A STUDY TO ANALYZE TRAFFIC STOP DATA IN SANTA CRUZ COUNTY

Final Report for the Capitola Police Department, Santa Cruz Police Department, Santa Cruz Sheriff's Office, and Scotts Valley Police Department, and Watsonville Police Department

Written by: Dr. Cheryl A. Rickabaugh
University of Redlands

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LAMBERTH CONSULTING

Lamberth Consulting was formed in 2000 in an effort to provide racial profiling assessment, training, and communication services to universities, states, counties, cities, civil rights groups, litigators, and communities.

Dr. John Lamberth, CEO and founder of Lamberth Consulting, developed the nation's first racial profiling methodology in 1993. Since that time we have revised and adapted our methodology for highways, urban areas, suburban areas, and pedestrian populations. We have expanded our service offerings to include training solutions targeted towards law enforcement and community members, as well as communication planning services to help educate and inform all parties concerned about racial profiling issues.

Lamberth Consulting, LLC
120 Commons Court
Chadds Ford, PA 19317
phone 610.358.5700
fax 610.358.2890
on the web www.lamberthconsulting.com
email us at info@lamberthconsulting.com

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PROJECT TEAM

Dr. John Lamberth
Dr. John Lamberth, CEO of Lamberth Consulting, has been working as a Social Psychologist for over 30 years, and has been consulting for over 20 years. His area of consulting expertise lies in statistics, surveying methodology, and social psychology. He has been qualified as an expert in these areas in State Courts in New Jersey, Pennsylvania, Iowa and Virginia and in Federal Courts in New Jersey, Connecticut and Virginia.

In 1993 Dr. Lamberth developed the first methodology used in the country to determine whether racial profiling was occurring. In New Jersey v. Soto, the Court relied upon his research methodology and statistical analysis in determining whether racial profiling occurred on the New Jersey Turnpike. In 1999, the Attorney General of New Jersey agreed that the New Jersey State Police were practicing racial profiling (Interim Report of the State Police Review Team Regarding Allegations of Racial Profiling @ www.state.nj.us/lps/intm_419.pdf) Since that time he has intensified his work in the area of racial profiling, assisting in litigation, and assisting police departments who are interested in voluntarily determining whether racial profiling is occurring in their jurisdictions.

Dr. Cheryl Rickabaugh
Dr. Rickabaugh has been working as a social psychologist for over 15 years. She has taught undergraduate and graduate courses in research methodology, and has worked as a consultant in the areas of program evaluation, research design, and statistical analysis since 1991. Dr. Rickabaugh's consulting experience includes program evaluation of community-based policing programs, process and summary evaluation for California Superior Courts, and the design and implementation of survey research, interviews, and focus groups. She also works as the local researcher and statistical analyst for the Mentor Drug Court/COPS Mentor Drug Court in Redlands, California.

Karl Lamberth
Karl Lamberth, President of Lamberth Consulting, has over ten years experience in the field of Change Management Consulting to assist organizations and employees through the change process. From 1992 through 1999, he worked with Andersen Consulting in the State Government, Communications and Financial Services industry groups. In 1999 and 2000, Mr. Lamberth worked as the Director of Operations for CommerceOne's Global Services operation in the Southeast region.

Mr. Lamberth's primary areas of expertise are in instructional design, change management, project management, and communications planning. Mr. Lamberth has specific skills in training design and development, communications development and management, project planning, project control, quality assurance, risk management, and project reporting.

Jerry Clayton
Jerry Clayton, Vice President of Training, designed and developed Lamberth Consulting's training programs. Mr. Clayton currently oversees all training delivery, and

regularly instructs Lamberth Consulting's training courses on Preventing Racial Profiling Practices, and Collecting Stop Data.

Mr. Clayton is a certified instructor in Interpersonal Communications, Cultural Diversity, Defensive Tactics, Aerosal Subject Restraint, Firearms, Special Weapons and Tactics, and Direct Supervision and Use of Force Management. He regularly instructs courses (Police, Corrections and D.N.R. academies) for the local community college and other law enforcement agencies. In addition, he frequently provides consulting and training services to the U.S. Department of Justice, National Institute of Corrections, in the areas of Field Training, Officer Program Development, and Training Program Development for agency training directors and coordinators.

Susanne Johnston
Provides project management and survey implementation to Lamberth Consulting. Ms. Johnston has over ten years of experience in Program and Project Management, leading cross-functional projects and teams through the development process.

Using her expertise in project planning, process development and documentation, risk assessment, and project reporting, Ms Johnston worked with Product groups at Adobe Systems, Apple Computer, and Borland International to ensure meeting project milestones through tracking results, risk and dependency resolution, and communication, resulting in the timely completion of multiple projects.

Christine Oskison
Ms. Oskison is an Associate with Lamberth Consulting and provides data management and data analysis services for the organization. Ms. Oskison performs crosstabulations and reports using data management software such as SPSS and Excel. Her data managment services are supervised by Dr. John Lamberth. Ms. Oskison holds a M.A. in Counseling from Eastern University, and a B.A. in Psychology from Dickinson College.

Ron Davis
Ronald Davis is a Captain of Police with the Oakland Police Department with 15 years of experience. He is currently assigned as the Department's Personnel and Training Commander and serves as the Department's racial profiling expert and data collection program manager. He is also the previous Region VI Vice President of the National Organization of Black Law Enforcement Executives (NOBLE).

Captain Davis has served as a subject matter expert for the United States Attorney General, the United States Department of Justice and the United States Attorneys' Office, and has spoken at conferences hosted by the International Association of Chiefs of Police (IACP), the National Organization of Black Law Enforcement Executives (NOBLE), the National Conference of State Legislatures, the American Civil Liberties Union (ACLU), Rainbow/Push Coalition and the National Association for the Advancement of Colored People (NAACP). He was also the keynote speaker at the 2nd National Symposium on Racial Profiling hosted by Northwestern University.

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The issue of racial profiling entered the headlines and the consciousness of the public in the mid 1990s. Although minority groups had perceived being targeted by police agencies long before that time, the raising of national awareness shed considerably more light on the issue. Agency responses to the issue historically have varied from denial to thoughtful consideration. More recently, many state and local governments have come to recognize the harmful effects the practice or perception of the issue can have on communities. More than 20 States have enacted legislation prohibiting the practice, and an additional 10 states have legislation pending at the time this report is being written. As the harmful effects of racial profiling continue to affect governments and law enforcement, agencies have begun to become much more sophisticated in their responses to the issue. Indeed, many agencies have begun to take a leadership position in addressing the issue by proactively measuring agency performance, by engaging community representative in dialogue on the issue, and by providing officers and supervisors training on how to mitigate risk relative to the issue and how to reduce the potential for the practice to occur.

The citizens of Santa Cruz County are fortunate to have Police Chiefs and a Sheriff who have taken a leadership position relative to this issue. The chief officers of the five Santa Cruz County Police Departments came together to work through and develop a strategy to measure whether profiling was occurring in the County and how to address it if it was. To this end they began collecting data in 2002 on each of the stops that their officers made. Knowing that they needed expertise that did not exist in house, they contacted us at Lamberth Consulting to assist them in the next step, which was to conduct an analysis of the data that had been collected. The Chiefs knew that this was a process that could not be finished in a short time frame, but would

have to be taken in incremental steps. We agreed with them that the first step should be the analysis of their stop data to determine whether a minority group was being targeted, and if so, what should be done about it. We also agreed that they should continue to collect data and that post-stop activity would be a next logical step in this ongoing process. We are now at the stage of presenting the results of our analysis of the stop data from the five agencies.

We think that the actions of the five Chiefs and their agencies have been particularly courageous. They were not forced into this action; rather they felt that they should determine whether their agencies were targeting a minority group and take action if they were. We work with many agencies around the country, and while we see agencies that collect data, it is the rare agency that decides to analyze those data and make that analysis public. One reason for this is the scarcity of resources for public agencies. To overcome this obstacle, the five agencies in the county worked collectively and decided to act in concert, thus achieving resource conservation of a high order.

By working together to analyze racial profiling data, the law enforcement agencies in Santa Cruz County have demonstrated a model for resource sharing that is a first in the nation. It will, we are sure, serve as a model for other groupings of agencies around the country that wish to conserve resources while squarely addressing the issue.

It would be an understatement to say that we have received exemplary cooperation from the Chiefs and the Sheriff in this endeavor. They have worked with us forthrightly and been willing to answer whatever questions we posed. Data analysis is much more complex than collecting the data and publishing it. One of the thorniest issues in the process is to determine the appropriate "benchmark" to which to compare stop data. The leading experts around the

country agree that determining the racial/ethnic makeup of the transient population, that is, the driving public, is the most accurate benchmark. Further, there is a large and growing consensus that there is no preexisting database that provides that benchmark. The early use of census data has been discredited by the leading experts in the field, and while there are several attempts to develop alternate ways of measuring the transient population, observational surveying of that population is the only one that is generally accepted by social scientists and courts. That the agencies in Santa Cruz County were consistently willing to work with us in determining which were the appropriate locations to benchmark and that they provided us with their data and access to their Information Technology people, escorts when necessary, lighting, and a multitude of other services necessary to completing our tasks attests to their dedication to this project.

The results of our study, presented more completely in this report, are that there is little evidence of racial profiling in the county. Indeed, these are among the most promising results that we have so far seen in addressing this vexing issue. The agencies are to be congratulated for the leadership they have demonstrated in addressing the issue, and because they have determined to go forward with this process by, among other things, continuing to collect data, providing study-specific training for their officers, and analysis of post stop data.

Dr. John Lamberth
CEO, Lamberth Consulting, LLC

ACKNOWLEDGEMENTS

We would like to thank Santa Cruz County Sheriff Mark Tracy and Department Chiefs Rick Ehle, Steve Belcher, Steve Lind, and Terry Medina for organizing the collaborative partnership necessary for this study. Their efforts included hours of time spent in teleconferences, organization of staff members to serve as department liaisons, coordination of officer training, and, when necessary, assisting benchmark data collection with additional lighting and escorts for nighttime benchmark survey sessions. Their collaborative efforts were essential to a successful study. Moreover, the Santa Cruz County agencies have provided a model demonstrating the usefulness of collaborative effort and collective use of resources in conducting a study of this nature.

A number of Santa Cruz County personnel played central roles in identifying the benchmark locations for the study as well as providing the stop data in a form appropriate for data analysis. These include Ben Hatheway, of **SCCECC-**Netcom, who provided maps summarizing the 2002 stop data for Santa Cruz County and the cities of Santa Cruz, Capitola, and Watsonville. Others provided assistance in geocoding the stop data, which enabled us to identify the stops within each benchmark location. These include Mike McDougal and Scotty Douglass, also with **SCCECC-**Netcom, Jim Keller (City of Santa Cruz), Paul Garcia (Santa Cruz County), and Rex Boyce (City of Watsonville). Captain Harry Bidleman and Jeanette Roland (SVPD) and Linda Peters (WPD) also spent many hours assisting us by providing additional data, when necessary.

We worked closely with teams from each agency to understand both traffic patterns and traffic enforcement. Team members provided us with information about police activity, special

deployments, special circumstances within the community that influence policing, and many other aspects of their work that would be necessary for us to understand when conducting this study. We thank them for their willingness to share their knowledge of their jurisdiction with us.

We would also like to thank Ron Davis, who, working on behalf of NOBLE was instrumental in providing education to the agencies involved in this study regarding the issue and methods for addressing it.

Whereas it is impossible to thank everyone who contributed directly to the planning and implementation of this study, we are grateful to all Santa Cruz County agency personnel who contributed to this collaborative venture. We are especially grateful for the assistance and support of the following individuals:

Capitola Police Department	**Santa Cruz Police Department**	**Santa Cruz Sheriff's Office**
Chief Rick Ehle	Chief Steve Belcher	Sheriff Mark Tracy
Lieutenant Mike Card	Lieutenant Lee Sepulveda	Chief Deputy Steve Robbins
	Lieutenant Patty Sapone	Lieutenant Len Lofano
		Ms. Susan Rozario

Scotts Valley Police Department	**Watsonville Police Department**	**SCCECC-Netcom, County and City Personnel**
Chief Steve Lind	Chief Terry Medina	Mr. Mike McDougal
Captain Harry Bidleman	Captain Edmundo Rodriguez	Mr. Ben Hatheway
Ms. Jeanette Roland	Ms. Linda Peters	Mr. Scotty Douglass
		Mr. Jim Keller
		Mr. Paul Garcia
		Mr. Rex Boyes

Finally, we would like to thank the Santa Cruz County agencies for not only voluntarily collecting traffic stop data but also taking the next step—data analysis. Taking this next step clearly communicates a proactive approach to the issue of biased policing.

EXECUTIVE SUMMARY

The past decade has seen increased awareness of the issue of racial profiling among lawmakers, law enforcement agencies, and the communities in which they work. As a result, data collection efforts have begun in many jurisdictions. Some efforts are due to threats of litigation or settlements; other efforts have been voluntary in nature. Still, once traffic stop data have been collected, these data must be analyzed. One of the major issues in data analysis to date has been in determining the appropriate benchmark or standard to which the stop data are to be compared. The methodology employed in this study is one that has been employed in several studies across the country. This methodology employs what we believe to be the most appropriate benchmark for such an analysis; that is, a measure of the transient population in the local area. This study addressed the following questions:

- Is there evidence of racial profiling in Santa Cruz County?
- Which minority groups (i.e., Blacks and Hispanics) are targeted?
- In which locations is profiling likely to occur?
- Are there special circumstances that might be interpreted as biased policing?

The Santa Cruz County Agencies study was conducted with the assistance of the five agencies, each of which had been engaged in voluntary stop data collection programs. Each agency provided a minimum of one year of traffic stop data; that is, motor vehicle stops that were under the law enforcement officer's discretion. A minimum of three benchmark locations in each jurisdiction was selected for analysis; 21 locations were selected countywide. These

locations were selected due to the high number of stops at each, traffic patterns that were relatively representative of the jurisdiction, as well as accessibility for surveyors. Traffic surveys on randomly selected days and times at each location were conducted over a six-week period by highly trained surveyors; these surveys provided the benchmark data to which stop data for that location was to be compared.

The results of this study are the "best" that we have seen in our work around the country. They provide very little evidence for targeting of Hispanics in Santa Cruz County. At most locations, the proportion of Hispanic stops was very close to what one would expect based upon their presence in the transient population. In some locations, the proportion of Hispanic stops was high enough to warrant a review of stops in that location by the department. Conversely, there were 3 of the 21 areas in the county at which the number of Hispanic motorists stopped was lower than would be expected on the basis of their presence in the transient population. It also should be mentioned that the disparities in Hispanic stops identified in this study are lower than those found in studies of several other jurisdictions.

Unfortunately, there were too few stops involving Black motorists countywide for meaningful statistical analyses to be conducted. As a result, we recommend to the Santa Cruz County agencies that they continue their stop data collection efforts. We further recommend that the agencies take the next step in assessing racial profiling and start the process of considering post-stop activity, particularly searches. Other recommendations concern a review of possible auditing procedures for stop data, the continuation of training activities which have been started, and the continuation of the police community groups that have worked so well on this project.

INTRODUCTION

Representatives from minority groups will provide anecdotal evidence of racial profiling on the roadways spanning back decades, however, the specific measurement of the practice by law enforcement agencies was not formalized until 1994. During the criminal litigation case in New Jersey (State v. Soto et al.), a group of defendants alleged that New Jersey State troopers were targeting and stopping minorities on the highway, not because of their driving behavior, but because of the color of their skin. During the course of this case the race and ethnicity of the driving population was observed and recorded on portions of the New Jersey State Turnpike (Lamberth, 1994.) The driving population then was compared to the racial and ethnic make-up of the individuals stopped in New Jersey to determine whether a disproportionate percentage of minority drivers were being stopped relative to their presence on the roadway. This method was also used in Maryland (Lamberth, 1996), during the civil litigation case (Wilkins v. Maryland State Police) in which Robert Wilkins alleged that the rental car driven by his cousin on the Maryland State highway was stopped and searched by a drug-sniffing dog due to a "profile" prepared by the Maryland State Police which included black males driving rental cars.

In the former case the courts held for the defendants. The latter case was settled, and the issue of racial profiling began to develop greater national attention and exposure. It is important to note that the early work performed in this field, while groundbreaking, was limited due to the fact that it was conducted within the context of litigation. That is, the issue was reviewed in a confrontative forum between community and law enforcement participants. The work was completed slowly, and dialogue surrounding the science was necessarily combative. A dramatic shift resulting from state legislation and agency participation and leadership relative to this

science began to take place in the late 1990's. State legislatures have mandated data collection, and/or developed laws prohibiting racial profiling by law enforcement agencies. At the time of this report, 24 states have enacted legislation relative to this issue. An additional 10 states have legislation pending on the issue, and agencies in all but 2 states in the nation have undertaken data collection efforts due to mandate, decree, or of their own volition. Several significant events have occurred nationally which have influenced this shift in focus, and which have helped direct activities in this field.

In June 1999 the Department of Justice (DOJ) hosted a conference on "Strengthening Police-Community Relationships." The conference recognized that police are more effective when they have the trust and cooperation of the residents in their community. However, in many communities, especially minority communities, a lack of trust remains between law enforcement and local residents. This tension is exacerbated by allegations of police misconduct such as racial profiling.

The conference highlighted the need to identify proactive police practices to build trust, enhance police integrity and reduce police misconduct. Members at the conference determined that collecting data on traffic and pedestrian stops, analyzing this data, and providing the results for public review can help to shift debates on racial profiling from anecdotal reports to informed discussions. By being proactive about recognizing and addressing racial profiling, police communities can go a long way towards managing perceptions around racial profiling and strengthening police-community relationships.

In February 2000 the DOJ held a conference entitled "Traffic Stops and Data Collection: Analyzing and using the Data." In this session, more than 75 federal, state and local police

administrators, prosecutors, civil rights advocates, government officials as well as police labor leaders, researchers, and community leaders gathered to examine the collection, analysis, and use of data on traffic, pedestrian and other law enforcement stops. Collectively the participants reached several conclusions:

- Traffic stop data collection systems are needed to respond to the perceptions of racial profiling, to measure the reality, and to bridge the gap between minorities and police.
- Core data elements of traffic stop systems should include: date and time, location, race and ethnicity, gender, reasons for initiating the stop, actions taken by the officer, and duration of the encounter.
- Benchmarks for comparing data collected on stops are essential for conducting valid analyses. Without valid control groups, supportable statistical analyses are not possible.
- Data that is complete, accurate and truthful is critical.
- Analysis of data must be conducted by a capable and credible party.
- Publicizing traffic stop data can help to build trust between public law enforcement agencies and the public.

In August of 2001 the Police Executive Research Forum under a DOJ grant held a conference for leading researchers in the field to discuss issues relating to benchmarking for stop data collection and analysis. The conference was attended by social scientists, legal scholars and practitioners from several police departments. This conference was the first of its kind to bring leading scientists and researchers together to discuss the best methods for analyzing stop data.

In March of 2003, the SOROS Foundation provided support for a conference on Racial Profiling that was co-hosted by the Institute on Race and Justice at Northeastern University, the American Civil Liberties Union, the National Organization of Black Law Enforcement Executives, and Lamberth Consulting. The Conference "Confronting Racial Profiling in the 21st Century: Implications for Racial Justice" featured 30 of the leading researchers in the country.

The intent of the conference was to bring together researchers, law enforcement representatives and community representatives to collectively review the latest and most progressive methods for stop data collection and analysis. The conference also focused on post-stop activity, community engagement, and data auditing as primary subject topics.

From these conferences, a central and critical focus has become clear. To manage public perception about racial profiling and to strengthen community-policing relationships, the method used for collecting and analyzing stop data is critical. Two primary components must be in place to determine whether racial profiling is occurring: benchmarks and complete stop data.

The Right Benchmarks

"Benchmark data" refers to control data against which stop data can be compared to determine if any racial or ethnic group is being stopped at a disproportionate rate. The right benchmark can provide the racial and ethnic demographic for any given locality, whether it be an urban intersection or a state highway. Stop data can then be compared to the demographic, and a statistical analysis can be conducted which will help determine if some racial groups are being stopped more frequently than their demographic presence, which may indicate that profiling is occurring.

We believe that collecting the right benchmark, or understanding the true demographic of a locality, is essential to procuring valid results on profiling. If the assumed demographic is suspect, then the comparison to stop data may yield invalid results.

Today, the most experienced researchers in this field generally agree that the best method to measure roadway traffic is observational surveys, and many researchers have used

observational surveys to validate other benchmark methods[1]. This means that the racial and ethnic mix of individuals traveling through a locality must be identified and recorded. A schedule must be developed to survey carefully chosen locations according to a randomly selected time schedule. If the right locations are surveyed according to the right schedule, then the demographic for a given locality may be assumed.

Other benchmarks, such as census data on population demographics, have proven not to serve as reliable benchmarks. Census data measures static populations; that is, the geographic demographic of households. Highway and pedestrian traffic represent transient populations. People work in different locations from which they live, and travel in different routes and different ways to get there. Additionally, tourism, business trips, and other populations not measured in census data, such as university populations, make the comparison suspect. For example, in New Jersey v. Soto (1996) and Wilkins v. Maryland State Police (1996), it was found that census data did not accurately predict highway transient traffic. For these reasons, we used direct observations of transient populations in all five agencies participating in this study.

Complete Stop Data

The second set of critical data is the police stop data. For the purposes of this report, we make a distinction between stop data, and ticket data. Stop data refer to all police stops (traffic or pedestrian) that do not result in the subject of the stop receiving a ticket. Ticket data refer to police stops that result in the subject of the stop receiving a ticket.

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[1] Geoffrey P. Alpert, Michael R. Smith & Roger G. Dunham, "Toward a better benchmark: Assessing the utility of not-at-fault traffic crash data in racial profiling research." Paper presented at *Confronting Racial Profiling in the 21st Century: Implications for Racial Justice.* Boston, March, 2003. Amy Farrell, Jack McDevitt, Shea Cronin & Erica Pierce, "Developing a modified census benchmark for traffic stop data in Rhode Island." Jeff Rojek, Richard Rosenfeld and Scott Decker. "The influence of driver's race on traffic stops in Missouri." Paper presented at *Confronting Racial Profiling in the 21st Century: Implications for Racial Justice.* Boston, March, 2003.

Ticket data may be compared to benchmark data to determine if racial profiling is occurring. However, the majority of police stops are not ticketed. For example, approximately 63% of all police stops in New Jersey (New Jersey v. Soto) are not ticketed, and 75% of all stops in Arizona (Arizona v. Faulk) are not ticketed. Analyzing these data are important-perhaps more so—than ticket data alone, and should be performed if at all possible.

The content of the stop and ticket data is equally important. In addition to race and ethnicity, the time of the stop and specific location are crucial so that valid comparisons against transient demographics can be conducted. On highways, this means that mile marker and traffic direction must be known to conduct valid comparisons. In urban areas, street name and nearest cross streets, or equally specific location data, must be known to conduct valid comparisons. Generalizations are not enough. Transient populations vary according to time of day and specific location. For example, the transient population in an urban area may differ significantly from one street corner to the next, depending upon the businesses, homes and university locations, and the time of day. We were fortunate in that the agencies in Santa Cruz County had been collecting stop data sufficient to meet the needs described above.

Data Analysis Considerations

We should note that the question of how to perform data analysis is not simple, nor have all researchers historically agreed on the best methods to conduct the analysis. This makes sense given the relative youth of this discipline, and the burgeoning nature of the issue. As mentioned previously, most researchers today agree that the best method for determining transient populations is observational surveys. We feel it is important, however, to discuss some points of

current interest and review in the academic community relative to conducting this type of analysis.

Violators

One question facing those attempting to analyze traffic stop data involves the selection of the most appropriate benchmark to use for comparison. A number of measures have been used in the research to date and an open question remains as to whether using estimates of the population violating traffic laws is an improvement over estimates of drivers operating on a community's roadways. Courts (beginning with the Soto and Wilkins decisions) have said violators, but then quickly changed their focus when it became obvious that the two were virtually synonymous.

Court decisions uniformly support the notion that any motorist violating a traffic law is subject to being stopped by police and are the appropriate group to benchmark. However, to date, empirical evidence supports the contention that traffic and violators are synonymous, and in Soto the Court essentially used traffic and violators interchangeably.

The first scientific measurement of the appropriate comparison number for traffic stops determined both the proportion of Black motorists in the traffic stream and among those violating at least one traffic law (New Jersey v. Soto, et al.). The evidence in that case subsequently has determined that the two are virtually synonymous. First in Soto and in Wilkins v. Maryland State Police (MSP) virtually every motorist was speeding (98.3% in Soto and 93.3% in Wilkins). More recently, Lamberth (2003) reported a study in which police officers were given 5 minutes to determine whether randomly selected cars were violating some traffic law.

The study concluded that fully 94% of the drivers were violating some law and it took a mean of 28 seconds for the officers to spot the violation.

For the reasons stated above, and due to constraints on resources, we have used the traffic estimates as our benchmarks in Santa Cruz. However, we should note that direct research measuring differences between racial or ethnic groups and driving behavior is very limited. While empirical evidence suggests that traffic violators and traffic motorists are virtually identical, a question remains as to whether one racial or ethnic group is more likely to violate egregiously than another. That is, it is theoretically possible, while perhaps not intuitive, that one racial or ethnic group is more likely to speed excessively, or drive vehicles with severe vehicle codes violations, or run traffic lights more often, etc. To date, empirical evidence is scant on these issues and mixed. We feel that one important area of future research in this field is a focused review of driving behavior among different racial and ethnic groups.

Agency and Community Role

The early studies conducted in the context of litigation were necessarily limited in the amount of agency and community participation to conduct the work. In more recent work, researchers have had the benefits of working closely with agencies to conduct these studies. Indeed, agency support for providing perspective, stop data, deployment patterns, enforcement activities, crime statistics, policy and procedures, training, and other department information and activities targeted towards these issues have provided a plethora of valuable information for researchers studying this issue. We found the participation and contributions of the Santa Cruz County agencies invaluable in our efforts to conduct this study.

However, the communities and rank-and-file officers affected by this issue must also be considered when conducting these studies. Practically speaking, if the results of any analysis prove favorable to the agency, there may be some community representatives or civil rights groups that have concerns about the legitimacy of the work produced by a researcher who is paid by the agency. Conversely, results that reflect negatively upon an agency may be viewed with skepticism by agency officers who do not engage in biased police practices.

We feel strongly that the best method to reduce the risks of both of these groups is to involve them early, and throughout the process. The Santa Cruz County agencies provided community representatives an opportunity to learn about the project and methodology at the outset of the program. They have also worked with Lamberth Consulting to provide training for officers that is supplemental to POST mandated training, and that is structured to provide specific information on how the study was conducted. We applaud the Santa Cruz County agencies for their foresight in recognizing and working with both of these stakeholder groups. We strongly recommend that future research efforts, in the counties or elsewhere, include both of these stakeholder groups in efforts to conduct studies of this kind.

A Better Benchmark

We have mentioned throughout this introduction that today, researchers have identified observational benchmarks as the most accurate methods to determine transient populations. Designing and conducting these benchmarks, however, are not easy. Teams of surveyors must be rigorously trained and monitored to yield quality results. Additionally, consistent and on-going testing must be conducted to ensure the reliability of surveyor results. In large and complex jurisdictions observation benchmarks may prove time consuming and costly. For these

reasons and others, researchers have undertaken activities to develop benchmarks that estimate traffic populations without conducting observation benchmarks. We feel we would be remiss if we did not mention some of the very good work that has been conducted recently in this area.

One of the most promising methods for this research has been conducted by Northeastern University in Rhode Island[2]. This work consists of using census data as a starting point, and adjusting the data for local factors that may "pull" traffic into a jurisdiction studied, or "push" traffic away from a jurisdiction studied. By identifying "pull" and "push" factors, it may be possible to closely estimate transient populations utilizing data that has already been collected in a given jurisdiction. The researchers used observation surveys to validate their analysis. Another promising method developed by Alpert, Smith, and Dunham[3], has been the use of not-at-fault accident statistics on the roadways to approximate traffic. The rationale suggests that not-at-fault drivers in accidents should provide a representative sample of transient demographics at a given location. This method uses racial data from not-at-fault drivers involved in traffic accidents to estimate transient demographics. The researchers used observation surveys to validate their analyses. While more research is required to validate these methods, we feel that along with continued improvements in observation surveys, they represent some of the most promising prospects for continued advances in this science.

[2] (Amy Farrell, Jack McDevitt, Shea Cronin & Erica Pierce, "Developing a modified census benchmark for traffic stop data in Rhode Island.")

[3] Geoffrey P. Alpert, Michael R. Smith & Roger G. Dunham, "Toward a better benchmark: Assessing the utility of not-at-fault traffic crash data in racial profiling research." Paper presented at *Confronting Racial Profiling in the 21st Century: Implications for Racial Justice.* Boston, March, 2003.

Santa Cruz County Initiative

San Diego became the first large city in the nation to begin data collection in 1999. Since then, more than 50 California State, county, or municipal agencies have begun collecting stop data. California also is one of many states that have passed legislation mandating racial and cultural diversity training, data collection, and other actions to address the problem of biased policing. In 2001, California S.B. 205 mandated that cultural/racial sensitivity training be provided by law enforcement agencies and a $3 million statewide grant program was funded to assist agencies in the voluntary collection of stop and search data. The number of agencies engaged in data collection will continue to increase as A.B. 2133 requires that all agencies collect data as of July 1, 2004.

The Santa Cruz County agencies engaged Lamberth Consulting in early 2003 to conduct an analysis for the five departments participating in this study. While the collection of stop data was funded in part by the State, the agencies proactively chose to conduct an analysis of the data, and to fund the project internally. Perhaps what is most unique about this project is the collaborative manner in which the agencies chose to conduct the study. Through joint collaboration in fundamental project activities such as study design, management meetings, surveying, and training, the agencies were able to benefit from reduced time, effort, and costs which would otherwise be conducted separately by each agency. We feel that this model is a good one, and should be considered by other agencies across the nation intent on conducting work of this nature.

It is our understanding that the agencies will continue to work with the community representatives and officers after a thorough review of this study to continue to address the

practice or perception of the practice in the Santa Cruz County area. Specifically, the agencies will need to continue to collect data, and to begin to review post-stop activities more thoroughly. While additional work yet needs to be conducted, we feel strongly that the Santa Cruz County agencies are among the leading agencies in the nation working to address this issue scientifically, practically, and openly.

METHODOLOGY: OVERVIEW

The methodology used in this study has been developed and refined based upon experience with similar efforts in determining if racial profiling is occurring in the states of New Jersey, Maryland, Arizona, Kansas, and Michigan (*State of New Jersey v. Soto*,[4] *Wilkins v. Maryland State Police*,[5] *Arizona v. Folkes*[6], Lamberth, 2001, 2003), and through our experience in working with national leaders on this issue in U.S. DOJ conferences and work sessions. Our belief is that the most effective approach is a holistic one and includes the assessment of racial profiling, intervention to train employees and to improve processes and behaviors if the problem exists, and communications with the stakeholder communities and groups that are affected by the practice.

It is not possible to conduct benchmarking in every part of a city or highway to assess racial profiling. The logic of our work, elemental to statistical analysis in other contexts, is to sample certain portions of city drivers on randomly selected days and times of day. This method enables the generalization of the study results to the police department's activity in the areas that we study. The determination of locations to assess in a city is necessarily determined by traffic patterns and police activity in that city. Days and times of day are selected randomly to assure the greatest generalization possible. In this study, we assessed in great detail specific locations within the four cities and Santa Cruz County.

[4] *State v. Pedro Soto*, A. 734A. 2d 350(N.J. Super: Ct. Law Div. 1996)

[5] *Wilkins v. Maryland State Police, et al.*, Civ. No MJG-93-468

[6] *State v. Barrington Foulkes, et al.*

As previously described, the appropriate standard of comparison, or benchmark, must be established. Existing stop data then must be compared against that benchmark to assess the occurrence of racial profiling. That is, the percentage of minorities stopped by police departments must be compared to the benchmark data to assess whether minorities are stopped at a disproportionate rate to that at which they travel the roadways. Furthermore, most experts agree that the appropriate benchmark is not city or surrounding area population that can be obtained in census data. The appropriate benchmark is the motoring, or transient, population.

The racial composition of this transient population may or may not mirror the population of the city or county. For example, as shown in Table 1.1 the Hispanic driving population (that is to say, men and women aged 16 years or older) residing within the 41st and Capitola benchmark location is 16.0 percent[7]. If we used this percentage as the benchmark to which to compare the stops made by the Capitola police in that area, we would significantly overestimate the percentage of Hispanics in the driving population (10.4 percent). However, as Table 1.3 shows, had we used census data to estimate the transient population at Green Valley & Amesti, we would have substantially underestimated the Hispanics in the driving population.

Tables 1.1 through 1.5 provide the percentage of Blacks and Hispanics in the driving population at each of the locations benchmarked in Santa Cruz County.

[7] These data were compiled by identifying the census tracts (i.e., geographic units that average 4,000 residents) contained within the perimeters of each benchmark location. Then, demographics were obtained from the U.S. Census Bureau. In cases where more than one census tract fell within these perimeters, weighted averages were calculated.

Table 1.1: Capitola Police Department: Black and Hispanic Benchmark vs. Census Tract[8]

	Percent					
Location	Benchmark Black Traffic	Black Census	Comparative Disparity	Benchmark Hispanic Traffic	Hispanic Census	Comparative Disparity
41st & Capitola	1.3	1.9	+32.9	10.4	16.0	+34.8
Park & Kennedy	1.0	1.4	+31.0	7.2	8.0	+10.1
Stockton & Capitola	2.0	1.4	-38.1	6.1	8.0	+23.9

Table 1.2: Santa Cruz Police Department: Black and Hispanic Benchmark vs. Census Tract

	Percent					
Location	Benchmark Black Traffic	Black Census	Comparative Disparity	Benchmark Hispanic Traffic	Hispanic Census	Comparative Disparity
Mission & Bay	1.9	2.5	+23.7	10.8	13.9	+22.3
Riverside & Third	2.7	2.8	+2.2	26.7	24.8	-7.6
Soquel & Morrissey	2.0	2.1	+5.0	15.0	16.6	+9.4
Broadway & Ocean	2.6	2.6	+1.1	20.9	21.5	+2.7
Laurel & Pacific	2.4	2.9	+17.0	13.6	28.1	+51.7

Table 1.3: Santa Cruz Sheriff's Office: Black and Hispanic Benchmark vs. Census Tract

	Percent					
Location	Benchmark Black Traffic	Black Census	Comparative Disparity	Benchmark Hispanic Traffic	Hispanic Census	Comparative Disparity
17th & Capitola	1.40	1.38	-1.20	16.50	14.23	-15.97
30th & Portola	1.90	1.38	-37.34	12.70	14.23	+10.74
Soquel & State Park	1.20	1.42	+15.21	8.50	8.13	-4.54
Green Valley & Amesti	0.70	1.30	+46.03	62.50	49.72	-25.71
Hwy 9 and Graham Hill	0.50	1.42	+64.67	4.00	8.13	+50.81

[8] Note: The comparative disparity is arrived at by subtracting the traffic percentage from the census percentage and dividing by the census percentage.

Table 1.4: Scotts Valley Police Department: Black[9] and Hispanic Benchmark vs. Census Tract

	Percent					
Location	Benchmark Black Traffic	Black Census	Comparative Disparity	Benchmark Hispanic Traffic	Hispanic Census	Comparative Disparity
Scotts Valley & Carbonero	0.5	--	--	5.2	6.5	+20.5
Hwy 17 and Mt. Hermon	1.5	--	--	4.6	6.5	+29.7
Mt. Hermon & Skypark	0.5	--	--	4.0	4.4	+8.4
Hwy 17	1.2	--	--	8.0	5.6	-44.0

Table 1.5: Watsonville Police Department: Black and Hispanic Benchmark vs. Census Tract

	Percent					
Location	Benchmark Black Traffic	Black Census	Comparative Disparity	Benchmark Hispanic Traffic	Hispanic Census	Comparative Disparity
Main & Fifth	1.00	1.20	+16.40	67.50	85.02	+20.61
Main & Pennsylvania	1.30	0.94	-38.44	62.90	64.16	+1.96
Freedom & Davis	0.90	0.94	+4.15	68.50	72.95	+6.10
Riverside & Union	1.10	1.20	+8.04	67.70	85.02	+20.37

Clearly, using census data for Santa Cruz County would have overestimated Black and Hispanic traffic at some locations and underestimated it at others. The discrepancy between the transient population and census data, and among different geographic locations, is fundamental to understanding racial profiling and assessing whether or not it is occurring. It is this precision of measurement—accurately identifying the "transient" population at specific locations—that the methodology used in this study allows.

[9] Only benchmark data for Black motorists are displayed. The comparative disparity values cannot be calculated, as the U. S. Census Bureau has not reported statistics for Black residents for the city of Scotts Valley. This is attributable to the size of this minority population; the number of Black residents failed to reach the U.S. Census Bureau's criterion for inclusion (i.e., 100 residents) in the 2000 Census statistical reports.

Having determined the percentages of minorities in the driving population as the benchmarks, these data are then compared to the percentages of minorities stopped by officers in the five agencies included in this study. It is important to emphasize that we are comparing the officer-initiated stops to the benchmark data and not those stops that occur when officers are instructed to stop someone or they are doing it on the basis of credible third party information. The datasets that were utilized to determine the proportions of minority stops were provided to us by the five agencies.

Whereas there are three key components to a comprehensive racial profiling methodology, the focus of this study was on the first component—the assessment of racial profiling—that is described in detail in the remainder of this section.

Approach

The approach in Santa Cruz County consisted of five work components that were intended to satisfy three primary objectives developed by the agencies: 1) conduct an analysis to determine if racial profiling was occurring within any of the agencies, 2) include community representatives during the project and obtain feedback, 3) supplement state mandated training to educate officers on the project and the issue. The training was conducted after the study results so that any specific areas of concern or need could be addressed. These five work components are described in detail below.

Component 1: Benchmark Design

The goal of benchmark design was to determine the benchmark survey locations within the five Santa Cruz County agencies' jurisdictions. These locations served as the focal points used to determine the benchmark transient populations. In order to select survey locations for

benchmarking, the assistance of law enforcement agency personnel was required since the survey locations must be targeted rather than chosen randomly. Those sites selected had relatively high transient populations (traffic across these sites was high), were patrolled frequently, and were locations where police stops frequently were made. Targeting the right benchmark locations is critical to ensuring that the survey effectively represented the transient traffic. The benchmark locations yielded the control data against which stop data were compared. In order to yield meaningful results, the locations of the benchmark data had to be identical to the locations of the stop data.

Benchmarking locations were chosen after an initial conference with the chief of police, sheriff, or designees. Information relating to the location was discussed, including criteria such as:

- Traffic patterns (e.g., nearby entertainment or commercial establishments that might influence or impact traffic driving patterns)
- Traffic density (the number of cars traveling in each direction within a specified timeframe)
- Sight lines for surveyors (surveyor positioning, distance to traffic, and any obstacles that might impede sight)
- Lighting or lack thereof (required for night surveying and provided by some of the Santa Cruz County agencies)
- Surveyor safety (in high-crime areas and particularly at night, security was provided for the surveyors by some of the Santa Cruz County agencies)
- Police activity
- Type of vehicles stopped by police

During the selection process, work began on determining the perimeter around each location in which stops would be included for comparison to the benchmark data for that location[10].

The survey times for these locations were chosen randomly to ensure representative transient populations during all times of day. This ensures that no bias is inadvertently present when determining transient populations, and accounts for all possible stop times—day and night. A 24-hour table was used to select random surveying time periods. Surveying time periods at benchmark locations lasted anywhere from 8 to 70 minutes per session.

Component 2: Benchmark Data Collection

The goal of the benchmark data collection step was to capture the characteristics of the transient populations for the locations at which the surveys were to be conducted. Teams of surveyors were hired and trained to visually identify and manually record the race, ethnicity, and sex of individuals who comprise the transient populations.

On May 15, 2003, a one-day survey training session at the Santa Cruz Police Department offices was provided for the surveyors. Survey training is critical to ensure that surveyors understand the surveying process, surveyor positioning, daytime and nighttime surveying guidelines, data recording procedures, quality assurance reviews such as the assessment of inter-rater reliability, and the data cataloguing steps required for this work. During this session, survey team leaders also were trained on survey management tasks such as status reporting, interacting with police department personnel, and supervising surveyors. The survey training consisted of:

[10] Maps used to draw perimeters can be found in Appendix B.

1. A high-level overview of the purpose of the Santa Cruz County study. The intent of this portion of the training was to provide surveyors with a basic understanding of the importance of the study and the critical role that they would play in the study.
2. An explanation of the survey method, schedule, and roles were discussed, and the survey procedures were diagrammed and reviewed. The intent of this portion of the training was to provide surveyors with a basic understanding of how the survey would be conducted.
3. Hands-on practice in the field in which surveyors practiced on-location, using the actual data sheets developed for the survey. During this portion of the training, guidance was provided on data capture, review, and feedback to surveyors on the methods and tips for positioning, and data recording. Surveyor data sheets were reviewed, and feedback was provided on performance. The intent of this portion of the training was to provide surveyors a chance to practice in a "consequence-free" environment before conducting the actual survey; inter-rater reliability coefficients also were computed to ensure that surveyors were trained to criterion[11].

Two types of surveys were conducted—stationary and rolling—and different methods were used to capture different transient populations. Drivers' race or ethnicity was categorized as Asian, Black, Hispanic, White, Other, or Unknown. Drivers' sex was categorized as Male, Female, or Unknown.

[11] A minimum inter-rater reliability coefficient (i.e., the percent of agreement between two surveyors observing the same car at the same time) of .80 was used as this criterion. This is a commonly accepted standard in social science research. In this study, inter-rater reliability coefficients across all racial and ethnic categories averaged .89.

Stationary Surveys of Traffic Populations.

Surveyors stood at street corners to record the race or ethnicity, and sex of individuals. The surveyors recorded populations at predetermined times and predetermined locations.

Stationary surveys were conducted at all intersections surveyed for each Santa Cruz County agency. Each survey team was comprised of two individuals—one team leader and one surveyor. The team leader was responsible for supervising the team, keeping track of survey times, interacting with police liaisons, and organizing and collecting the data sheets. The team leader also acted as a surveyor. Each surveyor was responsible for capturing data for traffic moving in one direction (north, south, east, or west). Surveyors captured data for one lane at a time and alternated lanes. Surveyors were instructed to first note the race or ethnicity and sex of the driver for each car that passed within the survey period.

Rolling Survey

Surveyors traveled in cars to record the race or ethnicity, and sex of individuals traveling on Highway 17. Two surveyors were positioned in a moving car that drove in the right lane. The car would then exit the highway and proceed in the opposite direction. This process would be repeated for the duration of the time allotted for the surveying. Surveyors would have responsibility for one lane and would record drivers' race or ethnicity and age.

Quality Assurance

Each team consisted of one team leader and one core surveyor. The researchers and survey team leaders conducted benchmarking quality assurance activities throughout the duration of the surveys. Quality assurance was conducted to ensure that surveying was conducted

properly and on schedule, and to measure inter-rater reliability. Quality assurance activities consisted of:

- Conducting inter-reliability tests to measure the extent to which surveyors uniformly perceived race and ethnicity. These tests were conducted by several survey teams at several locations.
- Contacting police liaisons from each agency to provide them with the survey schedule and to answer any questions they might have about the benchmarking activities.
- Conducting pre-survey reviews for each location to determine positioning, scheduling, necessary materials, needs for additional lighting, and contingency planning.
- Conducting ongoing status meetings to review survey progress, discuss issues, and review surveyor performance.
- Conducting post-survey reviews to ensure timing and survey scheduling and to review data cataloguing and data entry schedules.
- Conducting periodic reviews of captured data to ensure that the data sheets were properly catalogued and filed.
- Conducting data entry reviews to ensure that data entered matched the data recorded.

After completion of the benchmark surveys, the data were entered into SPSS software for comparison against stop data. The outcomes of this step were the identification of transient traffic data that served as the benchmarks against which stop data were compared.

Inter-Rater Reliability.

One of the scientific standards for assuring that different raters are making the same determinations with regard to race and ethnicity is a technique called inter-rater reliability (Trochim, 2002). The assessment of inter-rater reliability involves two surveyors coding the race or ethnicity of drivers of the exact same cars. Several inter-rater reliability tests were run. Whereas there is little doubt that there is a high reliability in determining race with regard to Blacks and Caucasians, there has been little empirical evidence that it is possible to make the same determinations accurately in the case of Hispanics. Therefore, we purposely ran inter-rater reliability tests where there were higher concentrations of Hispanics.

Inter-rater reliability for Hispanic drivers was assessed during the second survey session at the 41st and Capitola benchmark locations. The first assessment was conducted on June 10, 2003, at 8:00 a.m. The inter-rater reliability for Hispanics was .93; that is, the two surveyors agreed 93 percent of the time. Another impediment to accuracy is the lighting conditions under which the surveys are conducted. The most difficult lighting conditions generally occur either in dusk or dawn conditions or in dark areas where no supplemental lighting is provided. The second assessment was conducted on June 13, 2003, at 8:00 p.m., just before dusk. The inter-rater reliability was .81.

Component 3: Data Analysis

The goal of the data analysis step was to analyze the benchmark data against the stop data to determine if racial profiling was occurring. The analysis compared the proportion of stops for specified minority groups against the transient populations in the surveyed areas. When the

proportion of stops for specified minority groups is higher than their representative transient population, then one may conclude that racial profiling is occurring.

Our analysis was conducted separately for Blacks and Hispanics. We computed odds-ratio analyses (Hosmer and Lemeshow, 1989) for these minority populations. These estimates take the form of "If you are Black (Hispanic) you are ___ times as likely to be stopped as if you are not Black (Hispanic)." Generally, when the odds ratio is greater than 1.5, we conclude that there may be racial profiling occurring. Also, we computed a chi-square analysis (Kanji, 1993) on the number of minority group members in transient populations compared to the numbers stopped. This analysis answers the question "Are these real differences, or could these observed differences be a result of chance factors?" The outcomes of this step were the statistical analyses run for each minority group at each benchmark location as well as odds ratios for each minority group that will indicate whether racial profiling is occurring.

Component 4: Reporting

The goal of this step is provide concerned stakeholders with information relative to the study method and progress in a timely fashion. In early March 2003 the project team met with agency representatives and community representatives to discuss the study methodology and to answer questions relative to the project and the issue. These meetings were conducted to accomplish the following:

- Provide interested stakeholders the opportunity to learn the methodology and ask questions about how and why the study was conducted
- Bring law enforcement, the study researchers, and communities members together in one forum to discuss the issue and the approach towards addressing it

- Develop a common context in which to view the study to facilitate discussion after study results are developed
- Provide community members the opportunity for authentic participation in the study

Two meetings were held for community representatives. The first meeting was held for the north county agencies (Santa Cruz Police Department, Santa Cruz Sheriff's Department, Scotts Valley Police Department, and Capitola Police Department) on March 3, 2003. The second meeting was held for the Watsonville Police Department in south county on March 4, 2003. Dr. John Lamberth provided a presentation to community members designed to present the methodology used to address the issue. Agency representatives and members from the project team were present to answer questions.

Throughout the project, monthly management meetings were conducted which included representatives from all agencies participating in the study. These meetings were conducted to review project progress against plan, discuss completed tasks, and review upcoming tasks and issues associated with the project.

Component 5: Training

Training supplemental to the POST specified curriculum on racial profiling (PC13519.4(f)) was provided to Watsonville police officers. Two four-hour training sessions were conducted on Wednesday, August 27, 2003, and one four-hour training session was conducted on Wednesday, September 10, 2003. The intent of the training was to provide information specific to the study to Watsonville police officers, and to supplement the POST curriculum relative to the issue of racial profiling. The four-hour course was comprised of two primary modules. The first module was structured to provide a national perspective on the racial

profiling issue, its impact on law enforcement, communities, and other stakeholders. The second module was developed to provide an overview of data collection efforts. The study conducted in Watsonville was reviewed in detail, and specific information about the methodology, project goals, and study outcomes were reviewed.

RESULTS: CAPITOLA POLICE DEPARTMENT

The research team met with representatives of the Capitola Police Department (CPD) on March 4, 2003. During the meeting the project was described and any questions were answered. Possible benchmark locations were reviewed based upon the motor vehicle stop data provided by CPD from January 1 through December 31, 2002. Three benchmark locations were selected:

1. 41st and Capitola
2. Park and Kennedy
3. Stockton and Capitola

Benchmarking surveys took place from June 4, 2003 through June 14, 2003. The CPD survey schedule included eight daytime and nighttime survey sessions:

- Wednesday, June 4: 6:00 a.m. to noon.
- Thursday, June 5: noon to 6:00 p.m.
- Saturday, June 7: midnight to 6:00 a.m.
- Sunday, June 8: noon to 6:00 p.m.
- Monday, June 9: noon to 6:00 p.m. (rescheduled June 7 session)
- Tuesday, June 10: 6:00 a.m. to noon.
- Friday, June 13: 6:00 p.m. to midnight.
- Saturday, June 14: 6:00 a.m. to noon

Surveyors coded a total of 6,092 drivers within the CPD benchmark locations. Of these drivers, 6,063 (99.5 percent) were race identified. This is an extremely high rate of racial identification, in part due to the excellent ambient light present and additional lighting provided by cooperating Santa Cruz County agencies. The identification rate of drivers by sex was only slightly higher (99.7 percent).

The stop data set consisted of 2,402 motor vehicle stops coded for location, date, and time of stop, motorist demographics, and Santa Cruz County disposition code (i.e., type and outcome of stop). The final stop data set consisted of 1,721 cases that were located within one of the CPD benchmark locations.

Race

The odds ratios and chi-square analyses for race are not reported due to the small number of Black drivers in the stop data. The number of Black stops ranged from 48 (at 41st and Capitola) to two (at Park and Kennedy). Because statistical analyses based on these sample sizes would include unacceptably high margins of error, only the results of the ethnicity and sex analyses are reported below. Suggestions for further data collection to increase the sample size of Black stops are included in this report's Conclusions.

Ethnicity

The data for ethnicity of motorists in both the benchmark and stop data at each benchmark locations are presented in Table CPD-1[12].

Table CPD-1: Ethnicity Analysis[13]

Location	Benchmark N	Benchmark Hispanic %	Stop N	Stop Hispanic %	Diff %	Odds Ratio
41st & Capitola	2,614	10.4	1,317	15.0	4.6	1.5
Park & Kennedy	1,867	7.2	148	14.2	0.7	2.1
Stockton & Capitola	1,582	6.1	256	11.3	5.2	2.0

The first column in Table CPD-1 refers to the location of the stops. The second column refers to the number of motorists (N) recorded at the benchmark location. The next column refers

[12] Chi-square analyses of these data are reported in the Appendix.

[13] Note that the N for the benchmark and the stop data are race-identified motorists and may differ slightly from the N for sex, as there were different percentages of sex-identified motorists.

to the percentage of Hispanic motorists in the benchmark data. The next column refers to the number (N) of stops recorded in the stop data. The next refers to the percentage of Hispanic stops. The next refers to the percent difference, and the final column refers to the odds ratio of being stopped if you are Hispanic.

The odds ratio is best understood by filling in the ratio in the following sentence: "If you are Hispanic, you are _____ times as likely to be stopped as if you are not Hispanic." If no racial profiling were occurring, all of the ratios would be 1.0. This would mean that Hispanics are no more likely to be stopped than non-minorities.

Odds ratios between 1.0 and 1.5 generally are seen as benign. Ratios between 1.5 and 2.0 provide an indication that a review of stops in these locations could be conducted. Ratios above 2.0 point to the potential targeting of minority motorists, and further action may be required from the agency. The level of inter-rater reliability must be considered, however, when discussing these guidelines.

As reported earlier, the inter-rater reliability coefficients for Hispanics ranged from .81 to .93. Whereas an inter-rater reliability coefficient of .80 is considered to be acceptable in social science research, it is not free of error. Given the less reliable measurement of Hispanic motorists, we suggest that the benign category be adjusted upward to 1.7, and the category that indicates that a review of the stops in these locations could be conducted be adjusted upward to include odds ratios of approximately 1.7 to 2.2. Accordingly, odds ratios above 2.2 would indicate a potential targeting of minority motorists and further action may be required from the agency. If this adjustment is taken into consideration, one of the odds ratios reported in Table CPD-1 is in the benign category; the odds ratios for Park and Kennedy and Stockton and Capitola suggest that a review of stops could be conducted at these locations. If these data are

collapsed and an odds ratio is computed (considering that 247 Hispanic motorists were stopped and, based upon the benchmark data, one would expect that 143 Hispanic motorists would be stopped), the overall odds ratio for CPD is 1.9.

We must urge caution in evaluating the odds ratios at both Park and Kennedy and at Stockton and Capitola. There were but 21 stops of Hispanics at Park and Kennedy and 29 stops of Hispanics at Stockton and Capitola. This means that approximately two Hispanics were stopped each month by the Capitola Police Department. With this few stops of Hispanics at these two locations, we caution that these data are marginally reliable. A more reliable measure of the Capitola Police Department can be obtained by considering the 41st and Capitola location. Here, 198 Hispanics were stopped and as we see, the odds ratio is in the benign region.

Sex

The analyses described above also were conducted for sex of motorist (see Table CPD-2)[14]. These analyses indicate that no disparities exist on the basis of sex. The overall odds ratio for CPD is 1.2.

Table CPD-2: Sex Analysis[15]

Location	Benchmark N	Benchmark Male %	Stop N	Stop Male %	Diff %	Odds Ratio
41st & Capitola	2,619	56.7	1,317	62.3	5.6	1.3
Park & Kennedy	1,871	56.9	148	62.2	5.3	1.2
Stockton & Capitola	1,582	60.1	256	58.6	-1.5	0.9

[14] Chi-square analyses of these data are reported in the Appendix.

[15] Note that the N for the benchmark and the stop data are race-identified motorists and may differ slightly from the N for sex, as there were different percentages of sex-identified motorists.

Establishing the Context

A teleconference with departmental representatives was held on August 18, 2003, to discuss this report and any special circumstances and/or enforcement activities that would influence these findings. Chief Ehle indicated that the high number of stops at 41st and Capitola were attributable to additional traffic enforcement actions taken after February 2002 and continuing to date. Departmental reports that were forwarded to us the following week indicated that the special enforcement included increased police patrols and radar enforcement. These activities were taken in response to community complaints of speeding on Capitola between 41st and 45th Avenue.

Conclusions

The number of Black motorists in the stop data was too small to conduct a meaningful statistical analysis for this variable. We suggest that the agency continue to collect stop data, though it is very likely that at least two or more additional years of data collection will be necessary to produce an adequate sample size. Though the odds ratio computed for ethnicity at 41st and Capitola was in the benign category, the odds ratios computed for Park and Kennedy and Stockton and Capitola indicate that Hispanic motorists are stopped at higher rates than would be expected. However, the odds ratios computed at two locations must be interpreted cautiously due to the comparatively small number of Hispanic stops. As in the case of the race analysis, a minimum of one additional year of stop data collection would be necessary to obtain sample size that would permit a conclusive analysis.

RESULTS: SANTA CRUZ POLICE DEPARTMENT

The research team met with representatives of the Santa Cruz Police Department (SCPD) on March 2, 2003. During the meeting the project was described and any questions were answered. Possible benchmark locations were reviewed based upon the motor vehicle stop data provided by SCPD from January 1 through December 31, 2002. Five benchmark locations were selected:

1. Mission and Bay
2. Riverside and Third
3. Soquel and Morrissey
4. Broadway and Ocean
5. Laurel and Pacific

Benchmarking surveys took place from May 18, 2003 through June 6, 2003. The SCPD survey schedule included eight daytime and nighttime survey sessions:

- Sunday, May 18: 6:00 a.m. to noon.
- Monday, May 19: 6:00 a.m. to noon
- Wednesday, May 21: 6:00 p.m. to midnight.
- Friday, May 23: midnight to 6:00 a.m.
- Tuesday, May 27: noon to 6:00 p.m.
- Thursday, May 29: 6:00 a.m. to noon.
- Saturday, May 31: noon to 6:00 p.m.
- Friday, June 6: 6:00 p.m. to midnight (rescheduled survey session due to conflict with community event)

Surveyors coded a total of 11,276 drivers within the SCPD benchmark locations. Of these drivers, 11,192 (99.3 percent) were race identified. This is an extremely high rate of racial identification, in part due to the excellent ambient light present and additional lighting provided by cooperating Santa Cruz County agencies. The identification rate of drivers by sex was only slightly higher (99.7 percent).

The stop data set consisted of 5,052 motor vehicle stops coded for location, date, and time of stop, motorist demographics, and Santa Cruz County disposition code (i.e., type and outcome of stop). Three percent of the data was deleted from the stop data set as the streets intersected at least twice (37 cases), and 114 of the cases were ungeocodable (e.g., either miscoded coordinates or locations that were unable to be identified in the database). The final data set consisted of 2,311 cases that were located within one of the SCPD benchmark locations.

Race

The odds ratios and chi-square analyses for race are not reported due to the small number of Black drivers in the stop data. The number of Black stops ranged from 39 (at Laurel and Pacific) to 8 (at Riverside and Third). Because statistical analyses based on these sample sizes would include unacceptably high margins of error, only the results of the ethnicity and sex analyses are reported below. Suggestions for further data collection to increase the sample size of Black stops are included in this report's Conclusions.

Ethnicity

The data for ethnicity of motorists in both the benchmark and stop data at each of the five benchmark locations is presented in Table SCPD-1[16].

Table SCPD-1: Ethnicity Analysis[17]

Location	Benchmark N	Benchmark Hispanic %	Stop N	Stop Hispanic %	Diff %	Odds Ratio
Mission & Bay	2,250	10.8	765	10.7	-0.1	1.0
Riverside & Third	3,398	26.7	232	29.3	2.6	1.1
Soquel & Morrissey	2,333	15.0	241	13.7	-1.3	0.9
Broadway & Ocean	1,481	20.9	421	20.0	-0.9	0.9
Laurel & Pacific	1,730	13.6	652	15.6	2.0	1.2

The first column in Table SCPD-1 refers to the location of the stops. The second column refers to the number of motorists (N) recorded at the benchmark location. The next column refers to the percentage of Hispanic motorists in the benchmark data. The next column refers to the number (N) of stops recorded in the stop data. The next refers to the percentage of Hispanic stops. The next refers to the percent difference, and the final column refers to the odds ratio of being stopped if you are Hispanic.

The odds ratio is best understood by filling in the ratio in the following sentence: "If you are Hispanic, you are _____ times as likely to be stopped as if you are not Hispanic." If no racial profiling were occurring, all of the ratios would be 1.0. This would mean that Hispanics are no more likely to be stopped than non-minorities.

Odds ratios between 1.0 and 1.5 generally are seen as benign. Ratios between 1.5 and 2.0 provide an indication that a review of stops in these locations could be conducted. Ratios above 2.0 point to the potential targeting of minority motorists, and further action may be required from

[16] Chi-square analyses of these data are reported in the Appendix.

[17] Note that the N for the benchmark and the stop data are race-identified motorists and may differ slightly from the N for sex, as there were different percentages of sex-identified motorists.

the agency. The level of inter-rater reliability must be considered, however, when discussing these guidelines.

As reported earlier, the inter-rater reliability coefficients for Hispanics ranged from .81 to .93. Whereas an inter-rater reliability coefficient of .80 is considered to be acceptable in social science research, it is not free of error. Given the less reliable measurement of Hispanic motorists, we suggest that the benign category be adjusted upward to 1.7, and the category that indicates that a review of the stops in these locations could be conducted be adjusted upward to include odds ratios of approximately 1.7 to 2.2. Accordingly, odds ratios above 2.2 would indicate a potential targeting of minority motorists and further action may be required from the agency. This adjustment was taken into consideration in interpreting these results. As shown in Table SCPD-1, two odds ratios are in the benign category; three odds ratios indicate that Hispanics have an equal, or slightly less, likelihood of being stopped than do non-Hispanics. The overall odds ratio for the SCPD stop data is 0.9. These analyses support the conclusion that there are no disparities on the basis of ethnicity.

Sex

The analyses described above also were conducted for sex of motorist (see Table SCPD-2)[18]. Two of the odds ratios indicate that male drivers have an equal, or slightly less, likelihood of being stopped, and one odds ratio is in the benign category. Two of the odds ratios fall into the category indicating a need for departmental review. However, the overall odds ratio computed for the SCPD stop data is 1.2; this odds ratio is in the benign category.

Table SCPD-2: Sex Analysis[19]

Location	Benchmark N	Benchmark Male %	Stop N	Stop Male %	Diff %	Odds Ratio
Mission & Bay	2,255	63.6	765	60.9	-2.7	0.9
Riverside & Third	3,408	69.3	232	69.4	0.1	1.0
Soquel & Morrissey	2,346	56.9	241	68.5	11.6	1.6
Broadway & Ocean	1,495	64.5	421	70.5	6.0	1.3
Laurel & Pacific	1,741	59.9	652	71.6	11.7	1.7

Establishing the Context

We reviewed these findings by telephone with Chief Belcher on August 18, 2003. He indicated that he would forward the report to the agency's liaison for review and identification of any special circumstances and/or enforcement activities that might influence these findings. A follow-up telephone conversation with the agency's liaison indicated that there were no special circumstances to report.

[18] Chi-square analyses of these data are reported in the Appendix.

[19] Note that the N for the benchmark and the stop data are race-identified motorists and may differ slightly from the N for sex, as there were different percentages of sex-identified motorists.

Conclusions

Because the SCPD stop data contained a comparatively small number of Black stops, analyses are not reported for this variable. To address the question of racial disparities, we suggest that the agency continue data collection. Due to the very small number of Black motorists (for example, 8 at one location), however, it is very likely that at least two years or more of additional data collection will be necessary to ensure an adequate sample size.

These analyses indicated that there were no disparities on the basis of ethnicity. Two of the five odds ratios computed for sex indicated that male drivers were more likely to be stopped than female drivers. However, the overall odds ratio–that is, for the department overall—for these data is in the benign category.

RESULTS: SANTA CRUZ SHERIFF'S OFFICE

The research team met with representatives of the Santa Cruz Sheriff's Office on March 2, 2003. During the meeting the project was described and any questions were answered. Possible benchmark locations were reviewed based upon the motor vehicle stop data provided by SCSO from January 1 through December 31, 2002. Five benchmark locations were selected:

1. 17th and Capitola
2. 30th and Portola
3. Soquel and State Park
4. Green Valley and Amesti
5. Highway 9 and Graham Hill

Benchmarking surveys in the Sheriff's Office jurisdiction were conducted during two consecutive survey sessions. The surveys for two of the locations (Green Valley and Amesti and Highway 9 and Graham Hill) were conducted during Survey Session 1, scheduled for May 18, 2003 through June 1, 2003. The surveys for the remaining two locations (30th and Portola, 17th and Capitola, and Soquel and State Park) were conducted during Survey Session 2, scheduled for June 2, 2003 through June 15, 2003. Scheduling the surveys over the two sessions allowed us to coordinate the SCSO surveys with those for the other four agencies, thus completing all stationary surveys within a four-week period. Surveys were conducted according to the following schedules:

Survey Session 1

- Sunday, May 18: 6:00 a.m. to noon.
- Monday, May 19: 6:00 a.m. to noon
- Wednesday, May 21: 6:00 p.m. to midnight.

- Friday, May 23: midnight to 6:00 a.m.
- Tuesday, May 27: noon to 6:00 p.m. (Highway 9 and Graham Hill only; Green Valley and Amesti rescheduled to June 3)
- Thursday, May 29: 6:00 a.m. to noon.
- Saturday, May 31: noon to 6:00 p.m.
- Friday, June 6: 6 p.m. to midnight (makeup session for May 16, rescheduled due to community event).

Survey Session 2

- Monday, June 2: noon to 6:00 p.m. (30th and Portola and 17th and Capitola only; Soquel and State park rescheduled to June 9)
- Wednesday, June 4: 6:00 a.m. to noon.
- Thursday, June 5: noon to 6:00 p.m.
- Saturday, June 7: midnight to 6:00 a.m.
- Sunday, June 8: noon to 6:00 p.m.
- Tuesday, June 10: 6:00 a.m. to noon.
- Friday, June 13: 6:00 p.m. to midnight.
- Saturday, June 14: 6:00 a.m. to noon

Surveyors coded a total of 8,819 drivers within the SCSO benchmark locations. Of these drivers, 8,751 (99.2 percent) were race identified. This is an extremely high rate of racial identification, in part due to the excellent ambient light present and additional lighting provided by cooperating Santa Cruz County agencies. The identification rate of drivers by sex was only slightly higher (99.7 percent).

The stop data set consisted of 4,184 motor vehicle stops coded for location, date, and time of stop, motorist demographics, and Santa Cruz County disposition code (i.e., type and outcome of stop). The final data set consisted of 2,942 cases that were located within one of the SCSO benchmark locations.

Race

The odds ratios and chi-square analyses for race are not reported due to the small number of Black drivers in the stop data. The number of Black stops ranged from 39 (at 17th and Capitola) to 1 (at Green Valley and Amesti). Because statistical analyses based on these sample sizes would include unacceptably high margins of error, only the results of the ethnicity and sex analyses are reported below. Suggestions for further data collection to increase the sample size of Black stops are included in this report's Conclusions.

Ethnicity

The data for ethnicity of motorists in both the benchmark and stop data at each of the five benchmark locations is presented in Table SCSO-1[20].

Table SCSO-1: Ethnicity Analysis[21]

Location	Benchmark N	Benchmark Hispanic %	Stop N	Stop Hispanic %	Diff %	Odds Ratio
17th & Capitola	1,646	16.5	797	17.3	.8	1.1
30th & Portola	2,037	12.7	348	14.1	1.4	1.1
Soquel & State Park	1,713	8.5	458	13.1	4.6	1.6
Green Valley & Amesti	1,516	62.5	296	57.4	-5.1	0.8
Hwy 9 & Graham Hill	1,839	4.0	1,043	5.8	1.8	1.5

[20] Chi-square analyses of these data are reported in the Appendix.

[21] Note that the N for the benchmark and the stop data are race-identified motorists and may differ slightly from the N for sex, as there were different percentages of sex-identified motorists.

The first column in Table SCSO-1 refers to the location of the stops. The second column refers to the number of motorists (N) recorded at the benchmark location. The next column refers to the percentage of Hispanic motorists in the benchmark data. The next column refers to the number (N) of stops recorded in the stop data. The next refers to the percentage of Hispanic stops. The next refers to the percent difference, and the final column refers to the odds ratio of being stopped if you are Hispanic.

The odds ratio is best understood by filling in the ratio in the following sentence: "If you are Hispanic, you are _____ times as likely to be stopped as if you are not Hispanic." If no racial profiling were occurring, all of the ratios would be 1.0. This would mean that Hispanics are no more likely to be stopped than non-minorities.

Odds ratios between 1.0 and 1.5 generally are seen as benign. Ratios between 1.5 and 2.0 provide an indication that a review of stops in these locations could be conducted. Ratios above 2.0 point to the potential targeting of minority motorists, and further action may be required from the agency. The level of inter-rater reliability must be considered, however, when discussing these guidelines.

As reported earlier, the inter-rater reliability coefficients for Hispanics ranged from .81 to .93. Whereas an inter-rater reliability coefficient of .80 is considered to be acceptable in social science research, it is not free of error. Given the less reliable measurement of Hispanic motorists, we suggest that the benign category be adjusted upward to 1.7, and the category that indicates that a review of the stops in these locations could be conducted be adjusted upward to include odds ratios of approximately 1.7 to 2.2. Accordingly, odds ratios above 2.2 would indicate a potential targeting of minority motorists and further action may be required from the agency. If this adjustment is taken into consideration, four of the five odds ratios fall into the

benign category. The remaining odds ratio indicates that Hispanics have a slightly less likelihood of being stopped than do non-Hispanics. The overall odds ratio computed for the SCSO stop data is 0.8. These data support the conclusion that there are no disparities on the basis of ethnicity.

Sex

The analyses described above also were conducted for sex of motorist (see Table SCSO-2)[22].

Table SCSO-2: Sex Analysis[23]

Location	Benchmark N	Benchmark Male %	Stop N	Stop Male %	Diff %	Odds Ratio
17th & Capitola	1,652	54.9	797	69.6	14.7	1.9
30th & Portola	2,042	59.8	348	76.7	16.9	2.2
Soquel & State Park	1,714	53.9	458	69.2	15.3	1.9
Green Valley & Amesti	1,544	66.1	296	73.3	7.2	1.4
Hwy 9 & Graham Hill	1,841	55.2	1,043	74.2	19.0	2.3

Whereas one odds ratio is in the benign category, two suggest a need for departmental review of stops at 17th and Capitola and Soquel and State Park. The odds ratios for Highway 9 and Graham Hill and 30th and Portola indicate that there are potential problems at these locations as the number of male stops is higher than would be expected. The overall odds ratio for the SCSO stop data is 1.9.

Establishing the Context

We discussed this report with Sheriff Tracy by telephone on August 20, 2003. The report's findings were discussed as well as any special circumstances or enforcement activities

[22] Chi-square analyses of these data are reported in the Appendix.

[23] Note that the N for the benchmark and the stop data are race-identified motorists and may differ slightly from the N for sex, as there were different percentages of sex-identified motorists.

that might influence these findings. Sheriff Tracy indicated that he would forward the report to a department representative who would be asked about any special circumstances. As we have received no reply to date, we assume that there are no special circumstances.

Conclusions

Due to the small number of Black motorists in the stop data, no statistical analyses are reported for this variable. We suggest that data collection continue in order to address the question of racial disparities. However, it is very likely that at least two or more years of data collection will be necessary to ensure that an adequate sample size is obtained.

One statistical analysis indicated that Hispanic motorists are less likely to be stopped than non-Hispanic motorists. The odds ratios computed for the remaining four locations fell into the benign category. These data suggest that there are no disparities on the basis of ethnicity. In contrast, two of the statistical analyses for sex suggested a need for departmental review of stops at two locations. Another two analyses also supported the conclusion that there might be potential problems on the basis of sex. Barring any special circumstances, these analyses suggest that men are stopped at higher rates than would be expected at these locations.

RESULTS: SCOTTS VALLEY POLICE DEPARTMENT

The research team met with representatives of the Scotts Valley Police Department (SVPD) on March 2, 2003. During the meeting the project was described and any questions were answered. Possible benchmark locations were reviewed based upon the motor vehicle stop data provided by SVPD from January 1 through December 31, 2002[24]. Four benchmark locations were selected:

1. Scotts Valley and Carbonero
2. Highway 17 and Mt. Hermon
3. Mt. Hermon & Skypark
4. Highway 17 (rolling survey)

Two survey sessions were conducted. Benchmarking stationary surveys took place from June 2, 2003 through June 14, 2003. The daytime rolling survey for Highway 17 was conducted from June 18, 2003 through June 25, 2003.

The SVPD stationary survey schedule included eight daytime and nighttime survey sessions:

- Monday, June 2: noon to 6:00 p.m.
- Wednesday, June 4: 6:00 a.m. to noon.
- Thursday, June 5: noon to 6:00 p.m.
- Saturday, June 7: midnight to 6:00 a.m.
- Sunday, June 8: noon to 6:00 p.m.
- Tuesday, June 10: 6:00 a.m. to noon.

[24] As described below, due to the small number of stops additional data were provided for Highway 17.

- Friday, June 13: 6:00 p.m. to midnight.
- Saturday, June 14: 6:00 a.m. to noon

The daytime rolling survey schedule included the following sessions:

- Wednesday, June 18: 6:00 p.m. to midnight
- Thursday, June 19: noon to 6:00 p.m.
- Friday, June 20: 6:00 p.m. to midnight
- Saturday, June 21: noon to 6:00 p.m.
- Sunday, June 22: noon to 6:00 p.m.
- Monday, June 23: noon to 6:00 p.m.
- Tuesday, June 24: 6:00 a.m. to noon
- Wednesday, June 25: 6:00 a.m. to noon

Surveyors coded a total of 6,289 drivers within the SVPD benchmark locations. Of these drivers, 6,213 (98.8 percent) were race identified. This is an extremely high rate of racial identification, in part due to the excellent ambient light present and additional lighting provided by cooperating Santa Cruz County agencies. The identification rate of drivers by sex was only slightly higher (99.1 percent).

The stop data set consisted of 4,673 motor vehicle stops coded for location, date, and time of stop, motorist demographics, and SVPD disposition code (i.e., type and outcome of stop). Of these data, 3,025 stops were located within one of the SVPD benchmark locations. Approximately 1% of the stop data were incomplete, with race (1.2%) or and/or sex (1.3%) of driver unidentified. These data were supplemented with stop data collected between October 1, 2001 and April 15, 2003 at Highway 17 in order to ensure that the sample size was large enough to conduct meaningful statistical analyses.

Race

The odds ratios and chi-square analyses for race are not reported due to the small number of Black drivers in the stop data. The number of Black stops ranged from 8 (at two locations, Scotts Valley and Carbonero and Mt. Hermon and Skypark) to 18 (at Highway 17 and Mt. Hermon). Because statistical analyses based on these sample sizes would include unacceptably high margins of error, only the results of the ethnicity and sex analyses are reported below. Suggestions for further data collection to increase the sample size of Black stops are included in this report's Conclusions.

Ethnicity

The data for ethnicity of motorists in both the benchmark and stop data at each of the four benchmark locations is presented in Table SVPD-1[25].

Table SVPD-1: Ethnicity Analysis[26]

Location	Benchmark N	Benchmark Hispanic %	Stop N	Stop Hispanic %	Diff %	Odds Ratio
Scotts Valley & Carbonero	1,407	5.2	652	10.6	5.4	2.2
Hwy 17 & Mt. Hermon	1,795	4.7	1,029	9.8	5.1	2.2
Mt. Hermon & Skypark	2,019	4.0	709	7.1	3.1	1.8
Hwy 17 (rolling survey)	992	8.1	210	11.9	3.8	1.5

The first column in Table SVPD-1 refers to the location of the stops. The second column refers to the number of motorists (N) recorded at the benchmark location. The next column refers to the percentage of Hispanic motorists in the benchmark data. The next column refers to the number (N) of stops recorded in the stop data. The next refers to the percentage of Hispanic

[25] Chi-square analyses of these data are reported in the Appendix.

[26] Note that the N for the benchmark and the stop data are race-identified motorists and may differ slightly from the N for sex, as there were different percentages of sex-identified motorists.

stops. The next refers to the percent difference, and the final column refers to the odds ratio of being stopped if you are Hispanic.

The odds ratio is best understood by filling in the ratio in the following sentence: "If you are Hispanic, you are _____ times as likely to be stopped as if you are not Hispanic." If no racial profiling were occurring, all of the ratios would be 1.0. This would mean that Hispanics are no more likely to be stopped than non-minorities.

Odds ratios between 1.0 and 1.5 generally are seen as benign. Ratios between 1.5 and 2.0 provide an indication that a review of stops in these locations could be conducted. Ratios above 2.0 point to the potential targeting of minority motorists, and further action may be required from the agency. The level of inter-rater reliability must be considered, however, when discussing these guidelines.

As reported earlier, the inter-rater reliability coefficients for Hispanics ranged from .81 to .93. Whereas an inter-rater reliability coefficient of .80 is considered to be acceptable in social science research, it is not free of error. Given the less reliable measurement of Hispanic motorists, we suggest that the benign category be adjusted upward to 1.7, the category that indicates that a review of the stops in these locations could be conducted be adjusted upward to include odds ratios of approximately 1.7 to 2.2. Accordingly, odds ratios above 2.2 would indicate a potential targeting of minority motorists and further action may be required from the agency. Taking these adjustments into consideration, three of the odds ratios are in the category that indicates a review of the stops in this location could be conducted and one of them clearly is in the benign area. When these data are collapsed and an overall odds ratio computed, the overall odds ratio is 2.0, indicating that overall, Scotts Valley's odds ratios are in the category indicating that a review of the stops in this area could be conducted.

The odds ratio computed for Highway 17 should be seen in a slightly different light than the other odds ratios. Even though nighttime stops (75.1% of the data) were excluded from the data as the rolling survey was conducted during daytime hours, the proportion of Hispanic stops at night was virtually identical to the proportion of daytime stops of Hispanics. In this location, where there is the most transient traffic through Scotts Valley and the highest proportion of Hispanic motorists measured in the jurisdiction, one would expect profiling to be at its most rampant, if it was occurring. That this is not the case adds additional weight to the lack of significant targeting of Hispanics that appears to be the case in Scotts Valley.

Sex

The analyses described above also were conducted for sex of motorist (see Table SVPD-2)[27]. Each of the odds ratios are in the benign category suggesting that there are no disparities on the basis of sex. The overall odds ratio for the SVPD stop data is 1.4.

Table SVPD-2: Sex Analysis[28]

Location	Benchmark N	Benchmark Male %	Stop N	Stop Male %	Diff %	Odds Ratio
Scotts Valley & Carbonero	1,409	56.6	653	62.6	6.0	1.3
Hwy 17 & Mt. Hermon	1,807	58.7	1,026	68.1	9.4	1.5
Mt. Hermon & Skypark	2,019	57.2	708	62.3	5.1	1.2
Hwy 17 (rolling survey)	998	64.5	210	66.2	1.7	1.1

[27] Chi-square analyses of these data are reported in the Appendix.

[28] Note that the N for the benchmark and the stop data are race-identified motorists and may differ slightly from the N for sex, as there were different percentages of sex-identified motorists.

Establishing the Context

We discussed this report during a telephone call with Chief Lind on August 19, 2003. He could not identify any special circumstances or enforcement activities; however, he raised several issues related to traffic patterns in the community.

Scotts Valley is a residential community with high levels of commuter traffic. Highway 17 is a busy corridor connecting San Jose and Santa Cruz. Mt. Hermon Road is a major thoroughfare that serves as a "feeder" to Highway 17. Chief Lind indicated that as a result, many of the stops at three of the benchmark locations (i.e., Highway 17, Highway 17 and Mt. Hermon, and Mt. Hermon and Skypark) would consist of workday commuters and motorists driving to and from the local beaches. In contrast, the Scotts Valley and Carbonero area contains some low-income housing and an industrial park, and it is likely that comparatively more stops involve low-income drivers at this location. To test this, an analysis was conducted comparing the reason for the stop (i.e., equipment violation versus others) and ethnicity of driver (i.e., Hispanic vs. non-Hispanic). This analysis was not significant, indicating that Hispanics were no more likely to be stopped due to equipment violations than for other reasons.

The Chief also suggested that if disparities do exist they might be the result of a few officers' actions rather than a systemic problem. In our experience odds ratios of this magnitude generally indicate that it might well be a few officers, rather than anything systemic.

Conclusions

Because the sample of Black motorists in the SVPD stop data was so small, analyses are not reported for this variable. To address the question of racial disparities, we suggest that the agency continue data collection. Due to the very small number of Black motorists, however, it is

very likely that at least two years or more of additional data collection will be necessary to ensure an adequate sample size.

There is an indication that a review of the stops could be conducted by the agency at three of the locations, the odds ratios should be viewed in the light of the type of community and the type of traffic that goes through it. Even though it is not possible for us to determine the impact of the feeder roads at three of the locations and the low-income housing and industrial park at the fourth from our data set, there is the possibility that these had an effect. It should be pointed out that these disparities are not as large as those found in other studies of racial profiling. For example, the likelihood that a Black motorist would be stopped on the New Jersey Turnpike by the New Jersey State Police was 4.85 times the likelihood that a non-Black motorist would be stopped. The two highest odds ratios discussed here are less than half that. Higher odds ratios also have been obtained in other studies that we have conducted.

RESULTS: WATSONVILLE POLICE DEPARTMENT

The research team met with representatives of the Watsonville Police Department (WPD) on March 4, 2003. During the meeting the project was described and any questions were answered. Possible benchmark locations were reviewed based upon the motor vehicle stop data provided by WPD (January 1 through December 31, 2002). Four benchmark locations were selected:

1. Main & Fifth
2. Main & Pennsylvania
3. Freedom & Davis
4. Riverside & Union

Benchmarking surveys took place from May 16, 2003 through June 3, 2003. The WPD survey schedule included eight daytime and nighttime survey sessions:

- Friday, May 16: 6:00 p.m. to midnight.
- Sunday, May 18: 6:00 a.m. to noon.
- Monday, May 19: 6:00 a.m. to noon.
- Wednesday, May 21: 6:00 p.m. to midnight.
- Friday, May 23: midnight to 6:00 a.m.
- Thursday, May 29: 6:00 a.m. to noon.
- Saturday, May 31: noon to 6:00 p.m.
- Tuesday, June 3: noon to 6:00 p.m. (session rescheduled from May 27)

Surveyors coded a total of 8,403 drivers within the WPD benchmark locations. Of these drivers, 8,308 (98.9 percent) were race identified. This is an extremely high rate of racial

identification, in part due to the excellent ambient light present and additional lighting provided by cooperating Santa Cruz County agencies. The identification rate of drivers by sex was only slightly higher (99.6 percent).

The stop data set consisted of 6,886 cases coded for location, date, and time of stop, motorist demographics, and Santa Cruz County disposition code (i.e., type and outcome of stop). Of these data, 53 cases were ungeocodable (e.g., either miscoded coordinates or locations that were unable to be identified in the database). The final data set consisted of 4,216 cases that were located within one of the WPD benchmark locations.

Race

The odds ratios and chi-square analyses for race are not reported due to the small number of Black drivers in the stop data. The number of Black stops ranged from 9 (at Main and Pennsylvania) to 32 (at Main and Fifth). Because statistical analyses based on these sample sizes would include unacceptably high margins of error, only the results of the ethnicity and sex analyses are reported below. Suggestions for further data collection to increase the sample size of Black stops are included in this report's Conclusions.

Ethnicity

The data for ethnicity of motorists in both the benchmark and stop data at each benchmark locations are presented in Table WPD-1.

Table WPD-1: Ethnicity Analysis[29]

Location	Benchmark N	Benchmark Hispanic %	Stop N	Stop Hispanic %	Diff %	Odds Ratio
Main & Fifth	1,861	67.5	1,856	79.9	12.4	1.9
Main & Pennsylvania	1,751	62.9	447	74.0	11.1	1.7
Freedom & Davis	2,443	68.5	714	74.9	6.4	1.4
Riverside & Union	2,253	67.7	1,199	79.2	11.5	1.8

The first column in Table WPD-1 refers to the location of the stops. The second column refers to the number of motorists (N) recorded at the benchmark location. The next column refers to the percentage of Hispanic motorists in the benchmark data. The next column refers to the number (N) of stops recorded in the stop data. The next refers to the percentage of Hispanic stops. The next refers to the percent difference, and the final column refers to the odds ratio of being stopped if you are Hispanic.

The odds ratio is best understood by filling in the ratio in the following sentence: "If you are Hispanic, you are _____ times as likely to be stopped as if you are not Hispanic." If no racial profiling were occurring, all of the ratios would be 1.0. This would mean that Hispanics are no more likely to be stopped than non-minorities.

Odds ratios between 1.0 and 1.5 generally are seen as benign. Ratios between 1.5 and 2.0 provide an indication that a review of stops in these locations could be conducted. Ratios above 2.0 point to the potential targeting of minority motorists, and further action may be required from the agency. The community demographics and inter-rater reliability must be considered, however, when discussing these guidelines.

[29] Note that the N for the benchmark and the stop data are race-identified motorists and may differ slightly from the N for sex, as there were different percentages of sex-identified motorists.

As reported earlier, the inter-rater reliability coefficients for Hispanics ranged from .81 to .93. Whereas an inter-rater reliability coefficient of .80 is considered to be acceptable in social science research, it is not free of error. The comparatively lower inter-rater reliability obtained for Hispanics will have a larger influence in instances where Hispanic motorists are the majority, as is the case in the benchmark data.

We suggest that the benign category be adjusted upward to 1.7, the category that indicates that a review of the stops in these locations be adjusted upward to include odds ratios of approximately 1.7 to 2.2. Accordingly, odds ratios above 2.2 would indicate a potential targeting of minority motorists and further action may be required from the agency.

This adjustment has been taken into consideration in interpreting the data reported in Table WPD-1. The odds ratios for two of the four locations are in the benign area and the other two are just above that point. If the 4,216 stops that fall within the four benchmark locations are collapsed and one computes an odds ratio (that is, 3,299 Hispanic motorists were stopped and the prediction from the benchmark data would suggest that 2,821 was the expected number) the overall odds ratio is 1.8, just above the benign category[30].

Sex

The analyses described above also were conducted for sex of motorist. As shown in Table WPD-2, there appear to be disparities on the basis of sex. Whereas two of the four odds ratios are in the benign category, two suggest that departmental review of stops in these locations

[30] Chi-square analyses of these data are reported in the Appendix.

is warranted. The overall odds ratio computed for the WPD jurisdiction is 1.6; this suggests that the problem is at most a moderate one.

Table WPD-2: Sex Analysis[31]

Location	Benchmark N	Benchmark Male %	Stop N	Stop Male %	Diff %	Odds Ratio
Main & Fifth	1,874	64.6	1,856	76.3	11.7	1.8
Main & Pennsylvania	1,766	61.1	447	70.7	9.6	1.5
Freedom & Davis	2,465	66.4	714	75.8	9.4	1.6
Riverside & Union	2,265	71.5	1,199	77.6	6.1	1.4

Establishing the Context

We held a teleconference with Chief Medina and department representatives on August 20, 2003, to discuss this report and any special circumstances and/or police activities that might influence these findings. A number of special circumstances were raised by the agency:

Three of the four locations (Main and Fifth, Main and Pennsylvania, Riverside and Union) are located on two state highway routes that connect traffic from the Monterey Bay Coast to two major north-west corridors (Highway 101 and Interstate 5). The department expressed concern that stops on these routes might include a disproportionate number of non-Hispanic motorists. To address this issue, analyses were conducted comparing the proportion of Hispanic and non-Hispanic drivers in the original and reduced stop data set for these three benchmark locations. The results of these analyses were not significant, indicating that the proportion of Hispanic drivers stopped was not changed significantly by the elimination of the traffic stops on the state routes.

[31] Note that the N for the benchmark and the stop data are race-identified motorists and may differ slightly from the N for sex, as there were different percentages of sex-identified motorists.

The department also provided documentation for police activity within these three locations. There is departmental and community concern about the crime rate in this area; in fact, a number of police-neighborhood partnerships have been forged addressing the increasing crime rate in the downtown area. Whereas many of these efforts addressed enforcement of seat belt laws, crimes such as drug activity, burglary, and armed robbery, the department also increased traffic enforcement in this area. Many of the traffic enforcement activities were a response to the activity of approximately 10 gangs in the downtown area. A departmental representative indicated that the department's policy was to maintain high visibility in the area and to take steps to reduce the gang-related violence in the area. These steps might include traffic stops of known gang members (primarily male Hispanics aged 18-29) and associates and/or cars suspected to have been involved in criminal activity. Adult and juvenile arrest data also were provided by race and ethnicity (but not by sex). This increased activity within the boundaries of the benchmark locations may very well have increased the proportion of Hispanic drivers stopped, particularly since relatively minor increases in the stopping of Hispanic drivers would have accounted for the small elevations in the odds ratio above the benign area.

Conclusions

Due to the small number of Black motorists in the stop data, no statistical analyses are reported for this variable. We suggest that data collection continue in order to address the question of racial disparities. However, it is very likely that at least two or more years of data collection will be necessary to ensure that an adequate sample size is obtained.

The odds ratios obtained for ethnicity should be interpreted with caution in all five Santa Cruz County jurisdictions due to the influence that less reliable measurement (as we see when

surveyors are asked to discriminate between Hispanic and White motorists). In Watsonville, where the majority of motorists are Hispanic, the impact may be even greater than it is in other jurisdictions where Hispanic drivers are a minority. Only two odds ratios indicate a potential need for further review—and these ratios are just above the benign category. It also should be pointed out that these disparities are not as large as in other studies of racial profiling. For example, the likelihood that a Black motorist would be stopped on the New Jersey Turnpike by the New Jersey State Police was 4.85 times the likelihood that a non-Black motorist would be stopped. The two odds ratios discussed here are less than half that. Higher odds ratios also have been obtained in other studies that we have conducted.

There was some evidence that male drivers were stopped at disproportionate rates at three of the four locations, but these disparities were not large. However, the overall odds ratio for the jurisdiction (1.6) indicates that the problem is at most a moderate one.

DISCUSSION

The aim of the research discussed in this report was to begin the process of analyzing data collected by the five law enforcement agencies in Santa Cruz County with the specific goal of determining whether there was targeting of minorities and/or genders by any or all of the agencies with regard to the traffic stops that were made in 2002. This portion of the endeavor is the first step in the overall process of determining whether racial profiling is occurring in Santa Cruz County. The answer to this question can be only partially answered at this time, due to the small number of Black motorists stopped at the benchmark locations.

It is possible, however, to speak to the question of whether Hispanics are being targeted by law enforcement agencies in the County. While there are a few locations in the County where the level of stops of Hispanics should lead to a review by an agency, overall, there is little evidence of targeting of Hispanic motorists. To illustrate, there were 21 areas benchmarked in the County, with 3 of the locations having fewer stops than would be indicated on the basis of the recorded traffic, 11 of the locations having stops in the benign area and 7 having stops in the area that provides an indication that a review of these stops could be in order. There were no benchmark locations that fell into the area that points to the potential targeting of minority motorists, and further action may be required from the agency, which is unusual in our experience.

In fact, in the work that we have done in assessing racial profiling around the country, these results are the "best" (in the sense of showing the smallest disparities between stops and transient population) results that we have seen. We have seen odds ratios as high as 4.85 in New

Jersey, but in other agencies that have been assessed, it is not uncommon to have ratios in the high 2s or even 3.

In addition to assessing the stops of minorities, an assessment of the gender of those stopped was also accomplished. With regard to odds ratios, the results are similar to the ethnicity results mentioned above. There were two odds ratios below 1, eleven between 1.0 and 1.5, six between 1.5 and 2.0 and two somewhat above 2.0. In each instance, the males were stopped at a disproportionate rate compared to females. However, none of the agencies' overall odds ratios reached the area that points to the potential targeting of male motorists and further action may be required from the agency.

In addition to assessing stop data, the agencies have banded together to provide specific training for their officers with regard to racial profiling. California mandates a racial profiling training course for officers and the Santa Cruz County agencies are expanding upon that training to emphasize aspects of policing that relate to the stop data study. That training has started and will continue for several months.

At the beginning of the study, community groups in North County and Watsonville were invited to meet with the Chiefs, the Sheriff, and the research team. In that first meeting, they were informed of the way the study would be conducted and were encouraged to ask questions and provide input to the process. The Watsonville group had an interim meeting after the benchmarking was completed. The agencies have encouraged community involvement and the communities have shown an avid interest in the study and its results.

We should emphasize that this is the first step in a long process and that there are several more to go before the agencies can say that they are, or are not targeting any minority, either in

stops or in post-stop activity. The first step is quite encouraging for the agencies and for the communities these agencies serve. The involvement of the communities has been one of the cornerstones of this process. We have met with the community groups in explaining and reporting the results, and we are encouraged that the spirit of cooperation that we have seen between the agencies and the communities will continue.

RECOMMENDATIONS

The agencies participating in this study have demonstrated leadership, courage, and insight with regard to the issue of racial profiling. We fully expect that the agencies will continue to address this important issue with their communities in the spirit with which they have conducted the project thus far. To facilitate future endeavors, we have provided the following recommendations to help the agencies in their decision-making process as they move forward.

1. It is clear that data collection in the County should continue and the agencies have indicated their intention to continue to collect data. One of the immediate reasons for this is that one year's worth of stop data proved to be inadequate to assess racial profiling among Black motorists because of the small number of stops recorded in the benchmark areas. Having completed the benchmarking at 21 locations through out the county makes it possible to easily analyze stop data for 2003 at the benchmark locations by using the benchmark data that were collected during the spring of 2003.

2. The agencies should begin to analyze post-stop activity related to traffic stops, with a particular emphasis on searches. While there is no doubt that minority motorists in other jurisdictions have been treated differently, not only in the frequency of stopping, but in the way they are treated after the stop occurs, care must be taken to accurately analyze search data. There have been calls for simply using the proportion of minority stops as a benchmark for the proportion of minority searches. This suggestion is too unsophisticated when it comes to searches. First, there are several kinds of searches, including probable cause, inventory, searches incident to arrest, consent and probation

and parole. Some are mandatory for officers and some are not. There may be racial/ethnic implications with some of types of searches and not with others. Furthermore, strength of deployment in various sections of a jurisdiction can have a strong impact on the number of persons searched. If all of these variables are not taken into consideration, it is possible to seriously misinterpret search data.

3. A concomitant recommendation concerns the auditing of police stop data. As data analysis in racial profiling continues to mature, there is more of a spotlight being turned on the quality of stop data that is generated. Basically there are two levels of auditing that can be undertaken by a department.
    a) A review of all data as it is put into the system for completeness. That is, each stop should be fully documented, and this is activity that is best reviewer by front-line supervisors.
    b) A comparison of stops recorded for racial profiling data collection to other data collection systems in the department, such as Computer Assisted Dispatch systems.

    As the agencies continue to collect data, we feel that they should implement data auditing mechanisms to help ensure consistent integrity of the stop data collected.

4. The supplementing of the training mandated by California Peace Officers Standards and Training (POST) should be continued. The supplemental racial profiling training specifically geared to data collection and analysis will help ensure a greater

understanding of the data collection project and buy in by the officers of the five agencies.

5. The agencies and the communities they represent should continue the excellent cooperation that they have evidenced during this first step in the process of determining whether racial profiling is occurring. Future community meetings will increase the understanding for the positions expressed by both the agencies and community members. The agencies should consider developing a more formal process for soliciting consistent participation from community members. The development of a racial profiling community group or council could achieve this goal.

APPENDIX A – CHI SQUARES

Whereas odds ratios provide a good analysis of the probabilities of being stopped, the chi-square analysis takes into consideration sample sizes (number of stops by each group) to determine the likelihood of observed differences due to chance. By convention, statisticians use the .05 level of probability to determine the statistical significance of an analysis. That is, if the observed result would occur five or fewer times out of a hundred, then it is treated as a real result, not a chance finding. As probabilities decrease, we become more confident that the result is real, so probabilities normally are reported as statistically significant if they are .05 or less.

Unlike odds ratios, the chi square statistic is sensitive to sample size. When conducting chi square analyses on large samples—as in this case—small observed differences might reach statistical significance simply due to the size of the sample. Thus, it is important to consider the results of chi square analyses and odds ratios together to consider whether statistically significant differences are in fact meaningful differences.

Capitola Police Department

The results of the chi-square analyses for each of the CPD benchmark locations are presented below. As shown in Table CPD-1A, each of the chi-square analyses for ethnicity was statistically significant.

Table CPD-1A: Chi-Square Analysis for Ethnicity

Location	Chi-Square	Probability
41st & Capitola	29.87	<.001
Park & Kennedy	10.68	.001
Stockton & Capitola	12.43	<.001

Note: ns = not significant

As shown in Table CPD-2A, two of the three chi-square analyses did not reach statistical significance. The statistically significant chi-square analysis for sex conducted for 41st and Capitola should be interpreted as a large sample artifact, considering the comparatively larger number of stops at this intersection.

Table CPD-2A: Chi-Square Analysis for Sex

Location	Chi-Square	Probability
41st & Capitola	16.59	<.001
Park & Kennedy	1.66	ns
Stockton & Capitola	.25	ns

Santa Cruz Police Department

The results of the chi-square analyses for each of the SCPD benchmark locations are presented below. The results shown in Table SCPD-1A support the conclusion that there are no disparities on the basis of ethnicity.

Table SCPD-1A: Chi-Square Analysis for Ethnicity

Location	Chi-Square	Probability
Mission & Bay	.01	ns
Riverside & Third	.81	ns
Soquel & Morrissey	.32	ns
Broadway & Ocean	.21	ns
Laurel & Pacific	2.22	ns

Note: ns = not significant

As can be seen in Table SCPD-2A, three of the five chi square analyses are statistically significant. However, these results should be interpreted with caution as the chi square statistic is affected by sample size.

Table SCPD-2A: Chi-Square Analysis for Sex

Location	Chi-Square	Probability
Mission & Bay	2.37	ns
Riverside & Third	.00	ns
Soquel & Morrissey	13.13	<.001
Broadway & Ocean	6.62	.01
Laurel & Pacific	37.62	<.001

Santa Cruz Sheriff's Office

The results of the chi-square analyses for each of the Santa Cruz Sheriff's Office benchmark locations are presented below in Table SCSO-1A and Table SCSO-2A.

Table SCSO-1A: Chi-Square Analysis for Ethnicity

Location	Chi-Square	Probability
17th & Capitola	.36	ns
30th & Portola	.63	ns
Soquel & State Park	12.31	<.001
Green Valley & Amesti	3.29	ns
Hwy 9 & Graham Hill	8.70	.003

Note: ns = not significant

Three of the five chi-square analyses for ethnicity failed to reach statistical significance. However, each of the chi-square analyses for sex was statistically significant.

Table SCSO-2A: Chi-Square Analysis for Sex

Location	Chi-Square	Probability
17th & Capitola	69.87	<.001
30th & Portola	41.49	<.001
Soquel & State Park	43.50	<.001
Green Valley & Amesti	6.94	.008
Hwy 9 & Graham Hill	152.60	<.001

Scotts Valley Police Department

The results of the chi-square analyses for ethnicity at each of the SVPD benchmark locations are presented below in Tables SVPD-1A and SVPD-2A.

Table SVPD-1A: Chi-Square Analysis

Location	Chi-Square	Probability
Scotts Valley & Carbonero	38.57	<.001
Hwy 17 & Mt. Hermon	60.84	<.001
Mt. Hermon & Skypark	17.79	<.001
Hwy 17 (rolling survey)	4.18	.04

Table SVPD-2A: Chi-Square Analysis

Location	Chi-Square	Probability
Scotts Valley & Carbonero	9.57	.002
Hwy 17 & Mt. Hermon	37.50	<.001
Mt. Hermon & Skypark	7.47	.006
Hwy 17 (rolling survey)	.25	ns

Note: ns = not significant

Each of the chi square analyses for ethnicity is statistically significant and three of the four analyses for sex are significant. However, these results should be interpreted with caution as these analyses were conducted on large samples.

Watsonville Police Department

The results of the chi-square analyses for ethnicity and gender at each of the WPD benchmark locations are presented below in Tables WPD-1A. and WPD-2A.

Table WPD-1A: Chi-Square Analysis for Ethnicity

Location	Chi-Square	Probability
Main & Fifth	129.31	<.001
Main & Pennsylvania	23.67	<.001
Freedom & Davis	13.76	<.001
Riverside & Union	72.56	<.001

Table WPD-2A: Chi-Square Analysis for Sex

Location	Chi-Square	Probability
Main & Fifth	11.54	<.001
Main & Pennsylvania	17.31	<.001
Freedom & Davis	28.27	<.001
Riverside & Union	22.08	<.001

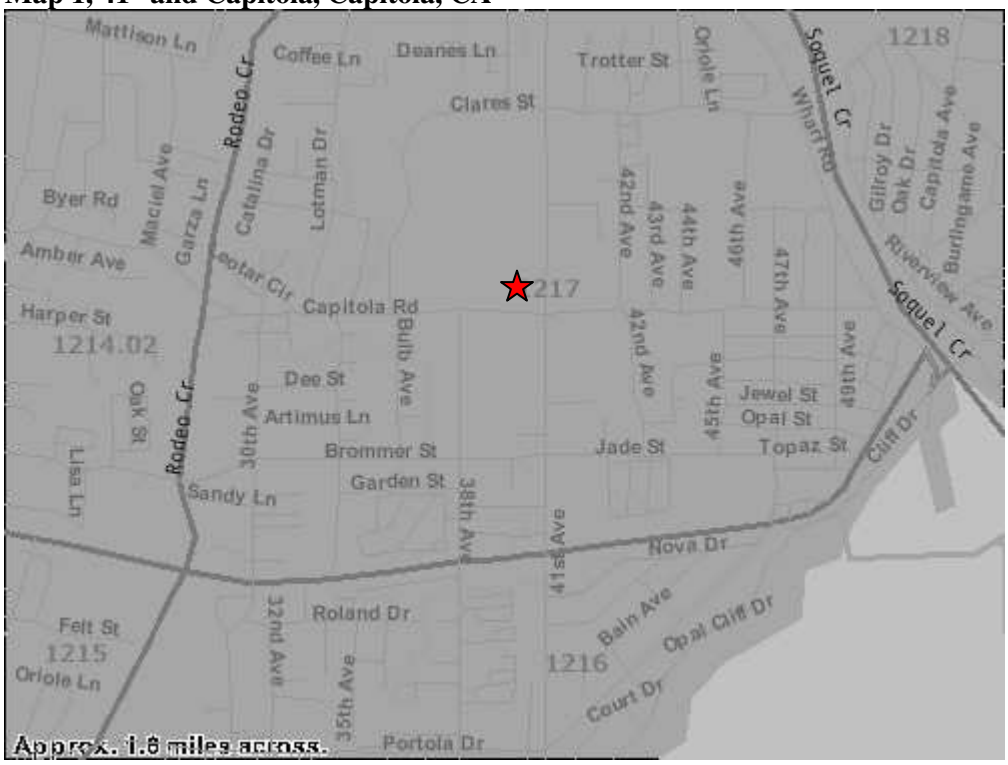
Each of these chi square analyses is statistically significant. However, these results should be interpreted with caution as these analyses were conducted on large samples.

APPENDIX B – BENCHMARK LOCATIONS

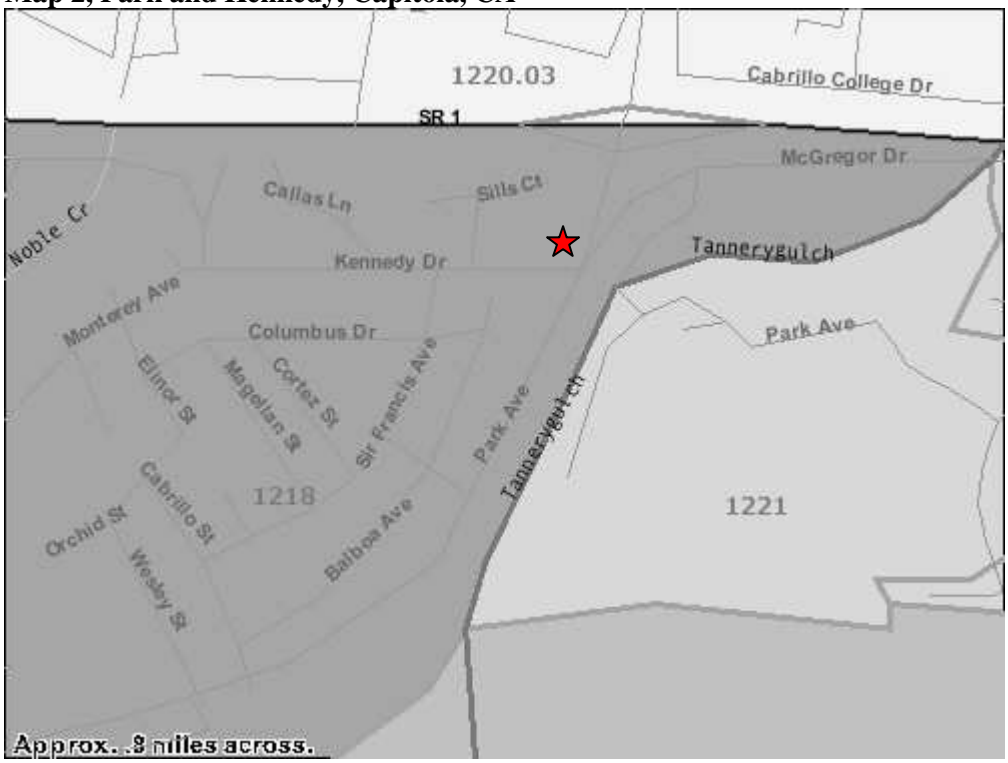
The following maps demonstrate the benchmark locations selected for use in the Santa Cruz County Study.

Capitola, CA

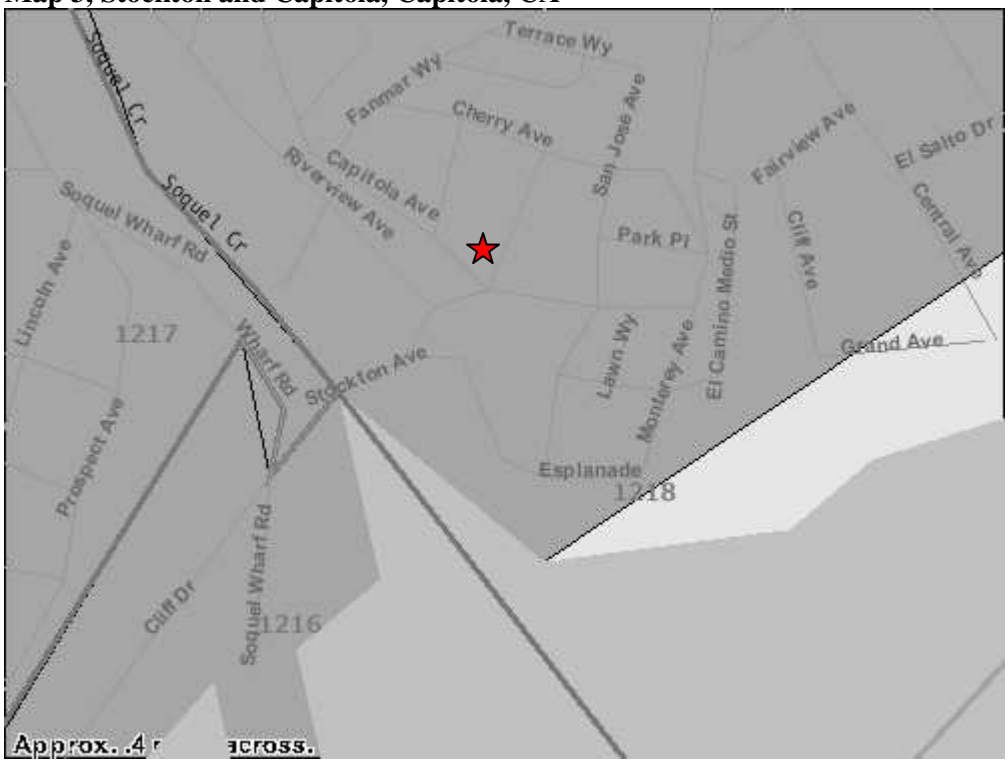
Map 1, 41st and Capitola, Capitola, CA



Map 2, Park and Kennedy, Capitola, CA

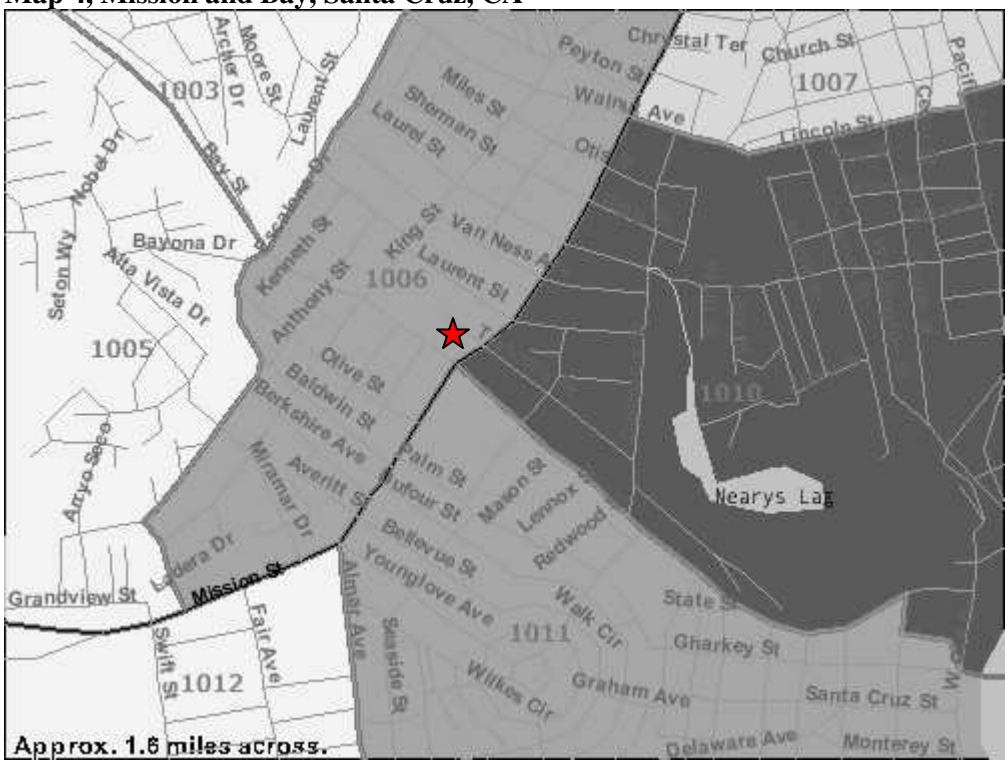


Map 3, Stockton and Capitola, Capitola, CA

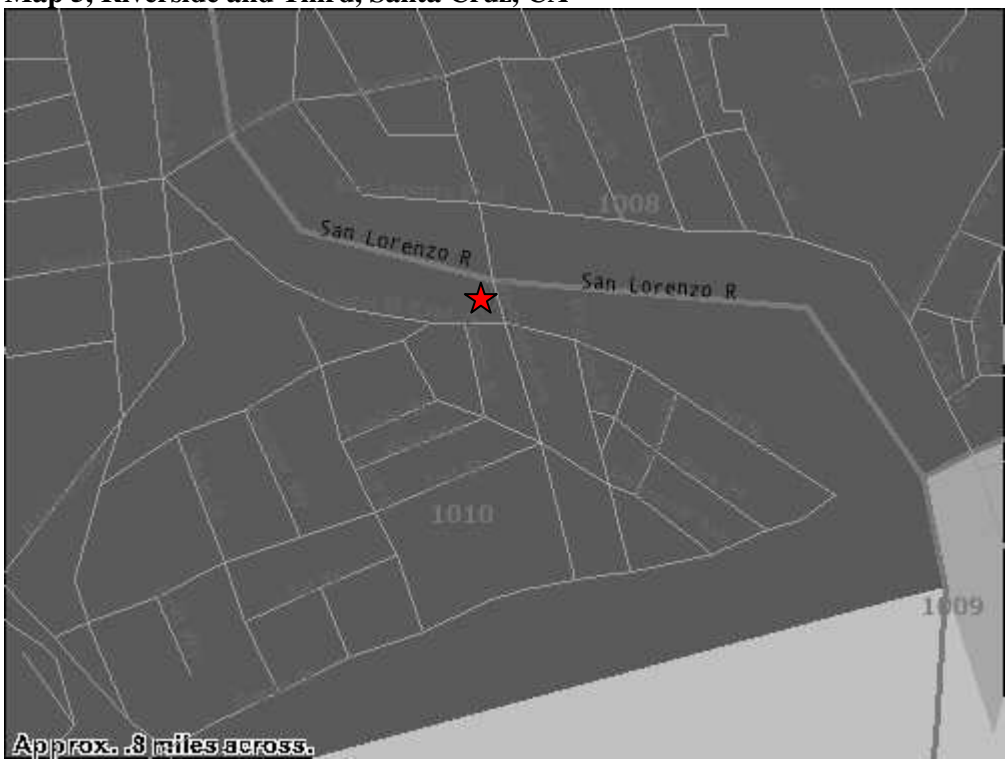


Santa Cruz PD

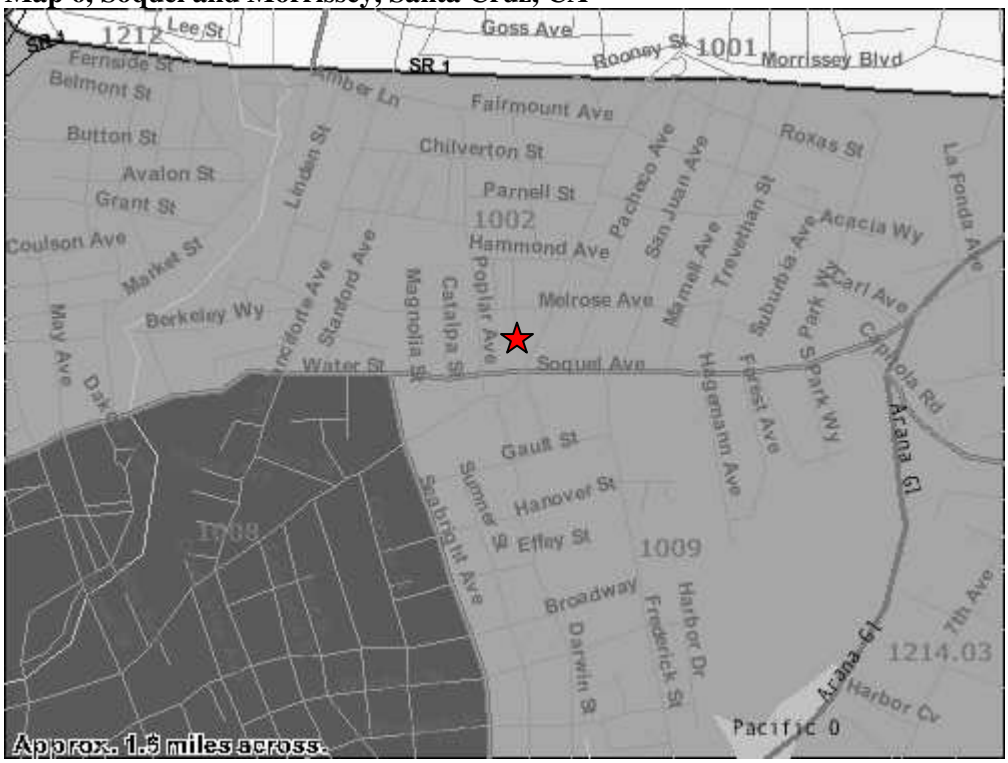
Map 4, Mission and Bay, Santa Cruz, CA



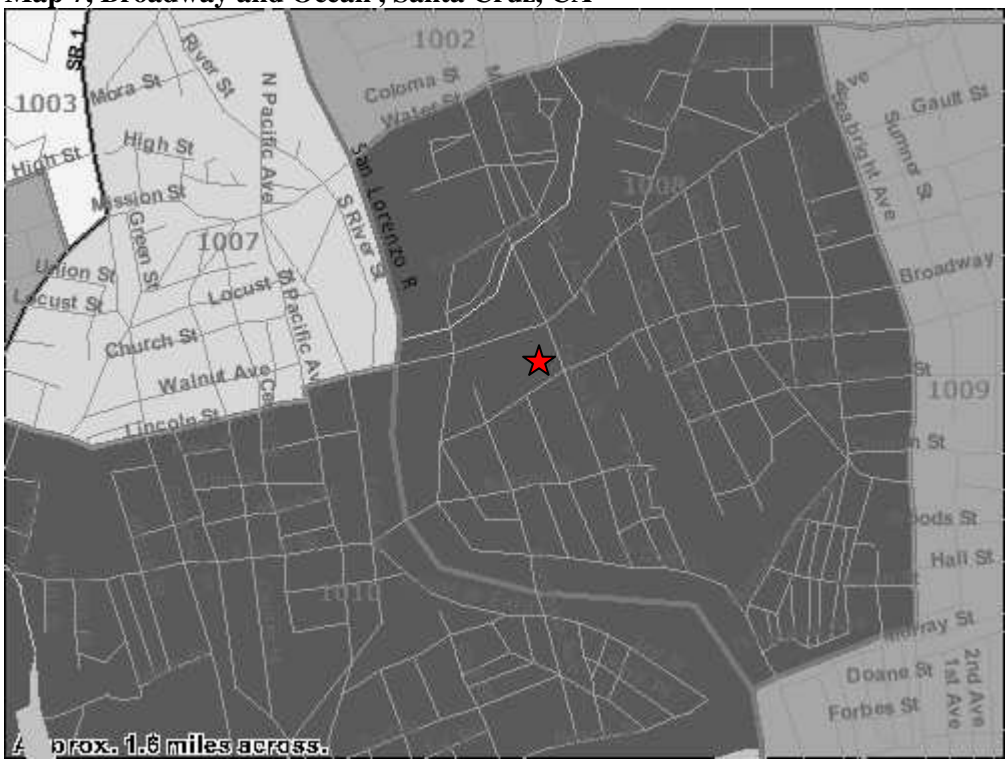
Map 5, Riverside and Third, Santa Cruz, CA



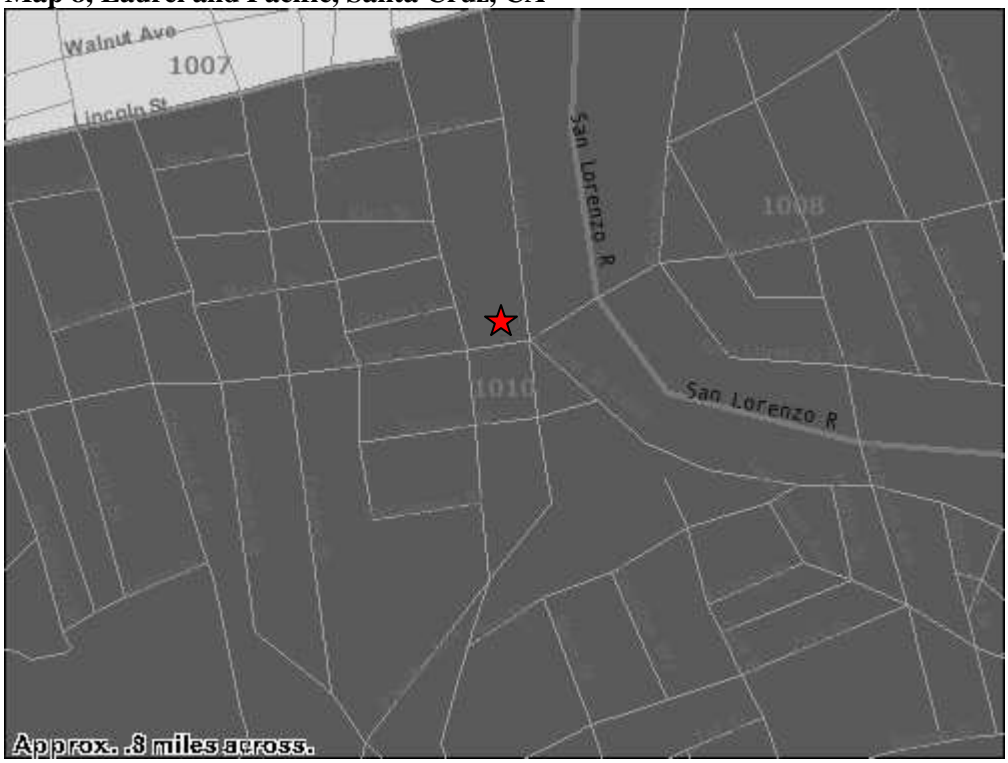
Map 6, Soquel and Morrissey, Santa Cruz, CA



Map 7, Broadway and Ocean , Santa Cruz, CA

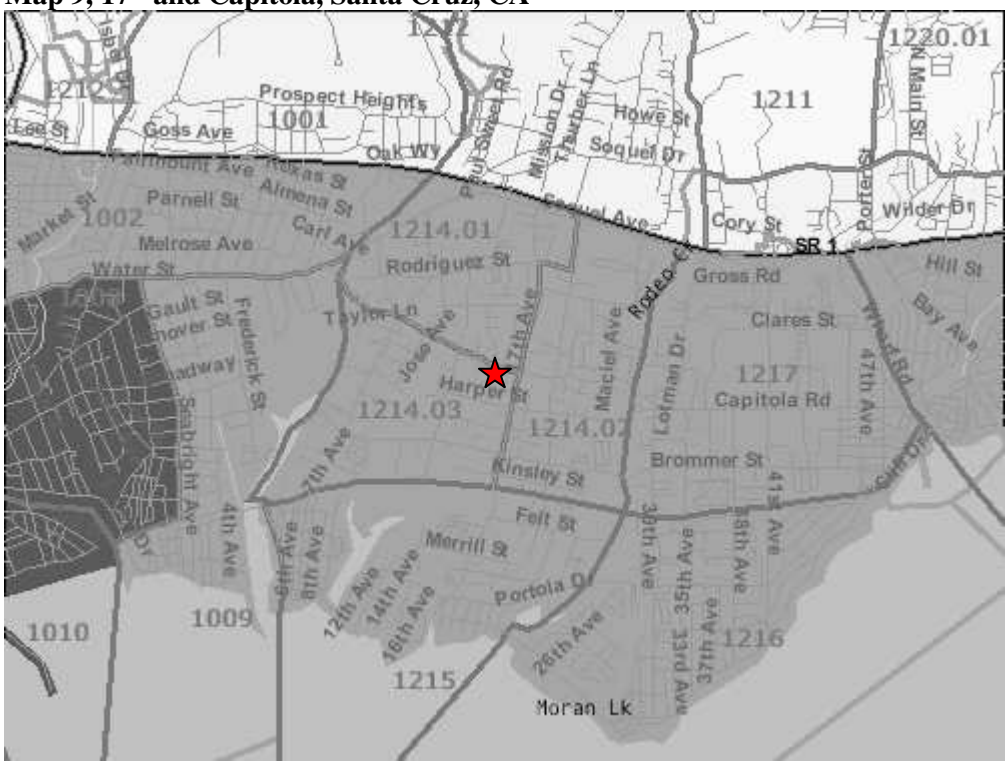


Map 8, Laurel and Pacific, Santa Cruz, CA

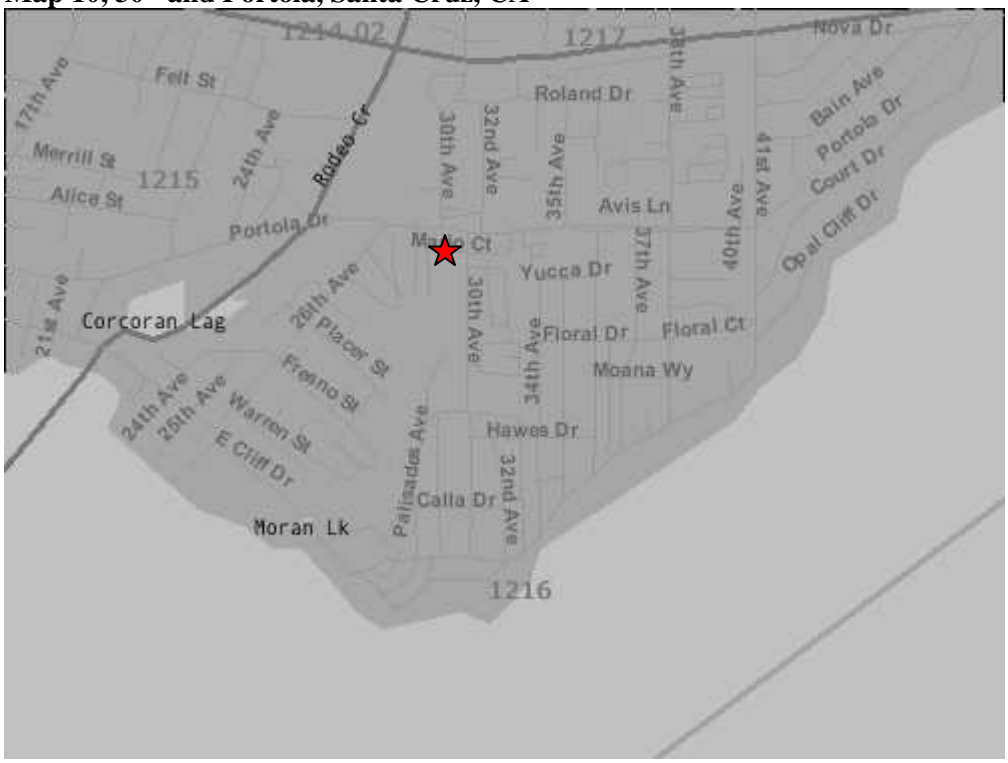


Santa Cruz Sheriff's Department

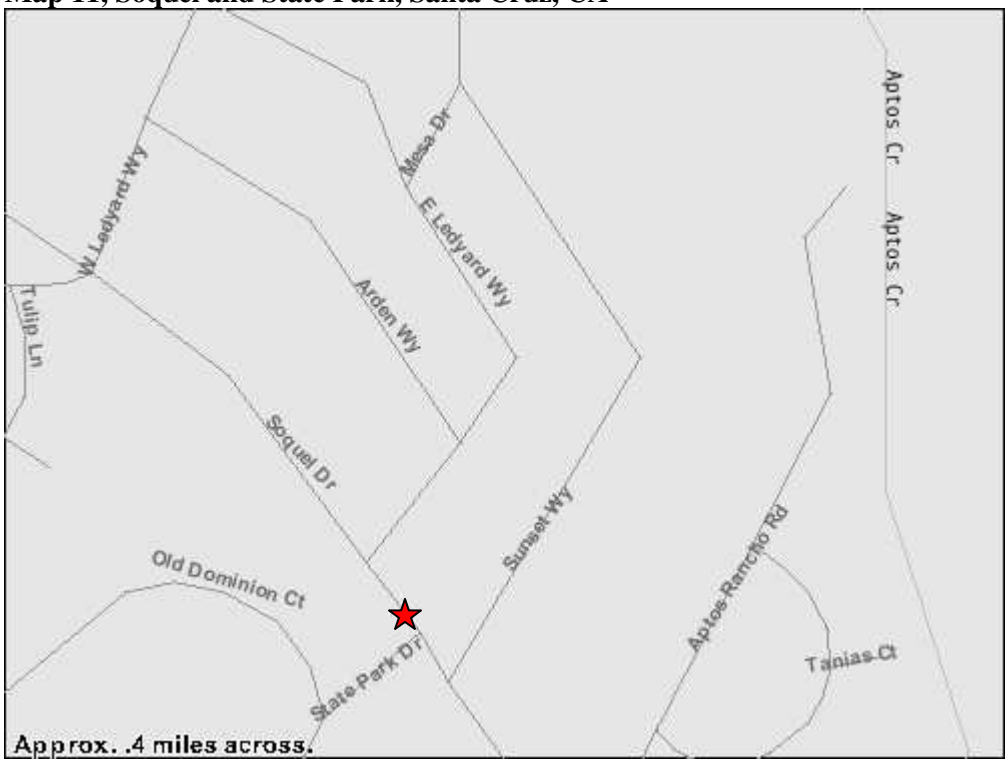
Map 9, 17th and Capitola, Santa Cruz, CA



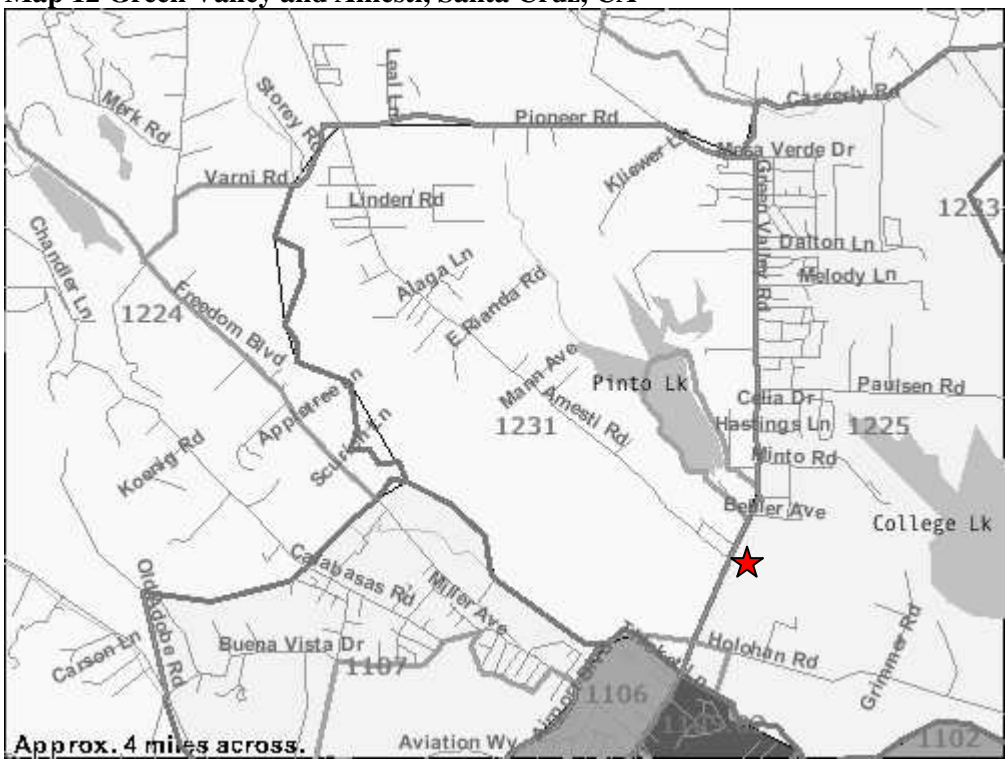
Map 10, 30th and Portola, Santa Cruz, CA



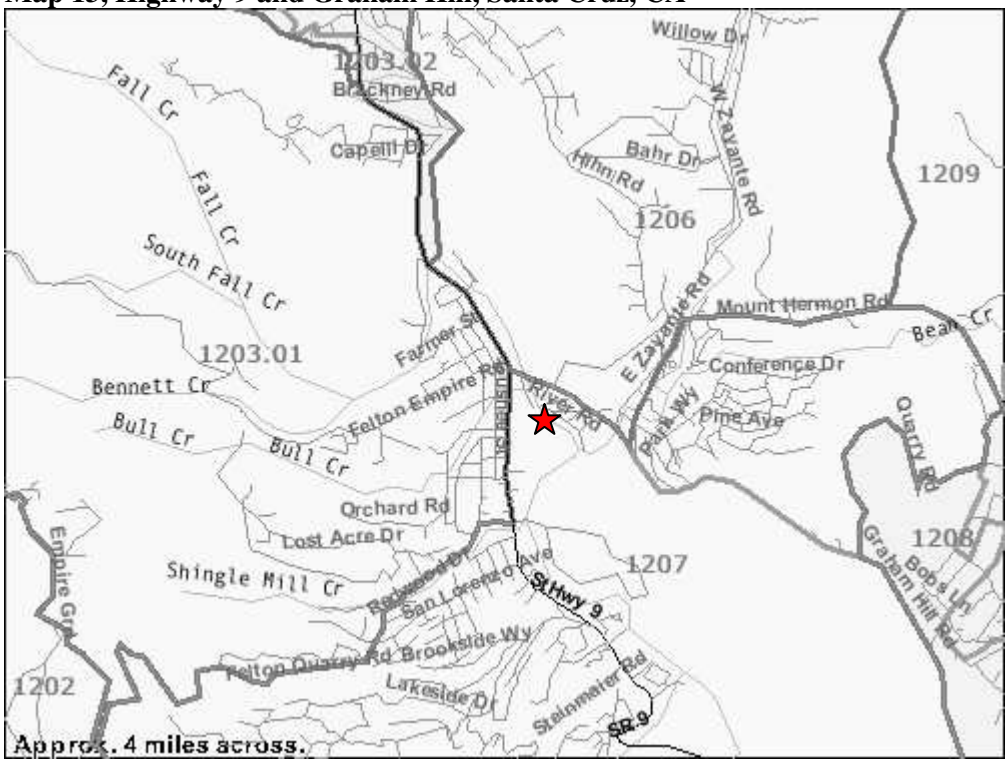
Map 11, Soquel and State Park, Santa Cruz, CA



Map 12 Green Valley and Amesti, Santa Cruz, CA

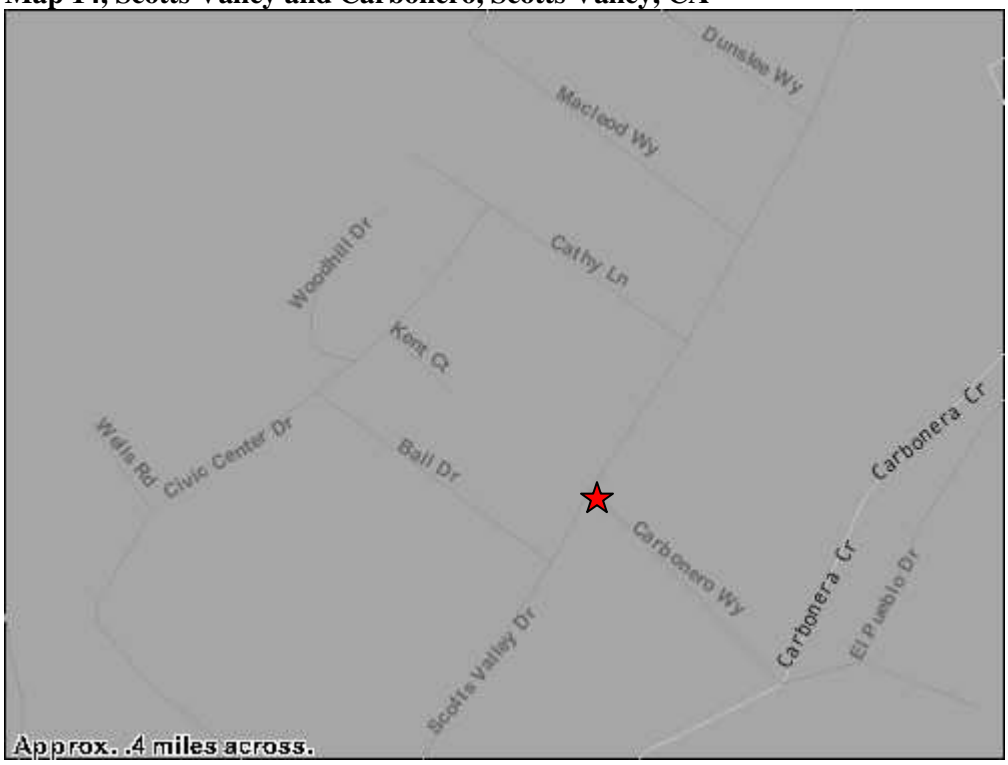


Map 13, Highway 9 and Graham Hill, Santa Cruz, CA

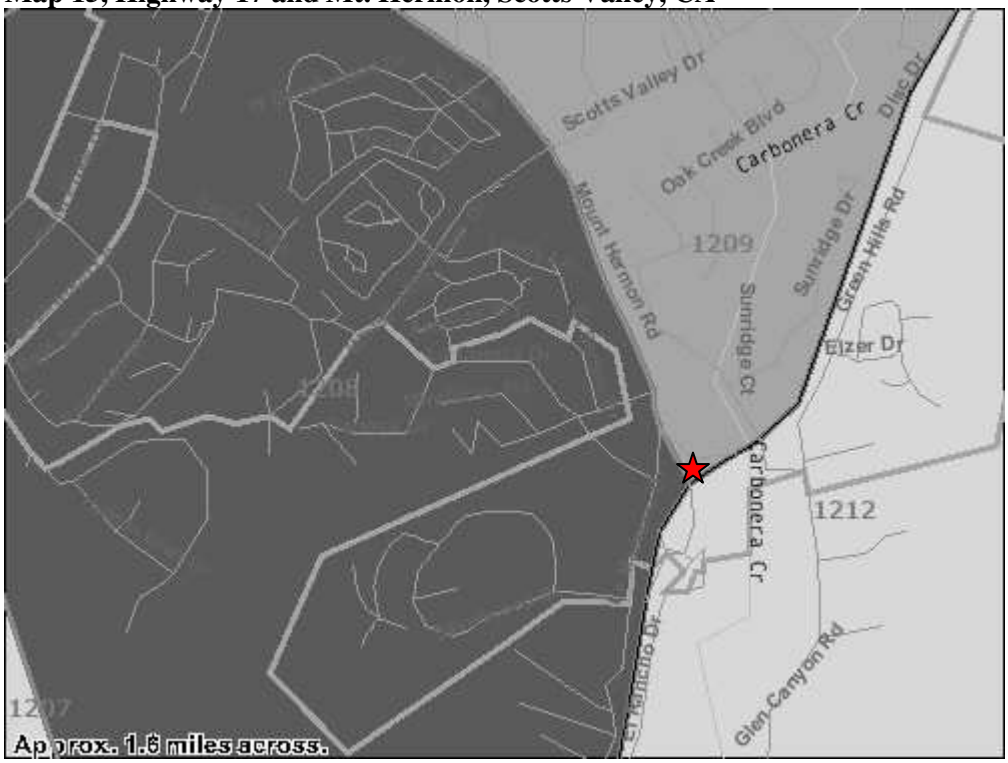


Scotts Valley, CA

Map 14, Scotts Valley and Carbonero, Scotts Valley, CA

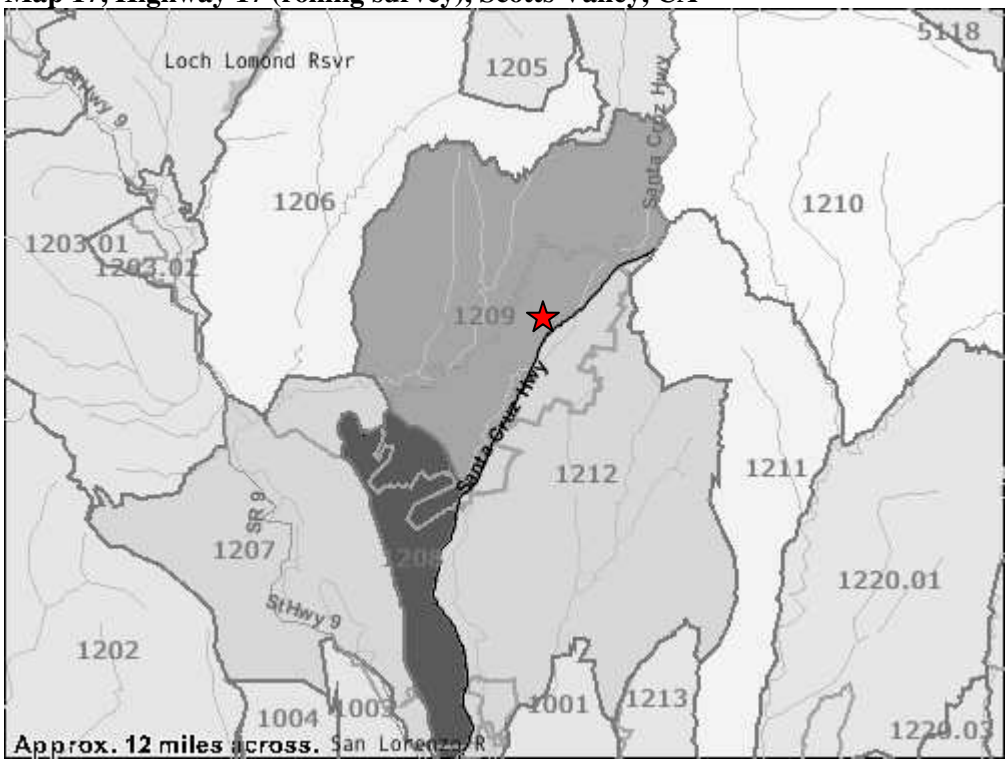


Map 15, Highway 17 and Mt. Hermon, Scotts Valley, CA



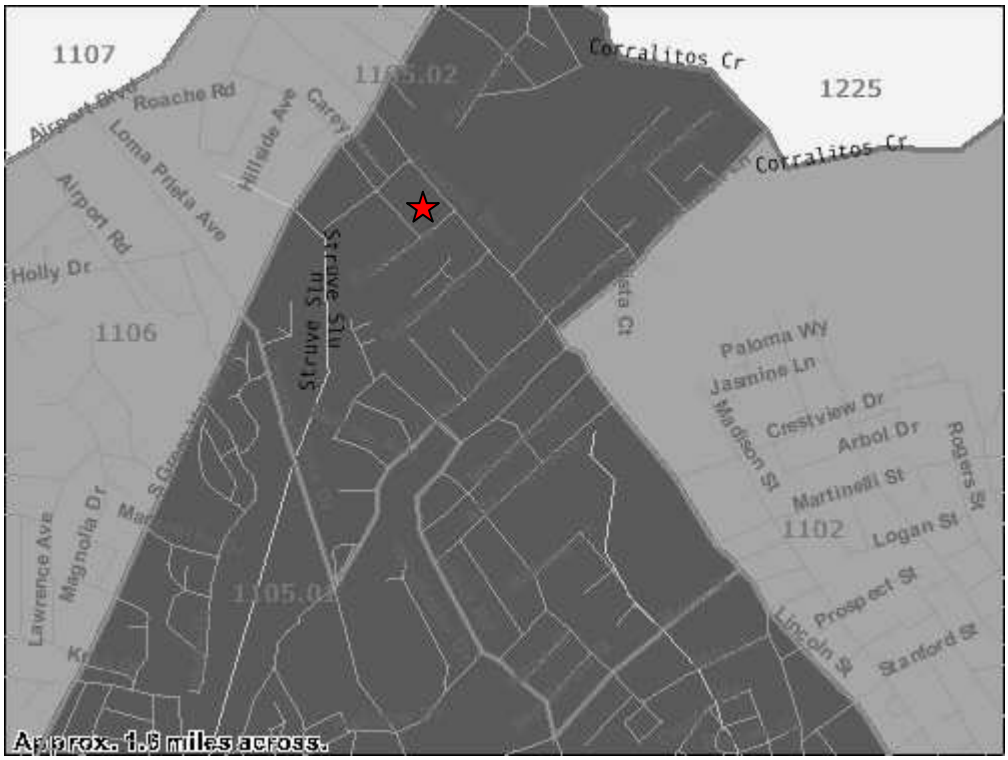
Map 16, Mt. Herman and Skypark, Scotts Valley, CA

Map 17, Highway 17 (rolling survey), Scotts Valley, CA

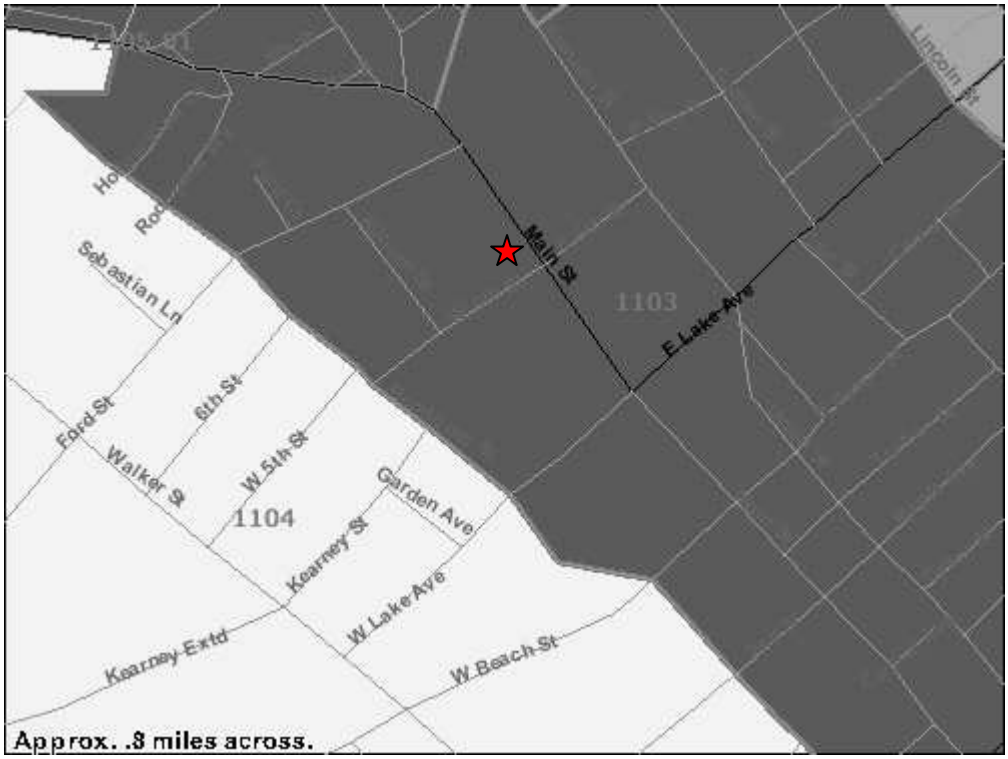


Watsonville, CA

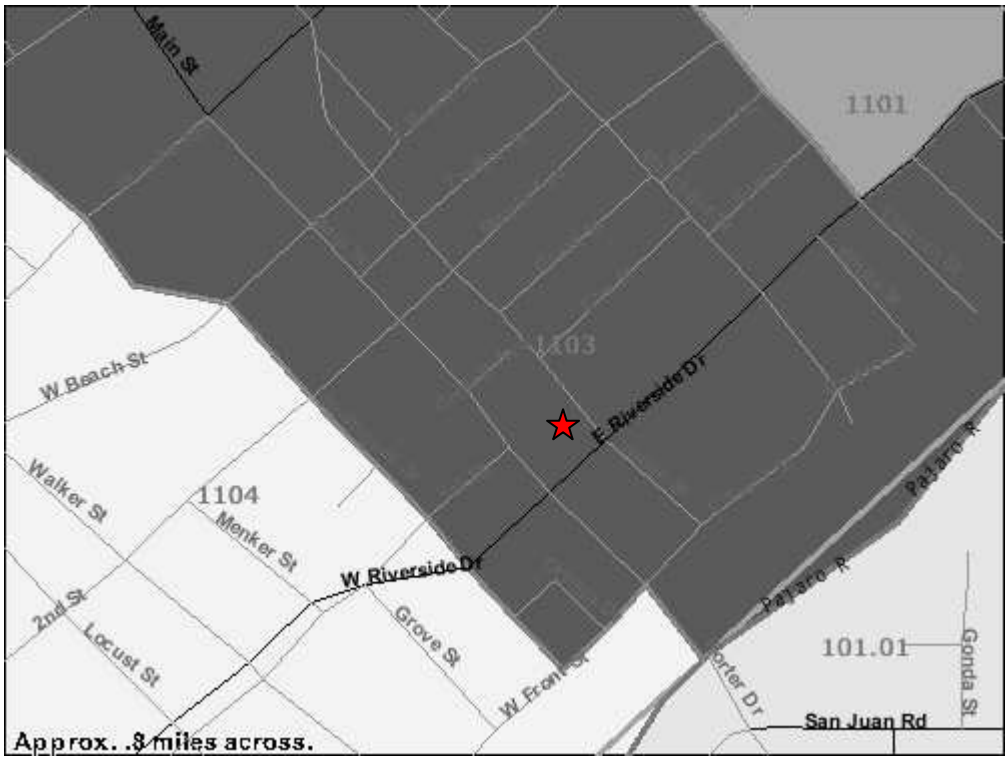
Map 1. Freedom and Davis, Watsonville, CA



Map 2. Main and 5th Street, Watsonville, CA



Map 3. Riverside and Union, Watsonville, CA



Map 4. Main and Pennsylvania, Watsonville, CA