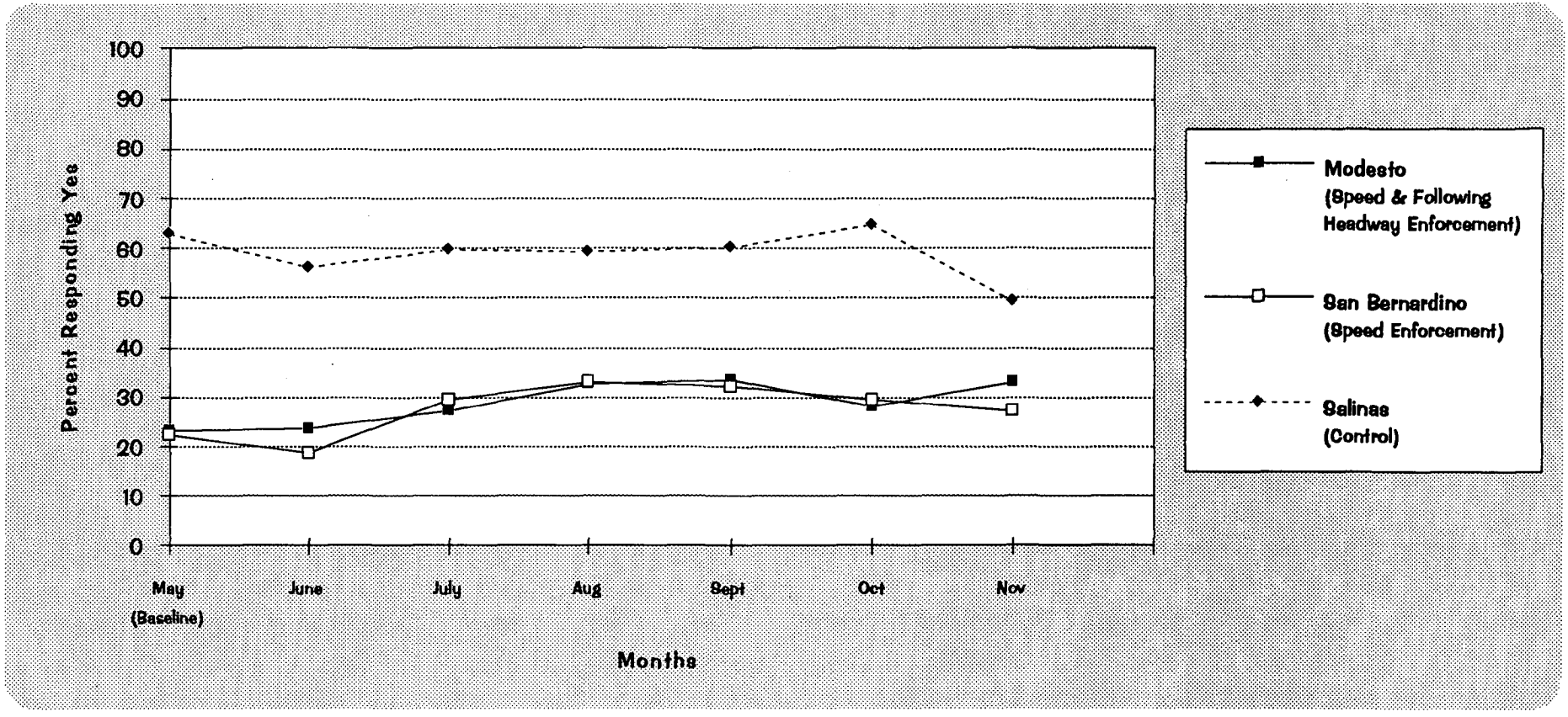
MAJOR PROGRAM ACTIVITIES

- Conducted Program Support Committee Meetings (2).
- Speed awareness PSAs on radio and television.
- The California Highway Patrol continued to issue daily announcements to the media of impending traffic enforcement in Stanislaus County cities and rural areas. Planned speed enforcement activities in Modesto are included in the announcements and broadcast over local radio stations each morning.
- NHTSA PSA broadcast on city television station three to four times per week.
- Conducted DMV Survey.
- Collected program data.

APPENDIX H

DMV SURVEY DATA AND FIGURES

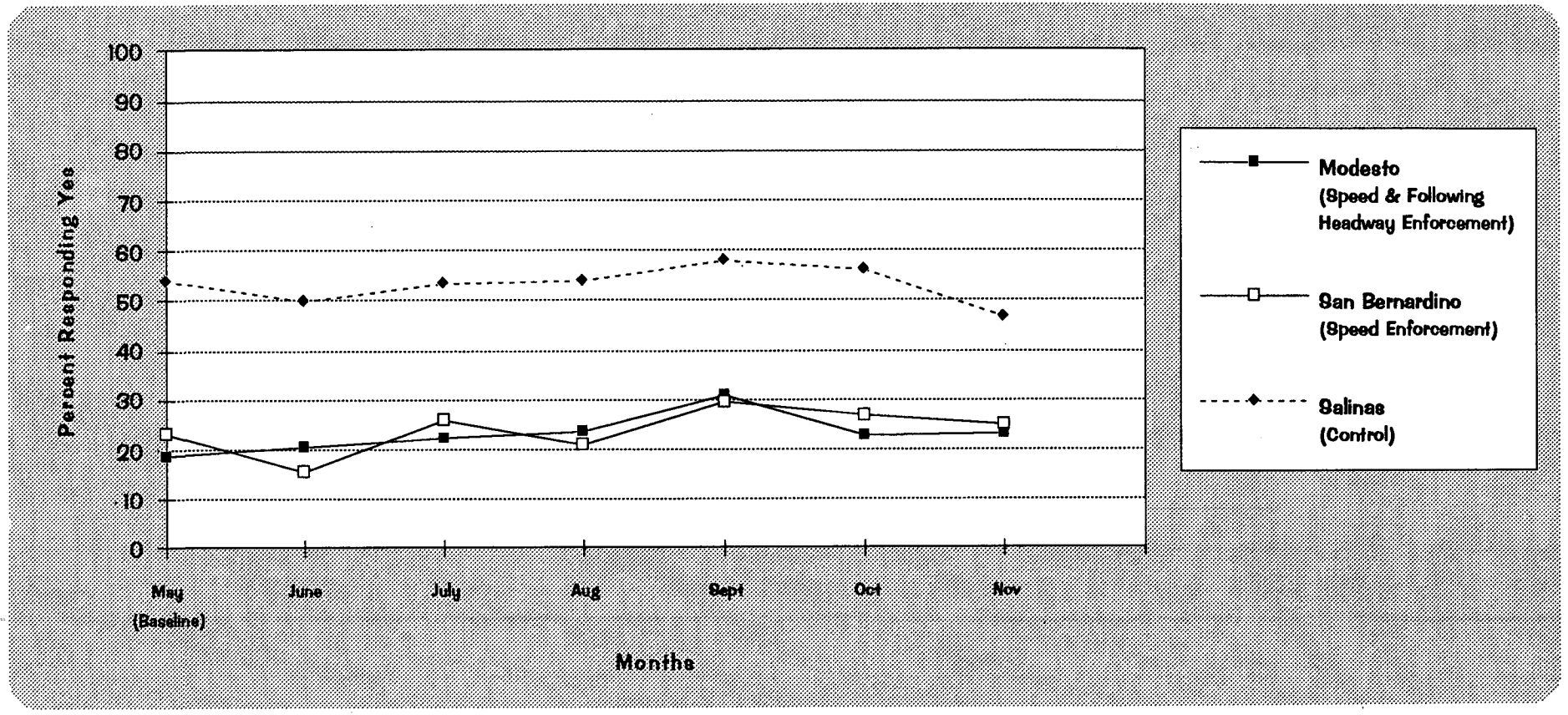
Question 5: Before this survey, had you ever heard of special speed enforcement in Modesto & San Bernardino, or of speed enforcement in Salinas?



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	23.308 (266)	23.826 (298)	27.143 (210)	32.558 (301)	33.333 (213)	28.261 (184)	33.117 (154)
San Bernardino	22.344 (273)	18.75 (176)	29.31 (174)	33.019 (212)	32.065 (184)	29.534 (193)	27.083 (192)
Salinas	62.759 (145)	56.061 (132)	59.804 (204)	59.259 (54)	60 (20)	64.444 (90)	49.315 (73)

Percent Responding Yes
(n)

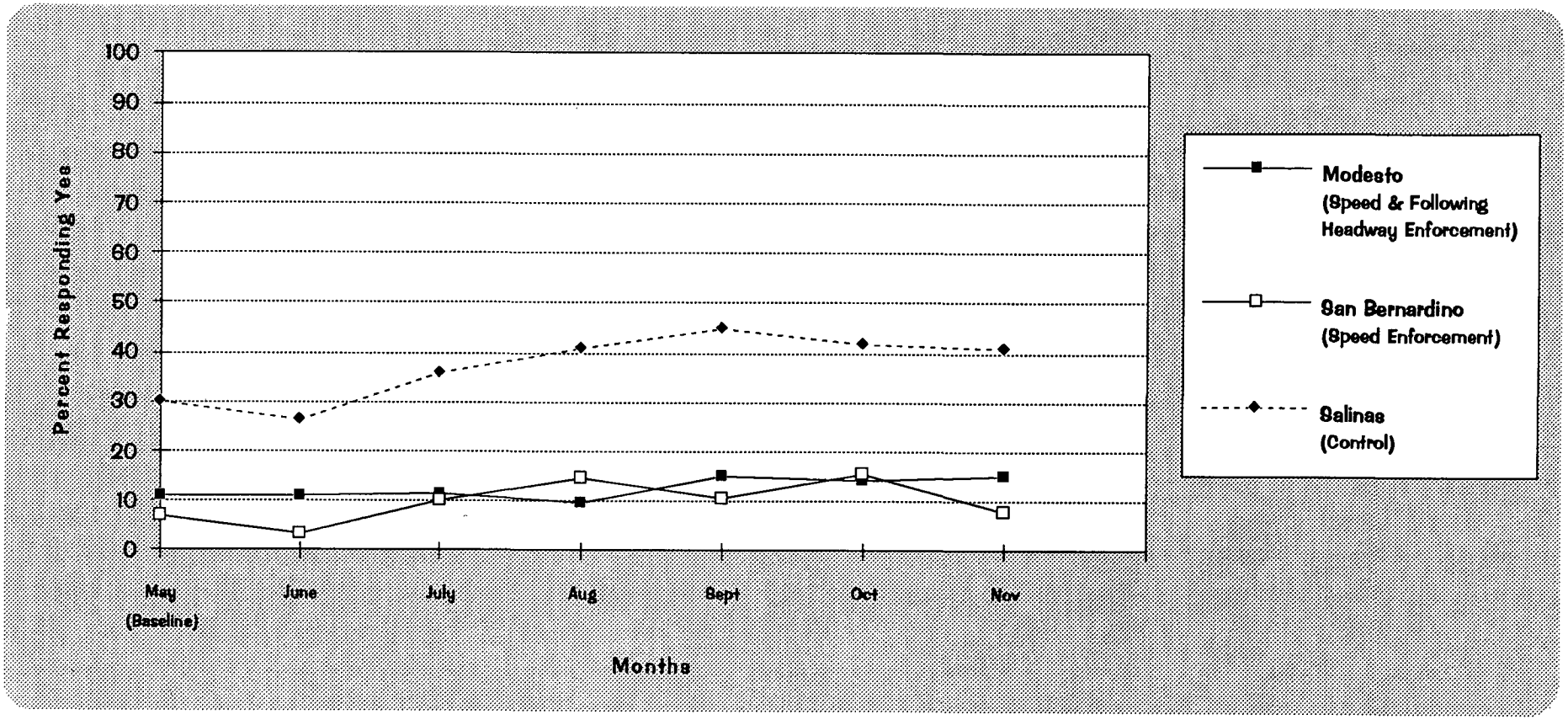
Question 6: Before this survey, had you ever <u>seen</u> special speed enforcement in Modesto & San Bernardino, or speed enforcement in Salinas?



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	18.631 (263)	20.339 (295)	22.167 (203)	23.81 (294)	30.622 (209)	22.581 (186)	23.026 (152)
San Bernardino	23.048 (269)	15.517 (174)	25.882 (170)	21.053 (209)	29.57 (186)	26.984 (189)	25.134 (187)
Salinas	53.793 (145)	49.612 (129)	53.535 (198)	53.846 (52)	57.895 (19)	56.044 (91)	46.377 (69)

Percent Responding Yes
(n)

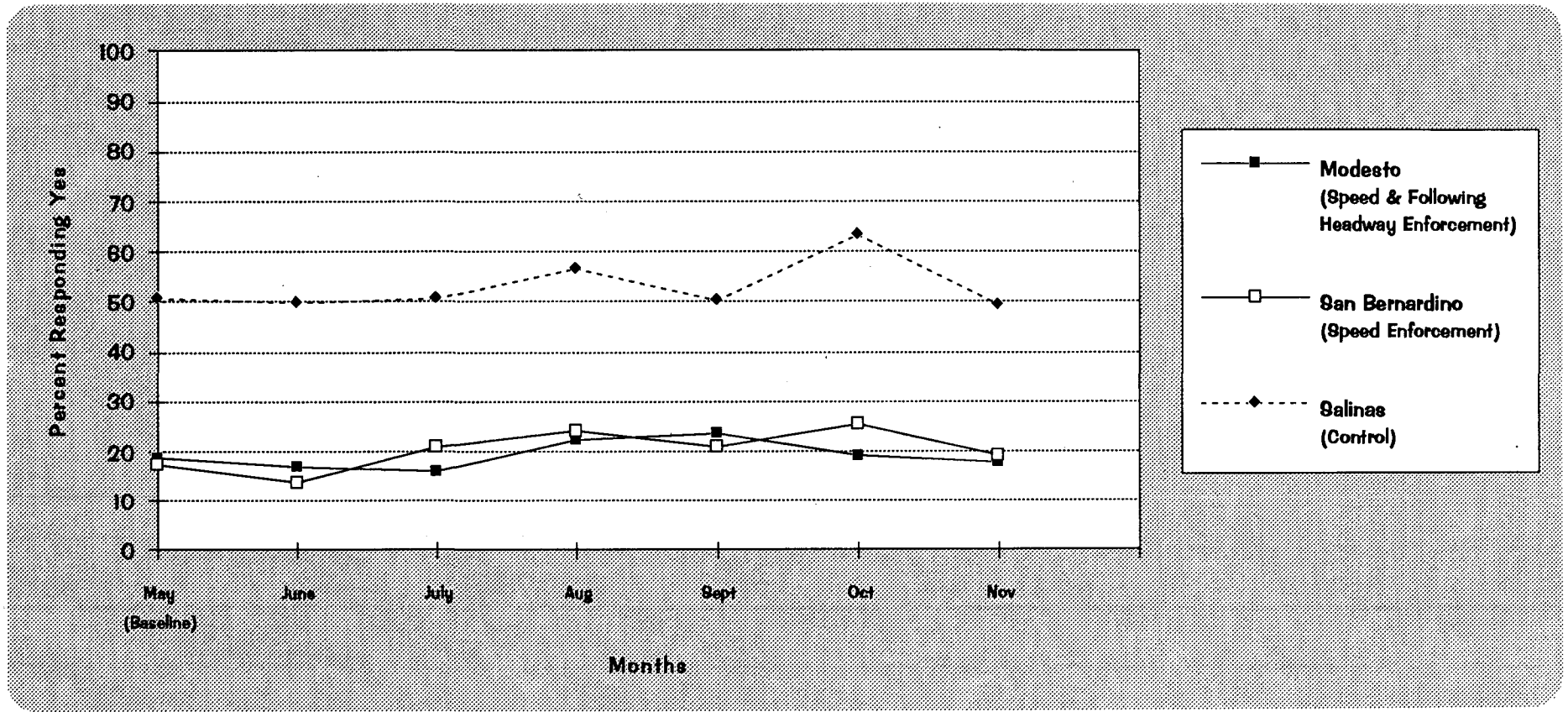
Question 7: Before this survey, had you ever driven by a car stopped by special speed enforcement in Modesto & San Bernardino, or by speed enforcement in Salinas?



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	10.902	11.149	11.65	9.524	15.049	14.054	15.033
	(266)	(296)	(206)	(294)	(206)	(185)	(153)
San Bernardino	6.985	3.409	10.119	14.423	10.753	15.426	7.979
	(272)	(176)	(168)	(208)	(186)	(188)	(188)
Salinas	29.861	26.19	35.784	40.741	45	41.758	40.845
	(144)	(126)	(204)	(54)	(20)	(91)	(71)

Percent Responding Yes
(n)

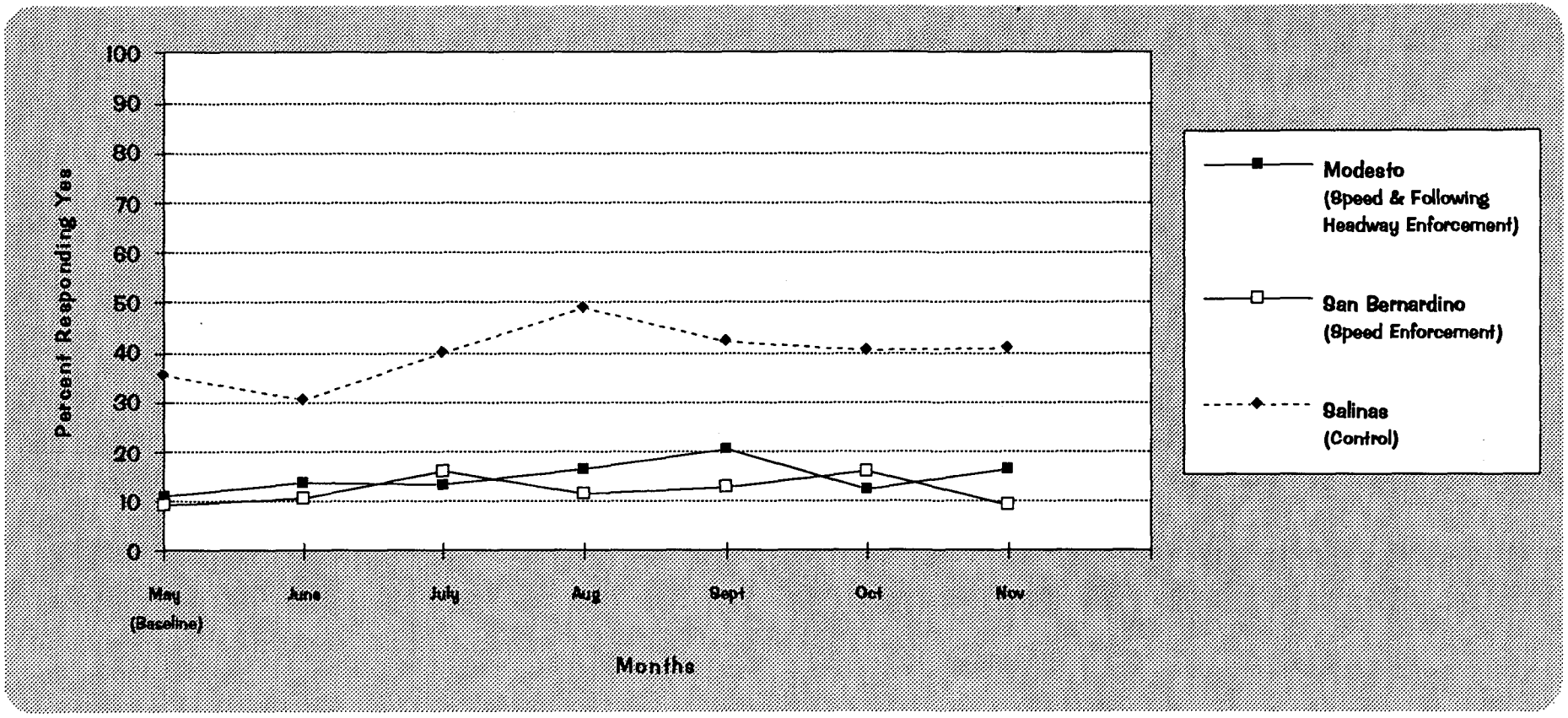
Question 8a: Have you ever seen/heard about speed enforcement (Special Program in Modesto and San Bernardino; general enforcement in Salinas) in your community on <u>television</u>?



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	18.504 (254)	16.961 (283)	15.957 (188)	22.064 (281)	23.5 (200)	19.318 (176)	17.857 (140)
San Bernardino	17.442 (258)	13.855 (166)	21.118 (161)	24.121 (199)	20.809 (173)	25.543 (184)	18.889 (180)
Salinas	50.735 (136)	49.606 (127)	50.432 (188)	56.604 (53)	50 (18)	63.333 (90)	49.254 (67)

Percent Responding Yes
(n)

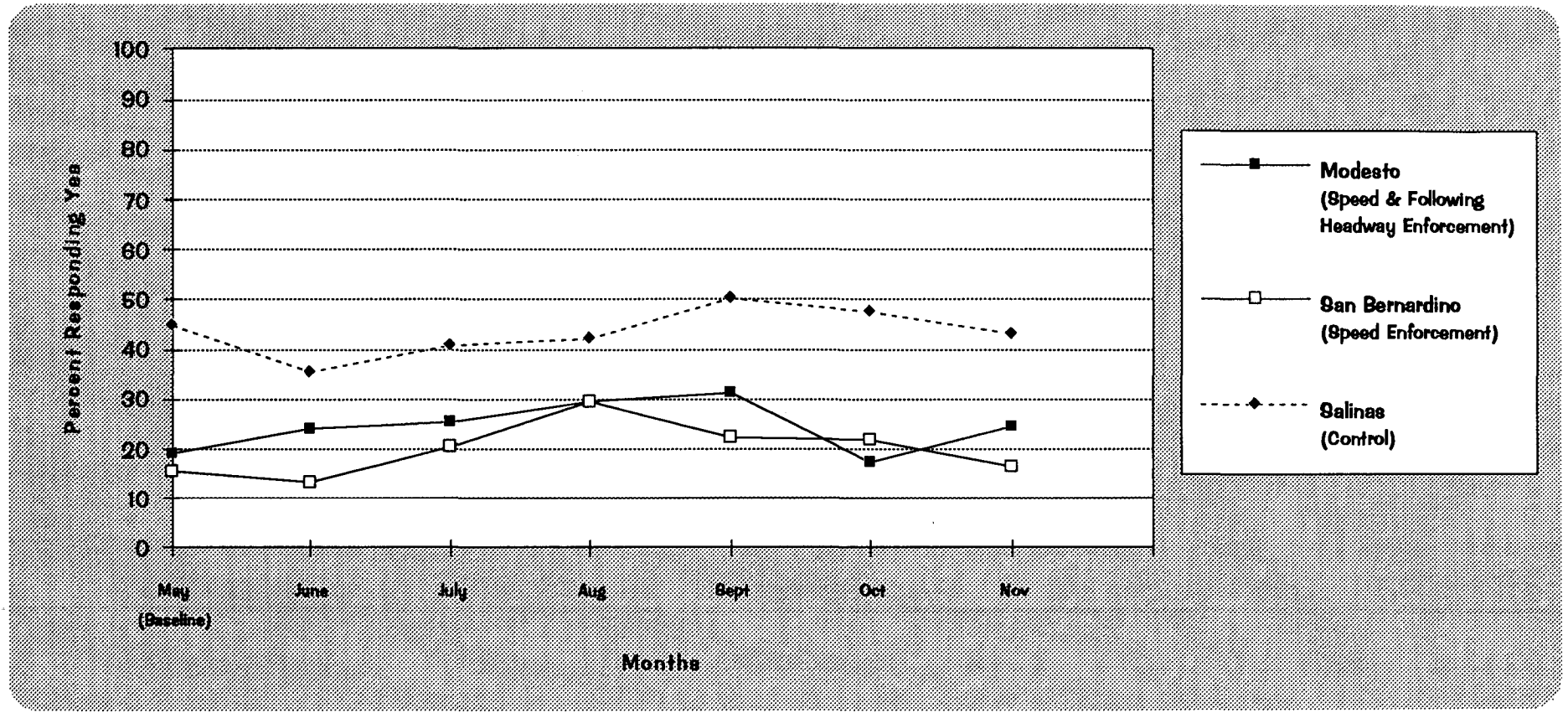
Question 8b: Have you ever seen/heard about speed enforcement (Special Program in Modesto and San Bernardino; general enforcement in Salinas) in your community on radio?



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	11.157 (242)	13.806 (268)	13.333 (180)	16.236 (271)	20.312 (192)	12.571 (175)	16.296 (135)
San Bernardino	9.205 (239)	10.559 (161)	15.789 (152)	11.29 (186)	12.805 (164)	16.092 (174)	8.982 (167)
Salinas	35.433 (127)	30.328 (122)	39.674 (184)	49.02 (51)	42.105 (19)	40.254 (82)	40.741 (54)

Percent Responding Yes
(D)

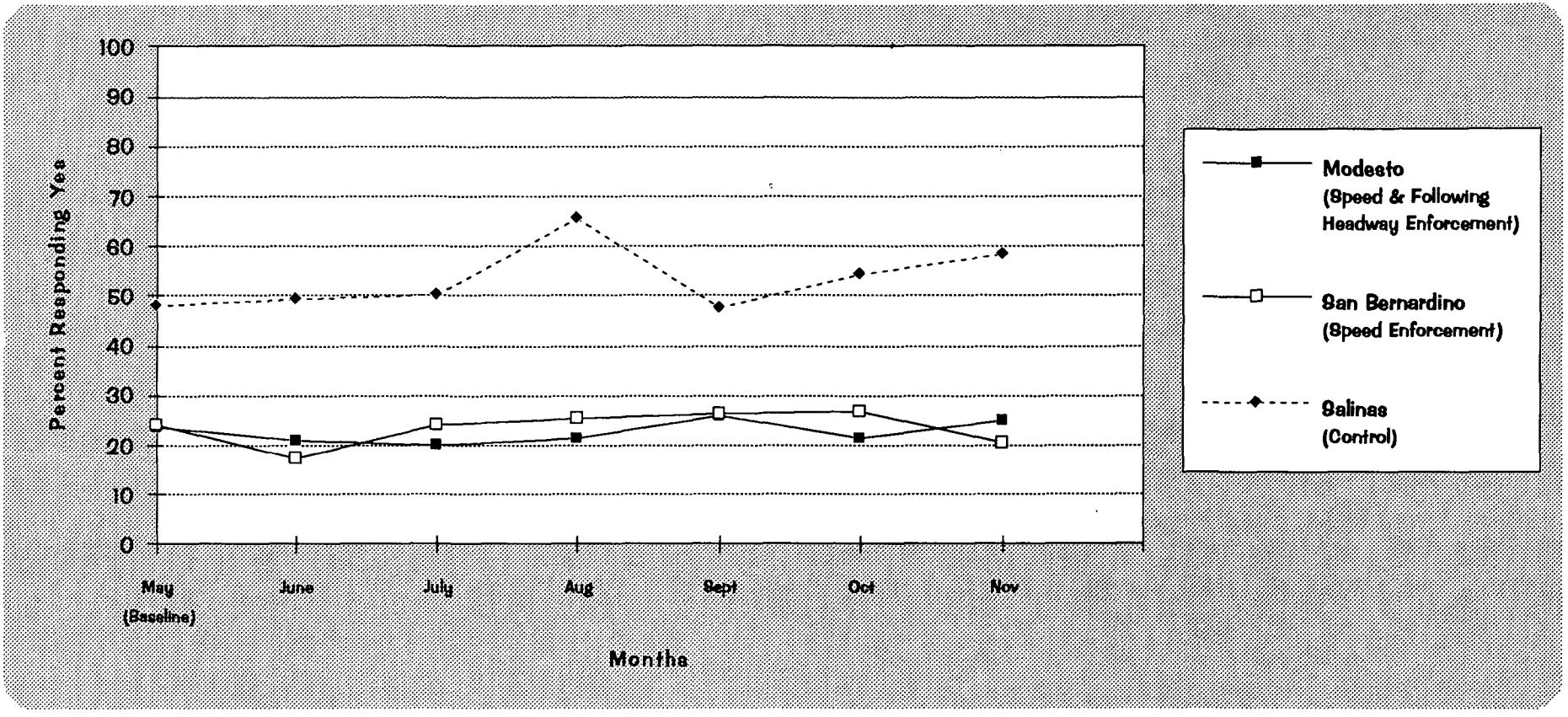
Question 8c: Have you ever seen/heard about speed enforcement (Special Program in Modesto and San Bernardino; general enforcement in Salinas) in your community in the newspaper?



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	19.008 (242)	24.074 (270)	25.543 (184)	29.643 (280)	31.217 (189)	17.341 (173)	24.46 (139)
San Bernardino	15.481 (239)	13.043 (161)	20.382 (157)	29.319 (191)	22.093 (172)	21.714 (175)	16.568 (169)
Salinas	44.8 (125)	35.484 (124)	40.678 (177)	42 (50)	50 (20)	47.5 (80)	42.857 (56)

Percent Responding Yes
(n)

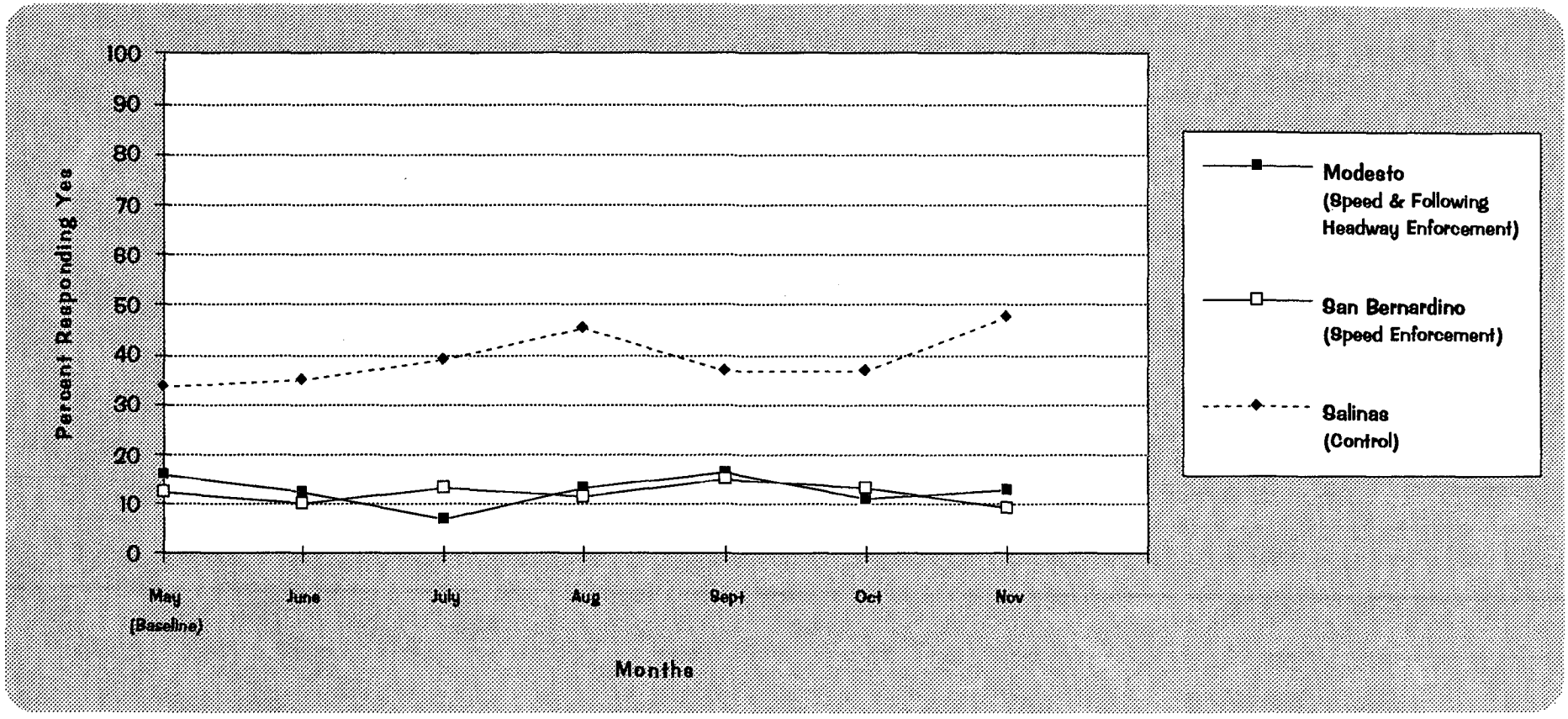
Question 8d: Have you ever heard about speed enforcement (Special Program in Modesto and San Bernardino; general enforcement in Salinas) in your community from friends?



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	23.577 (246)	21.014 (276)	20.219 (183)	21.533 (274)	25.789 (190)	21.367 (171)	24.812 (134)
San Bernardino	23.887 (247)	17.178 (163)	24.026 (154)	25.397 (189)	26.506 (166)	26.705 (178)	20.238 (168)
Salinas	48 (125)	49.194 (124)	50 (188)	65.385 (52)	47.368 (19)	54.321 (81)	58.333 (60)

Percent Responding Yes
(n)

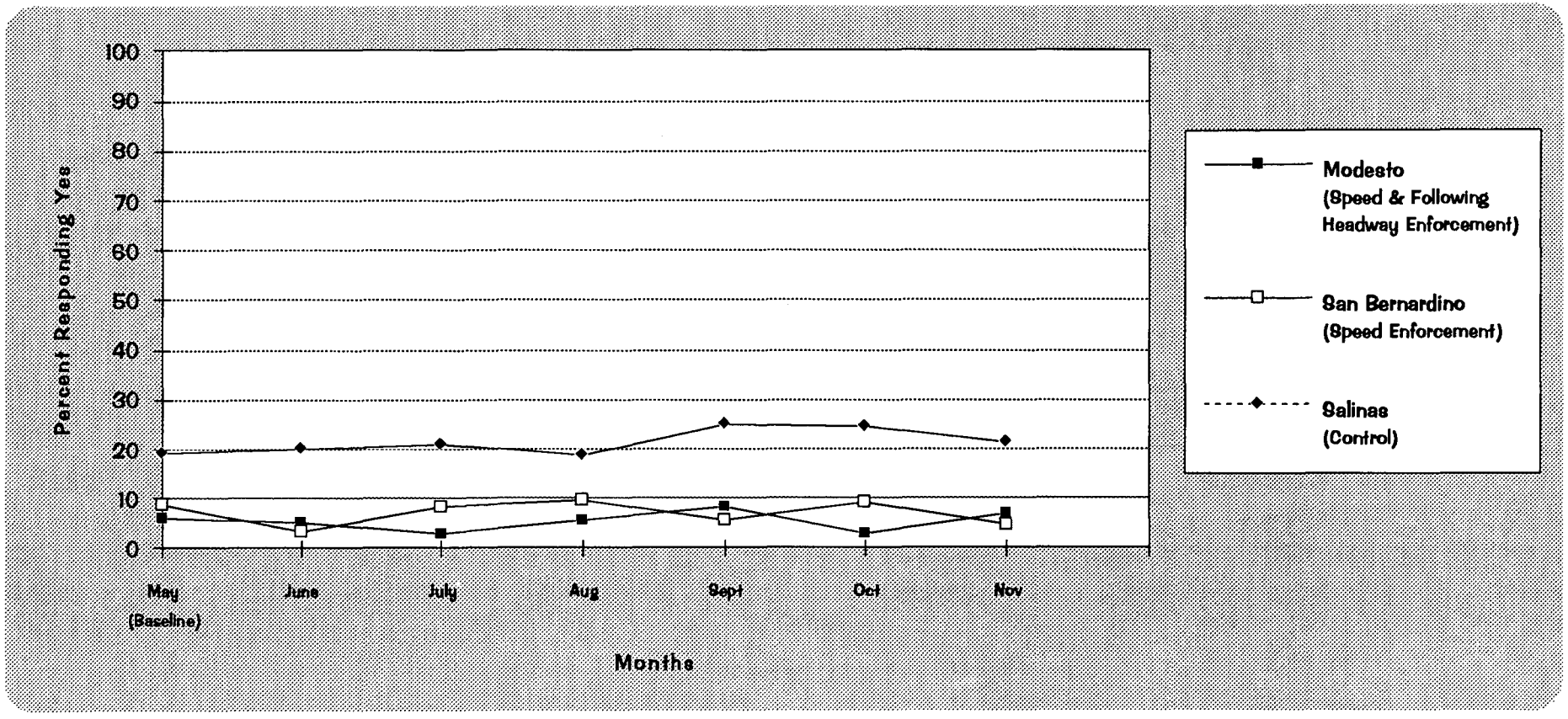
Question 8e: Have you ever seen/heard about speed enforcement (Special Program in Modesto and San Bernardino; general enforcement in Salinas) in your community at work?



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	16.116 (242)	12.222 (270)	6.78 (177)	13.383 (269)	16.489 (188)	10.778 (167)	12.687 (134)
San Bernardino	12.134 (239)	9.938 (161)	13.158 (152)	11.29 (186)	15.244 (164)	13.45 (171)	9.146 (164)
Salinas	33.607 (122)	35 (120)	38.889 (180)	45.098 (51)	36.842 (19)	36.709 (79)	47.368 (57)

Percent Responding Yes
(n)

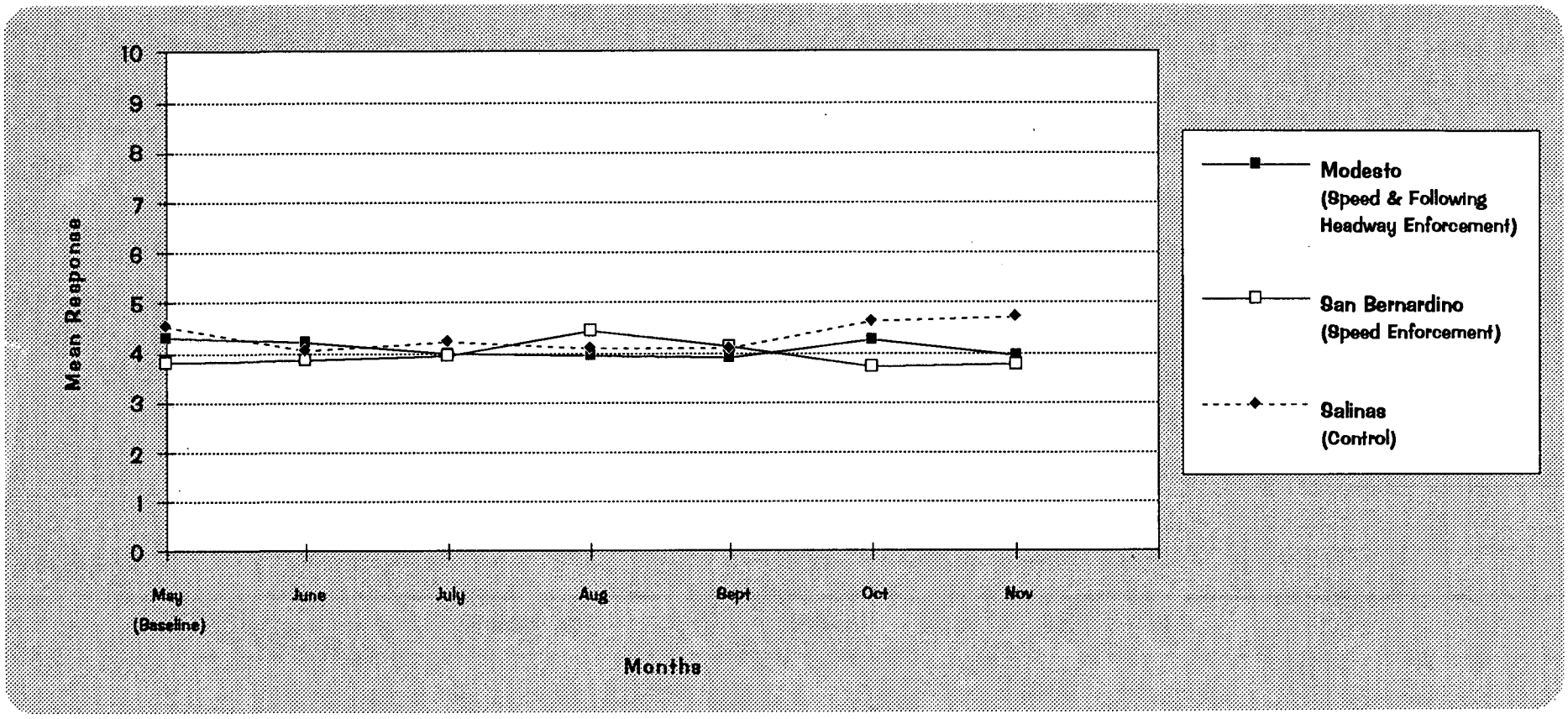
Question 8f: Have you ever seen/heard about speed enforcement (Special Program in Modesto and San Bernardino; general enforcement in Salinas) from a community organization?



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	5.957 (235)	5.204 (269)	2.89 (173)	5.618 (267)	8.511 (188)	3.03 (165)	6.716 (134)
San Bernardino	8.898 (236)	3.165 (158)	8.108 (148)	9.677 (186)	5.488 (164)	9.412 (170)	4.908 (163)
Salinas	19.328 (119)	20.168 (119)	20.69 (174)	18.75 (48)	25 (20)	24.359 (78)	21.429 (56)

Percent Responding Yes
(n)

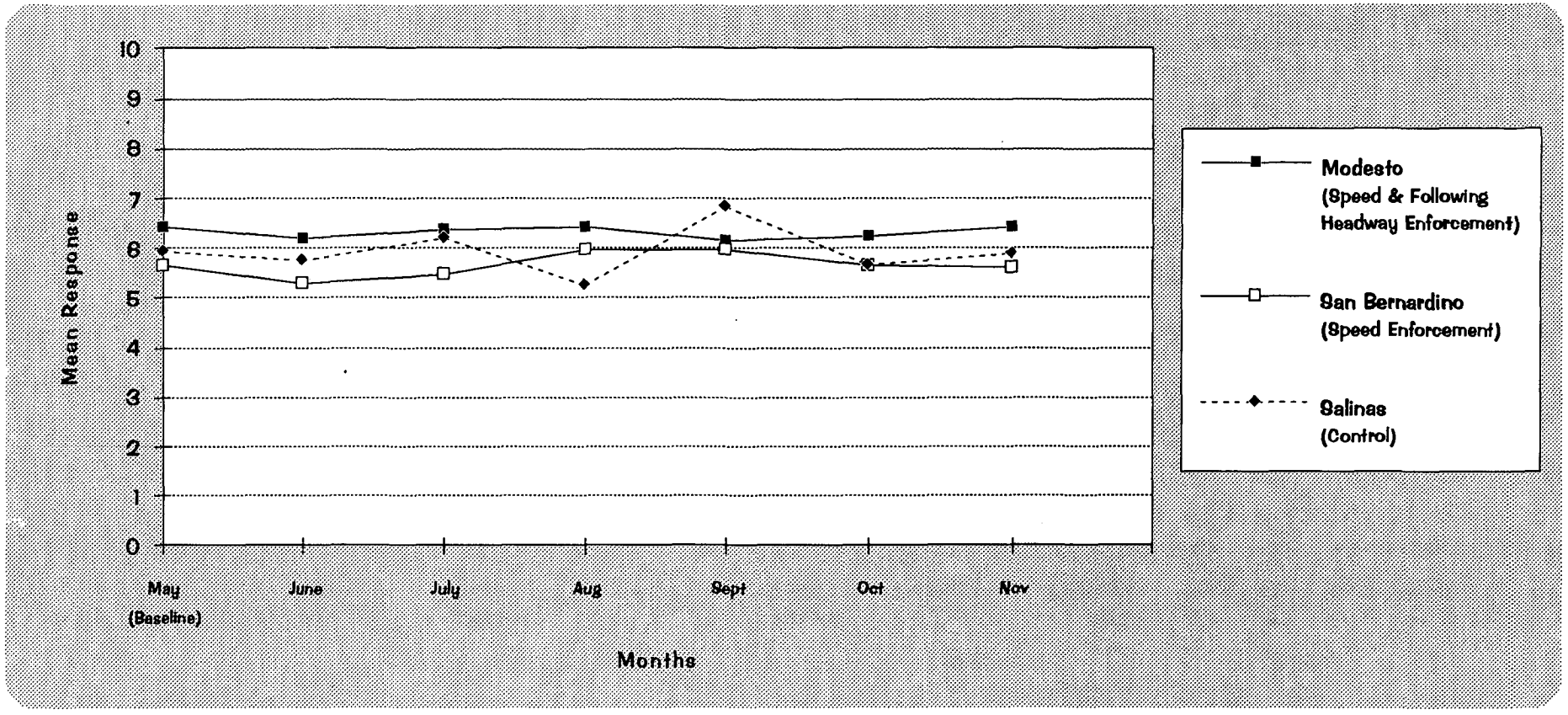
Question 9: If you were driving across town on city streets and were exceeding the speed limit by at least 10 MPH, what are the chances that you would be stopped by a law enforcement officer? (1=1 out of 10; 2=2 out of 10; etc.)



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	4.293 (232, 2.981)	4.198 (247, 2.822)	4.006 (170, 2.594)	3.943 (245, 2.768)	3.905 (211, 2.741)	4.234 (175, 2.66)	3.938 (146, 2.486)
San Bernardino	3.818 (231, 2.796)	3.855 (172, 2.819)	3.936 (141, 2.676)	4.429 (189, 2.968)	4.116 (181, 3.01)	3.727 (187, 2.685)	3.765 (183, 2.792)
Salinas	4.523 (128, 3.112)	4.051 (117, 2.962)	4.207 (184, 3.096)	4.078 (51, 2.822)	4.056 (18, 2.754)	4.624 (85, 3.259)	4.719 (64, 3.099)

Mean Response
(n, sd)

Question 10: If you were driving across town on city streets and were exceeding the speed limit by at least 10 MPH, what are the chances that you would be cited if you were stopped by a law enforcement officer? (1=1 out of 10; 2=2 out of 10; etc.)

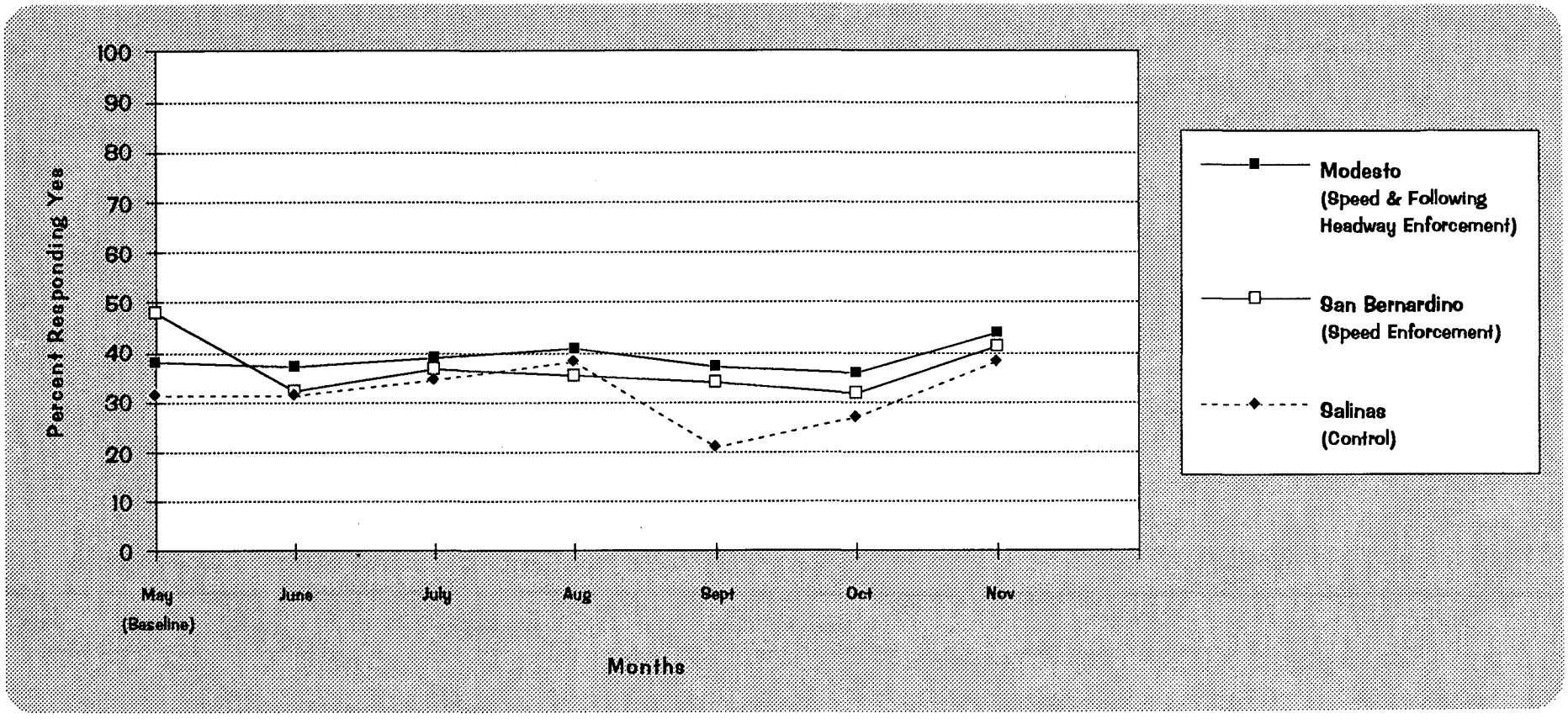


Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	6.427 (232, 3.421)	6.202 (242, 3.438)	6.38 (166, 3.273)	6.423 (239, 3.333)	6.163 (209, 3.27)	6.253 (178, 3.203)	6.429 (147, 3.339)
San Bernardino	5.668 (228, 3.369)	5.278 (169, 3.407)	5.45 (140, 3.215)	5.973 (185, 3.236)	5.961 (181, 3.413)	5.645 (183, 3.456)	5.622 (180, 3.407)
Salinas	5.935 (123, 3.389)	5.757 (115, 3.278)	6.193 (181, 3.487)	5.25 (52, 3.247)	6.833 (18, 3.417)	5.632 (87, 3.534)	5.889 (63, 3.57)

Percent Responding Yes
(n, sd)

Question 11: If you had to drive, and you knew in advance that there was going to be speed enforcement somewhere in your community (Special Speed Enforcement in Modesto and San Bernardino; general speed enforcement in Salinas) would you drive as usual, drive slower than usual, or drive no faster than the posted speed limit?

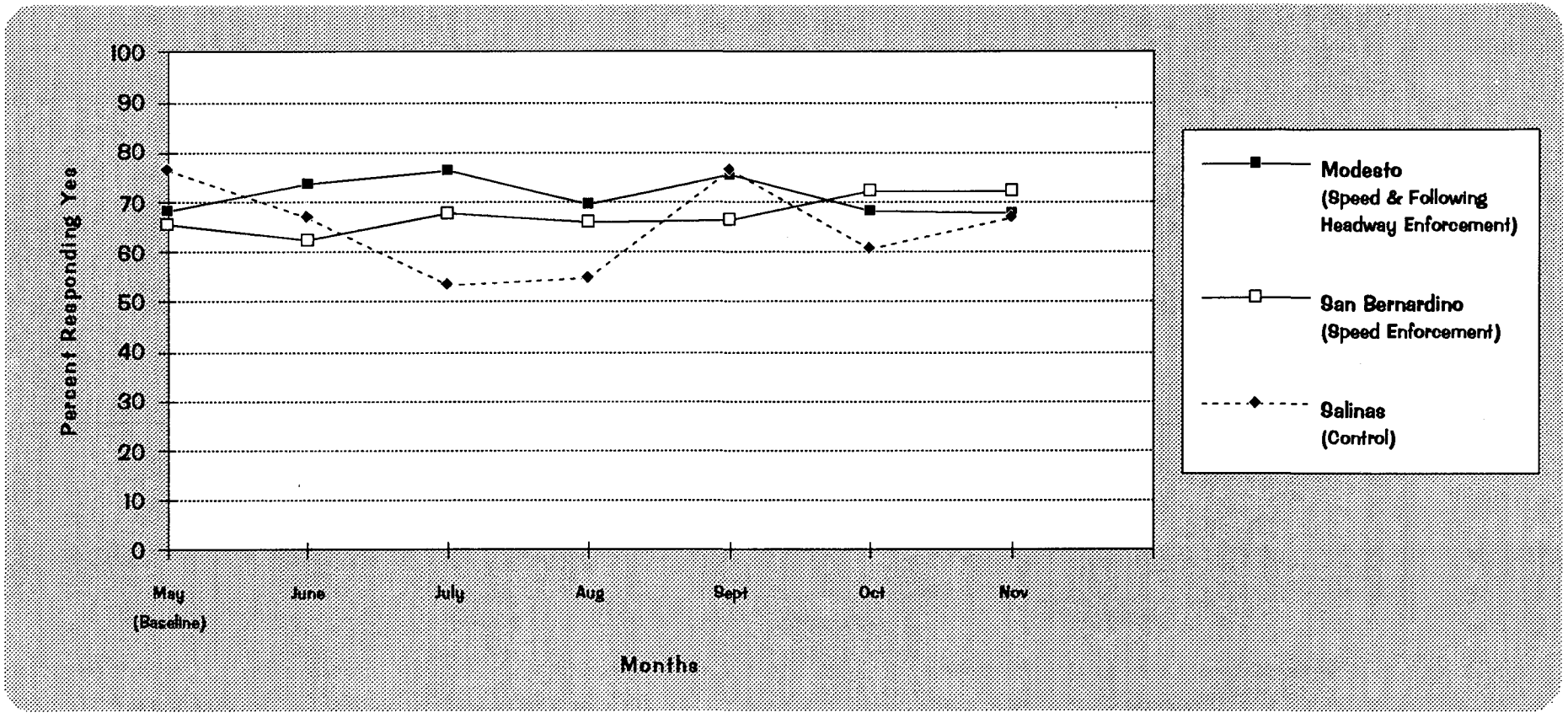
(Percent responding "Drive as Usual")



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	38.235 (238)	37.052 (251)	38.728 (173)	40.945 (254)	37.264 (212)	35.676 (185)	43.791 (153)
San Bernardino	48.101 (237)	31.977 (172)	36.735 (147)	35.263 (190)	33.88 (183)	31.746 (189)	41.146 (192)
Salinas	31.298 (131)	31.148 (122)	34.254 (181)	38.182 (55)	21.053 (19)	26.966 (90)	38.235 (68)

Percent Responding "Drive as Usual"
(n)

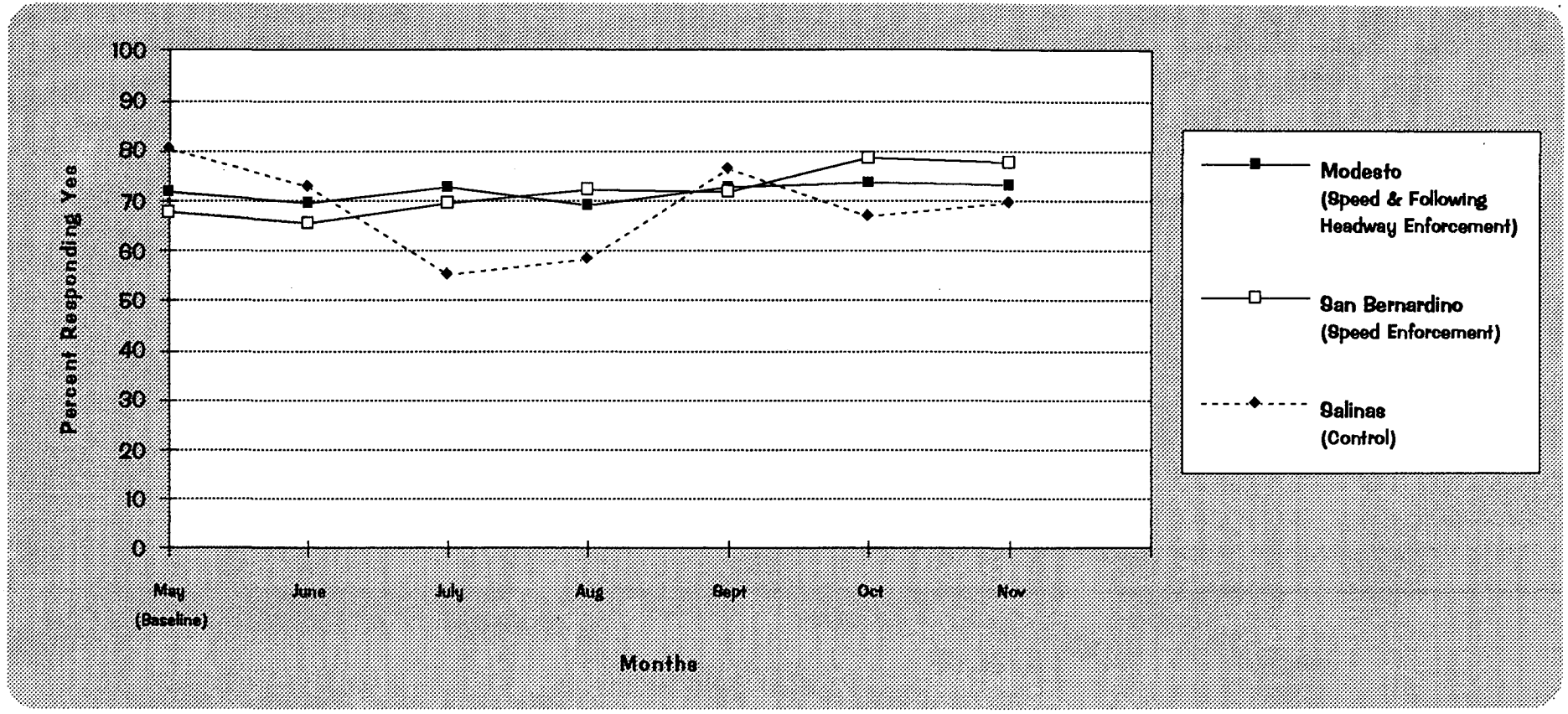
Question 12: How much do you think speed enforcement (Special Speed Enforcement in Modesto and San Bernardino; general speed enforcement in Salinas) helps reduce vehicle speeding?
(Percent responding "Some" to "A lot")



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	68.162 (223)	73.451 (226)	76.129 (155)	69.737 (228)	75.384 (195)	68.125 (160)	67.882 (154)
San Bernardino	65.741 (216)	62.5 (160)	67.91 (134)	65.922 (179)	66.464 (164)	72.067 (179)	72.093 (172)
Salinas	76.562 (128)	66.667 (114)	53.513 (185)	54.717 (53)	76.471 (17)	60.502 (86)	66.667 (66)

Percent Responding "Some" to "A lot"
(n)

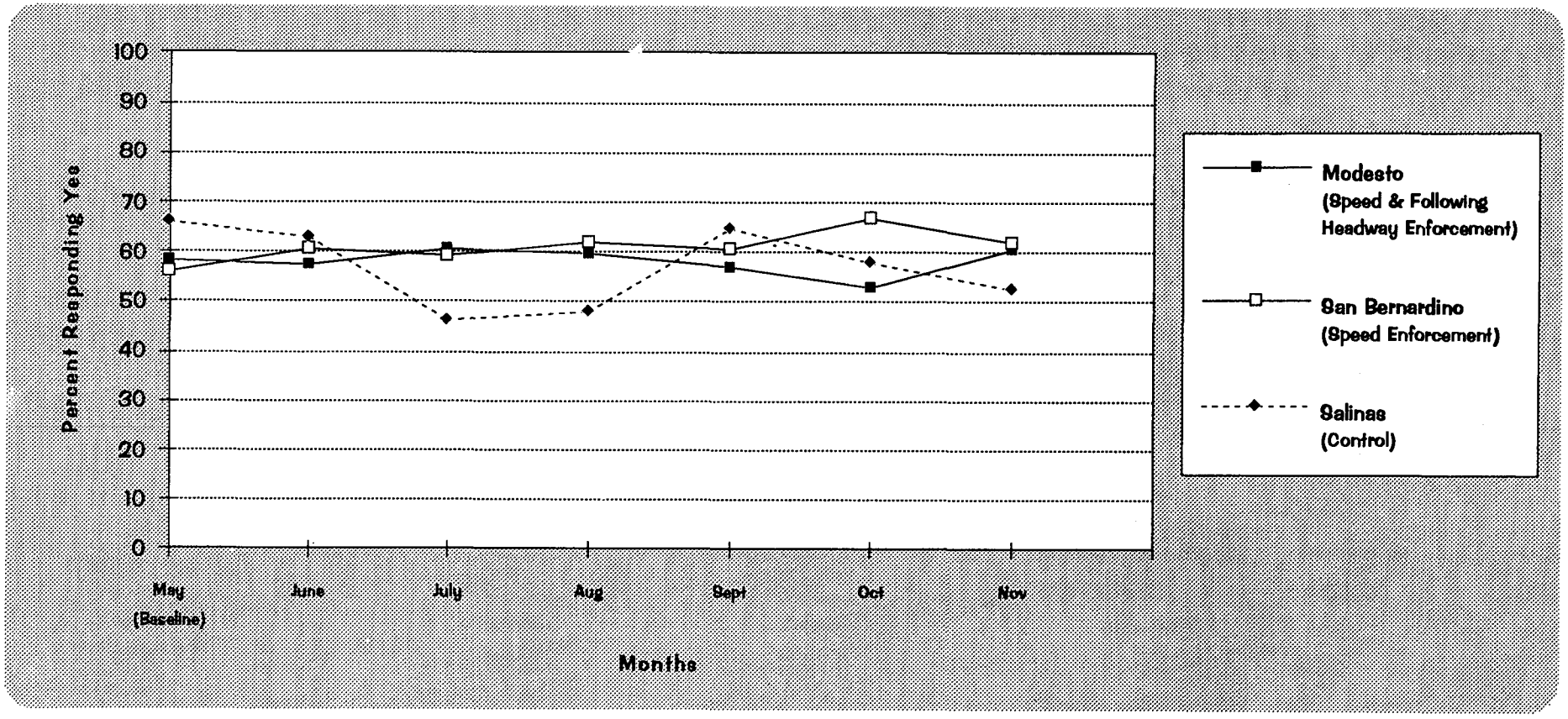
Question 13: How much do you think speed enforcement (Special Speed Enforcement in Modesto and San Bernardino; general speed enforcement in Salinas) helps reduce the number and seriousness of speed-related crashes? (Percent responding "Some" to "A lot")



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	71.806 (227)	69.737 (228)	72.548 (153)	69.299 (228)	72.916 (192)	73.75 (160)	73.333 (135)
San Bernardino	67.742 (217)	65.625 (160)	69.403 (134)	72.223 (180)	73.951 (164)	78.651 (178)	77.585 (174)
Salinas	80.315 (127)	72.807 (114)	55.319 (188)	58.491 (53)	76.471 (17)	67.059 (85)	69.698 (66)

Percent Responding "Some" to "A lot"
(n)

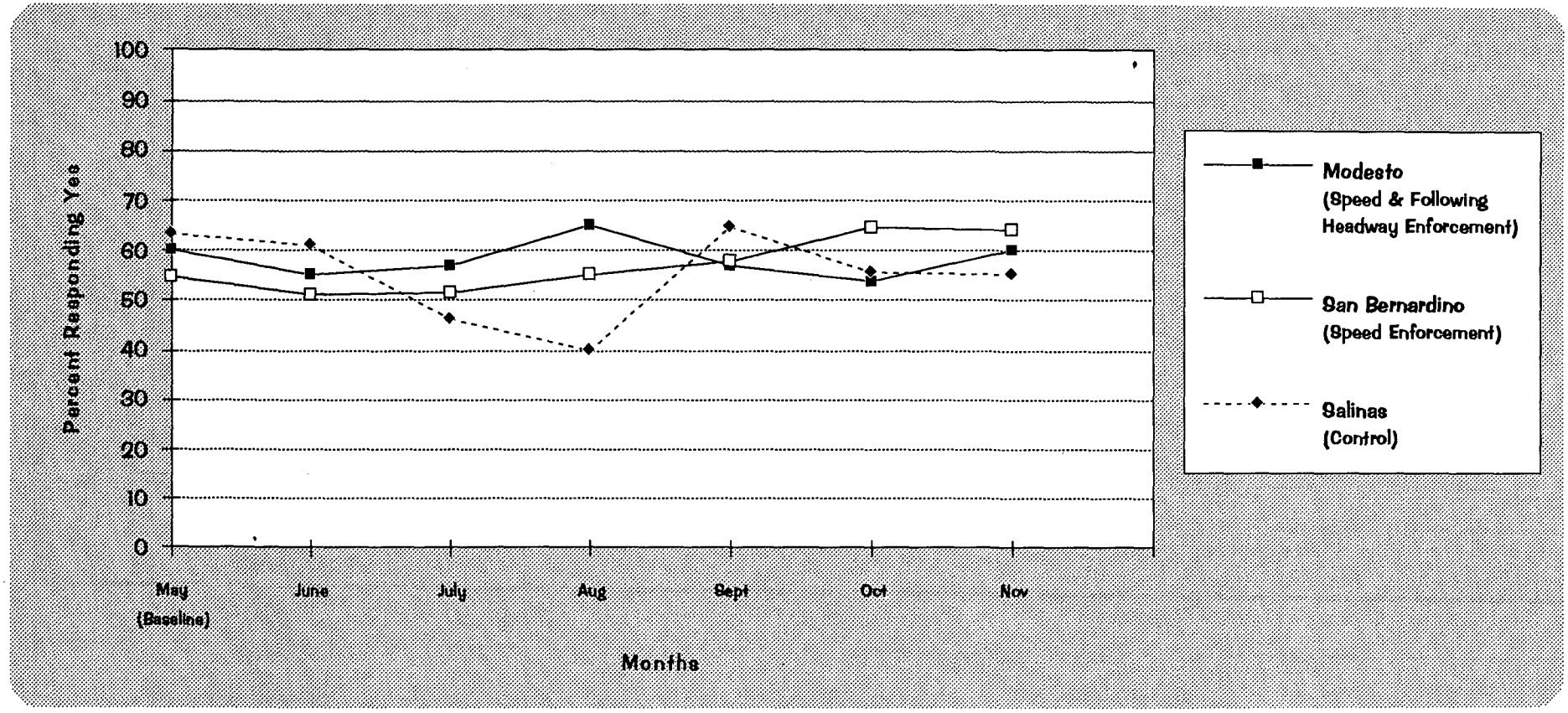
Question 14: How much do you think speed enforcement (Special Speed Enforcement in Modesto and San Bernardino; general speed enforcement in Salinas) contributes to catching people wanted for crimes? (Percent responding "Some" to "A lot")



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	58.222 (225)	57.268 (227)	60.39 (154)	59.649 (228)	56.995 (193)	52.831 (159)	60.584 (137)
San Bernardino	55.963 (218)	60.625 (160)	59.091 (132)	62.011 (179)	60.605 (165)	67.415 (178)	61.849 (173)
Salinas	66.141 (127)	62.832 (113)	48.237 (186)	48.149 (54)	64.705 (17)	57.647 (85)	52.307 (65)

Percent Responding "Some" to "A lot"
(n)

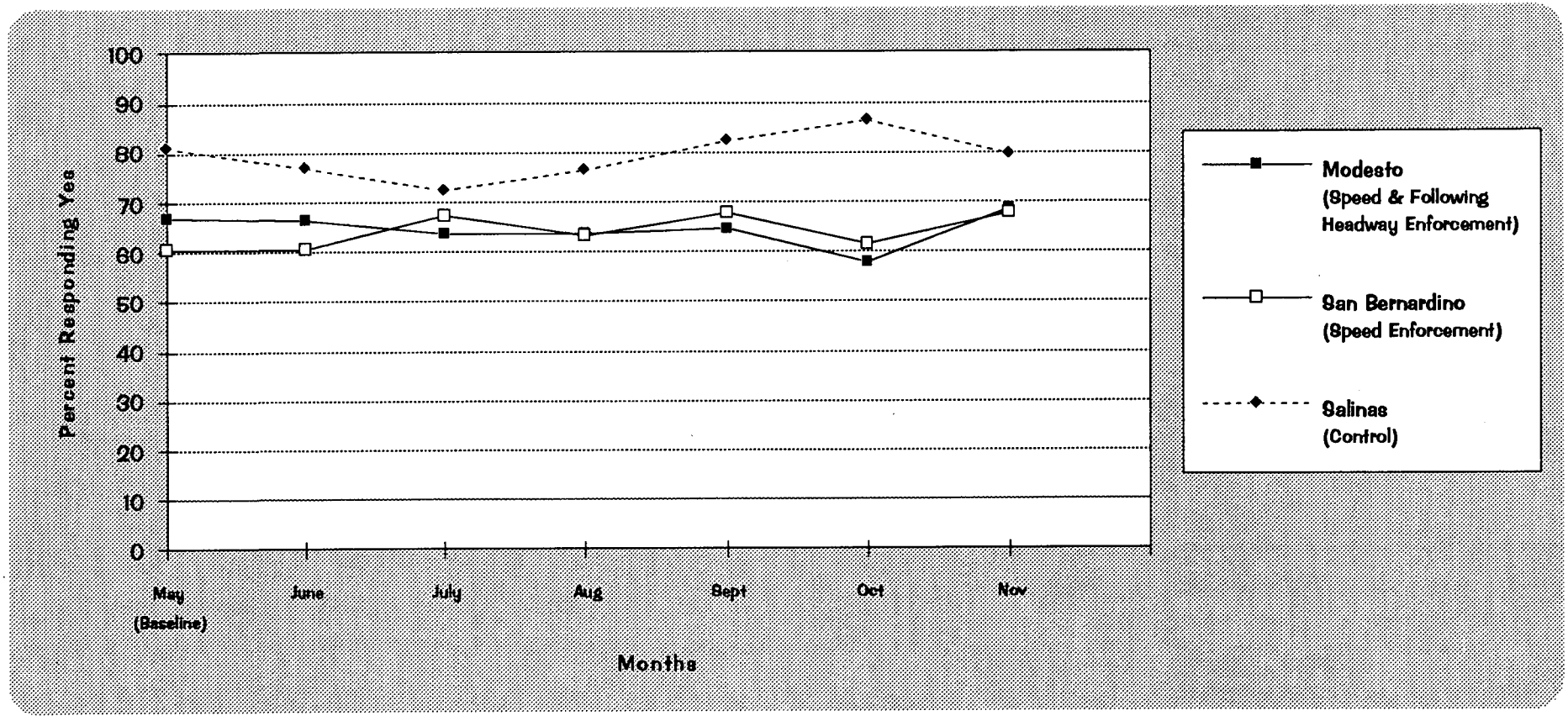
Question 15: How much do you think speed enforcement (Special Speed Enforcement in Modesto and San Bernardino; general speed enforcement in Salinas) reduces criminal activity in city areas where enforcement takes place? (Percent responding "Some" to "A lot")



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	60.268 (224)	55.066 (227)	57.143 (154)	65.045 (226)	56.842 (178)	53.75 (160)	60.294 (136)
San Bernardino	54.883 (215)	50.944 (159)	51.515 (132)	55.368 (177)	57.927 (164)	64.606 (178)	63.954 (172)
Salinas	63.2 (125)	61.062 (113)	46.154 (182)	39.623 (53)	64.706 (17)	55.814 (86)	55.384 (65)

Percent Responding "Some to "A lot"
(n)

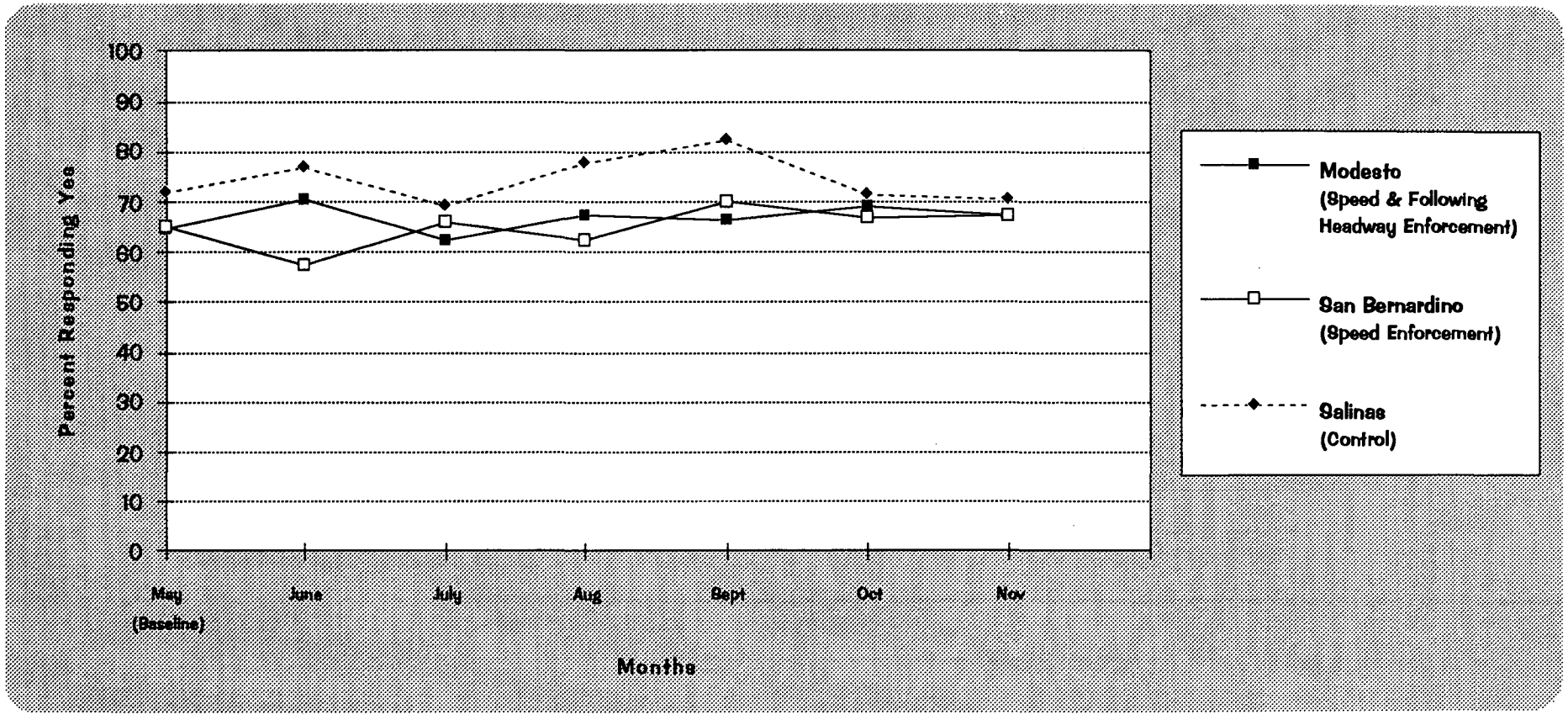
Question 16: What do you think about speed enforcement (Special Speed Enforcement in Modesto and San Bernardino; general speed enforcement in Salinas) in your community? (Percent responding "Approve" and "Strongly Approve")



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	66.817 (223)	66.523 (233)	63.58 (162)	63.519 (233)	64.615 (195)	57.739 (168)	68.613 (137)
San Bernardino	59.722 (216)	60.377 (159)	67.176 (131)	63.069 (176)	67.836 (171)	61.582 (177)	67.977 (178)
Salinas	80.8 (125)	76.724 (116)	72.193 (187)	76.471 (51)	64.706 (17)	86.206 (87)	79.365 (63)

Percent Responding "Approve" and "Strongly Approve"
(n)

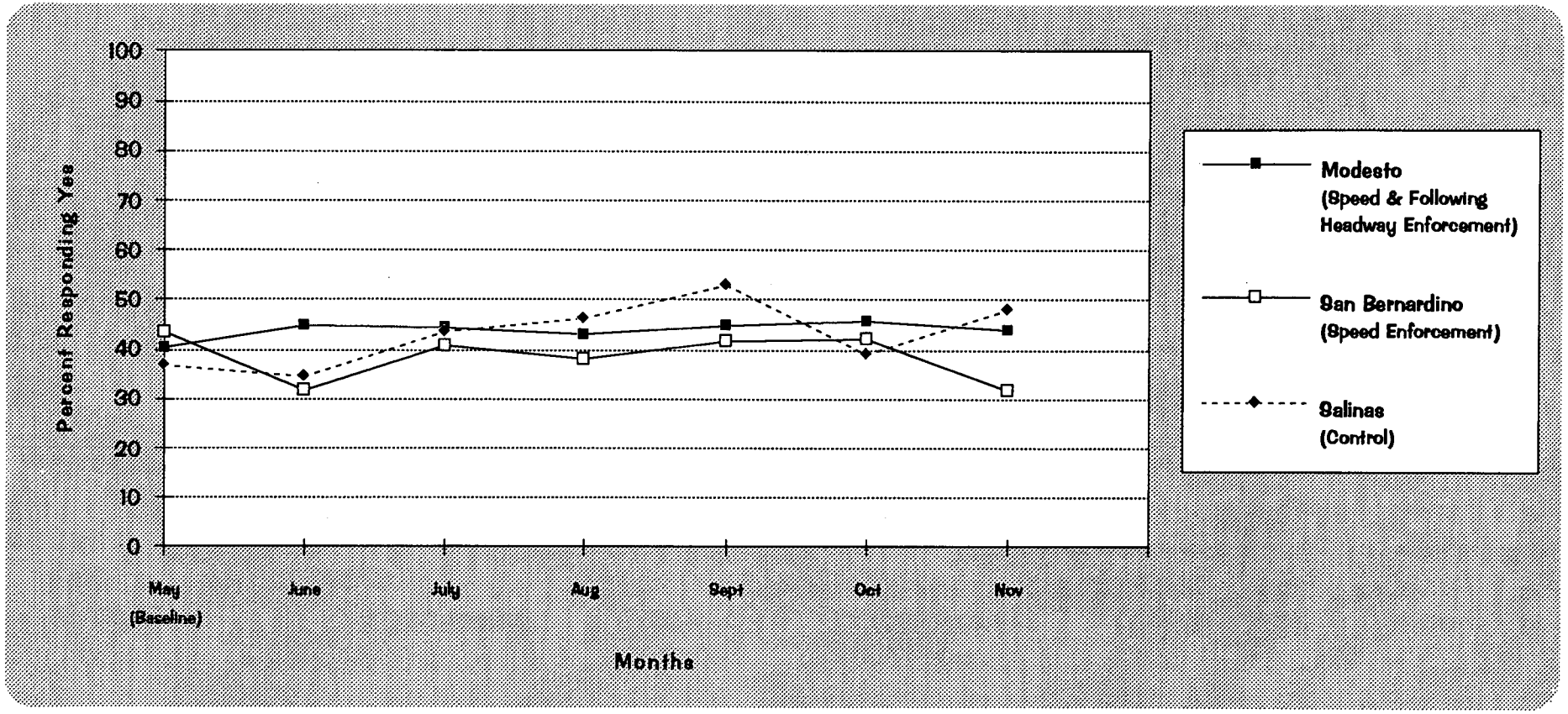
Question 17: Have you ever reduced your driving speed on the streets of your community out of concern for being stopped by a law enforcement officer?



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	64.706 (238)	70.472 (254)	62.428 (173)	67.194 (253)	66.341 (205)	69.061 (181)	67.55 (151)
San Bernardino	65.236 (233)	57.229 (166)	65.972 (144)	62.5 (184)	70.225 (178)	66.667 (186)	67.539 (191)
Salinas	71.654 (127)	76.923 (117)	69.312 (189)	77.778 (54)	82.353 (17)	71.264 (87)	70.588 (68)

Percent Responding Yes
(n)

Question 18: Do you ever exceed the posted speed limits while driving on city streets in your community?



Month	May	June	July	Aug	Sept	Oct	Nov
Modesto	40.254 (246)	45.02 (251)	44.509 (173)	42.969 (256)	44.298 (207)	45.556 (180)	43.791 (153)
San Bernardino	43.348 (233)	31.515 (165)	40.845 (142)	38.251 (183)	41.808 (177)	42.077 (183)	31.746 (189)
Salinas	36.8 (125)	34.454 (119)	43.386 (189)	46.296 (54)	52.941 (17)	38.824 (85)	47.761 (67)

Percent Responding Yes
(n)

APPENDIX I

GUIDELINES FOR DEVELOPING A MUNICIPAL SPEED ENFORCEMENT PROGRAM

GUIDELINES FOR DEVELOPING A MUNICIPAL SPEED ENFORCEMENT PROGRAM

INTRODUCTION

The purpose of this appendix is to provide step-by-step guidance to both law enforcement and civilian personnel to assist with the development of traffic safety program support committees and the implementation of municipal speed enforcement and other special traffic safety programs.

Law enforcement agencies from across the United States are attempting to improve traffic safety in their jurisdictions, by reducing the incidence of speeding and driving while impaired (DWI), and increasing compliance with safety restraint laws and other motor vehicle codes. Although important, the effects of an enforcement program will be limited unless public awareness of the enforcement can be elevated. In particular, a special general deterrence effect can result when public awareness of an enforcement effort is elevated by an effective publicity campaign. The following pages provide suggestions that can be followed to design and implement a traffic safety program composed of both enforcement and public information and education about the special enforcement.

SELECT A FOCUS

The first step in the process is to select a focus for the traffic safety program. Although the general objective of improving traffic safety is laudible, the probability of a program achieving measurable success is increased if the effort is focused on a specific traffic safety issue, such as speed, safety restraint, rail road crossing or right-of-way violation, or DWI enforcement. A locally salient traffic safety issue usually precipitates interest in a special program, rather than the reverse (i.e., a program searching for an issue). If clueless, problem issues can usually be identified through a review of annual collision statistics, comparing the incidence of various categories of crashes in a community to the incidence in comparable communities in the same state. These crash data will also be used later in the program to help measure the combined effects of the special enforcement and publicity.

Municipal speed enforcement will be the traffic safety issue used as an example in this brief guide, but many of the suggestions apply to other issues as well. The following elements composed the special enforcement programs implemented by the Modesto and San Bernardino, California, Police Departments as part of a NHTSA study concerning the effects of municipal speed enforcement. Both communities experienced declines in speed-related crashes and the incidence of larceny crimes in the areas of the communities in which the special enforcement was conducted. A focused approach is suggested, but police managers are not limited to the recommended numbers of special enforcement zones.

SUGGESTIONS FOR A MUNICIPAL SPEED ENFORCEMENT PROGRAM

- Select four enforcement zones within the community by examining crash records to identify road segments and intersections that have been the sites of speed-related crashes, or where speeding is a persistent problem for motorists, bicyclists, or pedestrians. The zones should be several blocks to a mile or so in length.
- Select two zones within the community that have been the sites of chronic citizen complaints about speeding. Selecting areas within a community for special enforcement on the basis of crash statistics and citizen complaints contributes to the credibility of the program.
- Deploy to the selected sites during hours of greatest crash risk or incidence, but following a weekly schedule that prevents motorists from predicting with certainty when the special enforcement will be in place.
- Use radar and, if possible, at least some laser speed monitoring equipment. There are site-specific advantages to both types of equipment, but laser devices are more newsworthy and will generate public interest and awareness of the programs. Yes, you want the public to become aware of the speed enforcement programs, contrary to the traditional law enforcement philosophy. Publicize the enforcement effort to the maximum extent possible, even if it means using innovative technologies to obtain "free press." It is even a good idea to announce on the radio in the morning where the enforcement will be later in the day (but do not permit the schedule to be so regular that it becomes predictable). The objective of the program is to reduce vehicle speeds (and indirectly, to reduce speed-related crashes). Writing citations is not the objective, but a means to increase public awareness. This theme must be incorporated in the program to ensure public acceptance of the special enforcement effort.
- Use decoy vehicles at the special enforcement sites and elsewhere in the community to contribute to motorist uncertainty and public awareness, and to generate free publicity about the enforcement programs. Parked patrol vehicles also contribute to public perceptions of safety by implying a police presence.
- Place an emphasis on speed enforcement in all routine patrols throughout the community, in addition to increased enforcement by the dedicated traffic personnel.
- The number of hours devoted to the enforcement program by dedicated traffic personnel should be substantial to maximize the probability of achieving measurable results. On average, about 200 hours per month should be devoted to the six special enforcement zones, based on study results. This works out to an average of about 8.5 officer hours per week devoted to each special enforcement zone. Doubling the average effort

during the first two program months will increase the initial impact of the programs, and permit a relaxation of effort in subsequent months. Officers will notice the effects of the programs within one month, as fewer speeding vehicles are observed. It is recommended that deployment strategies remain flexible, permitting officers to shift to another zone when speeding declines greatly in an assigned location.

- The objective of the deployment strategy should be to maximize the visibility of the police presence. This is sometimes best accomplished by teaming officers, rather than working individually. Teaming involves a trade-off between duration on site and police visibility, or presence. For example, one officer can work a zone for two hours each day, four days each week and expend the same level of effort as two officers working together on only two days of the week. It is believed that greater effects might be achieved if officers spread their time on-site over more days by working individually. But, some officers prefer the team approach for tactical reasons, and certain areas within communities render a team approach a safety requirement. What ever approach is ultimately implemented, the objective should be to maximize police visibility and the perception of police presence in a special enforcement zone, while maintaining acceptable levels of officer safety.
- Officers and police managers should participate in the meetings and activities of the program support committees (e.g., providing stopping distance demonstrations and ride-along opportunities for reporters; demonstrations of the laser equipment for citizens, reporters, DAs, and judges; participating in a speakers bureau or providing TV and radio interviews, etc.).
- The police department's commitment to a vigorous enforcement program must be sustained for a period of at least six months.
- Obtain crash statistics for the special enforcement zones and compare the incidence of speed-related crashes during the program to the same months in previous years.
- Obtain statistics concerning the incidence of crime in the reporting areas encompassed by the special enforcement zones. Watch for declines in larceny and other daytime crimes.
- Modify your department's record system to permit the identification of all arrests that were made as a consequence of traffic enforcement stops. Note: This could be a monumental job, but the resulting lists of arrests will provide considerable evidence of the contributions made by traffic enforcement to the overall mission of the police department.

DEVELOPING A PUBLIC INFORMATION AND EDUCATION PROGRAM

Law enforcement agencies typically lack the staff and resources necessary to generate the level of public awareness needed to create a general deterrence effect. But, in most communities there are concerned citizens and civic leaders who have both the talent and resources that are required to develop and implement effective program support activities. Significant achievements can be obtained when law enforcement and civilian volunteers work together toward the common goal of improved traffic safety.

The following paragraphs describe how to plan, establish, and maintain a traffic safety program support committee to increase public understanding and awareness of traffic safety enforcement efforts by local law enforcement. In the approach described here, traffic safety program support committees become part of the general deterrence effort by increasing awareness of the enforcement program, and other traffic safety issues, within a community. Research has demonstrated that traffic safety program support committees can have significant impacts on public awareness of special speed and DWI enforcement programs and related safety issues. Further, the efforts of local program committees can increase community support for law enforcement efforts, and lead to reductions in the numbers of crashes in a community.

This "how to" appendix is designed to simplify your task by describing proven methods of committee development. You may consider this appendix a blueprint for successful committee formation and maintenance. The following topics are covered:

- Suggestions for getting organized
- Directions to develop a traffic safety implementation plan
- A strategy to recruit committee members
- Plans for the first meeting of your committee
- Examples of committee activities during the first program weeks
- Arrangements for a kick-off press conference
- Recommendations for long term committee activities and support

This appendix may be used by law enforcement managers and support personnel, or local government employees directed to organize a traffic safety support committee. It may also be used by independent citizens who wish to improve traffic safety in their area. Regardless of who uses this booklet, it is assumed that the user has no previous experience in developing traffic safety program support committees and that basic information is required to begin the project.

GET ORGANIZED!

While developing your committee, you will be contacting and meeting many new people from a variety of organizations, scheduling several meetings and appointments, and preparing a wide range of materials. Unless you are well-organized, you may soon be overwhelmed by this flood of activities. Acquire the following items to help you get organized.

- A monthly planner
- A journal
- An address book

Dedicate your new monthly planner to committee development activities. Make it a habit to review the planner once a day to prepare for upcoming events. Record committee development events and activities in your new journal. The journal may include notes from meetings and interviews, names of new people to contact, and your own ideas as the committee development process continues. Use the address book to record the names, addresses and telephone numbers of all individuals you meet during committee development. Include police personnel responsible for coordinating safety program activities, potential and existing committee members, and public or private organizations that agree (or might agree) to participate in the effort. Carry each of these items with you while performing committee development activities and make it a habit to use them! You will be amazed by the number of development tasks that you can handle if you are properly organized.

DEVELOP AN IMPLEMENTATION PLAN

"If you don't know where you're going, you may end up some where else."

A key to committee development is the creation of a plan that describes the committee's purpose, goals and member recruitment strategy. As a tool, the implementation plan:

- Allows you to intelligently (and consistently) describe the committee's mission to potential members and supporting organizations;
- Assures that committee members and affiliates work toward the same objective(s); and
- Prevents the committee from losing sight of its mission.

The Purpose of the Committee. The implementation plan must include a description of the committee's purpose. Essentially, the committee will exist to raise public awareness of the police department's traffic enforcement efforts; in this particular example, the objective is to increase public awareness of speed enforcement efforts and

to teach the community about the hazards of driving with excessive speed. Traffic safety program support committees can also focus on the DWI countermeasure employed by local law enforcement. For example, the purpose of a committee might be to support a police department's program of sobriety checkpoints by educating citizens about checkpoint procedures, publicizing the checkpoint program, and providing volunteers to help the law enforcement agency during checkpoints. Although the focus here is on speed enforcement and the reduction of speed-related crashes, a committee can also support law enforcement efforts regarding the full range of traffic safety issues, including safety restraints, child safety seats, pedestrian safety, bicycle safety, and DWI enforcement, to name a few--the applicability of program support committees is limited only by the creativity of the participants, and the willingness of law enforcement managers to take advantage of an untapped source of support and energy. As mentioned previously, it is advisable to focus the committees efforts to obtain maximum effects, at least initially.

Committee Objectives. The implementation plan must also include objectives that direct the committee's activities and that may be used to evaluate the committee's success. Examples of committee objectives are listed below.

- Support police speed enforcement/deterrence methods and cooperation between the police and community by actively promoting and sustaining police efforts.
- Educate high risk groups about speeding, the special enforcement effort, and their consequences.
- Develop or participate in high-visibility events.
- Gather adequate physical and monetary resources to support committee activities.
- Recruit new members to maintain committee vitality and perspective.

Committee Members. The implementation plan should describe the types of committee members you want to recruit and how you will recruit them. It is important to consider individuals who are likely to support traffic safety efforts, and individuals who possess talents and capabilities that might be useful to the committee. Successful committees are often made up of the following individuals.

- Concerned citizens
- Hospital emergency room staff
- Alcohol abuse counselors
- Community leaders (elected officials or their representatives)
- Police supervisors in charge of traffic safety and enforcement issues

Also, consider recruiting members from public and private organizations that have a vested interest in various topics related to traffic safety, like the following.

- Insurance companies
- Bars and restaurants
- The courts
- Department of motor vehicles
- Local employers
- Parent or student organizations (MADD, SADD)
- Social organizations (Kiwanis, Lions, etc.)
- Emergency department physicians and nurses

Start your member search by gathering names from the police department, government agencies, and hospitals. You may be able to obtain a list of community organizations from the local chamber of commerce, and be sure to refer to the phone book for useful community information.

Plan the First Committee Meeting / Write Letters of Invitation

Consider the schedules and time constraints of invited guests when arranging the first meeting. Also, select a centrally located site for the meeting that is large enough to accommodate everyone you plan to invite. Try to hold the meeting at a location that lends credibility to the committee and that is linked to the committee's objectives. You may, for example, decide to hold the meeting at police headquarters to emphasize the cooperation between the police and the community in the work that is to be accomplished.

Once a meeting site has been established, begin the recruitment process by mailing letters of invitation to potential committee members. In the letter, review the purpose and objectives of the committee. Be sure to mention the important work of the committee in supporting the police department's speeding deterrence policies and enforcement efforts. Also, place the committee's work in the larger context of traffic safety. For example, describe the committee as part of a nationwide effort to reduce the death toll on America's highways. Personalize each letter by describing why the person has been invited. For example, mention the qualifications of the invited guest, and describe what special expertise and resources he or she will bring to the committee. Close the letter by announcing the time, date, location, and length of the first committee meeting. Also provide a brief schedule and state that refreshments will be served.

Follow-Up Your Letters of Invitation

Follow up your invitation letters with telephone calls to remind invited guests of the upcoming meeting. During the call, maintain a friendly and professional conversational style. Review the major topics in your letter and explain why the person would be a valuable member of the committee. Be prepared to answer questions about the responsibilities and time commitments that might be required by particiating in the committee's work. Be flexible enough to accommodate existing schedules.

PREPARE AN AGENDA AND INFORMATION PACKAGE FOR THE FIRST MEETING

Your next task is to prepare an agenda for the first committee meeting. List the important topics and the time available for each one. Consider the following major topics for your agenda.

- Introductions (5 - 10 minutes)
- A summary of the committee's purpose and objectives (10 minutes)
- Plans for the program kick-off press conference (10 minutes)
- Plans for the first three months of committee activities (10 minutes)
- Selection of a committee chair (10 minutes)
- Arrangements for the next meeting (5 minutes)

Prepare an information package for committee members that includes a copy of the agenda, the names and telephone numbers of all invited guests, and an events calendar mapping the committee's activities for at least the first three months of the committee's existence. Fill the calendar with example activities to encourage comments and suggestions during the meeting. The following list includes examples of activities that were used as goals by two committees that supported a speed enforcement program. Neither of the committees was able to implement all of the target activities, but listing candidate or target activities early in the committee process serves the important purpose of establishing goals toward which the committee can work.

Include in the information package a summary of local statistics relevant to the issues for which you are organizing the committee. For example, if speed enforcement is the focus of your effort, prepare a table that presents speed-related crash statistics for your community and compares the local speeding "problem" to other areas or to your state, as a whole. Your local police department, state police/highway patrol office, or state office of traffic safety will have the information you need in an easy-to-use form. These statistics will help you to define the local problem, and to measure the success of your committee's efforts to improve local traffic safety.

EXAMPLE PUBLICITY ACTIVITIES AND TARGET FREQUENCIES FOR A SIX-MONTH CAMPAIGN TO SUPPORT A MUNICIPAL SPEED ENFORCEMENT PROGRAM

Activity: Individuals Involved	Target Frequency
Kick-off Press Conference: Representatives from Mayor's office, DA's office, media, Police Chief, local highway patrol captain, military and college liaisons, community leaders, teachers, local athletes, and other members of the Program Support Committees. Purpose: Announce the program and dramatically unveil the speed enforcement equipment. Press package developed by the committee.	Once at start of program
Public Service Announcements: English and Spanish radio and TV PSAs by local media or police personnel, developed by the committees.	3 per week per station
Media events and special news coverage of enforcement activity: (e.g., speed-related crash scenes, etc.). By law enforcement agency, the committee, and local media liaisons.	3 per program
Routine reporting of program activities (e.g., impending enforcement and numbers of citations and ancillary arrests made): By the Program Support Committees working with media liaison personnel.	Weekly for duration of program
Supermarket drop-ins: By Program Support Committees.	1,000 per month x 6 months
Posters for distribution to high schools, colleges, military installations, bars/taverns/restaurants, and major local employers: By Program Support Committees.	Several hundred, twice during program
Outdoor advertising on taxicabs, busses, bus stops, and billboards (if possible): By Program Support Committees, perhaps donated by transportation companies.	Several for the duration of program
Leaflets: distributed by youth organizations in shopping centers.	9 times per program
Speakers provided to address organization meetings on topic of speeding: By Local law enforcement personnel, NHTSA regional office, state OTS, and Program Support Committees.	6 per program
Stopping distance demonstration by experts: Local law enforcement, Program Support Committees, and local media.	2 per program
College and military activities: Contribute materials and information to existing college and military traffic safety programs.	Continuous during program

BEGIN COMMITTEE WORK

During the first weeks after formation, the committee should prepare for a long-term program support effort. Here are some proven methods for beginning and maintaining effective committee work.

Select a Committee Name and Logo. The chosen name should clearly identify the committee, and it might also describe the program it supports. *Speedwatch* was selected by a committee that supported a speed enforcement program because it conveyed the committee's purpose. Another committee changed its name from *Citizens for Sober Driving* to the more general *Citizens for Safe Driving* when the committee shifted the focus of its efforts from DWI to speed enforcement. If committee members want to identify the committee with the specific deterrence program conducted by the police, a more descriptive name would be appropriate. What is important is that the committee determines its own name.

Next, design a logo for the committee that includes the committee's new name and an illustration that defines the purpose of the committee. Have the logo printed on committee letterhead and on all materials produced by the committee. One of your members will probably have access to the skills and equipment necessary to develop a logo and letterhead; if not, you may wish to recruit an additional member from a local business, such as a copy or print shop.

Plan a Kick-off Press Conference. Arrange to hold a press conference approximately three months after committee formation. The press conference will introduce the committee to the community, describe its purpose and objectives, and provide the first opportunity to educate the driving public about the special traffic enforcement program that is planned for the community.

At the first committee meeting, schedule a date, time and location to conduct the press conference. Keep in mind that well-attended and successful press conferences are usually held mid-morning to mid-afternoon, and later in the work week. Try to schedule the press conference before the first scheduled deterrence event (e.g., before the first day of the special speed enforcement effort). Choose a location that can accommodate all attendees and any equipment needed during the press conference. In the past, successful press conferences have been held within city hall chambers, in parking lots where police equipment is displayed and demonstrated, and at sites of serious crashes. Prepare a list of speakers and invited guests. Selected speakers should be linked to enforcement, emergency medical respose, or traffic safety in the community, and should be able to attract the local press. An effective group of speakers may include the committee chair, a local or state politician, a spokesperson for a traffic victim's advocacy group, an emergency department physician or nurse, and the police chief. Provide the press with interesting visual opportunities that support the speakers' messages. Ask the police to conduct a stopping distance demonstration as part of the press conference (e.g., or a mock checkpoint if DWI deterrence is the focus of the program), or consider displaying the wreckage of a car involved in a speed-related crash (a gruesome, but particularly effective technique that can be used repeatedly

during your publicity program). Lastly, prepare a press package containing materials describing the program, your committee, and the local problem you have organized to counter. Include the following materials in your press kit.

- A press release from the local Chief of Police and a state police or highway patrol manager announcing the deterrence program.
- A description of the support committee and its planned efforts.
- Local speed-related crash statistics.
- Literature associated with the deterrence program.

Plan Three Months of Program and Publicity Efforts. Prepare for support activities to take place immediately following the kick-off press conference. Immediately begin production of flyers and posters, and distribute them to businesses, schools, and government offices throughout your community. Begin the process of developing professionally produced radio and television public service announcements (PSAs) by recruiting local broadcasters. In the meantime, prepare written PSAs that local radio stations can immediately air during rush hour drive times. Other start-up activities include the following.

- Plan committee participation at upcoming community events.
- Start a traffic safety speakers' bureau (traffic sergeants and motor patrol officers are particularly effective in this role).
- Develop traffic safety programs with local schools and colleges.

Capitalize on the creativity and unique character of your committee by developing original ideas and a signature approach toward the deterrence program. The more distinctive your effort, the more attention it is likely to get from the press, the community, and the driving public. Further, integrate your committee's publicity efforts with local festivals, parades, and county fairs. For example, encourage your local law enforcement agency to establish a both at festivals and fairs (staffed by committee volunteers and law enforcement personnel), and participate in local parades (e.g., arrange for a local towing company to carry a crashed vehicle on a flatbed truck in the parade, with your committee's message printed on a banner, etc.).

Continue to Recruit New Committee Members. Over time, committee faces will change and the fresh ideas and enthusiasm brought in by new members will sustain the program support efforts. It is critical to continually recruit new members -- especially those with the talents and resources needed to sustain the committee's efforts. For example, if you are having difficulty obtaining news coverage of committee and law enforcement activities, it is a good idea to recruit a local newspapers reporter to participate in the committee. The reporter may choose not to become a member, but he or she will be more likely to pay attention to your activities if invited to participate.

PROVIDE FEEDBACK TO THE COMMITTEE

Periodically assess the effects of the committee's efforts by reviewing local crash statistics and estimating the level of public exposure achieved by committee events and programs. Use this information to plan future publicity and education strategies. Good sources of information include local police records, state traffic safety records (frequently published as annual reviews), and the number and types of traffic-related items appearing in local newspapers.

SUMMARY

- Select a traffic safety issue to serve as the program's focus.
- Select zones within the community on the basis of speed-related crashes and citizen complaints of speeding.
- Devote considerable, high visibility enforcement effort to the special zones for at least six months.
- Collect relevant data to be able to evaluate program effects.
- All special traffic safety enforcement efforts should be accompanied by vigorous publicity programs to achieve the maximum general deterrence effects. In fact, it might be the publicity as much as the enforcement that causes any objective improvements in measures of traffic safety. A committee of concerned local citizens can be organized to direct this effort, and to provide other assistance with the program.
- The most effective programs are characterized by close cooperation between police and committee personnel. The process should be one in which police help with the publicity program and committee members assist police in their special enforcement efforts.
- Newspapers are the greatest source of public awareness of special enforcement programs, but the program activities must be newsworthy to receive news coverage. Any effort to enhance the "newsworthyness" of a program or activity will contribute to free publicity, and ultimately, to public awareness. Publicity is especially effective if it targets specific types of drivers who are at disproportionate risk.

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