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Mandatory Pet Sterilization and Overpopulation: Have Santa Cruz County's Policies Reduced Animal Shelter Intake and Euthanasia?

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Mandatory Pet Sterilization and Overpopulation

Have Santa Cruz County's Policies Reduced Animal Shelter Intake and Euthanasia?

By
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Recipient of the 2011 Smith Award for Excellence in Research

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Introduction

“We acknowledge that the euthanasia of healthy and treatable animals is the sad responsibility of some animal welfare organizations that neither desired nor sought this task. We believe that the euthanasia of healthy and treatable animals is a community-wide problem requiring community-based solutions. We also recognize that animal welfare organizations can be leaders in bringing about a change in social and other factors that result in the euthanasia of healthy and treatable animals, including the compounding problems of some pet owners'/guardians' failure to spay and neuter; properly socialize and train; be tolerant of; provide veterinary care to; or take responsibility for companion animals”.

–Asilomar Accords, 2004; Guiding Principle Number Three

Declaration of Intent

In 1994, the Board of Supervisors in Santa Cruz County, California enacted Municipal Code Number 6.10.030 which mandated that all cats and dogs over the age of six months must be sterilized, or, if they will remain unsterilized, must obtain an Unaltered Animal Certificate, the requirements for which include elevated licensing fees and veterinarian approval (Santa Cruz Co. § 6.10.030). Within twelve years of the county’s enactment of this ordinance, each of the four cities within its boundaries adopted identical legislation, thereby mandating spay/neuter requirements for every county resident in possession of a cat or dog (Santa Cruz § 8.16.030) (Capitola § 6.16.030) (Watsonville § 6-1.1001) (Scotts Valley § 6.10.030).

The intention of this study is to evaluate the effectiveness of all five mandatory spay/neuter (MSN) policies, hereafter bundled and referred to as the Santa Cruz County Mandatory Spay Neuter laws, with respect to their ability to; a) reduce shelter animal intake

rates adjusted for human population change, and b) reduce shelter euthanasia rates adjusted for human population change. Additionally, this study will assess the level of public awareness of and compliance with Santa Cruz County's MSN ordinances.

This evaluation acknowledges the potential for positive spillover impacted by community efforts toward pet owner compliance with and education about the MSN policies. These programs, such as the Friends of Santa Cruz County Animals' John S. Strauss Memorial Low Cost Spay/Neuter Fund, and the Friends of the Watsonville Animal Shelter Low Cost Spay/Neuter Program, are valuable community assets offering affordable modes of compliance (SCCASA 2011). However, because these programs target owned animals, their ability to contribute to reductions in intake and euthanasia cannot be abstracted but rather will be used to assess the desire and willingness of pet owners to comply.

In addition to exploring programs and policies that contribute to the realization of the legislative intent of the MSN ordinances, threats to data validity that may skew interpretation of the policy's effectiveness will also be examined. In the case of this undertaking, such variables are historical and instrumental in nature, and include issues such as employee retention, and a lack of standardization in data collection practices, both of which, unfortunately, are endemic challenges facing professionals in the field of animal welfare (Wenstrup et al. 1999, 304) (White et al. 2010, 192) (Fournier et al. 2004, 60) (NCPASC 2009) (SLOCAS Annual Stats 2004-2009) (SCCASA Web Stats 2003-2008).

In recognition of these and other threats to research validity that will be explored in depth in the analysis portion of this paper, this study will attempt to control for a number of variables that might contribute to changes in intake and euthanasia numbers. These variables include cultural and regional differences, internal policy changes, internal resource depletion, ability to

monitor compliance, policy awareness among constituents, and interoperability among animal welfare agencies.

This analysis will conclude with proposed amendments to some of the current policies employed by Santa Cruz County Animal Services Authority, the animal control body responsible for oversight of the county's MSN laws. These suggestions, derived through a combination of time-series analysis, theoretical and sociological study, and an exploration of the methods employed by another, similarly charged animal welfare agency, may contribute to greater optimization of the legislative tool that is mandatory spay/neuter legislation in Santa Cruz County.

Policy Background

Studies spanning the last two decades supply a range of estimates between 4.5 million to 17 million for the number of cats and dogs put to death in American animal shelters every year (Frank 2004, 108). In 2002, the Humane Society of the United States (HSUS) published findings that as many as five million of the eight to ten million cats and dogs relinquished to American animal shelters annually are euthanized (Fournier et al. 2004, 51). Prior to the publication of this finding, HSUS officials began lobbying support for MSN legislation across the United States (Oliver 1997), thus promoting the concept of sterilization as the cure to overpopulation, and setting the stage for California counties such as Santa Cruz, San Mateo, and Lake County, all of which would pass MSN ordinances (Santa Cruz Co. § 6.10.030) (San Mateo Co. § 6.12.020) (Lake Co. § 14-7.1).

To broaden one's understanding of the controversy surrounding such actions, however, it is important to note that some researchers have argued that the trend toward MSN legislation

represents an attempt at a quick fix solution to overpopulation, when it would be more appropriately discussed as one of many necessary tools. Lee Anne Fennel, for instance, in her paper *Beyond Overpopulation* notes that the root problem facing many animal shelters is refusal of shelter administrators to adjust organizational policies to reflect the supply and demand curve of the pet market (Fennel 1999). In 2004, a symposium of animal welfare professionals from across the United States convened in Pacific Grove, California with the goal of consolidating efforts and streamlining inter-agency communication in the name of reducing euthanasia by responding to the market in the hope of eventually achieving a no-kill status quo. The resulting documents, the Asilomar Accords, now guide many animal welfare agencies in their standard operating procedures for animal assessment and data collection (Asilomar Accords 2004). This approach, however, does not address the humane education issue, what to do to prevent animals from ending up in the shelter in the first place.

Wenstrup and Dowidchuk, for instance, note that a leading cause of relinquishment in many regions is a lack of pet-owner education prior to acquisition. They make the argument that, in many cases, outreach attempts targeting accessible training and behavior modification programs would lessen the strain on many animal shelters more so than would MSN legislation (Wenstrup et al. 1999, 308). Other studies question the government's jurisdictional ability to impose MSN restrictions on individual property rights, since companion animals are legally considered property (Kelch 1998, 532) (American Humane Association 2008, 11).

Many advocates of mandatory sterilization contest that their proposed solution is based on basic math; lower the birthrate and the intake rate will follow. For instance, Dr. Brenda Griffin, DVM, writes in support of legislation that mandates sterilization prior to adoption, "...given the financial, special, and resource restrictions of animal shelters, the only way to

ensure the welfare of surplus cats and dogs is to prevent them from being there in the first place” (Griffin, 2009). Similarly, Rush (1985) attributes the success of a reduction in intake and euthanasia rates at a Los Angeles area shelter to increased accessibility of low-cost spay/neuter programs and tiered licensing fees (i.e. higher fees for unaltered animals) (Frank 2004, 109). Such successes have inspired authors of recently failed, albeit by narrow margins, statewide MSN legislation in California to cite the Santa Cruz County ordinances as model laws (SCIL 2010) (Davis 2010). Notably, however, those sources fail to account for some crucial threats to data validity that will be explored in a subsequent section of this paper.

Veterinarians, legislators, and public officials are joined in this vigorous debate by many other industry professionals; namely, animal shelter employees, pet breeders and those in the pet-supply industry. Not surprisingly, breeders are staunchly opposed to MSN legislation, their position given voice by the American Kennel Club, that states on their website support of “...reasonable and enforceable laws that protect the welfare and health of dogs *without restricting the rights of owners or breeders*” (American Kennel Club 2010). Similarly, for makers of pet-supply products, their bottom line is directly linked to the number of pets and pet owners to which they can market, and with projections in 2000 of annual profits reaching \$30 billion by 2003, business men and women in this industry are likely to fiercely oppose MSN legislation (Fournier et al. 2004, 55).

The animal welfare community, on the other hand, has had more difficulty asserting an official position because of the bureaucratic enhancement of animal control bodies inherent in most MSN legislation (Winograd 2010). Some administrators, like Ed Bok, former General Manager of Los Angeles Animal Services, have advocated for the passage of MSN legislation statewide and at the local level, only to admit that its passage in Los Angeles had significantly

enhanced his agency's budget. Further, during a legislative hearing about AB 1634, Bok testified that the bill "[was] not about saving dogs and cats" (Winograd 2010). Ironically, Bok's successor, Cathy Davis, told *American Dog Magazine* in 2010 with regard to her support of SB 250, one of California's recent attempts at a statewide mandate, "History teaches us that voluntary spay/neuter doesn't work... We've got to try something different to interrupt the flow of pets coming into the shelters" (Davis 2010).

This study will endeavor to discover whether that "something different" is doing its job in Santa Cruz County. Original source data collected from SCCASA reveals the percentage, rather than number (to control for human population), of sheltered animals euthanized between 1995 and 2002. The report seems to offer a straight forward answer: Yes. It does work. During the first seven years of the policy's implementation the percentage of dogs and cats euthanized annually consistently declined at an average rate of 3.79%, the most drastic declines having occurred in the first three years of policy implementation (SCCASA, 1984-2002 Intake and Euthanasia). However, as previously mentioned, these statistics will not be examined in a vacuum, but will rather serve as a jumping off point toward the discovery of this policy's true impact from both an animal welfare and a public administration perspective.

Literature Review

The literature related to this study is aimed either at illustrating how sterilization, mandated by law or not, can be used to target the problem of pet overpopulation, or, conversely, how approaches such as pet-owner education are more effective means by which to address the issue. These academic resources, composed by field professionals, journalists, and policy analysts with an interest in animal welfare, will help contextualize the public documents that have informed the findings of this study. These include organizational annual reports, board reports and minutes, contractual agreements, audits, and staff reports from two municipal animal welfare organizations in California: Santa Cruz County Animal Services Authority and San Luis Obispo County Animal Services. The literature review, in its discussion of the issues driving this debate, lays the foundation upon which the findings and recommendations of this report have been established.

The Transition from Animal Control to Animal Welfare

Early humane organizations in the United States, which emerged in urban areas in the late nineteenth century, were charged with the responsibility of containing and ultimately destroying vicious animals. Rabies prevention was the mission. They did not operate adoption programs. Rather, they proudly reported rates of euthanasia as high as 95.5% (Zawistoski et al. 1998, 202). This is, of course, completely contrary to the mission of most humane organizations today, which strive toward a “no kill” ideal (California Legislation...2007, 1). To recognize this fact is to acknowledge a wholesale shift in the public’s perception of animals, effectively redefining the issue of animal control and wellness. Advocacy entered into the picture and, with the advent in the 1940s of the rabies vaccination, the growing ability of post-World War II era

families to take on house pets, and the advancement of the veterinary sciences, advocacy in the realm of animal control would soon overshadow concerns about public health (Practical Problems...1955, 565-566) (Zawistoski et al. 1998, 194).

Pet Overpopulation

“Shelters represent the last line of defense for homeless animals, and, if they fail to wage a full-scale war on behalf of these beings, they cannot rightfully call themselves a shelter – which, by any definition except that of our movement, is a safe haven”.

– Ed Duvin, Lobbyist for the “No-Kill Movement” (Pacelle 2011, 197),

from the essay, *In the Name of Mercy*

According to a 1990 report issued by the American Humane Association (AHA), the certifying body that trains and approves shelter technicians to perform euthanasia by injection, as many as 27 million cats and dogs were being received in animal shelters across the country, and as many as 18 million of those cats and dogs, or 66%, were being destroyed (Zawistoski et al. 1998, 196). The same year the AHA study was conducted, the Santa Cruz SPCA, which at the time operated under a contract with the county to perform all animal control functions, reported euthanasia rates of 54.25 %, nearing the national average reported by AHA (SCCASA, 1984-2002, Intake and Euthanasia). This level of euthanasia concerned Santa Cruz County officials who responded by approving the Mandatory Spay/Neuter (MSN) Ordinance four years later (Santa Cruz Co. § 6.10.030).

When examining pet overpopulation, it is important to distinguish that measurements thereof refer to total levels of animal shelter intake, including pets that were relinquished by their

owners (SCCASA Web Stats 2003-2008) (Zawistoski et al. 1998, 198) (Wenstrup et al. 1999, 307). Therefore, even though many of the animals included in the data herein at one point had homes, their status at the time of inquiry as “homeless animal” means that they will be included when considering rates of overpopulation.

Another vital reason to include owner relinquishment data in one’s consideration of the potential impact of MSN legislation on overpopulation is because studies have established a clear relationship between rates of relinquishment and alteration status. One study conducted by the National Animal Council’s Shelter Survey found that unaltered dogs were twice as likely as their sterilized counterparts to be relinquished, and unaltered cats were more than three times as likely to be relinquished, as were their sterilized counterparts (Marsh 1992, 10). Sterilization, therefore, is just one aspect of what Fournier et al. refer to as a “pet maintenance” activity. Pet maintenance, in addition to contributing to optimal pet health, also includes aspects such a willingness to seek help with behavioral concerns, and pursuit of training and stimulating exercise regimes for active dogs, for instance (Fournier et al. 2004, 52).

Major statistical significance in studies of pet overpopulation is also derived from the rate of stray intake within a given community (Zawistoski 1998, 198). In 2007, one year after Capitola became the final city within Santa Cruz County to adopt MSN legislation, bundling all county residents under identical policies, 67% of SCCASA’s incoming animals were strays (SCCASA Web Stats 2003-2008). Comparatively, a study conducted by Wenstrup and Dowidchuk found that 54% of total incoming animals from the 186 shelters surveyed were strays (Wenstrup et al. 1999, 307). This distinction may have informed the decision of Santa Cruz County officials to target a sterilization-based approach rather than one that centered upon pet

owner education programs, which, studies have concluded, may more effectively target high rates of owner relinquishment within a given community (Wenstrup et al. 1999, 308).

Although no available study tracks the percentage of animals that were already sterilized upon intake, a challenge that will be explored in a later segment of this report, Wandeler et al. inform our concerns about unaltered animals roaming at large with their finding that a healthy population of dogs should be expected to triple in size every year (Wandeler et al. 1988, S684). Similarly, a study conducted in Ohio between 1996 and 1997 found that 317 cat-owning households in the survey area produced 598 litters totaling 3,158 kittens over the course of the year. Only 216 of those litters were planned. The 154 dog-owning households in the survey area that reported litters produced 1,349 puppies from 255 litters, only 87 of which were planned (New et al. 2004, 232).

When one places these projections within the context of Santa Cruz County's stray intake in a given year, for instance, 3,949 stray cats and dogs in 2005 (SCCASA Web Stats 2003-2008), and combines it with the knowledge that cats and dogs reach sexual maturity by five and six months respectively (Griffin 2009, 54), AHA's finding that U.S. shelters are experiencing intake rates in excess of 20 million domestic animals a year seems perfectly logical (Zawistoski et al. 1998, 196).

However, as the American Humane Association observes on their website, when most people contemplate the concept of overpopulation, they think it means there are not enough homes for the number of pets born in the U.S. every year. Sadly, a more accurate statement would be that adoption from a rescue organization still connotes a stigma for many people, or the idea never occurs to them in the first place. Wayne Pacelle, President and CEO of the Humane Society of the United States, offers the following sobering assessment of this

disconnect. “Right now, slightly less than 25 percent of all dogs in American households come from shelters or rescue groups... There’s still a stigma associated with shelters, the vague, sometimes snobbish, always uninformed view that something is wrong with shelter animals” (Pacelle 2011, 204). So, overpopulation is exacerbated when those consumers support the breeding industry. According to AHA, seventeen million people in the U.S. acquire a new pet every year. However, only 20% of those acquisitions, or 3.5 million animals, are adopted from animal shelters (American Humane Association 2010).

Additionally, as previously noted, this problem is likely also exacerbated by resource restrictions that prevent many animal welfare organizations from collaborating to coordinate supply and demand by relocating adoptable animals as appropriate (A. Summitt, personal communication, March 10, 2011). A great example of a successful foray into inter-agency networking is the Denver-based Dumb Friends League’s 2009 transfer of 170 Chihuahuas from California shelters, many of which are overrun with small-breed dogs, to the Denver area where Chihuahuas were in short supply and high demand. An article published later that year in *Dog’s Life Magazine* reported that all but fifteen of the original 170 had been adopted (Dumb Friends League 2009) (Kirkwood 2009).

Therefore, an appropriately thorough examination of the variables affecting pet overpopulation in the United States today will take into account all of the following components:

1. The importance of “pet maintenance” activities (Fournier et al. 2004, 52)
2. The behavioral and medical benefits of sterilization (Griffin 2009, 55) (Fournier et al. 2004, 52)
3. The capacity of cats and dogs to procreate and (New et al. 2004, 232)
4. The flexibility of animal welfare organizations to adapt to their environment (Kirkwood 2009) (A. Summitt, personal communication, March 10, 2011).

The Spay/Neuter Approach

County-wide mandatory spay/neuter ordinances have been enacted in parts of California, Colorado, Illinois, Indiana, Maryland, Missouri, New Jersey, New Mexico, New York, North Carolina, and Washington. Advocates of this type of legislation assert that the long-term benefits thereof will, “decrease the burden on shelter workers, animal control officers, and tax payers significantly” (American Humane Association 2008, 10). Eighty percent of animal shelter managers surveyed in 1998 believed MSN legislation was the most important tool with which society could combat overpopulation (Wenstrup et al. 1999, 311).

Of the aforementioned stakeholders, one who typically does not garner a lot of attention in this debate is the tax payer. Wenstrup et al. reveal that the average cost per animal handled in a U.S. shelter is \$176 dollars (Wenstrup et al. 1999, 311). Pacelle has more recently noted that approximately thirty-five hundred physical animal shelters are currently operating across the United States (Pacelle 2011, 196). At this rate, we spend between \$1.4 and \$2.8 billion dollars each year on the care of homeless animals (Wenstrup et al. 1999, 311) (Pacelle 2011, 197). Therefore, many advocates of MSN, such as former Blount County, Alabama ACO, Donald Kendrick, have acknowledged that the best way to discuss MSN legislation with your local officials is by campaigning to their wallets. Says Kendrick, who retired from a long career as an ACO to establish a non-profit called *Spay Alabama* after having to euthanize fifty-two healthy cats and kittens in one day on the job, “If you show them in dollars and cents that it’s the right thing to do, it catches on” (Cohen 2010, 17).

Kendrick made another very astute observation about the public’s perception of pet sterilization, that it is often a fleeting priority that will quickly be eclipsed by a more pressing need. He explained to his interviewer that if spay/neuter advocates are not at the top of their

game 100 percent of the time, those ambivalent pet owners will fall through the cracks.

Describing why he carries his *Spay Alabama* cell phone with him at all times, Kendrick explains, “Some of the callers are on the fence already about whether they can afford it. If they call and just get a message that may be the end of it” (Cohen 2010, 17). Those callers would, however, advocates of MSN policies hope, be reached by public education messages that are often stipulated as a requirement of MSN laws (American Humane Association 2008, 10).

As previously noted, those in support of MSN legislation feel that it will help to curb pet overpopulation and will contribute to overall behavioral and health improvements among pets whose guardians are compliant. Those who stand in opposition conversely believe that MSN legislation carries the potential to increase rates of owner relinquishment to animal shelters due to the burdensome cost of compliance. They also contend that the cost of compliance with breeder certification processes, like that of Santa Cruz County’s which requires an annual letter from a veterinarian and \$165 in licensing fees (SCCASA 2011), is prohibitive to participation in breed competitions (American Humane Association 2008, 11).

Not surprisingly, since broad MSN legislation pertaining to privately owned animals (as opposed to MSN legislation governing rescue organizations) is still a relatively new concept, very few publications exist that evaluate its impact. Ironically, due to its relatively longstanding implementation, vague, and usually very biased assessments of the Santa Cruz County Ordinance dominate the very few offerings in circulation (American Humane Association 2008, 10) (Davis 2010) (Save Our Dogs 2010). To further complicate such assessments, studies have indicated that the full thrust of such a policy will not be revealed until it has been in operation for approximately forty years (White et al. 2010, 192). Notably, however a 2008 poll conducted by

Zogby International found that of Californians surveyed, the majority favored statewide legislation mandating spay/neuter (Zogby International 2008).

Hodges conducted a survey of State MSN Laws in 2010, but the findings therein only pertained to state laws that mandate sterilization prior to release from an animal rescue organization (Hodges 2010). Absent a comparable resource that illustrates compliance with MSN laws governing privately owned animals, in order to gain a clearer understanding of the likelihood that pet owners will sterilize their animals when given that extra “push”, this study will also examine the impact of Santa Cruz County’s publicly sponsored sterilization programs.

Methodology

The bulk of the data culled for this project came from Santa Cruz County Animal Services Authority’s public records and shows changes in intake and euthanasia rates over time, beginning in 1990 under the purview of the Santa Cruz SPCA and spanning through 2009 after the SCCASA had settled into the new shelter facility in Santa Cruz (SCCASA 1984-2002 Intake and Euthanasia) (SCCASA Web Stats 2003-2008). Sylvia and Sylvia’s (2004) method for time series analysis was applied to the primary source data and other related data points, such as the number of conversions over time. A conversion is a term used by shelter staff to indicate that an owned animal was sterilized by SCCASA, at the request of the owner, prior to being reclaimed (A. Lozoya, personal communication, March 29, 2011). The time series design was selected because of its ability to chart shifts in data performance according to the introduction of a new variable. In this case, shifts in the rates of intake, euthanasia, and conversion were scrutinized in light of the introduction of the MSN policies.

The source data was provided predominantly in PDF form, each report showing the overall kennel statistics for a given year. The kennel statistics included components not relevant to this undertaking, however, so the key variables were extracted from each report and consolidated into large Excel worksheets; one for cats, one for dogs, and one for cat and dog conversions. The conversion spreadsheet was simply used to chart whether or not fewer conversions were needed over time, which would indicate an increase in spay/neuter of animals found roaming at large. Excel formulas were used for the intake and euthanasia sets to track the following data points for each spreadsheet:

1. Percent of cats/dogs received in a given year that were euthanized
2. Percent change in intake rate between *Year A* and *Year B*
3. Percent change in euthanasia rate between *Year A* and *Year B*
4. Percent county population change between *Year A* and *Year B*

Confidence in the stability of one's observation points or indicators, Sylvia and Sylvia remind us, is essential to the success of a time series analysis (Sylvia et al. 2004, 154). Bearing this in mind, threats to external data validity were carefully examined, and, to the degree possible, applied to the data sets to indicate the introduction of a new variable. For instance, when SCCASA's flagship facility was relocated temporarily to allow for renovation, drops in intake were observed as a presumed indicator that citizens no longer knew where to bring a found pet (SCCASA Memorandum, October 17, 2002).

At the onset of this project, it was determined that in order to better contextualize the findings from the SCCASA data set, a comparative analysis, or a multiple time series design analysis (Sylvia et al. 2004, 156) of the same variables, should be conducted using another animal control agency whose demographics were similar to those of Santa Cruz County, but

whose residents had not adopted MSN requirements. Using the Census Bureau's website, it was determined that San Luis Obispo County, a short distance South of Santa Cruz County, would be an appropriate match. Similarly formatted kennel statics were therefore obtained from the director of that agency, San Luis Obispo County Animal Services. The data, unfortunately, however, was only available from 2004 to 2009 (SLOCAS Annual Stats 2004-2009).

Although this limitation at first appeared only to restrict analysis of the pre-implementation data; it soon became apparent that the policies driving data input and subsequent collection were so disparate between the two agencies, that an accurate multiple time series design could not be achieved. Nevertheless, Excel spreadsheets were compiled and the aforementioned data points tracked comparatively to instead offer insight as to the degree to which internal policy differences can bias animal shelter data. This finding was informed by a simultaneous examination of the organizations' different procedural guidelines, a key variable that greatly impacts euthanasia determinations.

Internal policy information for both agencies was obtained using a variety of methods including personal phone and email correspondence with managers and administrators, and consultation of staff reports and documents tracking organizational audits from outside agencies. Procedural manuals in most cases were either outdated or not available (SLOCAS Staff Report January, 2011) (HSUS Animal Services Consultation Program 2008) (A. Lozoya, personal communication, March 29, 2011).

The final method employed for data procurement was the creation and dissemination of an anonymous survey targeted at ascertaining the level of compliance with and awareness of Santa Cruz County's MSN ordinances (see appendix A). The survey was submitted to San Jose State University's Institutional Review Board and approved for use under exempt status by

virtue of anonymity and approval of waiver of written consent. Written consent could not be used in this case because the survey asked participants whether or not they were in compliance with the MSN laws. Therefore, inclusion of any identifying information would likely have prevented contributors from answering honestly.

Surveys were offered in English and Spanish, and were administered in person, by the investigator, outside of retail facilities in four county locations that were selected for their potential to draw a diverse cross-sample of contributors. Participants were asked to affirm their status as adults and county residents, but were not required to be current pet owners. The northern region of the county was covered by solicitation in Felton; Central County in Santa Cruz; South-Central County in Capitola; and South County in Watsonville. Two hundred responses were collected and analyzed using Statistical Package for the Social Sciences (SPSS) software.

Findings

Santa Cruz County Animal Services Authority - Percentage of Dogs and Cats Received that were Euthanized, Accounting for Population Change and MSN Policy Implementation; 1990-2009 (Under purview of SC SPCA 1990-2001)

Between 1990 and 2009, population change in Santa Cruz County maintained a growth rate between zero and one percent. Although growth from 1990 to 1991 and between 2002 and 2006 was statistically insignificant, generating a calculation of zero percent change; the actual population increased consistently throughout the span of this study (CA Dept. of Finance 2010).

Following the 1994 passage of the first three MSN ordinances, and prior to the 2004 acquisition of the Watsonville animal shelter and its corresponding jurisdiction, an inverse

relationship existed between intake rate and population growth. Between 1994 and 2003, dog intake consistently declined at a mean rate of 8.44% despite a mean population growth rate of 0.78%. Cat intake for the same period also dropped at a mean rate of 13.12% with the exception of one outlying year, 1998 (SCCASA 1984-2002 Intake and Euthanasia) (SCCASA Web Stats 2003-2008) (CA Dept. of Finance 2010).

Notably, however, dog intake rates also either stagnated or dropped prior to the passage of the first three ordinances, and cat intake from the same period declined in all but the first year. For instance, from 1991 to 1992 a decline of 17% in dog intake appeared despite the fact that population growth held at one percent (SCCASA 1984-2002 Intake and Euthanasia) (CA Dept. of Finance 2010).

While it is possible that some of that decline in intake might be attributable to the enforcement of MSN codes, the existence of declining intake rates in the years prior to implementation disallows assertion of a direct correlation. Further, ten years after the first three ordinances took effect, the agency experienced a 43% spike in dog intake and a 50% spike in cat intake, this despite zero percent growth in the human population at the time (SCCASA Web Stats 2003-2008) (CA Dept. of Finance 2010). These particular increases, however, may have been due to the acquisition of the Watsonville animal shelter, a threat to data validity that will be explored in a subsequent section (SCCASA Board Minutes, June 2004). An examination of the entire nineteen-year span revealed a decline in rates of intake as great as 65% for dogs between the highest (1990) and lowest (2003) years observed, and 69% percent for cats between the highest (1990) and lowest (2002) years observed (SCCASA 1984-2002 Intake and Euthanasia) (SCCASA Web Stats 2003-2008). The most dramatic decline in overall intake from one year to the next occurred between 2001 and 2002 when the rate dropped 28% and 30% for dogs and cats

respectively (SCCASA 1984-2002 Intake and Euthanasia). As will be discussed in the analysis, this decline may be partially attributable to major organizational restructuring that occurred at the time (SCCASA Board Minutes, September 2002).

Turning now to rates of euthanasia, as depicted by figures A and B, the relationship between intake and euthanasia, with few exceptions, maintained a positive correlation; as the rate of intake rose or decreased so followed the rate of euthanasia. The exceptions to this pattern occurred in 2000, 2003, 2006, and 2009 for dogs and 1991, 1998, and 2008 for cats. Interestingly, the deviation in the pattern showed an increase in dog euthanasia where a decrease was anticipated and a decrease in cat euthanasia where an increase was anticipated. The cause of these inverse relationships was not revealed during the course of this study (SCCASA Intake-Outcome Stats 1995-2002, 2009) (SCCASA Web Stats 2003-2008).

Echoing the high intake rate of the same year, the percentage of animals received that were euthanized was, in the case of both species, highest at the first observation point, 1990. Reports from that year showed euthanasia rates of 34% and 68% for dogs and cats respectively. In the pre-policy period, between 1990 and 1995, the rate of dog euthanasia hovered around 30%, but was nonlinear. The cat euthanasia rate for that period was between 59%-68% and was also nonlinear. However, as was the case with the intake rate, immediately following the implementation of the first MSN ordinances, euthanasia declined consistently with a few minor exceptions. Specifically, in 1997 and 1998 dog euthanasia stagnated at 20%, and in 2001 a one percent increase appeared in the rate of cat euthanasia. Excluding these instances, a steady decline in the rate of euthanasia was experienced between 1994 and 2002. Euthanasia rates for both species from the six-year period between 2003 and 2009 fluctuated and were nonlinear (SCCASA 1984-2002 Intake and Euthanasia) (SCCASA Web Stats 2003-2008). No relationship

was indicated between Watsonville and Capitola's respective 2006 and 2007 adoption of MSN requirements and SCCASA's euthanasia rates in those or subsequent years (SCCASA Intake-Outcome Stats 1995-2002, 2009) (Watsonville § 6-1.1001) (Capitola § 6.16.030).

Overall, because of the historical and structural threats to data validity that will be discussed in the analysis portion of this paper, one can only assert a likely correlation between MSN implementation and the persistent reduction in rates of intake for both species for the period between 1995 and 2002, when ordinances were in place in the unincorporated regions of the county and the cities of Scotts Valley and Santa Cruz (SCCASA 1984-2002 Intake and Euthanasia) (Santa Cruz Co. § 6.10.030) (Scotts Valley § 6.10.030) (Santa Cruz § 8.16.030). During this period, euthanasia also declined in sync with intake, the single exception being dog euthanasia between 1999 and 2000. The threats to data validity that surfaced in 2002, as they occurred on the agency's timeline, appear to bear direct relationship to the otherwise unanticipated dips and spikes in intake and euthanasia that occurred periodically between 2002 and 2009. For example, when the City of Watsonville joined the SCCASA Joint Powers Authority, and the data of the shelter therein was aggregated with the data generated by the Scotts Valley facility, intake and euthanasia sharply increased (SCCASA Board Minutes, June 2004) (SCCASA 1984-2002 Intake and Euthanasia) (SCCASA Intake-Outcome Stats 1995-2002, 2009).

Figure A
SC SPCA (1990-2001) / SCCASA Dogs Received and Euthanized Between 1990 and 2009

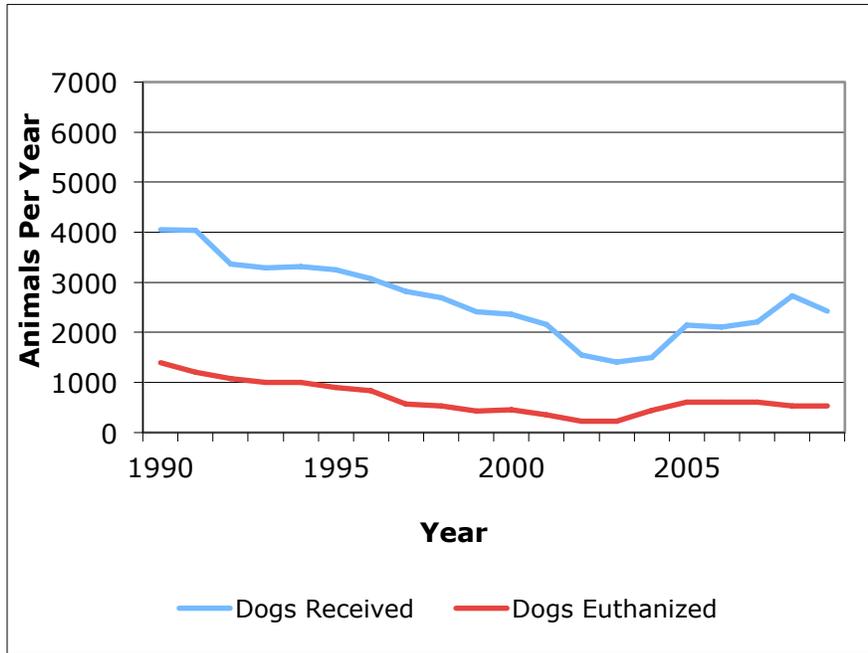
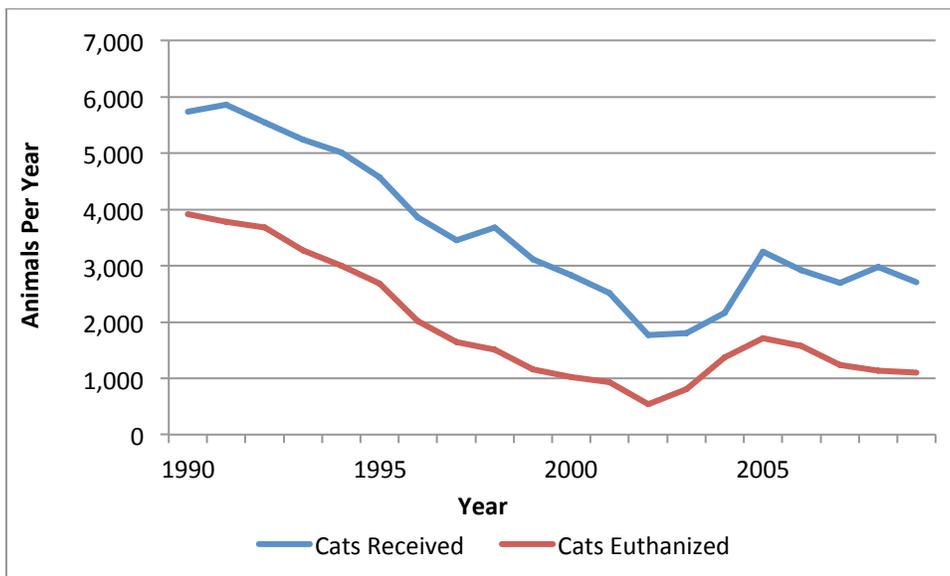


Figure B
SC SPCA (1990-2001) / SCCASA Cats Received and Euthanized Between 1990 and 2009



Percentage of Dog and Cat “Conversions”, 1996-2009

To recap, the term “conversion” as referenced by SCCASA staff means that an animal came into the agency’s custody unaltered but was sterilized, at the owner’s expense, prior to being reclaimed (A. Lozoya, personal communication, March 29, 2011). Therefore, we can assume that data evidencing a positive correlation between MSN legislation and lowered rates of intake of unaltered animals would show a declining rate of conversions over time, the implication being that as more residents begin to comply with MSN requirements, fewer cats and dogs will be received un-neutered or un-spayed.

Unfortunately, pre-MSN policy conversion data is not available. The data from 1996-2009 showed that dogs are converted at a much higher rate than cats, which is unsurprising considering that dogs are reclaimed at a mean average rate seven times greater than the rate of cat reclaim (SCCASA Conversion Report 1996-2009) (SCCASA Web Stats 2003-2008). While this observation does invite comment about the need for humane education outreach programs targeting guardians of free-roaming cats or caretakers of cat colonies (Ash et al. 2003, 337), it does not offer any insight to the impact of MSN legislation. Further, since the conversion rate, as a percentage of the stray intake, was nonlinear across the fourteen-year observation period, no clear relationship between implementation of the various MSN policies and the rate at which conversions are performed was indicated (SCCASA Conversion Report 1996-2009).

The highest conversion rate occurred in 2007, when 20% of dogs received and later reclaimed were altered before returning home; this represented a 5% increase from the previous three years which had held steady at 15% conversion. Interestingly, the 2007 rate of dog intake showed a 2% decline from the previous year, and since the data collection methods offered no way to track spay/neuter status at the time of intake, conclusions as to the cause of this spike

cannot be reached (SCCASA Conversion Report 1996-2009) (SCCASA Web Stats 2003-2008).

The rate of cat conversion was negligible until 2006, when, in the last four years of the observation period, it held steady at 1% of stray cat intake (SCCASA Conversion Report 1996-2009). However, since the overall rate of cat intake for that four-year period was nonlinear, no clearly discernable relationship between the two data sets could be drawn (SCCASA Web Stats 2003-2008).

Number of Unaltered Animal Citations Issued by Region

Another way to track the potential impact of Santa Cruz County's MSN laws is by recording the number of citations issued by animal control officers in the field to owners of unaltered dogs and cats. This measurement is, of course, greatly impacted by the number of animal control officers employed by SCCASA at any given time. With that in mind, only 2008 through 2010 have been examined because, a) prior to that period, jurisdiction of citation issuance was not being recorded in the shelter software, and b) field staffing held relatively steady between three and five field officers during that period (SCCASA MSN Citations, 2008-2010).

Results were, nevertheless, somewhat inconsistent. Citation issuance rose 31% between 2008 and 2009, from a total of 409 citations in 2008 to 536 in 2009. This could be partly attributable to the fact that, according to Todd Stosuy, the Supervising Animal Control Officer, field staffing levels were between three and four in 2008, but held steady at four during 2009. Between 2009 and 2010, staffing levels increased by one officer, from four to five. However, coinciding with that increase was a drop in citation issuance of 34% - from 536 in 2009 to 399 in 2010 (T. Stosuy, personal communication, April 22, 2011) (SCCASA MSN Citations, 2008-2010). One could interpret this as an indication of a decreasing population of unaltered animals within the community, a sign of the successful implementation of the MSN laws. It is the

contention of this report, however, on the basis inadequate sample size (Welch et al. 2001, 181) that assertion of such a correlation would be misguided.

Results of citation issuance pertaining to jurisdiction, however, solidly reflected the findings of the survey undertaken by the investigator of this report, the results of which will be revealed in a subsequent section. Specifically, SCCASA's MSN citation issuance reports indicated the strongest officer presence and highest rates of citation issuance in the unincorporated regions of the county, such as Felton, Boulder Creek, and Ben Lomond, this being the area in which survey respondents revealed the highest level of MSN awareness. The region showing the second highest rate of citation issuance is the City of Watsonville, where survey findings indicated the second highest level of awareness of local MSN requirements (SCCASA MSN Citations, 2008-2010). The implication, therefore, is that officer presence in a given area does positively contribute to policy awareness and compliance.

Survey Results

The survey conducted during the course of this study was aimed at assessing the levels of public awareness of and compliance with Santa Cruz County's MSN policies. Additionally, this component of the project was intended to ascertain whether one's area of residence within the county or one's pet ownership status would bear any relationship to awareness or compliance.

The only prerequisites to survey participation were a) that the participant be a resident of Santa Cruz County, and b) that he or she be at least 18 years old. The reason pet ownership was not stipulated as a requirement was because of the intention to assess overall policy awareness, including levels of awareness among residents who might become pet owners in the future, for

instance. The percentage of non-pet-owning participants was higher than expected, however, at 39%.

Policy Awareness

Of the two hundred persons surveyed herein, 46% were aware of the existence of mandatory spay/neuter requirements in the county and 54% were unaware.

Awareness by Pet-Ownership Status

Of dog owners surveyed, 60% were aware of the policy and 40% were not aware. Of non-dog-owners surveyed, this includes both cat owners and those with neither dogs nor cats, 37.6% were aware and 62.4% were not aware. Of cat-owning participants, 52.3% of participants were aware of the laws, 47.7% not aware. Of non-cat-owners surveyed, this includes both dog owners and those with neither cats nor dogs, 41.2% were aware and 58.8% were not aware. Of participants who owned neither cats nor dogs, only 34% were aware of the county's MSN requirements.

Figure C**MSN Awareness Among Cat Owners**

		Cats
		Yes
Not Aware	Count	41
	% within S/N Awareness	38.0%
	% within Cats	47.7%
	% of Total	20.5%
Aware	Count	45
	% within S/N Awareness	48.9%
	% within Cats	52.3%
	% of Total	22.5%
Total	Count	86
	% within S/N Awareness	43.0%
	% within Cats	100.0%
	% of Total	43.0%

Figure D**MSN Awareness Among Dog Owners**

		Dogs
		Yes
Not Aware	Count	30
	% within S/N Awareness	27.8%
	% within Dogs	40.0%
	% of Total	15.0%
Aware	Count	45
	% within S/N Awareness	48.9%
	% within Dogs	60.0%
	% of Total	22.5%
Total	Count	75
	% within S/N Awareness	37.5%
	% within Dogs	100.0%
	% of Total	37.5%

Awareness by Area of Residence within County

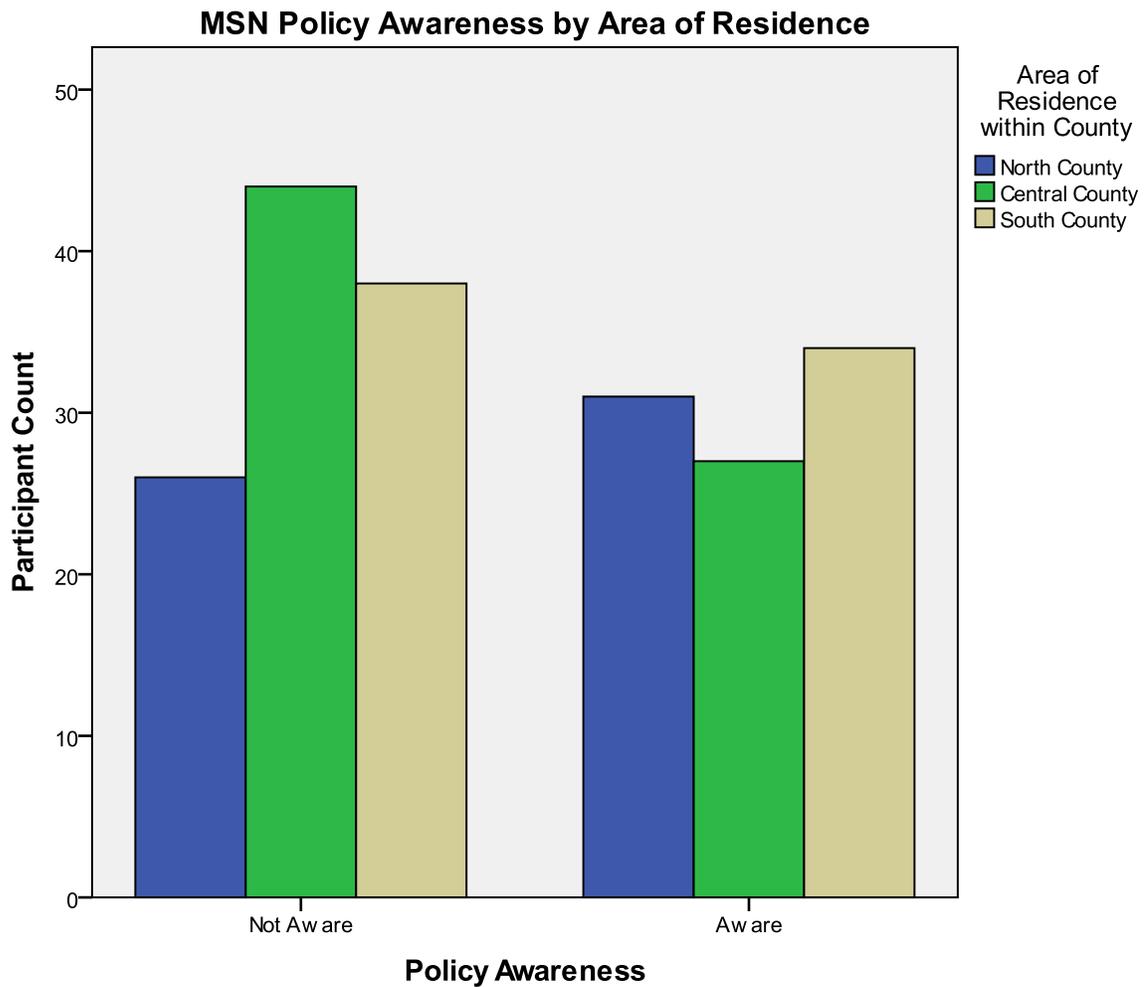
Disparities in policy awareness along geographic lines produced findings that were somewhat contrary to the expectations of the investigator, based on experience working with SCCASA’s Animal Control department. After the original sixteen jurisdictional designations offered by the survey were consolidated into three categories; North County, Central County, and South County, it was revealed that awareness was lowest in Central County and highest in North County.

Figure E
MSN Awareness by Area of Residence

			Area			Total
			North County	Central County	South County	
MSN Policy Awareness	Not Aware	Count	26	44	38	108
		% within Awareness	24.1%	40.7%	35.2%	100.0%
		% within Area	45.6%	62.0%	52.8%	54.0%
		% of Total	13.0%	22.0%	19.0%	54.0%
	Aware	Count	31	27	34	92
		% within Awareness	33.7%	29.3%	37.0%	100.0%
		% within Area	54.4%	38.0%	47.2%	46.0%
		% of Total	15.5%	13.5%	17.0%	46.0%
Total	Count	57	71	72	200	
	% within Awareness	28.5%	35.5%	36.0%	100.0%	
	% within Area	100.0%	100.0%	100.0%	100.0%	
	% of Total	28.5%	35.5%	36.0%	100.0%	

The exact breakdown, illustrated by Figure E, shows that of the residents of Central County, which includes Santa Cruz, Twin Lakes, Capitola, and Live Oak, only 38% were aware of the spay neuter mandate. Of those living in South County, which includes Watsonville, Soquel, Aptos, Corralitos, Rio Del Mar, and La Selva Beach, 47.2% were aware of the spay/neuter ordinances. Finally, the region of the County with the highest level of policy awareness was North County, which includes Scotts Valley, Felton, Ben Lomond, Bonny Doon, Boulder Creek, and Davenport. 54.4% of these residents were aware of the MSN requirements.

Figure F



Policy Compliance

When asked whether or not their pets were altered, participants chose from one of the following responses; a) *all are altered* b) *some are altered* c) *none are altered*, and, d) *N/A (I have no cats or dogs)*. Analysis of levels of compliance of course precludes those who indicated non-pet ownership.

An examination of all pet-owning respondents revealed an 84.4% rate of compliance with Santa Cruz County's MSN Ordinances, meaning that only 15.6% of dog or cat owners have an unaltered pet for which they are responsible. Of the nineteen total participants who indicated possession of one or more unaltered animals in their home, only ten were previously aware of the existence of the MSN laws. Only those ten individuals, therefore, would have potentially applied for the Unaltered Animal Certificate, as mandated by each ordinance and enforced by SCCASA (Santa Cruz Co. § 6.10.050) (Scotts Valley § 6.10.050) (Santa Cruz § 8.16.050) (Watsonville § 6-1.1002) (Capitola § 6.16.050). No measurement of compliance with that aspect of the five MSN laws was attempted during this survey, however, due to concern on the part of the investigator that inclusion of such detail would dissuade participation. Participants were, nevertheless informed of the UAC requirements of each ordinance.

Compliance Among Dog Owners vs. Cat Owners

Of dog owners surveyed, 78.7% reported that all dogs in the household were altered, 6.7% reported that only some were altered, and 14.7% revealed that none were. Of cat owners surveyed, 89.5% reported that all cats in the household were altered, 7% reported that some were altered, and 3.5% revealed that none were.

Figure G

MSN Compliance of Dog Owners

		Dogs
		Yes
None are S/N	Count	11
	% within S/N	100.0%
	% within Dogs	14.7%
	% of Total	5.5%
Some are S/N	Count	5
	% within S/N	62.5%
	% within Dogs	6.7%
	% of Total	2.5%
All are S/N	Count	59
	% within S/N	57.3%
	% within Dogs	78.7%
	% of Total	29.5%
Total	Count	75
	% within S/N	37.5%
	% within Dogs	100.0%
	% of Total	37.5%

Figure H

MSN Compliance of Cat Owners

		Cats
		Yes
None are S/N	Count	3
	% within S/N	27.3%
	% within Cats	3.5%
	% of Total	1.5%
Some are S/N	Count	6
	% within S/N	75.0%
	% within Cats	7.0%
	% of Total	3.0%
All are S/N	Count	77
	% within S/N	74.8%
	% within Cats	89.5%
	% of Total	38.5%
Total	Count	86
	% within S/N	43.0%
	% within Cats	100.0%
	% of Total	43.0%

Compliance by Area of Residence within County

Overall spay/neuter compliance is unmistakably lowest in South County, the region that includes Watsonville, Aptos, Corralitos, La Selva Beach, and Rio Del Mar. In that region, 18% of respondents reported having one or more unaltered pets in their care. Of that 18%, 11.1% reported that none of the cats or dogs in their care had been altered.

There is a drastic jump to the next lowest rate of compliance which, interestingly, is in the region with the highest level of policy awareness, North County, which includes Scotts Valley, Felton, Ben Lomond, Bonny Doon, Boulder Creek, and Davenport. In North County,

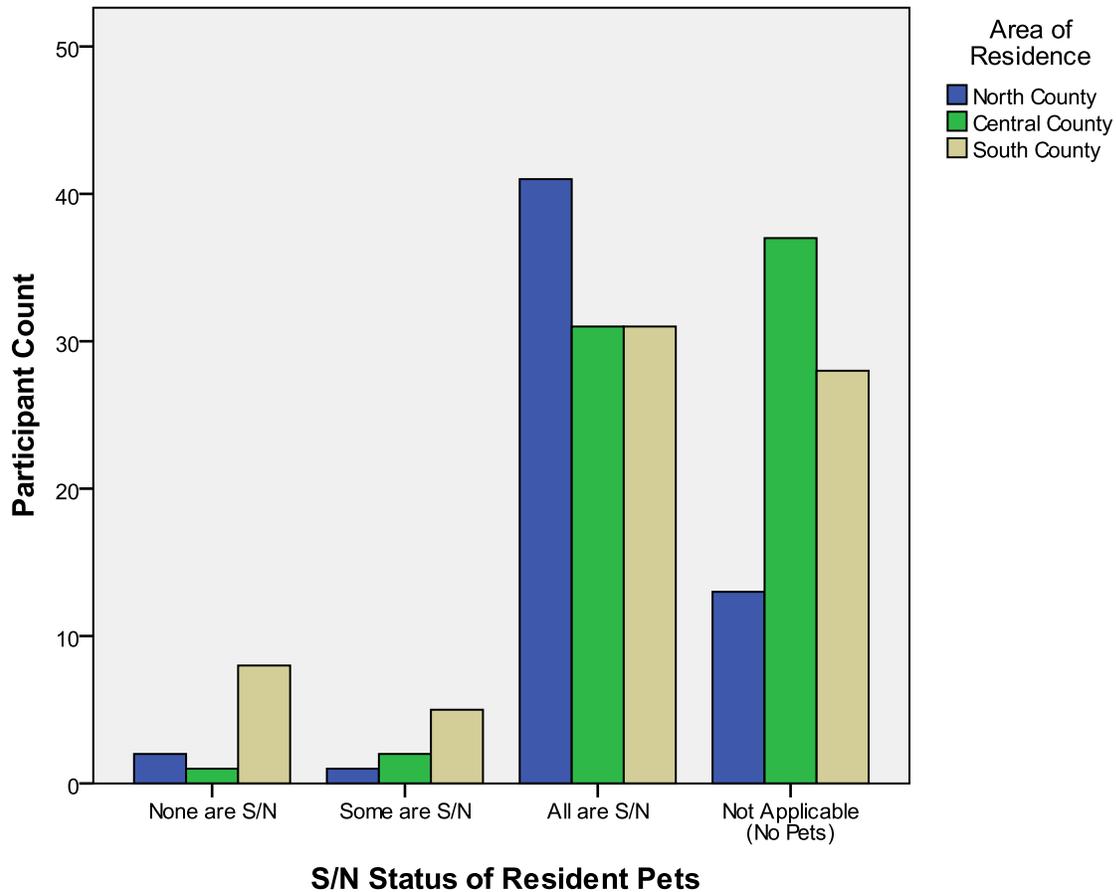
only 5.3% of respondents revealed guardianship of one or more unaltered cats or dogs, with 3.5% of that group reporting that none of the pets in their care had been spayed or neutered.

Also fascinating is the fact that the highest rate of compliance exists in the region of the county with the lowest levels of policy awareness, Central County, the region that includes Santa Cruz, Capitola, Live Oak, and Twin Lakes. In Central County, only 4.2% of respondents revealed guardianship of one or more unaltered cats or dogs. From that group, 1.4% reported that none of their pets had been spayed or neutered.

Figure J
MSN Compliance by Area of Residence

			Area			Total
			North County	Central County	South County	
S/N Status of Resident Pets	None are S/N	Count	2	1	8	11
		% within S/N	18.2%	9.1%	72.7%	100.0%
		% within Area	3.5%	1.4%	11.1%	5.5%
		% of Total	1.0%	.5%	4.0%	5.5%
Some are S/N		Count	1	2	5	8
		% within S/N	12.5%	25.0%	62.5%	100.0%
		% within Area	1.8%	2.8%	6.9%	4.0%
		% of Total	.5%	1.0%	2.5%	4.0%
All are S/N		Count	41	31	31	103
		% within S/N	39.8%	30.1%	30.1%	100.0%
		% within Area	71.9%	43.7%	43.1%	51.5%
		% of Total	20.5%	15.5%	15.5%	51.5%
Not Applicable (No Pets)		Count	13	37	28	78
		% within S/N	16.7%	47.4%	35.9%	100.0%
		% within Area	22.8%	52.1%	38.9%	39.0%
		% of Total	6.5%	18.5%	14.0%	39.0%
Total		Count	57	71	72	200
		% within S/N	28.5%	35.5%	36.0%	100.0%
		% within Area	100.0%	100.0%	100.0%	100.0%
		% of Total	28.5%	35.5%	36.0%	100.0%

MSN Policy Compliance by Area of Residence



San Luis Obispo Animal Services, Comparative Data, 2004-2009

Data from San Luis Obispo County Animal Services (SLOCAS) was only available for the five-year period between 2004 and 2009 (SLOCAS Annual Stats 2004-2009). Therefore, an accurate multiple time-series evaluation, marked by the introduction of the new policy, was not possible in this case, since MSN was first implemented in Santa Cruz County in 1995. The five-year data sample was nonetheless examined in case clear reductions in intake had been experienced in Santa Cruz County during a time when San Luis Obispo County intake either stagnated or rose.

Surprisingly, the comparative data revealed dog intake to be consistently higher at SLOCAS and cat intake to be consistently higher at SCCASA, precluding the affirmation of any discernable difference pertaining to spay/neuter mandates. Interestingly, however, actual euthanasia numbers were higher for both species at SCCASA (SCCASA Web Stats 2003-2008) (SLOCAS Annual Stats 2004-2009). Possible explanations for these disparities will be explored in-depth in the analysis portion of this report.

Looking at rates of dog euthanasia as a percentage of total dog intake, the Santa Cruz County shelters euthanized at an average rate 19% higher than their counterpart in San Luis Obispo County. For instance, in 2004 and 2005, SCCASA's dog euthanasia rate was 21% higher than SLOCAS' dog euthanasia rate; 30% in Santa Cruz and 9% in San Luis Obispo in 2004, and 28% and 7% respectively in 2005 (SLOCAS Annual Stats 2004-2009) (SCCASA Web Stats 2003-2008).

Turning now to a comparison of cat euthanasia rates as a percentage of total intake, during the 2004 to 2009 observation period, the Santa Cruz County shelters euthanized at an average rate 39% higher than their counterpart in San Luis Obispo County. Disparities in euthanasia rates ranged from a high of 53% more euthanasia in Santa Cruz in 2004 to a low of 26% more euthanasia in Santa Cruz in 2008. For instance, in 2004, cat euthanasia in San Luis Obispo was measured as 11% of total cat intake as opposed to 63% of the total in Santa Cruz (SLOCAS Annual Stats 2004-2009) (SCCASA Web Stats 2003-2008).

Analysis

Threats to Internal Data Validity and Resulting Impacts

Program evaluation theorists Emil Posavac and Raymond Carey define internal validity as the level of certainty with which a policy or program analyst can assert a correlation between the previously identified independent variables and resulting dependent aspects of the policy (Posavac, et al. 2007). In the case of this analysis, the independent variable is the implementation of five mandatory spay/neuter ordinances over the course of a twelve-year period. The dependent variables include rates of animal intake and euthanasia at the two animal shelters operated by Santa Cruz County Animal Services Authority, as measured by the collection of publicly available data, and the level of spay/neuter compliance and policy awareness as measured by the survey administered during the course of this project.

Posavac and Carey go on to divide threats to internal validity, non-policy related influences upon dependent variables, into six subcategories including history and instrumentation, two of the three types of threats to validity that have impeded analysis during the course of this study (Posavac, et al. 2007, 180-185). Additionally, threats to validity based on selection bias, as defined by Sylvia et al. will be explored as they pertain to the multiple time-series analysis herein attempted (Sylvia et al. 2004, 141).

Historical Threats to Intake Validity

Historical threats to validity, as posited by Posavac and Carey, refer to events that are otherwise unrelated to the policy or program but may lead to the development of externalities that will impact data output (Posavac, et al. 2007). In the case of this project, the historical threats are those that may interfere with the clear interpretation of animal intake data. Such

threats include the 2002 termination of the Santa Cruz SPCA's contract with Santa Cruz County and the subsequent move to a temporary facility (JPA Agreement, June 2002); the 2003 acquisition of a leased facility in Scotts Valley and the eventual move to that location (SCCASA Board Minutes, September 2002); the 2004 acquisition of the Watsonville animal shelter and the resulting increase in animal intake (SCCASA Board Minutes, June 2004); the 2008 move from Scotts Valley back to a new facility in Santa Cruz (SCCASA Board Minutes, August 2008); and the various and frequent shifts in management resulting from the high turnover typical to the field (J. Gunter, personal communication, March 2, 2011) (HSUS Animal Services Consultation Program, 2008, 185).

Physical Restructuring of SCCASA

Although the pre-test portion of the data sample, between 1990 and 1994 and the post-test period between 1995 and 2001 reflected relative stability inside the Santa Cruz Society for the Prevention of Cruelty to Animals (Santa Cruz SPCA), the dissolution of their contract with the county and the concurrent emergence of the Santa Cruz County Animal Services Authority (SCCASA) in 2002 marked the beginning of a period of major transitions for the new agency (SCCASA Board Minutes, September 2002) (JPA Agreement, June 2002). These changes appear to be reflected by dips and spikes in intake and euthanasia in the period between 2002 and 2008 (SCCASA 1984-2002 Intake and Euthanasia) (SCCASA Intake-Outcome Stats 1995-2002, 2009). Potential causes include three physical relocations over a five-year period, the acquisition of a sister agency in Watsonville, and the resulting growth of the organization's jurisdiction (SCCASA Memorandum, October 17, 2002) (SCCASA GM Report, October 24, 2002) (SCCASA Board Minutes, August 2008). These structural changes will be examined below.

In June 2002, negotiations began between the County and the three cities within its jurisdiction to establish a Joint Powers Authority (JPA) that would oversee the responsibilities that had theretofore fallen under the purview of the Santa Cruz SPCA (JPA Agreement June, 2002). Following the establishment of the JPA, the newly formed SCCASA's administrative staff was relocated to the basement of the Santa Cruz County Health Services Agency's campus on Emeline Avenue, and the animals in their care dispersed throughout the county to partner businesses such as vet hospitals and boarding facilities. This action was the result of an unanticipated inability of the SPCA's Board of Directors and county administrators to reach an agreement about leasing terms for the facility from which the organization had long operated under the management of the SPCA (SCCASA Memorandum, October 17, 2002).

The potential for this to cause a sudden drop in intake is unsurprising, considering that the Santa Cruz SPCA had operated the shelter on Seventh Avenue for forty-seven years (Santa Cruz SPCA 2011). Subsequently, 28% and 30% declines in dog and cat intake respectively were observed between 2001 and 2002. These declines were, on average, 22% greater than any decline in annual intake that had been recorded since 1990 (SCCASA 1984-2002 Intake and Euthanasia). Therefore, we can posit that the dispersion of the agency into multiple temporary holding facilities impacted community members in a way that resulted in fewer relinquishments and drop-offs to the agency, thus creating a threat to data validity for that period of time. Another sudden drop in intake coincided with the agency's relocation from the temporary Emeline Avenue facility and disbursed boarding sites to the retrofitted facility in Scotts Valley. This move occurred at the end of 2002 and brought the agency even further from its original location, thus distancing it from its primary customer base and likely also causing threats to data validity (SCCASA GM Report, October 24, 2002).

SCCASA remained at the Scotts Valley facility for approximately five and a half years, eventually settling into a new shelter at the original Seventh Avenue site in September of 2008 (SCCASA Board Minutes, August 2008). Interestingly, during the period that the agency was headquartered in Scotts Valley, there was very little opportunity for rates of intake to normalize in accordance with new conditions and intake expectations because of the acquisition of the Watsonville animal shelter, a transaction which occurred in November 2004 (SCCASA Analysis of Shelter Operations for FY 2005-2006). To this point, data from 2004 revealed 7% and 20% hikes in dog and cat intake respectively. Ironically, the acquisition of this new jurisdiction and the care of homeless animals therein essentially returned intake and euthanasia rates to the levels they had held in the late 1990s and early 2000s (SCCASA 1984-2002 Intake and Euthanasia) (SCCASA Web Stats 2003-2008).

Intake rates were, presumably, once again influenced by physical relocation following the 2008 move back to the original shelter site on Seventh Avenue in Santa Cruz (SCCASA Board Minutes, August 2008). From 2007 to 2008 intake rose 24% and 10% for dogs and cats respectively (SCCASA Web Stats 2003-2008). It can be assumed, therefore, that animals were being relinquished to the facility at higher rates than had occurred in Scotts Valley because the shelter was once again operating from the original flagship location that had long been established as a community asset (Santa Cruz SPCA 2011).

Introduction of Low-Income Spay/Neuter Programs

Working together with SCCASA to make the requirements of local MSN ordinances more attainable for low-income county residents, two 501C3 non-profit organizations, Friends of Watsonville Animal Shelter (FOWAS) and Friends of Santa Cruz County Animals (FOSCCA),

provide vouchers for low-cost sterilization services to county and city residents (FOWAS 2011) (FOSCCA 2011). These programs, while positively relating to the attainment of the legislative goals of MSN ordinance implementation, must be considered as threats to data validity because they were implemented during the observation period in 2004 and 2006 respectively (FOWAS 2011) (FOSCCA 2011).

The FOWAS website proudly charts the success of its program, the vouchers for which are distributed by SCCASA employees at the Watsonville shelter facility. The site notes that since the voucher program's inception in 2004, 2,819 dogs, cats, puppies, and kittens have been sterilized using this service (FOWAS 2011). This tremendous feat was accomplished with the help of seven local veterinarians who have provided their services at a discounted rate (A. Summitt, personal communication, March 10, 2011). Participants pay forty dollars per surgery, regardless of the sex, species, or size of the animal. Participants must be residents of Watsonville or Freedom (unincorporated), and must supply proof of residency and qualifying low-income status (FOWAS 2011).

Although the FOSCCA voucher program has been in operation since 2006, data showing the number of sterilizations that have been performed using FOSCCA vouchers is only available from 2007 on. The results, however, are very impressive. Like FOWAS, FOSCCA requires proof of residency and income status, and a forty dollar registration fee per animal. FOSCCA, however, covers a larger geographic area, offering vouchers to any qualified county resident living outside of FOWAS' jurisdiction. Since 2007, the nine cooperating veterinary facilities have performed approximately 4,418 spay/neuter surgeries on dogs, cats, puppies, and kittens (listed as an approximation due to FOSCCA board recommendation to subtract 3-4% for rabbits) (C. Davidson, personal communication April 20, 2011).

It is also noteworthy that, although FOSCCA voucher recipients can select from one of nine facilities based on convenience and first availability, SCCASA's contract veterinarian, Dr. Joan Freed, who operates an on-site surgery suite out of the Santa Cruz facility, performs on average 80% more surgeries for the FOSCCA program than do any of the other participating surgeons (FOSCCA 2011). FOSCCA board members have speculated that the ease with which scheduling can occur due to Dr. Freed's accessibility has been a huge boon for this program (B. Winkleblack, personal communication April 1, 2011).

Threats to Euthanasia Validity Based on Instrumentation

Critics of this study might posit that because euthanasia is only directly linked to intake, which is the primary dependent variable in this analysis, euthanasia should not be measured to test the hypothesis that a spay/neuter mandate will reduce overpopulation. In response, it is important to recall the positions of Lee Anne Fennel and Wayne Pacelle, both of whom remind us that recognition and application of the market principles of supply and demand are vital to championship of the animal welfare cause (Fennel 1999). That is to say, euthanasia rates must be included in a policy analysis such as this because, as the availability of privately bred animals declines in a given community (an assumed impact of successful MSN legislation), so too should the rate of euthanasia as more citizens begin to consider shelter adoption (Pacelle 2011, 204).

Threats to validity based upon instrumentation result from incongruent methods of data collection (Posavac, et al. 2007, 185). In the case of SCCASA, such incongruence tends to result from frequent management turnover, and thus frequent changes in data selection criteria, factors that can significantly impact euthanasia. (J. Gunter, personal communication, March 2, 2011) (A. Lozoya, personal communication, April 22, 2011). These threats of instrumentation have the

greatest potential to skew the euthanasia data, a variable which, by virtue of being dependent upon intake is secondarily dependent upon intervening variables that effect intake, such as a spay/neuter mandate.

High Rates of Turnover within the Field

The phenomenon of high turnover within an animal welfare organization is by no means unique to the Santa Cruz facilities. Many studies have identified employee retention as a challenge in the field of animal welfare (Zanowski 2010, 34) (Aronson 2010, 174) (HSUS Animal Services Consultation Program, 2008, 185). Some researchers have theorized that the main factor contributing to high turnover in the field is the emotional impact upon employees resulting from their dealings with euthanasia (Zanowski 2010, 34). Others, such as Stephen Aronson, have asserted, as he did in his recent book, *Animal Control Management*, that turnover is most commonly related to incommensurate compensation not only in terms of salary but also benefits, the overall argument being that the emotional and physical challenges of this type of work are often overlooked or undervalued in terms of compensation. Thus, appropriately trained people may not enter the pool of recruits (Aronson 2010, 174-175).

Frequent vacancies and resulting appointments to key middle and upper management positions within SCCASA have also likely impacted euthanasia patterns, thereby creating a historical threat to data validity. A rough examination of the agency's human resource history, excluding any names or personal information, reveals frequent shifts in three key positions whose occupants possess the authority to implement new criteria for determining candidacy for adoption as opposed to euthanasia. These positions include the Animal Services Coordinator, the Shelter Manager, and the General Manager; the Animal Services Coordinator being a direct

report of the Shelter Manager who, in turn, reports to the General Manager (J. Gunter, personal communication, March 2, 2011) (A. Lozoya, personal communication, April 22, 2011).

Although there are three positions classified under the umbrella of Animal Services Coordinator, one is informally referred to as the Animal Care Supervisor. That person, or in his or her absence, the Lead Animal Health Technician, typically makes the euthanasia decisions, which only involve upper management if they are questioned by members of the public, staff, or volunteers. There is one Animal Care Supervisor in Santa Cruz and one in Watsonville, both of whom report to the Shelter Manager. Any of the three aforementioned managers, however, as indicated by past precedent, has the ability to adjust euthanasia criteria to his or her choosing, assuming agreement from his or her superior and the absence of objection from the Board of Directors (A. Lozoya, personal communication, March 29, 2011).

Since the agency's inception in 2002, three people have held the Animal Care Supervisor position in the Scotts Valley, and later, Santa Cruz facility; four people have held the Animal Care Supervisor position in Watsonville (since 2004); and three have held the Shelter Manger Position, which was also impacted by two separate two-year vacancies from 2005 to 2007 and 2009 to 2011. Finally, six people, one serving at two different intervals, have held the General Manager position between 2002 and 2011. In one two year period, between 2006 and 2008, the General Manager position changed hands four times (A. Lozoya, personal communication, April 22, 2011). All told, that means that since SCCASA's establishment in 2002, sixteen different individuals have possessed the authority to affect changes to adoption criteria, and thus, euthanasia criteria. Thus, an obvious threat to historical validity of the data is herein presented.

Frequent Policy Changes Resulting from High Turnover

Three examples of procedural changes resulting from turnover and ultimately impacting rates of euthanasia, and thus, data validity, were provided by SCCASA staff during interviews conducted for this project.

Allison Lozoya, who has served as the Animal Care Supervisor in the Scotts Valley / Santa Cruz branch since 2005, provided an example of how new policies can decrease euthanasia rates. Mrs. Lozoya explained that, under the supervision of the new Shelter Manager, who served between 2007 and 2009, group euthanasia decision-making was adopted under the banner of a program called the Humane Animal Review Team (HART). The idea behind the daily HART meetings was that any employee with a vested interest in an animal who was being considered for euthanasia could attend the meeting and make a case for that animal's placement in the adoptions program, or, on the other end of the spectrum, could make a case for why the animal was not a viable candidate for adoption and should be euthanized. One can imagine the added pressure these meetings placed upon the management team, who were still ultimately responsible for making the final determination. This decision would fall to Mrs. Lozoya who, when the position was not vacant, would consult with the Shelter Manager as necessary. This is still the practice today. Thus, a steady decline in the rates of cat euthanasia occurred between 2007 and 2009. Dog euthanasia for that period also either declined or stagnated. Aggregated together, the average decline in euthanasia from 2007 to 2009 was 7% (SCCASA 1984-2002, 2009 Intake and Euthanasia) (SCCASA Web Stats 2003-2008).

Mrs. Lozoya, also commented on a recent spike in rescue placement with cooperating non-profit organizations like the Santa Cruz Society for the Prevention of Cruelty to Animals (SCCASA Transfers 2006-2010). This development, which the Animal Care Supervisor

attributed to an intra-agency culture shift that began in 2007 under the influence of the same manager that instituted the HART meetings, also may have led to a reduction in euthanasia by virtue of the fact that the relocation of one animal makes room for another; thereby reducing euthanasia dispositions based on space and other resource limitations (Personal communication, A. Lozoya, April 22, 2011).

Mrs. Lozoya's instinct about rescue placement increasing was confirmed by data that showed a 130% average increase in the rate of transfer placement between 2006 and 2010. For instance, the number of cats and dogs transferred to the Santa Cruz SPCA during that same time period increased at an impressive average rate of 201% a year; topping the charts in 2008 when the SPCA took a total of 512 cats and dogs from SCCASA, placing them in adoption programs (SCCASA Transfers 2006-2010).

The final example of a policy change that impacted euthanasia numbers, thus threatening the validity of a broad assessment of the agency's euthanasia rates, was adopted in 2005 by the newly appointed Animal Care Supervisor in Watsonville. Contrary to the others, this policy was believed to have caused a spike in euthanasia that occurred following its implementation (A. Summitt, personal communication, March 10, 2011) (SCCASA Web Stats 2003-2008).

Prior to the appointment of that manager, when a litter of kittens or puppies under two months of age was relinquished to the animal shelter without their mother, they would be euthanized (A. Lozoya, personal communication, April 22, 2011). This was the policy because infant animals of such a young age should still be being nursed by their mother if they are to achieve optimal health. They often will not yet eat solid food before reaching eight weeks of age. Therefore, if separated from their mother, they need 24-hour care, including provision of formula and bladder and bowel stimulation (Itty Bitty Orphan Kitty Rescue 2011). SCCASA's

volunteer corps, while robust, did not at that time possess the capacity to provide 24-hour infant care. Therefore, when an owner abandoned litter (OAL) under the viable age was received, they would be euthanized. However, if a single kitten or puppy under two months was received, it had to be nursed through a stray holding period, unless its health was clearly failing (A. Lozoya, personal communication, April 22, 2011).

In 2005, the new Animal Care Supervisor in Watsonville enacted an informal (not documented in writing but corroborated by two employees during interviews) policy, stipulating that a single, pre-wean kitten or puppy should be termed part of an OAL if another pre-wean came in from the same relative area, within a day or two; the implication being that they could be littermates, and the result being that they could be euthanized sooner. The manager explained that this practice was enacted, especially during the spring and summer months, to accommodate a shortage of space and resources (A. Summitt, personal communication, March 10, 2011). Coinciding with the informal adoption of this policy in Watsonville, euthanasia rose 35% and 25% between 2004 and 2005 for dogs and cats respectively. It is also noteworthy, however, to reiterate that the 99% and 70% increase in dog and cat euthanasia respectively from the preceding year, 2003 to 2004, is more than likely a simple reflection of the acquisition of the Watsonville jurisdiction (SCCASA Web Stats 2003-2008) (SCCASA Board Minutes, June 2004).

Threats to Data Validity Resulting from Selection Bias:

Challenges Presented by the Multiple Time-Series Analysis

At the start of this project, the motivation to collect data from San Luis Obispo County Animal Services was simple. In terms of human population and socio-economic indicators, it is the California county that is most comparable to Santa Cruz County, and whose animal control body *does not* operate under mandatory spay/neuter legislation (CA Dept. of Finance 2010) (SLOCAS 2011). Therefore, the intention was to compare the data side by side in order to assess the efficacy of Santa Cruz County's policy in its ability to curb overpopulation (intake) and thus, euthanasia.

The procurement of the SLOCAS data immediately revealed a selection bias (Sylvia et al. 2004, 141) however, proving that a straight forward multiple time-series analysis would not be possible due to the presence of spurious relationships between the outcome data (euthanasia) and the independent variable that the investigator sought to measure, mandatory spay/neuter legislation. A spurious relationship, as defined by policy theorists, Welch and Comer, is one that is premised on a simple causal correlation between two variables when in reality, outside variables contribute indirectly but significantly to the findings (Welch et al. 2001, 13).

In the case of this study, the assumed causal relationship is that the introduction of MSN legislation would, over time, reduce rates of intake and thus, euthanasia. As previously asserted, euthanasia should be considered as a secondary dependent variable of MSN legislation by virtue of the relationship between the supply of available pets in a given community and the resulting demand for pet adoption.

The reason a spurious relationship was implicated in this multiple time series analysis, however, is because the criteria employed by SLOCAS staff to determine an animal's

adoptability is far less stringent than the criteria used by SCCASA. Therefore, we cannot accurately compare the euthanasia data between the two agencies (SLOCAS Staff Report, January, 2011, 2) (A. Lozoya, personal communication, March 29, 2011). The investigator chose to include a discussion of findings regardless of this selection bias in order to illustrate how difficult it is to draw meaningful conclusions about policies like spay/neuter mandates in the face of this endemic lack of data standardization within the field (Gruen et al. 2007) (Asilomar Accords, 2004).

Detailed exploration of the adoption criteria employed by each agency revealed that every dog housed by SCCASA is subjected to a regimented and recorded behavioral assessment wherein tests are conducted to gauge whether a dog might be prone to severe aggression toward other dogs, food aggression (i.e., they would attempt to bite a person who approached their food), or intolerance of invasive handling. Similarly, cats are tested for handling intolerance and aggression (E. Thomas, personal communication, April 24, 2011). Conversely, Dr. Eric Anderson, Director of SLOCAS, explained that his staff members do not perform formal assessments unless they have witnessed a behavior that triggers concern (E. Anderson, personal communication, March 3, 2011).

It follows that, under SCCASA's adoption selection criteria, some animals will not pass their behavioral assessment. Further, some will be euthanized pre- or post- assessment because they are simply unhandleable, or because they develop behaviors at a later date that make adoption undesirable. With this in mind, the euthanasia reports from both agencies were analyzed across a five year period, between 2005 and 2009, with various subcategories such as "behavior history", "behavior observed", "feral", among others aggregated to represent all euthanasia decisions made those years on account of behavior. Findings indicated that, on

average, San Luis Obispo euthanizes 4% of their dog population for behavioral reasons, as compared to Santa Cruz's 15%, and 2% of their cat population as compared to Santa Cruz's 21% (SCCASA Euthanasia Report, Cats and Dogs 2009) (SLOCAS Annual Stats 2004-2009). This examination is not meant to imply that animals in the care of San Luis Obispo Animal Services Authority are never euthanized for behavioral reasons, but is an important consideration in light of Dr. Anderson's explanation of standard operating procedure as it pertains to adoption selection criteria (E. Anderson, personal communication, March 3, 2011).

A meaningful illustration of the challenge presented by such inconsistencies can be found when one examines, side by side, a euthanasia report from a given year at SLOCAS and a euthanasia report from a given year at SCCASA. Before even beginning the assessment, one should note that SLOCAS data managers have culled all intake and outcome data, euthanasia included, into one report. Conversely, SCCASA data managers have formulated a single report that only deals with euthanasia (SCCASA Euthanasia Report, Cats and Dogs 2009) (SLOCAS Annual Stats 2009). If the next objective was to determine how many dogs were euthanized at each agency for behavioral reasons, one would need to be reassured that the same measures were used to evaluate aggression and sociability. For reasons already stated, we know that this is not the case. Further, the sub-categories that indicate a disposition of euthanasia for behavioral reasons were not consistent between agencies. SLOCAS lists the following sub-categories, which have been assigned under the umbrella of behavior by the investigator (SLOCAS Annual Stats 2009):

- a. Treatable Behavior
- b. Untreatable Behavior
- c. Court Order [*usually only used once an animal is deemed "vicious" in court*]
- d. Feral

Conversely, SCCASA lists all of the following sub-categories for a disposition of euthanasia for behavioral reasons (SCCASA Euth Report, Cats and Dogs 2009):

- a. Aggressive [*to*] Dogs
- b. Aggressive [*because of*] Fear
- c. Aggressive [*around*] Food
- d. Aggressive [*to*] People
- e. Aggressive [*because of*] Prey Drive
- f. Aggressive [*around*] Toys
- g. Behavior Observed
- h. Bite
- i. Behavior History
- j. Kennel Stress
- k. Soiling [*in the house*] History
- l. Unsocial

It follows, then, that if a researcher were to attempt to apply such data to a question such as, *Which would have a greater impact on statewide euthanasia rates, behavior modification programs or mandatory sterilization legislation?*; the researcher would not be aided by these data sets because it is unclear, for instance, whether SLOCAS employees would classify prey aggression, which resulted in the euthanasia of 14 dogs in 2009 at SCCASA as a “treatable” or “untreatable” behavior problem (SCCASA Euthanasia Report, Cats and Dogs 2009). Therefore, any assertion about one community having a greater need for behavioral modification resources (as opposed to the need for MSN legislation) could not be definitively made.

In March 2008, the Humane Society of the United States conducted an audit of San Luis Obispo County Animal Services through the HSUS Animal Services Consultation Program. The audit was commissioned in response to requests made to county officials by volunteers and members of the public who sought guidance on behalf of the agency about best practices (SLOCAS Staff Report, January, 2011, 2). In a recent staff report wherein progress toward achievement of HSUS’ 538 recommendations was documented and credited toward the work of

a Task Force that had been established following the audit, Dr. Anderson made the following comment about HSUS' recommendation to implement formal behavioral testing for all animals:

“[Regarding] implementation of regular animal temperament testing and adoption counseling – These measures would help promote more successful and lasting animal placements. However, they require the consistent availability of trained staff with direct oversight and accountability. In the absence of a larger paid kennel staff or volunteer coordinator these measures are not practically achievable” (SLOCAS Staff Report, January, 2011, 4).

This explanation reflects the harsh reality faced by many animal control agencies today and it underscores the crucial procedural disparity between the two agencies (Aronson 2010, 108) (E. Thomas, personal communication, April 24, 2011). In acknowledgement of these conditions, the investigator has noted a spurious relationship between SLOCAS' lack of spay/neuter mandate and their comparatively low euthanasia numbers (SCCASA Euth Report, Cats and Dogs 2009) (SLOCAS Annual Stats 2004-2009).

Summary of Findings

Summary Analysis of Relationship between MSN Ordinances and Rates

of Intake and Euthanasia, Given Threats to Validity

The first three mandatory spay/neuter ordinances in Santa Cruz County were adopted in 1994 (Santa Cruz Co. § 6.10.030) (Santa Cruz § 8.16.030) (Scotts Valley § 6.10.030). Other incorporated jurisdictions followed suit in 2005 and 2006 (Watsonville § 6-1.1001) (Capitola § 6.16.030). Between 1995 and 2002, during the period in which the status quo was maintained in terms of shelter location and jurisdiction, dog intake consistently declined at an average rate of

8%. In turn, dog euthanasia declined with one exception wherein it rose by 4% despite a simultaneous decline in dog intake. The average rate of decline in dog euthanasia for that period, therefore, was 19%. During that same period, cat intake declined consistently at a mean average rate of 14% and cat euthanasia declined at a mean average rate of 19% (SCCASA Intake and Euthanasia, 1984-2002, 2009).

It is important to restate these findings in the overall analysis of this study because, in light of the many threats to data validity that have been discovered during the course of this project, the seven-year period between 1995 and 2002 embodied the greatest degree of organizational stability. This assertion, however, is only informed by the threats to validity herein discussed at the exclusion of other considerations that may have impacted the organization at the time. Specifically, this finding was informed by the knowledge that, during that seven-year period a) no new jurisdictional responsibilities were added to the agency's purview, and b) no facility relocations occurred - the shelter was where the public had come to expect the shelter to be (SCCASA Analysis of Shelter Operations for FY 2005-2006) (SCCASA Memorandum, October 17, 2002). Thus, the primary independent variable imposed upon these conditions, and therefore, the variable that likely contributed to the observed reductions in dog and cat intake and euthanasia, was the introduction of mandatory spay/neuter in the County of Santa Cruz (unincorporated areas), the Cities of Santa Cruz and Scotts Valley (Santa Cruz Co. § 6.10.030) (Santa Cruz § 8.16.030) (Scotts Valley § 6.10.030).

Because the true impact of the aforementioned threats to validity during the organizational restructuring period between 2002 and 2009 cannot be accurately measured - for instance, a decline in euthanasia was noted after the introduction of HART meetings in 2007 but no clear empirical evidence that states that *X* number of lives were saved by the HART meetings-

this second half of the observation period produced no clear implications as to the success of local MSN ordinances (SCCASA Intake and Euthanasia, 1984-2002, 2009) (SCCASA Web Stats 2003-2008) (Personal communication, A. Lozoya, April 22, 2011).

Absent the perceived stability that enabled a clearer analysis of the first seven-year period of observation, the examination of the success of the wrap-around initiatives that have augmented the positive impacts of mandatory spay/neuter, namely the FOWAS, FOSCCA, and Watsonville Door to Door programs, was clearly measured and all three were determined to have a positive impact (FOWAS 2011) (C. Davidson, personal communication, April 20, 2011) (Personal Communication, G. De Leon, April 22, 2011).

Vital Implications of Survey Results

As previously noted, the results of the public survey undertaken for purposes of this analysis indicated that overall compliance with mandatory spay/neuter in Santa Cruz County currently, as of Spring 2011, stands at 84.4%. Overall policy awareness is much lower, at 46%. Both findings were contextualized by an examination of annual reports detailing where, inside county lines, the majority of citations issued for non-compliance with the ordinances have been filed. In a clear-cut reflection of the survey results, citation issuance reports showed the greatest presence of in-field Animal Control Officers in the unincorporated areas of the county, which include, for instance, Felton, Boulder Creek, and Ben Lomond, areas shown to have the highest rates of policy awareness, according to the survey results (SCCASA MSN Citations 2009). It would follow, then, that deliberate, physical placement of Animal Control Officers in regions of the county that reflect low awareness and compliance would be an effective action to take toward

the realization of improved MSN compliance. This will be further discussed in the recommendation section of this report.

Recommendations

Enact and Maintain Consistent Data Gathering and Mining Protocols

As observed by the National Council on Pet Population Study and Policy and the contributors to the Asilomar Accords, the absence of an umbrella organization that would oversee the functionality of America's animal shelters complicates the challenge of obtaining and interpreting inter-agency data in a streamlined fashion (Asilomar Accords 2004) (NCPSPSC 2009). Many people who are not immersed in this industry assume that the American Society for the Prevention of Cruelty to Animals, the Humane Society of the United States, or the American Humane Association serve this function, but this is not the case. Municipal shelters are run by local governments and non-profit shelters are run by their own unique Board of Directors (Pacelle 2011, 196). In light of this, one can easily comprehend the challenge posed by this project of attempting to interpret data, the selection criteria for which had changed in step with changes in management. Similarly, the absence of an industry standard for data collection also impeded the multiple-time-series component of the analysis by virtue of the fact that standard operating procedures differ substantially between SLOCAS and SCCASA (A. Lozoya, March 29, 2011) (HSUS Animal Services Consultation Program, 2008).

Independent of the challenges posed by shifts in management or different standard operating procedures between agencies was the impediment to optimal data selection resulting, it is presumed, from software limitations. The growing interest in mandated sterilization as a strategy with which to address pet overpopulation necessitates the availability of simple tools of measurement, straight-forward instrumentation (Wenstrup et al. 1999, 311). The first data

request made during this project was for records that indicated the sex of an animal upon intake. Where this an easily traceable data point, the investigator would have examined all relevant kennel reports to see how many unspayed females or unneutered males were received in a given year, and tracked whether or not that number was declining in relation to overall intake.

Unfortunately, this was not possible because both SLOCAS and SCCASA, as well as two other agencies with whom the investigator spoke to confirm that this as an industry-wide problem (C. Machado, personal communication, November 2010), do not have the ability to retain indicators of an animal's original sex upon intake. In other words, once an animal is spayed or neutered, its sex will forever read as "S" or "N" in any data mining exercise. For instance, if the investigator were to review the 2004 kennel statistics, any animal therein referenced who was altered in 2006 would be listed as altered in the 2004 kennel report; despite the fact that at that time, the animal was still intact.

The investigator twice attempted contact with representatives from Chameleon Beach, the software company used by both SLOCAS and SCCASA to store and track data, in hopes of ascertaining whether the inability to track sex over time resulted from lack of training on the user end or whether the software does not possess the capacity to track this information. Despite the fact that the answer to this inquiry is still unknown, it is clearly a correctable problem that must be addressed in order to facilitate the success of future policy analyses pertaining to sterilization.

The beginning of 2011 brought the simultaneous appointment of a new General Manager and a new Shelter Manager to Santa Cruz County Animal Services Authority. The combined qualifications represented by the new leadership team include a proven record of successful revenue generation and quality of care improvements in animal control facilities across the United States, personal investment to this organization and its related low-income spay/neuter

programs, and over a decade of employment in the local veterinary community of Santa Cruz County (A. Summitt, personal communication, March 10, 2011).

It is with this knowledge of the firm footing on which this agency now stands that this study recommends that the SCCASA management team undertake a strategic re-assessment of current record-keeping and data mining practices. By pulling reports such as those generated by their data manager for purposes of this study, they should be able to easily identify problematic classifications that might impede streamlined analysis of overall achievements toward the agency's stated mission, including progress toward widespread dog and cat sterilization. Ability to track the date on which an animal's sex status is changed would be tremendously useful in this regard, not just from an outsider's perspective, but also for use in organizational board reporting, for instance.

When undertaking this project, management may choose to employ a template for data standardization, such as those proposed by the National Council on Pet Population Study and Policy or the contributors to the Asilomar Accords (Gruen et al. 2007) (Asilomar Accords 2004). It is worth mentioning, however, that the investigator is aware that the Asilomar Accords were sponsored by an organization whose mission is premised on a no-kill ideal, which, although worth aspiring to, is currently not a standard that Santa Cruz County Animal Services Authority can realistically achieve given its open door policy (A. Summitt, personal communication, March 10, 2011). Nevertheless, adoption of any template used by other agencies would increase the relatability of SCCASA data to that of other agencies using similar criteria (*Organizations participating...Asilomar Accords 2004*). If a template is employed, however, care must be taken that terminology commonly open to interpretation is explicitly defined in training materials. For instance, the terms "treatable" or "untreatable" are defined in the Asilomar Accords (Asilomar

Accords 2004).

An example of this type of vigilance in training is provided by the Humane Society of Silicon Valley and regards their incoming kitten policy. A detailed flow chart indicating proper employee action based on the incoming kitten's overall condition leaves little room for personal interpretation or error in data entry (HSSV, 2011).

*Strategically Implement Animal Control Patrols in Regions Shown
to have Low Compliance and Awareness*

The results of the survey administered during the course of this project offer significant value to the administrators of Santa Cruz County Animal Services Authority. Their mission statement reads, "Through community involvement, education, adoption, and humane law enforcement, we work to preserve the well being of all animals and bring an end to the homeless animal crisis" (SCCASA 2011). A vital component of the agency's efforts in the realm of humane law enforcement has to do with educating the community about the individual and collective benefits of pet sterilization. The results of this survey, to the extent possible based on the limited pool of 200 participants, revealed regions within SCCASA's jurisdiction wherein these outreach efforts need to be bolstered. It is the hope of the investigator that Supervising Animal Control Officer Todd Stosuy, who has been very cooperative during the course of this project, will take these findings under advisement and apply the efforts of his team to the areas in which a need has been observed.

Continue to Support Wrap-Around Initiatives and Apply their Data to Future Analyses

Wayne Pacelle, President and CEO of the Humane Society of the United States, wrote in his new book, *The Bond, Our Kinship with Animals, our Call to Defend Them*,

“...making no-kill policy a reality is not just a matter of flipping a switch. It takes low-cost spaying and neutering; adoption efforts at various locations, instead of just the shelter at the edge of town; keeping pets with their families for behavior training, instead of relinquishing them; and developing a community-wide network of adoption and foster groups all working in sync” (Pacelle 2011, 202).

The tremendous success of the low-income spay/neuter voucher programs administered by the Friends of Watsonville Animal Shelter and the Friends of Santa Cruz County Animals non-profit organizations have undoubtedly contributed to recent drops in intake and euthanasia at both of SCCASA’s facilities (FOWAS 2011) (C. Davidson, personal communication, April 20, 2011) (SCCASA Web Stats 2003-2008). These programs, however, are not immune to the budgetary woes facing public organizations. FOSCCA’s voucher program was initially funded by a generous bequest, but both organizations subsist primarily on charitable donations (FOWAS 2011) (FOSCCA 2011).

With these restrictions in mind, the investigator recommends the establishment of a task force consisting of SCCASA volunteers and FOWAS and FOSCCA board members whose primary objective would be to develop joint, volunteer-based fundraising initiatives that would benefit the FOWAS and FOSCCA spay/neuter programs which, in turn, of course, benefit SCCASA. Such a task force would symbiotically combine the volunteer corps strength of the animal shelters with the fundraising flexibility that accompanies the nonprofit status of FOWAS and FOSCCA.

Of course, FOWAS and FOSCCA's voucher programs are not the only wrap-around initiatives that are contributing to the County's progress toward widespread spay/neuter. Humane education initiatives like the newly formed Watsonville Door to Door Program also play an important role. Unlike the low-income spay/neuter vouchers, which were first offered in 2004 and 2006 (FOWAS 2011) (FOSCCA 2011) and have therefore been discussed as historical threats to data validity, the newly adopted Watsonville Door to Door Program, operated by SCCASA staff, has only been in effect for three months, but has already proven to have a significant impact on rates of pet sterilization in the South County region (T. Stosuy, personal communication, April 22, 2011) (FOWAS 2011). Therefore, its contribution to rising rates of pet sterilization in that area should be considered in any future analysis.

Bilingual Animal Control Officer George De Leon had this to say about the Watsonville Door to Door Program, SCCASA's newest foray into the realm of humane education; "It's made a huge impact educating people because there are a lot of people who would never venture out and get information about shelter services, like our spay/neuter program. If we didn't go to them and tell them about our low-income spay/neuter program, they'd never even know it exists" (G. De Leon, personal communication April 22, 2011).

De Leon explained that, depending on staffing levels, one to two officers canvass Watsonville neighborhoods full-time, at least five days a week, distributing educational information and pet care supplies. Participating officers wear simple polo shirts, displaying the SCCASA logo, the intention being to emphasize approachability. They educate pet owners on a variety of animal care topics, for instance, the dangers of tethering their dog (although, interestingly, De Leon noted, they don't over emphasize the fact that tethering is now illegal in the state of California because they want residents to feel comfortable approaching SCCASA for

future services). Rather than chiding, the ACOs provide resources to help dog owners construct safer means for confinement. Most popular among their educational resources however, is the dual-language brochure that describes how to qualify for forty dollar sterilization services for your cat or dog (G. De Leon, personal communication, April 22, 2011).

FOWAS' voucher distribution data certainly reflects De Leon's hunch about the success of the new program, which began in February 2011 (Personal Communication, G. De Leon, April 22, 2011). Between January and March there was a 266% increase in voucher distribution; 32 vouchers were issued in January, 69 in February and 85 in March (FOWAS 2011). This surge in the spay/neuter rate of pets in Watsonville and Freedom is certain to contribute to the realization of the legislative intent of these ordinances.

In light of this tremendous success, it is the hope of the investigator that recent staffing levels in the animal control department will be maintained to enable the continued success and, it is to be hoped, expansion to other areas of this vital program. Unfortunately, the animal control department of SCCASA recently experienced a resignation and the vacated position has been frozen due to budget shortfalls (B. Winkleblack, personal communication, April 1, 2011). Further, SCCASA administration is recommending a 12.5% reduction in salary expenditures (SCCASA proposed budget for fiscal year 2009-2010). Understanding the significance of such a reduction and the impact it will likely have on all departments within SCCASA, not just the animal control department, the investigator does not anticipate such a recommendation to be realized in the immediate future. Rather, it is the hope of the investigator that the findings of this report - for instance, the fact that FOWAS voucher distribution increased 266% during the first three months of the Door to Door Program - will be referenced as evidence of the value of such

initiatives toward the ultimate achievement of SCCASA's mission (FOWAS 2011) (T. Stosuy, personal communication, April 22, 2011).

Reevaluate After a Period of Relative Organizational Stability

As White et al. noted in their 2010 study of the impact of publicly sponsored pet sterilization programs, the full thrust of an increase in the rate of pet sterilization in a given community may take as long as forty years to be realized (White et al. 2010, 192). Although seventeen years have elapsed since the initial enactment of mandatory spay/neuter in Santa Cruz County, a number of extraneous factors have impacted the data one must consult to measure the success of such a policy. Since 2008, however, Santa Cruz County Animal Services Authority has experienced a period of relative stability; interrupted only by the symptoms of budget shortfalls common to many government agencies today (SCCASA proposed budget for fiscal year 2009-2010). Therefore, it is the recommendation of this report that, once new operating standards for data input and data mining have been adopted and adhered to for a period of at least five years, a reevaluation of the type of data examined herein should be attempted in the hope of achieving clearer results.

Conclusion

During the course of this study, it became evident that a straight-forward time series analysis of the impact of mandatory spay/neuter legislation could only be conducted for the period between 1995 and 2002; the first seven years of the policies' implementation (Santa Cruz Co. § 6.10.030) (Scotts Valley § 6.10.030) (Santa Cruz § 8.16.030). Although at the time, only residents of the unincorporated regions of the county and those of the cities of Santa Cruz and Scotts Valley were obliged to comply, the rates of both intake and euthanasia experienced steady decline (SCCASA 1984-2002 Intake and Euthanasia).

Since 2002 intake and euthanasia rates for both cats and dogs have risen and fallen, although not always in sync with one another (SCCASA Intake-Outcome Stats 1995-2002, 2009) (SCCASA Web Stats 2003-2008). This report finds that likely causes of these inconsistencies include externalities like the physical reorganization of the agency, the acquisition of the Watsonville jurisdiction and the shelter and animal population therein, the high rate of turnover and the subsequent high rate of implementation of new internal policies. Together, these variables can greatly impact rates of intake just as they can guide euthanasia decisions, thereby impacting not only the actual data but also the data selection criteria.

While an array of political, demographic, social, and organizational externalities may have impeded the direct analysis of mandatory spay/neuter legislation in recent years, the inarguable success of the wrap-around initiatives that have bolstered the efforts of Santa Cruz County Animal Services Authority staff and the mission that they endeavor to fulfill is already making substantial contributions toward the realization of full policy compliance.

It is the sincere hope of the investigator that the findings of the public survey administered for purposes of this report will be useful to the management team at Santa Cruz

County Animal Services Authority in their continued efforts to not only direct citizens to accessible spay/neuter resources, but also to educate them about the individual and communal benefits that can be derived through this practice of responsible pet ownership. Application of the survey results to this end, coupled with continued excellence in collaborative work with the non-profit sector, and refinement of current data collection practices, should equip this organization with the necessary means to realize the full potential of this legislative tool.

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Appendix A

Survey – Offered in English and Spanish for purposes of this study.

*You have been asked to participate in a San Jose State University graduate studies research project investigating the efficacy of local mandatory spay/neuter laws. No risks to participants are anticipated because **no identifying information will be collected, therefore, results will remain anonymous.** Although the results from this study may be published, no information that could identify you will be included. **No audio or visual recordings will be made and no photographs will be taken.** By checking the box below, you are consenting to participate in this study and affirming that **A) you are at least 18 years old and B) you are a resident of Santa Cruz County.** You have the right to refuse to participate in the entire study or any part of the study. Any questions regarding this research may be directed by email to the investigator at: amysjsu@gmail.com. Thank you for your participation!*

Yes, I am at least 18 years old and am a resident of Santa Cruz County.

For information about low-cost pet spay/neuter services, please visit www.scanimalservices.ca.us or call (831) 454-7303.

1. Please check the appropriate box to indicate where, in Santa Cruz County, you live.

- | | | |
|--|---|--|
| <input type="checkbox"/> Aptos | <input type="checkbox"/> Davenport | <input type="checkbox"/> Scotts Valley |
| <input type="checkbox"/> Ben Lomond | <input type="checkbox"/> Felton | <input type="checkbox"/> Soquel |
| <input type="checkbox"/> Bonny Doon | <input type="checkbox"/> La Selva Beach | <input type="checkbox"/> Twin Lakes |
| <input type="checkbox"/> Boulder Creek | <input type="checkbox"/> Live Oak | <input type="checkbox"/> Watsonville |
| <input type="checkbox"/> Capitola | <input type="checkbox"/> Rio Del Mar | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Corralitos | <input type="checkbox"/> Santa Cruz | |

2. My household includes one or more cat(s).

- Yes No

3. My household includes one or more dog(s).

- Yes No

4. My pet(s) are neutered or spayed (unable to impregnate or become impregnated).

- All are Some are None are N/A

5. I am aware that Santa Cruz County law and the laws of each city therein require that my cats and dogs be spayed or neutered by the age of six months, and if they will not be spayed or neutered by that age that I must obtain a breeding certificate.

- Yes, I did know this. No, I did not know this.

