

EXPERT REPORT ON THE ALAMANCE COUNTY SHERIFF'S OFFICE

November 15, 2013

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This report was prepared for the United States Department of Justice in the case *United States v. Johnson*, 12-cv-1349. The report's analysis and conclusions are based principally on a field study I conducted of traffic violators on Alamance County roadways and data provided by the Alamance County Sheriff's Office ("ACSO") relating to traffic citations issued by ACSO. I examined this data to assess whether ACSO engages in discriminatory policing against Latinos.

Qualifications

I received my B.A. from Austin College, an S.T.B. from Harvard University, and an M.A. and Ph. D. from Purdue University in Personality and Social Psychology. I served on the faculty at Temple University from 1973 until my retirement in 2002, serving as Chair of the Department of Psychology from 1989 until 1995. Since that time I have headed Lamberth Consulting, a firm which provides consulting services to police departments, local governments, and civil rights groups. These services include benchmark measurement and assessment of stop data, training for police and community members, community engagement, and litigation services. I was an expert for the defense in *State v. Soto, et. al.*¹, in which the court relied upon my benchmark and my conclusions to find that statistical evidence established a de facto policy of targeting African Americans for investigation and arrest. Courts have likewise relied upon my findings in *Wilkins v. Maryland State Police (Civil Action No. CCB-93-483)* and *Maryland State Conf. of NAACP Branches. v. Maryland State Police, et. al (Civil Action No. CCB-98-1098)*, both were cases in the US District Court of Maryland. I have conducted assessment studies of

¹ *State v. Soto*, 324 N.J. Super 66; 734 A.2nd 350 (1996).

police stops and searches on more than 30 occasions, in both the United States and abroad. For a more complete recitation of my professional experience, publications and education, please see my Vita appended to this report.

In the last 4 years I served as an expert in the following cases: *Major Tours, Inc., et. al. v. New Jersey Department of Transportation, et. al.*, Case No.05-cv-03091 (Camden District of New Jersey); *Martin v. Conner & Gussoni*, Case No. 11-cv-00881 (Baltimore District of Maryland); and *United States v. Lighty & Flood*, Case No. 03-cr-457(United States District Court, Southern District of Maryland).

Compensation

My rate of compensation for this analysis is \$1200 per day.

Scope of Opinion and Summary of Conclusions

I conducted a field study and corresponding statistical analyses to determine whether ACSO disproportionately stopped and cited Hispanic motorists on three major roadways in Alamance County during the years 2008 to 2013. To make this determination, I conducted a field study of traffic violators on three major roads in Alamance County over a three week period. The field study serves as a baseline against which to compare ACSO's records of actual citations given on those three roadways. The field study was conducted on the following roadways: (1) U.S. Hwy 70 as it traversed Alamance County from Mebane to the County line in the west; (2) on NC Hwy 87 from Southern High School Road to Troxler Mill Road; and (3) NC Hwy 49 from Bellemont Mt. Herman Road to NC 119.

Analysis of traffic citations given on these three highways reveals significant disparities based on ethnicity. On Highway 70, Latino drivers were 7.13 times as likely as non-Latino drivers to be cited for traffic violations by ACSO deputies. Latino drivers on Highway 87 were

6.5 times as likely to receive citations, and Latinos on Highway 49 were 6.0 times as likely to be cited. Each of these odds ratios is statistically significant; there is far less than 1 chance in a million that these results occurred by chance. The observed disparities in ACSO's traffic enforcement are larger than any I have previously observed at a law enforcement agency in the United States. In all the analysis of racial profiling with which I am familiar, the only disparities consistently greater than the ones observed here were the product of the Russian Police targeting individuals from the Caucasus in the Moscow Metro in 2008.

ANALYSIS

1. Materials Considered and Relied Upon

The United States Department of Justice ("DOJ") provided me with two databases containing information about ACSO's enforcement activities. I understand that these databases were provided to DOJ by ACSO. I reviewed both of these databases: (1) a database that contained information about each of the 10,468 citations issued by ACSO from 2008 through October 4th, 2013 (the "citation database"); and (2) a database containing information about the 20,059 stops made by ACSO from 2008 to 2013 ("stop database"). Because entries in the stop database did not contain the name of the individual stopped, I did not base my analysis upon them. Instead, my analysis is based on the citation database. The citation database contains the names of individuals issued citations, but does not appear to contain reliable information about ethnicity. When I checked the ethnicity reported on this list of names in the citation database, I found that of the 10,468 entries on the list, 13 were reported as being Hispanic.

2. Hispanic Surname Analysis

As the citation database that I was provided apparently did not capture the ethnicity of motorists, it was necessary to use "surname analysis" to estimate the number of Hispanics who

were in the group. The use of surnames to categorize persons as to Hispanic ethnicity is widely accepted, dating back at least to the 1950s. As Perkins (1993) wrote:

The United States Bureau of the Census has used Spanish surname lists as a method of identifying the Hispanic population for more than 40 years. In 1950, the first Spanish surname list helped indicate the Hispanic population found in Arizona, California, Colorado, New Mexico, and Texas. New Spanish surname lists developed whenever additional significant Spanish surname data became available.²

Subsequent research on Hispanic surnames, primarily coming from the United States Census Bureau, has found that Hispanic surnames are an accurate way of determining Hispanic ethnic origin when surnames are available. Probably the most recent in a series of articles relating to this methodology is an undated one by Word, et. al. available at <http://www.census.gov/genealogy/www/surnames.pdf>. The methodology of determining ethnicity from the surname of an individual has been widely utilized by social science researchers. To cite but a few examples, Beckett³ used the methodology in classifying drug arrestees in Seattle, Barreto⁴ in determining the effect of naturalized citizens on the California electorate, and Karr⁵ in determining the ethnicity of injured children in Washington state. Surname analysis has been credited by courts, most recently in a 2013 decision by the United States District Court for the District of Arizona in litigation over alleged profiling of Latinos. See *Melendres v. Arpaio*, Case No. 07-02513.

² Perkins, R. Colby (1993), Evaluating the Passel-Word Spanish Surname List. Available online at

<http://www.census.gov/population/www/documentation/twps0004.html>.

³ Beckett, et al. (2005). "Drug use, drug possession arrests and the question of race: Lessons from Seattle. *Social Problems*. 52, (3): 419-441.

⁴ Barreto, et al. (2005). "Are naturalized voters driving the California Latino electorate? Measuring the effect of IRCA citizens on Latino voting." *Social Science Quarterly*. 86 (4): 792-811.

⁵ Karr, et al. (2005). "Severe injury among Hispanic and Non-Hispanic white children in Washington State." *Public Health Reports*. 120 (1): 19-24.

Individuals of Hispanic ancestry can be identified using this methodology with a high degree of certainty. According to the U.S. Census Bureau's surname list for the year 2000, there are more than 3,000 surnames for which 90% or more of the population identify as Hispanic, and more than 6,000 surnames for which 75% or more of the population with that surname identify as Hispanic.⁶ The final surname list is made up of more than 151,000 different surnames.⁷ For each of these distinct surnames, the list provides the percentage of people who claim one of the following race/ethnicities: white, black, Asian pacific islander, American Indian, of two races, or Hispanic.

I used these percentages to calculate the exact probability that the names in ACSO's citation database are Hispanic. Applying the Census data to names in the citation database, I determined the percentage of persons with each surname who claimed Hispanic ancestry and summed these probabilities to determine the total percentage of Hispanics on the list of individuals given citations. Then this number was divided by the total number of individuals on the list.⁸ This percentage was then used as the best estimate for the percentage of Hispanics in

⁶ <http://www.census.gov/genealogy/www/data/2000surnames/index.html>. The general methodology used to build the Census 2000 surname list was to determine specific surnames from that census. Then the race/ethnicity of people with that surname was obtained from census forms. Almost 270 million people responded to the census and their data made up the information from which the list of Hispanic surnames was developed.

⁷ A small number of names in ACSO's citation database do not appear on the Census surname list. There are two reasons that a surname would not appear in this list or would not have a percentage race/ethnicity reported based on the list construction. The first is that surnames that rarely occur (defined as occurring less than 100 times in the 2000 census) are omitted from the list. Only about 10% of the population has a surname that is not frequent enough to appear on the census list. Second, a surname that has less than five instances in which respondents claim a specific race/ethnicity is suppressed for confidentiality purposes. The only other reason that a name may not appear on the list is if misspellings or other data entry errors can make the name unrecognizable when compared to the list.

⁸ As explained above, a small number of surnames were excluded from this analysis because they did not match names in the Census data.

the citation database. When all of the names in ACSO's citation database are compared to the Census Bureau's surname list, the percentage Hispanic is 17.89.

As an alternative method of surname analysis, some researchers have selected a cutoff point for concluding that a person with a specific surname is Hispanic. For example, Word and Perkins (1996)⁹ provided definitions of heavily, generally and moderately Hispanic surnames. In this context *heavily* is defined as a surname for which more than 75% of individuals with that name describe themselves as Hispanic, *generally* is defined as 50 to 74.9% Hispanic, and *moderately* as 25 to 49.9% Hispanic. However, a more accurate way to measure the likelihood that a person is Hispanic is to use the actual percentage of persons having a specific surname who indicated that they were Hispanic. This approach avoids classifying Gomezgarcia (for which 99.66% of people with the name indicated that they were Hispanic) and Alviso (for which 75.04% with the name indicated that they were Hispanic) as equivalent, even though both would be classified as Hispanic if the cutoff being used was a list of "heavily" Hispanic surnames.

Further, Word, in a personal communication to Karr (2005) pointed out that the use of the heavily Hispanic list underestimates the Hispanic population by about 10%¹⁰. While the technical reasons for this are beyond the scope of this report, this undercounting of Hispanics is something about which researchers are aware. Using the Census surname list to calculate the exact probability that names in the database are Hispanic overcomes this shortcoming.

3. **Benchmark Methodology**

I created a benchmark of all traffic violators on three highways in Alamance County. The benchmark facilitates comparisons between the percentage of actual violators who are Hispanic and the percentage of citations that ACSO gives to Hispanics. As early as 1991, in

⁹ <http://www.census.gov/population/documentation/twppo13.pdf>

¹⁰ See Karr, et al. (2005) p.23.

*State v. Kennedy*¹¹, a court held that those motorists who were violating a law were the group that should be considered as the benchmark for comparing police stops of motorists. Other courts have endorsed that reasoning¹².

Once a benchmark is created, it can be used to analyze data for several years because racial/ethnic benchmarks for roadways are quite stable for rather long periods of time. In the *Soto* litigation, for example, the stop data from the New Jersey State Police predated the benchmark by two to five years. Subsequent benchmarks of the New Jersey Turnpike have been relatively stable for seven years.

Accordingly, I conducted a survey of traffic and violators, defined as motorists who were violating some traffic law, to determine the race/ethnicity of motorists traveling on three major roadways in Alamance County. Survey sessions were conducted from March 1-6, 2012, and September 28th through October 7, 2012. The three roadways surveyed were: (1) US Hwy 70 from the Springwood Point Shopping Center just west of Ashley Woods Drive to NC 119 in Mebane, North Carolina; (2) North Carolina Hwy 87 from Southern High School Road in the South to Troxler Mill Road in the North; and (3) North Carolina Hwy 49 from Bellemont Mt. Herman Road in the South to NC 119 in the North. The benchmark was created over 45 survey sessions (15 for each roadway), with each survey session lasting approximately 3 hours. In all, the study included approximately 135 hours of traffic observation.

This benchmark survey determined the race/ethnicity of drivers on each roadway, the drivers that were observed violating at least one traffic law, and the speed of each vehicle seen on the roadway. The observer drove a midsized SUV with a Genesis II Select Directional radar

¹¹ *State v Kennedy*, 274 N.J. Super. 21 588A. 2nd 834 (App. Div. 1991)

¹² See *State v. Soto*, 324 N.J. Super 66; 734 A.2nd 350 (1996), *Wilkins v. Maryland State Police*, PN-0003, MJG, *State vs. Barrington Folkes*, et. al

from Decatur Electronics mounted in the vehicle. The observer was a former police officer who was certified by the manufacturer on the radar unit. The unit was calibrated in test runs and on a daily basis prior to the beginning of survey runs. There were seven or eight survey locations identified on each roadway in extensive testing prior to the initial survey run. The SUV was stopped at each location and traffic coming from each direction (north or south on Highways 87 and 49 or east and west on Highway 70) was clocked using the radar gun. The observer also noted the race/ethnicity of the driver and any other visible traffic violation. The assistant recorded the observations the observer made and assisted in making determinations of the race/ethnicity of the drivers when traffic was heavy.

The roadways were chosen based on two criteria: (1) ACSO issued a significant number of citations on the roadways; and (2) the roadways generally covered different parts of the county. They intersected for brief periods either in Graham or Burlington. The locations where the surveying actually took place were selected on the basis of being spread approximately equidistantly from each other on the roadway except where traffic conditions called for extra surveying. On both Highways 87 and 49, surveying was conducted adjacent to the passage of interstate 85/40 to ensure that we picked up traffic that was exiting the interstate. Otherwise, the survey locations were about three miles apart. The actual locations were carefully selected so that the SUV could be stopped for the requisite period of time for each survey session and would have sight lines to the traffic that were unimpeded, and where light from the SUV's headlights was adequate to identify the race/ethnicity of drivers when there was insufficient ambient light to do so. The survey vehicle spent approximately 7.5 minutes shooting radar for vehicles travelling in each direction for a total of 15 minutes at each location for each survey run.

The day was divided into 8 three hour segments beginning at 7:00 AM and progressing through the day and evening until 1:00 AM. Surveying was not done between 1:00 and 7:00 AM because ASCO issued very few citations during these hours and there was very little traffic on the roadways. The few citations issued during these hours were omitted from the data for analysis purposes. Survey runs and times were selected randomly with the caveats that surveyors could do no more than 2 sessions without a rest period intervening and that there would be no more 3 runs on each day. In addition, survey runs were started at either the northern or southern end of the roadway (or eastern or western on US 70) on a randomly selected basis with the caveat that time permitted the survey team to get to the next start point on a timely basis.

Training for the team occurred for approximately a day and a half in late February of 2012 on the roadways that were to be surveyed. Both the observer and his assistant had conducted a survey on another roadway in Maryland prior to the beginning of surveying in Alamance County. I conducted the training and consulted with both surveyors about the specifics of survey site selection, lighting conditions, sight lines, placement of the survey vehicle¹³ during data collection and so forth. In addition, I conducted a one day refresher training session shortly before the October 2012 survey. During this refresher course, the roadways were driven again and sites were again evaluated for suitability. Inter-rater reliability tests were conducted to determine what the level of agreement was between the observer and his assistant as to the race/ethnicity of drivers of vehicles. The results of three tests indicated perfect agreement between the two raters.

4. **Methodology and Results**

¹³ The stationary methodology was introduced in the *Soto* litigation in New Jersey in the 1990s and has been utilized in many other studies. Originally, the stationary methodology was used to establish the race/ethnicity of the traffic, not violators, but was subsequently adapted to violator identification when radar guns became available to us.

During the 45 survey runs, we encountered 14,706 vehicles, and identified the race/ethnicity in all but 10 of them. We observed 29 Asian drivers, 3,478 black drivers, 810 Hispanic drivers, and 10,373 white drivers. Six of the drivers were classified as “other” and 10 were unknown. We observed the following number of vehicles on each roadway: 5,957 vehicles on US 70; 4,867 on NC 87; and 3,872 on NC 49. The first relevant statistic for our purposes is the proportion of Hispanic drivers observed on each road and that is as follows: US 70 - 5.7%; NC 87 - 4.4%; and NC 49 - 6.7%.

I next calculated the percentage of Hispanic drivers who were violating a traffic law. Of the 14,637 drivers we classified, 5,793 were violating a law¹⁴. The proportion of drivers violating some traffic law was 39.6%. On US 70, 4.2% of violators were Hispanic; on NC 87, 4.2% of violators were Hispanic; and on NC 49, 4.7% of violators were Hispanic. The difference between Hispanic violators and non-violators was not statistically significant for NC 87, but that difference is statistically significant for NC 49 and US 70. This indicates that on two of the roadways benchmarked, Hispanic drivers were violating traffic laws at a lower rate than they were driving on that roadway.

A. Survey Locations

i. U.S. Highway 70

¹⁴ The proportion of drivers violating a law in the present design is considerably lower than the proportion of drivers violating a law on an open highway in other studies. This is inevitable as assessing speed in an urban area that is replete with traffic, stop lights and other impediments means that drivers who were speeding slowed down or were just accelerating when they were assessed. The proportion of drivers violating a traffic law in this study is quite similar to another study done in an urban area in Massachusetts. Therefore, I will provide a statistical measure for both the proportion of drivers violating a law and the total proportion of Hispanic drivers even though courts have consistently held that traffic violators are the appropriate benchmark. It should be noted that a benchmark based on Hispanic motorists is an extreme assumption, assuming that every motorist is violating a traffic law for the few seconds that a deputy would normally observe them.

U.S. Highway 70 is an east - west road that runs from Mebane in the east to the west of Burlington. The portion of the roadway that was benchmarked is primarily but not exclusively an urban road. There were seven survey locations associated with this roadway. ,

The seven survey locations on US 70 were anchored by the Spring Point Shopping center (location 1) in the west and Hwy 119 (location 8) in Mebane in the east. The other locations were at Huffman Mill Road (location 2), Trade St. (location 3), Graham Hopedale Road (location 4), NC 49 in Haw River (location 6), and Green Auto Dealer just west of Lake Latham Road (location 7).

ii. NC 87

There were 7 survey locations on NC 87, beginning at Southern High School Rd. in the South (location 10) to Troxler Mill Rd. (location 16) in the north, which are approximately 20 miles apart. In addition to the survey locations at the southern and northern terminuses of the roadway, there were survey locations at Rogers Rd. (location 11), Gilbreath St. (location 12), Lexington Avenue (location 13), Spring Valley Dr. (location 14), and Gerringer Mill Rd. (location 15), all where they intersect Hwy 87.

iii. NC 49

NC Highway 49 had 8 survey locations on its approximately 18 mile route from Bellemont Mt. Hermon Rd. (location 25) in the south to Hwy 119 (location 18) in Mebane in the north. There were additional survey locations at Hanford Rd. (location 24), Plantation Dr. (location 23), Maple St. (location 22), Roma Rd. (location 21), Sandy Cross Rd. (location 20), and Cates Loop Rd. (location 19).

iv. Apple Street Trailer Park Area

In addition to surveying three major highways, I also created a benchmark at the intersection of Graham Hopedale Rd and Apple Street near a large, predominantly Latino mobile home park. This benchmark location allows me to test the hypothesis that ACSO deputies target Latino motorists near the mobile home park.

5. Comparison of Benchmark to Citation Data

I utilized the benchmark to analyze ACSO's citation data for the years 2008 to 2013. The citation database contained 10,467 citation numbers, but there were a fairly large number of citations that were entered more than once. The breakdown by year was quite uneven. There were 8 citation entries for 2007; 900 in 2008; 1238 in 2009; 2198 in 2010; 1647 in 2011; 2686 in 2012; and 1778 in 2013 through October 4th.

I categorized each citation occurring along these three major highways according to the location of the closest benchmark observation point. Generally speaking, stops on the roadway of approximately 1.5 miles on either side of a benchmark location were used as the traffic for that benchmark location, except of course the first and last locations on a roadway. The number of stops at each location was utilized as a weighting factor for that location. The benchmark developed was the weighted (by number of stops) benchmark for the entire roadway. After the stops were categorized as to the location, duplicates were removed as well as stops that occurred between 1:00 and 7:00 AM.

A. US Highway 70

There were 503 citations noted on this roadway. Forty six (9.1%) of these citations occurred between 1:00 a.m. and 7:00 a.m. when the benchmarking was not done and were removed, leaving 457 stops. After the Hispanic surname analysis was applied to these stop data

there were 28 names that could not be matched to the census data. As indicated earlier, this was because there are names that are very uncommon in the country that were omitted from the list of names by the census bureau or there was a mistake made in spelling the names. This accounted for 6.1% of the remaining names. Finally, there were 7 names that were included in the census bureau list of names but had no Hispanic percentage associated because there were fewer than 5 individuals with that name who reported that they were Hispanic¹⁵. This accounted for 1.5% of the names. After removing these 35 stops there were 422 stops for the analysis.¹⁶

The weighted (by number of stops at each location) benchmark for US 70 is 4.34% Hispanic violators¹⁷. The percentage of Hispanic citations by ACSO is best estimated by the 422 names for which it was possible to estimate the Hispanic population most accurately. That percentage on US 70 in the benchmarked area is 24.45%¹⁸. These results are highly consistent with the notion that Hispanic motorists are targeted for stopping far more than are non-Hispanic motorists.

By convention, statisticians typically agree that a result is statistically significant when the observed result would occur by chance only five times in 100. This level of significance is reached when the analysis is at about 2 standard deviations (often expressed as a z score). At

¹⁵ If these seven were included in the total number and they were assumed to have a 0 % probability of being Hispanic, which we know is incorrect, the mean percentage of citations for Hispanics would be reduced by less than 0.4%.

¹⁶ These stops were not equally located upon the roadway with the largest number being in the area of location 6 and the fewest at location 8.

¹⁷ If Hispanic motorists are considered as the benchmark, the weighted Hispanic benchmark for US 70 is 6.79%. This means that even with this extreme assumption Hispanic motorists are 4.44 times as likely to be stopped as are non-Hispanic motorists. The z score for the difference between the proportion of Hispanic stops and the Hispanic benchmark for Hispanic motorists is 12.82, $p < .0002$.

¹⁸ If the list of Hispanic Heavily Hispanic surnames is used as an indicator of the entire list of names for US 70 then the list contains 22.5% Hispanics. Given that Word indicated that the heavily Hispanic list underestimated Hispanics by about 10%, the percentage of 24.45% is the best estimate available.

2.6 standard deviations the results would occur by chance only 1 time in 100. Most tables used to obtain probability levels from a resulting standard deviation analysis do not go beyond 4 standard deviations, with an associated probability of being a chance finding of 6 in 100,000. The one in a million level is reached at 5.3 standard deviations.

The second statistical measure that I will utilize to describe these results is the odds ratio. The odds ratio is intended to provide a description of the odds of being stopped if you are an Hispanic violator relative to the odds of being stopped if you are not an Hispanic violator. If the odds were the same, the result would be 1.

For the Highway 70 data, the difference between the 4.34% Hispanic violators and the 24.45% Hispanic cited is highly statistically significant ($z=13.63$, $p < .0002$). The possibility that this finding could occur by chance is well beyond the one in a million mark and the statistical significance is literally "off the charts," as z score tables generally do not go beyond a score of 4. The second statistic that was computed was the odds ratio for these data, which is 7.13. This means that an Hispanic motorist is 7.13 times as likely to be stopped and cited as a non-Hispanic motorist. To put this result in context, the highest odds ratio that I have seen in the United States is 4.85, which was the odds ratio for stopping black motorists at the southern end of the New Jersey Turnpike by the New Jersey State Police in the *Soto* case.

B. NC Highway 87

NC Highway 87 had 670 citations recorded. Ninety nine (14.8%) of the stops occurred during the time that there was no benchmarking and they were removed, leaving 571 stops. When the names were compared to the Hispanic surname list, there were 42 that could not be matched and 8 for which the probability Hispanic was suppressed for privacy reasons¹⁹. These

¹⁹ If the 8 names were included in the total number of stops, assuming incorrectly that their probability of being Hispanic is 0, the mean for Hispanic citations would drop from 15.39% to 15.16%.

were removed, leaving 521 stops for the analysis.²⁰ The weighted (by number of stops at each location) benchmark of Hispanic violators was 2.71%²¹. Using the surname analysis described above, the percentage of Hispanic citations by ACSO on NC 87 in the benchmarked area is 15.39 percent²². These results are highly consistent with the notion that Hispanic motorists are targeted for stopping far more than are non-Hispanic motorists.

The z score for the weighted mean of Hispanic violators in the benchmark area is 10.88 (p.<0002). The odds ratio is 6.5 – meaning that Hispanics who are violating a law on Hwy 87 are 6.5 times as likely to be stopped and cited as are non-Hispanics. The odds are less than a one in [] that these results occurred by chance.

C. NC Highway 49

The citation database indicated that ACSO officers gave out 807 citations on NC Highway 49, but 103 of them were recorded during the time benchmarking was not done. Therefore, there were 704 citations remaining, of which 36 could not be matched and 11 had the probability of being Hispanic suppressed for privacy purposes²³. This left 657 citations.²⁴

The weighted (by stops at each location) percentage of Hispanic violators in the benchmarked area was 4.17. ACSO made 657 stops during the times benchmarked that could be ethnically identified and 20.77% were of Hispanics. The difference between the proportion of

²⁰ The stops occurred unevenly on the roadway with the fewest (29) being recorded at location 16, followed by location 10. The most stops occurred at location 15 (105), followed by location 12 (98).

²¹ If the percent Hispanic motorists rather than violators is used, the weighted average is 3.80%. The odds ratio even for this extreme case is 4.60 and the z score is 11.59.

²² If the list of Hispanic Heavily Hispanic surnames is used as an indicator of the entire list of names for NC 87 then the list contains 13.70% Hispanics. Again, as with US 70, the best estimate is the percentage provided by the method I am using, 15.39%.

²³ If I incorrectly included these 11 in the total number for calculation purposes, the Hispanic citations would be decreased by 0.34%.

Hispanics in the benchmark area and the proportion of Hispanics stopped was extremely large. The z score for the difference between the two was 13.54 and the odds ratio was 6.0²⁵.

D. Graham Hopedale Road Near Apple Street Trailer Park

Traffic was rather light at this particular location, as the surveyor categorized 380 vehicles during the time they were there. Of these vehicles, 5.53% were driven by Hispanics. The Hispanic drivers made up 5.3% of the non violators and 5.8% of the violators. The difference between Hispanic violators and non violators was not statistically significant.

The first analytic step is to determine whether the benchmarks at Graham Hopedale Road and U. S. 70 and Graham Hopedale Road and Apple St. Ext. differ from each other. At location U.S. 70 and Graham Hopedale Road, the percentage of Hispanic violators was 6.5% (23 of 355) and it was 5.8% (10 of 172) at Graham Hopedale Road & Apple St. Ext. The difference is not significant.

All stops on N Graham Hopedale Rd, between Martin St. and Apple St. Extension were used for comparison purposes. This did not include the stops made on US 70. There were 183 stops made between US 70 and Apple St. Extension on N Graham Hopedale Rd. When the duplicate stops and those made during the time that there was no benchmarking done were removed, there were 135 citations. The percent Hispanic was determined by subjecting all names to the surname analysis and computing the proportion Hispanic from the cumulative proportion of those that could be ethnically identified as has been done in the other analyses in this report. There were 125 names from the 135 citations that could be classified. Forty four percent of those cited were Hispanic.

²⁵ If all Hispanic motorists, even those not observed violating a traffic law, is used as the benchmark, the odds ratio is 4.30. The z score for these data is 13.13.

The next step is to determine whether the percentage of Hispanics issued citations at Graham Hopedale Road and US 70 differed from the percentage of Hispanics issued citations in the area approaching Apple Street Extension on Graham Hopedale Road. There were 102 citations issued on Graham Hopedale Road and U.S. 70, and 95 of them could be classified using the Hispanic surname list. Of the citations classified 22.1% were to Hispanics. The difference between the percentage of Hispanics cited at these two locations is statistically significantly different ($z=3.04$, $p < .0025$), with more Hispanics being cited on Graham Hopedale Road as it approached the Apple Street Ext..

Next, we test the difference between the benchmark (5.8%) Hispanic and the cited Hispanics (44.0%) on Graham Hopedale Road as it approached the Apple Street Ext. The result is highly statistically significant ($z=7.86$, $p < .0002$). The odds ratio for these data is 12.73.

Interestingly, there was much more traffic on U S 70 at Graham Hopedale Road than on the same road at Apple Street Extension, but ACSO issued more citations on the less traveled road near the predominantly Hispanic mobile home park. The probability that ACSO will stop and cite an Hispanic motorist is about twice as high as Graham Hopedale Road approaches Apple Street Ext and the mobile home park than it is at Graham Hopedale Road and US 70.

The relevant comparisons of Hispanic violators and Hispanics cited by ACSO on the three roadways are contained in Table 1.


Roadway	% Hispanic Violators	% Hispanics Cited	z-Score	p.	Odds Ratio
US 70	4.34%	24.45%	13.63	<.0002	7.13
NC 87	2.71%	15.39%	10.88	<.0002	6.5
NC 49	4.17%	20.77%	13.54	<.0002	6.0

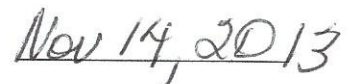
Table 1. Percent Hispanic violators and Hispanics cited on three roads in Alamance with attendant statistics.

Conclusion

The results of this analysis demonstrate that ACSO is significantly more likely to stop and cite Hispanic motorists than non-Hispanic motorists on three major roadways in Alamance County. The odds ratios for these three roadways are: 7.13 for US Hwy 70; 6.5 for NC Hwy 87; and 6.0 for NC Hwy 49. An even higher odds ratio was seen when the citations on a road close to a mobile home park heavily inhabited by Hispanics was analyzed. Even though there was considerably more traffic on the benchmark location at U. S. 70 and Graham Hopedale Road, there were more citations issued on that same road as it approached the Trailer Park, and Hispanics were much more likely to be cited. The level of significance recorded indicates that the probability that chance plays a part in the results is miniscule.

All of the odds ratios observed here are well above the 4.85 ratio that was seen in the *Soto* litigation. In all of the work that I have done over 30 years and other work with which I am familiar, the *Soto* litigation produced the highest odds ratio of any law enforcement agency in the United States, until now.


John Lamberth


Date